Town of Tiverton
Rhode Island

COMPREHENSIVE COMMUNITY PLAN




APPROVED BY THE TIVERTON PLANNING BOARD
JULY 27, 2017
ADOPTED BY THE TIVERTON TOWN COUNCIL
APRIL 30, 2018

ACKNOWLEDGEMENTS

Comprehensive Plan Advisory Committee
Stephen Hughes, Past Planning Board Chair
Stuart Hardy, Planning Board Chair
Joan Chabot, Town Council
William Gerlach, Past Town Council, Ex-Officer
Patricia Hilton, Conservation Commission, Chair
Scott Humphrey, Economic Development Commission
Melinda Foley-Marsello, Harbor and Coastal Waters Commission
Garry Plunkett, Open Space Commission
Matthew Wojcik, Ex-Officio as Town Administrator
Kate Michaud, Past Clerk to Planning Board

Appointed Members of the Public
Jonathan Cottrell
John Foley
Cecil Leonard, Vice Chair

Comprehensive Plan Professional Services
Cecil Group
Mary Hutchinson, GISP, Mapping and Planning Services
Deirdre Paiva, Steere Engineering Inc.
Alison Ring, AICP, AB Planning + Mapping

Photo Credits
Rick Barrette
Robert Egan
Kate Michaud
Tara O'Shea
Deirdre Paiva
Garry Plunkett
Union Studios

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All previous revisions superseded

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INTRODUCTION

1.0 INTRODUCTION

1.1 What is the Tiverton Comprehensive Community Plan?

The Tiverton Comprehensive Community Plan is a long-range guide to the physical development and preservation of the Town of Tiverton, Rhode Island. It is intended as a framework for accomplishing community aspirations and intentions. It states goals and objectives and recommends courses of action in the areas of natural and cultural resources, land use, housing, services and facilities, open space and recreation, circulation and economic development. Taken in its entirety, the Comprehensive Community Plan presents a vision for the future of the community, an advisory policy guide, and an agenda for future actions by the Town and its citizens. When reviewing development proposals, considering amendments to the Town's Zoning Ordinance and Subdivision Regulations, and making policy decisions that affect land use and development, Town officials rely on the Comprehensive Community Plan to guide their actions.

The original Tiverton Comprehensive Community Plan was prepared in the 1990's and received approval from the Statewide Planning Program of the RI Department of Administration on July 14, 1997. State law governing local Comprehensive Community Plans now mandates that each community undergo a review and update of its plan every ten years.

This 2018 Plan represents a major update of the 2009 Tiverton Comprehensive Community Plan. Each chapter was examined in detail and updated according to new Census and other data. All objectives and policies were reviewed, and if necessary modified or removed to reflect changes in circumstances since the last update. Many objectives and policies were added in response to new issues. It is the Town's intent to have the plan be a flexible document which evolves over time, but remains as the policy document which expresses the Town's most fundamental goal – to preserve Tiverton's character (See Section 4.1), scenic beauty and high quality of life.

TIVERTON IS DEFINED BY ITS SMALL TOWN CHARACTER

1.2 The 2018 Plan Update Process

This Comprehensive Community Plan was prepared under the 1988 state enabling statute related to land use planning (RIGL Title 45, Chapter 22). This law stipulates the plan's format and content, and requires community participation in the planning process.

CITIZENS AND VOLUNTEER BOARD MEMBERS WORK TO PLAN TIVERTON'S FUTURE.

The 2018 update was initiated by the Town Council in late 2013 with the appointment of a 13-member Comprehensive Community Plan Advisory Committee (CPAC) representing the general public, Town boards and commissions and Town officials and chaired by Planning Board Chair Steven Hughes. A grant was secured to fund the services of The Cecil Group, a Boston-based professional planning firm. Two well-attended open forums were conducted on June 11 and 14, 2014 where the general public expressed their views regarding the content and policy substance of the updated Plan.

Subsequently, CPAC established smaller working groups to update and improve specific elements based on public input. About 12 CPAC plenary sessions and many more working group meetings were conducted between 2014 and 2015. Updated draft Elements were then forwarded to the Planning Board for review and improvement.

The Draft Plan was submitted to Statewide Planning in 2016 for informal review and comments. The State provided written comments to the Town in November of 2016 with required and recommended edits to the 2016 Draft Tiverton Comprehensive Community Plan in order to meet State standards for local Comprehensive Community Plans and consistency with State Guide Plans. In May of 2017, the Town hired AB Planning + Mapping to assist the Town in addressing the State comments.

Following a public hearing on July 27, 2017, the Planning Board recommended adoption of the 2017 Draft Comprehensive Community Plan to the Town Council. A public hearing was held on the Plan before the Town Council on January 10, January 20, February 10, February 13, and April 30 of 2018 and the Town Council adopted the 2018 Comprehensive Community Plan on April 30,

2018. Following local adoption, the Tiverton 2018 Comprehensive Community Plan was submitted to the State for formal review and approval.

THE TIVERTON PLANNING BOARD

THE COMPREHENSIVE COMMUNITY PLAN AIMS TO CONSERVE "NATURAL FEATURES WHILE ACCOMMODATING FUTURE GROWTH.

PLANNING BACKGROUND

2.0 PLANNING BACKGROUND

2.1 Development History

Tiverton's identity is derived from the interplay of its history, unique natural features and growth from a farming and waterfront community to include a series of residential and commercial villages.

The Pocasset Indians settled the prime areas of Tiverton for farming and shellfishing along the Sakonnet River at Nanaquaket, Puncateest and Seapowet. Puncateest, Nanaquaket and Main Roads follow old Indian trails, and many later roads were named after farmsteads, natural features and commercial villages. A few roadways form historic crossroads such as Bliss Four Corners and Tiverton Four Corners, another small town quality that gives Tiverton an identity of its own. Along the shoreline, each inlet and peninsula has a place in history.

Stone Bridge derived its name from the old stone bridge that crossed the narrows, the remains of which now form a breakwater that protects the Sakonnet River Basin. Before the bridge, this served as a ferry crossing, with a post office, blacksmith shop, a store, stables, and a tavern. Historic elements remaining in this area are the Portsmouth commercial fishing docks which serve the local fleet of shellfishermen and commercial fisherman; marinas on Riverside Drive between the Sakonnet Bridge and Grinnell's Beach; and many historic homes. The Stone Bridge Inn, located on Main Road across from the bridge, once a hotel and theater, was demolished in 2000 and replaced with a small commercial plaza. The Newport and Old Colony Railroad Bridge, inoperative for many years, was dismantled as part of the Sakonnet River Bridge relocation project (see Circulation Chapter 8.0).

Tiverton developed as a series of small hamlets along the waterfront and in inland areas based on farming and fishing. A great architectural legacy of Colonial and Federal era homes and estates are found along Puncateest, Nanaquaket, Highland and Main Roads including many surviving whaling captain's houses. Many roadways in Tiverton are lined by stone fences from historic farms. The hamlets centered around churches adjoined by cemeteries, schoolhouses and commercial establishments such as taverns, general stores and mills. These villages included a sawmill and grist mill, later replaced by a cotton and a woolen mill and a general store at Eagleville; a stone church on Stone Church Road; shipbuilding, fish factories, and store at Bridgeport; a saw and gristmill, later replaced by a thread mill and ice house at Sin and Flesh Brook by The Gut; a stagecoach tavern, cider mill, post office and a general store at Bliss Four Corners; a windmill and tavern at Tiverton Four Corners, later followed by a church, a store, blacksmith shop, wheelwright shop, post office, grist mill and library; and an ice house at Nonquit Pond. Later development grew up around major thoroughfares and the crossroads areas began to lose their distinctive character.

The spine of Tiverton has always been Main Road, which runs along a natural ridgeline that follows the coast from Fall River to Little Compton. These two ends of Tiverton share some of the characteristics of the adjacent towns. To the north, Tiverton is more urbanized, with a history associated with the Bourne and Eagleville Mills where housing was originally constructed for mill workers. Stafford Pond was part of a water system to power these and other mills in Fall River. Indeed, Fall River still retains water rights to the pond stemming from the mill era. Moving southward toward Little Compton, Tiverton becomes less developed and more rural in character.

TIVERTON HAS A GREAT ARCHITECTURAL HERITAGE

After World War II, north Tiverton began to suburbanize. Homes were constructed with Veterans Housing Administration financed mortgages and summer bungalows developed around Stafford Pond and at High Hill in south Tiverton. The 1970's saw the conversion of farms into residential subdivisions and the construction of major public works, such as the Tiverton High School, Tiverton Middle School and the Tiverton Police Station.

The early 1990's was a period of moderate residential growth with little change in the rural character and scenic beauty of Tiverton. Through a coalition of private fund-raising and a consortium of public and private agencies (RI Department of Environmental Management, Newport Water Authority, Audubon Society through the Federal Wildlife Protection Act, Nature Conservancy, Tiverton Land Trust and Tiverton Open Space Committee), Matta Farm was acquired as permanent open space, and is now known as Pardon Gray Preserve.

In the late 1990's, the Town also took advantage of a State law allowing a portion of the real estate transfer tax to be set aside in a fund used to purchase open space, if the voters of the given town or city approve. By the time the new century began, Tiverton's scenic and rural qualities, much of it related to its success in open space preservation, in combination with low land prices as compared to other Rhode Island communities, made it very attractive for residential development.

The waterfront continues to be important to the community. The fishing docks near the Nanaquaket Bridge and along Riverside Drive and Main Road are still home base to commercial fishermen and shell fishermen. The Stone Bridge Committee, made up of representatives from various groups and commissions, focuses on physical improvements to the area, including administration of a Rhode Island Department of Transportation grant in 2004 to design improvements to the aesthetics and functioning of Main Road and the waterfront from Riverside Drive south to Stone Bridge including the Stone Bridge abutment.

TIVERTON'S ACTIVE WATERFRONT

2.2 Regional and Local Context

The Town of Tiverton is part of the East Bay area of Rhode Island and borders the farming community of Westport, Massachusetts to the east and bucolic Little Compton, Rhode Island to its south. To the north lies the historic mill City of Fall River, Massachusetts. Its western boundary is formed by the Sakonnet River and Mount Hope Bay. Across the Sakonnet River is Aquidneck Island, which exerts major economic influence on the region through its defense and tourism industries.

Route 24, with three interchanges in the northern portion of Tiverton, connects with Route 195 to the north and the Mount Hope Bridge to the west and Newport to the south. Tiverton is approximately 25 miles from the City of Providence, 15 miles from Newport, 25 miles from New Bedford to the east, and 55 miles from Boston to the north. Route 195 is a major highway that serves Cape Cod and southeastern Massachusetts.

Figure 2-1 shows the local and regional context of the Town. This location, on the expanding edge of a major population center, has contributed to Tiverton's evolution from a community of farming and fishing, to a suburban residential area with regional recreational resources. Development within Tiverton has been shaped by this regional location, with areas of denser development spreading from Fall River to the north. South Tiverton has been essentially rural in character, although residential subdivisions have begun to suburbanize this part of Tiverton.

The scenic rural character and beaches of southern Tiverton and Little Compton are a destination for day-trippers during the summer months. The attraction of south Tiverton and Little Compton as a recreation location is likely to continue. As a residential location, Tiverton offers many advantages. The natural beauty of its shoreline, its rural and historic character, the availability of land, the relative affordability of housing as compared to the Boston regional market, and the proximity to employment centers within the region contribute to this attractiveness. By the late 1990's and early 2000's Tiverton was experiencing strong residential growth in the form of new subdivisions and major housing projects (see Land Use Chapter). The recession beginning in 2007 brought a halt to this development aided by the State's tolling of all building permits. Tolling

automatically extended the expiration date for State and local permits, allowing developers to retain valid approvals without commencing construction.

Southeastern Massachusetts and Rhode Island benefited from great economic growth in the 1980's. Defense industries in Portsmouth, Middletown and Newport, and the military installations in Newport and Middletown, have contributed to past economic surges. The future regional economic picture, which would contribute to additional growth in Tiverton, is strong; the town is part of a regional marketplace located on a major trading corridor. In comparison with major cities in the region, land costs are less in Tiverton. This factor along with available land and convenient access to nearby metropolitan areas and major markets by way of Route 24make Tiverton a desirable location for businesses. These development pressures, along with the needs and desires of residents, will determine the extent and type of future commercial and industrial development. The overly burdened residential tax base is in need of help and the Town will continue to look for answers in the form of responsible commercial and industrial growth. In response, the town must have clear guidelines in the Comprehensive Community Plan, and in its accompanying zoning ordinance and subdivision regulations, to manage this growth so that the historic small town character of Tiverton is not lost.

2.3 Population Trends and Characteristics

According to the 2010 Census, Tiverton's population is 15,780; this is an increase of 3.4 percent from the 2000 population of 15,260. As seen in Table 2-1, which shows the Census counts from 1960 to 2010, a period in which the population nearly doubled, Tiverton experienced its greatest population growth in the decade 1950-1960, when population increased by almost 70 percent. This was a trend typical of communities in the post-World War II years. In the decades after 1960, growth slowed, but continued at decreasing rates throughout the following decades.

TABLE 2-1: Population Trends, 1950-2010

Tiverton												
1950	*1960*	*Change*	*1970*		*1980*		*1990*		*2000*		*2010*	
5,659	9,461	67%	12,559	33%	13,526	7.70%	14,321	5.90%	15,260	6.60%	15,780	3.40%
Newport County												
1950	*1960*	*Change*	*1970*		*1980*		*1990*		*2000*		*2010*	
60,807	81,405	34%	94,228	16%	81,383	-13.60%	87,194	7.10%	85,433	-2.00%	82,888	-3.00%

Source: U.S. Census

Tiverton's growth since 1970 has been moderate compared to the dramatic changes experienced by its surrounding communities. Newport and Middletown have been impacted by large fluctuations in military personnel. Newport has consistently lost population since 1960, most significantly between 1960 and 1980 (nearly 18,000 persons, or 40 percent of its population). Middletown also experienced a significant loss between 1970 and 1980, which was offset somewhat by growth between 1980 and 1990, but like Newport, lost population in the most recent decades. The loss of population in these two communities explains why there was a net loss in the county of 2 percent in 2000 and 3 percent in 2010 despite growth in the other towns. Like Tiverton, Middletown and Portsmouth, and to a lesser degree Little Compton, are experiencing residential subdivision activity; this means that countywide, while urban units are being lost, suburban units are being added.

POPULATION PROJECTIONS

Population projections prepared by the Rhode Island Statewide Planning Program in 2013 up to the year 2040 predict that Tiverton's growth will continue slowly, only about 8 percent over a 30-year period. By 2020 the population is expected to grow to 16,043; and by 2035 it is expected to reach 16,906.

AGE CHARACTERISTICS

According to the 2010 Census, the median age for Tiverton residents is 46.2 years. In 1990 it was calculated at 37.2 years, in 1980, 33.6 years, indicating a gradual aging trend. Between 2000 and 2010 Tiverton lost population in the age group between 15 and 34 years, the dominant age group is between 25 and 54 years, which makes up 44.6 percent of the total population. The number of school age children is also decreasing, as a percentage as well as in total numbers. In 2000, the two cohorts making up the age group between 5 and 14 years represented 13.1 percent of the population; in 2010 they were 11.1 percent.

About 19.4 percent of the total population is age 65 or older; in 2000, it was 16.5 percent. While this does not seem significant as an increase in overall percentage of population, the actual total number of persons in this age bracket increased by 22.7 percent between 1990 and 2000 as compared to the overall population increase of 6.6 percent.

These figures show that if Tiverton did not experience the out-migration of young adults, it would expect a higher rate of overall population growth. Also worth noting is that over time the older residents become greater components of the population, which reflects the fact that not only are families smaller, but people are living longer. Because the growth in the oldest residents will likely continue to outpace that of the youngest, in the future there will be more focus on the housing and service needs of an older population.

HOUSEHOLD CHARACTERISTICS

Declining household size is the second major national trend clearly reflected in Tiverton. The Town's average number of persons per household declined from 2.69 in 1990 to 2.51 in 2000, and declined again to 2.35 in 2010. In 2010, the Census counted 6,684 households, up from 6,077 in 2000. Note: the number of households varies from the number of household units counted in the Census (see Housing Chapter) because of a number of vacant and seasonal or recreational units.

INCOME

The 2008-2012 American Community Survey (U.S. Census) shows that Tiverton's median household income is $68,706; while this compares favorably with the State's median income of $54,900, it is the lowest median income of all the communities in Newport County with the exception of the City of Newport ($57,690). Little Compton, Portsmouth, Middletown and Jamestown all have somewhat higher median incomes, with Little Compton's being the highest at $91,319. A discussion of median income and how it relates to the cost of housing is contained in the Housing Chapter.

The 2010 Census also shows an individual poverty rate of 6.3 percent (increased from the 4.5 percent level of 2000). This again compares favorably with the overall State poverty rate of 12.2 percent and Newport's, which is high at 10.2 percent, as well as Middletown's, which is 7.5 percent (Little Compton's is very low at 2.9 percent).

TABLE 2-2: Median Household Income

Town	1980 Median Income	1990 Median Income	2000 Median Income	2008-2012 Median Income
Tiverton	$19,678	$36,170	$49,977	$68,706
Little Compton	$21,130	$41,187	$55,368	$91,319
Portsmouth	$21,539	$42,474	$58,835	$73,308
Rhode Island	$19,440	$32,181	$42,090	$54,900

Source: U.S. Census/ACS

EDUCATIONAL ATTAINMENT

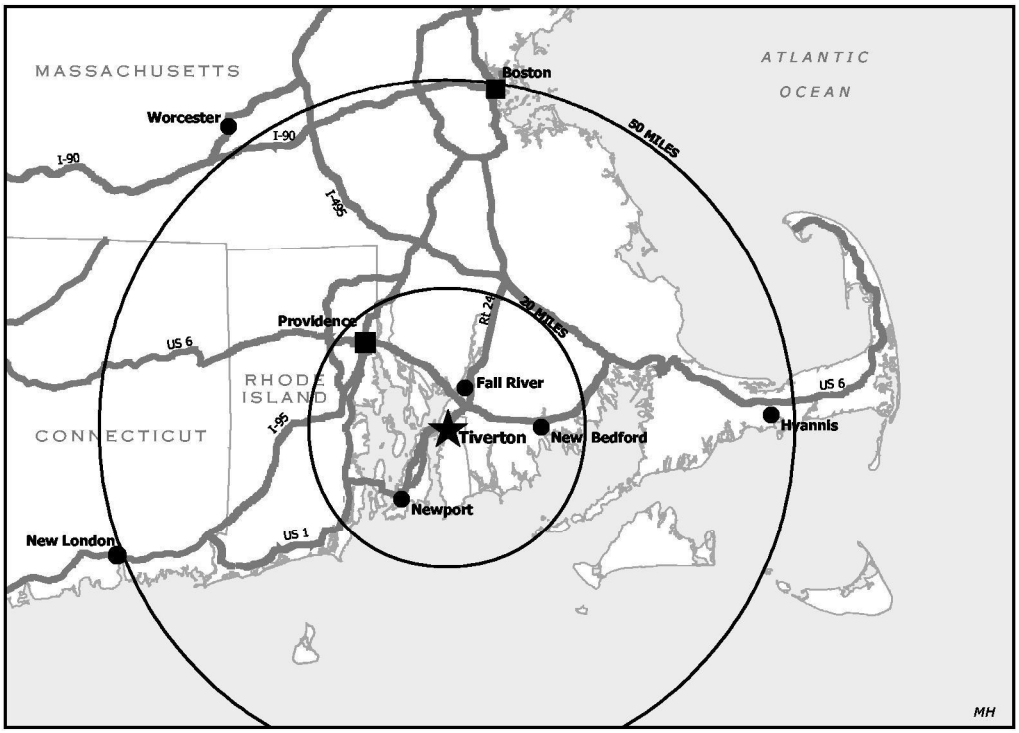
About 86.1 percent of residents aged 25 years or older are high school graduates, as measured by the 2010 Census (up from 79.5 percent as measured by the 2000 Census), with 29.9 percent obtaining a bachelor's degree or higher (up from 24 percent as measured by the 2000 Census). This is roughly equivalent to the educational attainment measured for the State as a whole. (Statewide: 83.7 percent had high school diplomas and 30.3 percent obtained a bachelor's degree or higher.) However, the other Newport County communities all have significantly higher rates of educational attainment, including Newport (90.3 percent with a high school degree and 48.2 percent with a college degree, respectively).

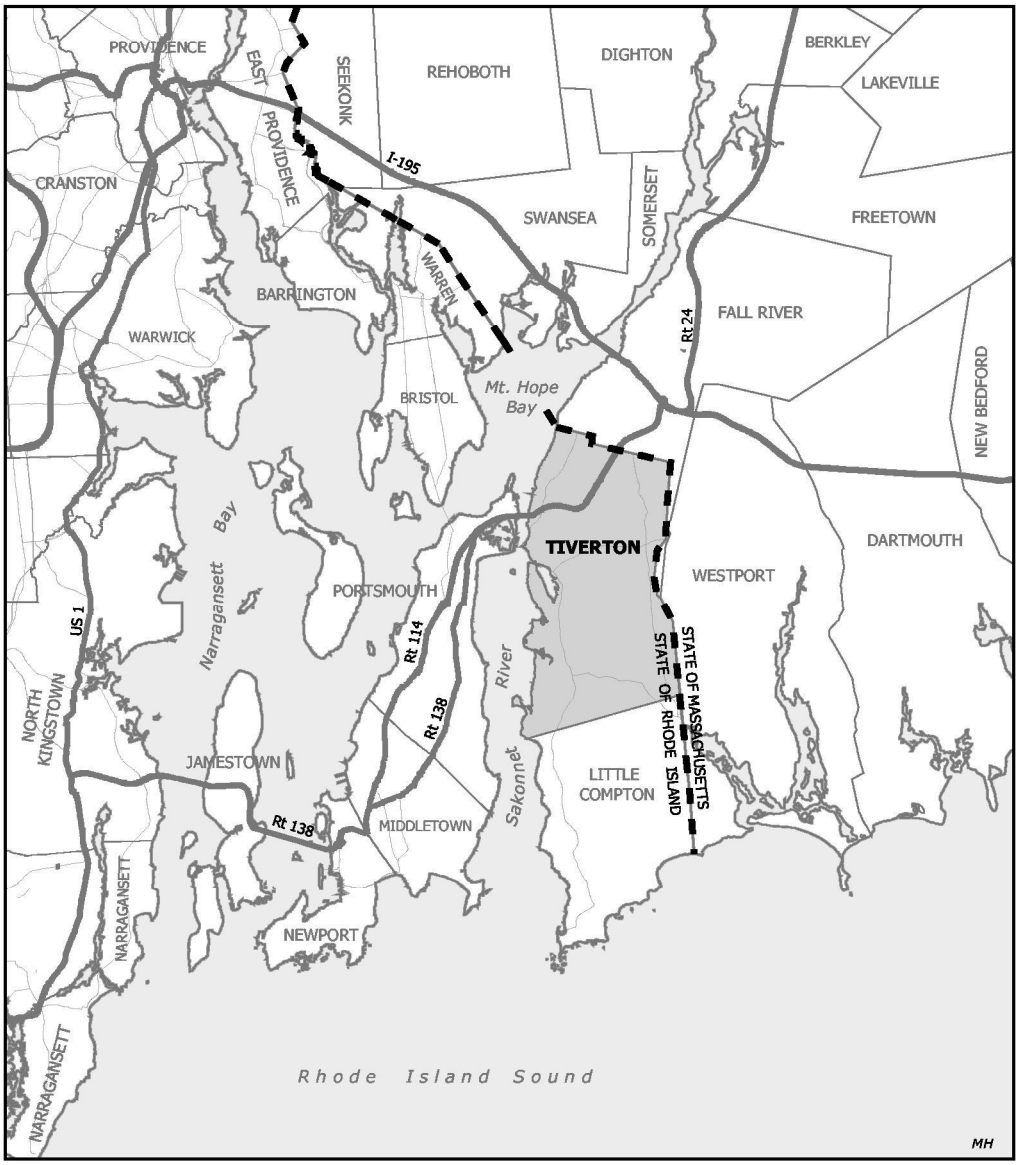
EMPLOYMENT

According to the 2010 Census, Tiverton's labor force was comprised of 8,283 persons. The majority of Tiverton residents find their employment opportunities within the State of Rhode Island. In 2010, 68.4 percent of Tiverton residents were employed within the State of Rhode Island, compared with 54.8 percent in 2000. While the people of Tiverton seem generally content to work outside of town, there is interest in encouraging small businesses and commercial and industrial development to improve the tax base and create employment opportunities.

TABLE 2-3: Employment Characteristics – 2010 Census

Town of Tiverton	Percent
Agriculture	0.2%
Information Industry	2.0%
Transportation, Warehouse & Utilities	3.2%
Public Administration	4.1%
"Other" Industries	5.0%
Construction	6.0%
Arts & Entertainment	7.1%
Finance, Real Estate & Insurance	8.6%
Manufacturing	12.7%
Professional, Scientific & Waste	12.8%
Wholesale & Retail	14.5%
Education, Health & Social Services	23.8%



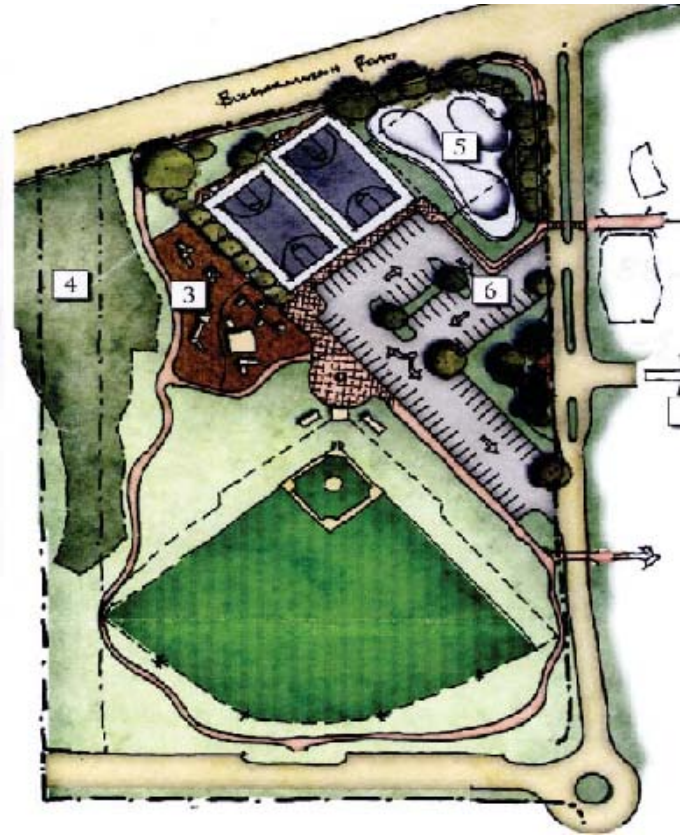


Source Data courtesy of MassGIS, RIGIS and MAGIC.

TIVERTON COMPREHENSIVE
COMMUNITY PLAN

Figure 2-1
REGIONAL and
LOCAL CONTEXT

PLANNING CONCEPT



3.0 PLANNING CONCEPT

3.1 The Nature of Tiverton: Issues and Opportunities

Tiverton faces a number of development issues, many of which were identified in the Comprehensive Plan workshops. Some of these concern the day-to-day operation of the Town. Others have to do with the basic structure of land use and future physical development. The Comprehensive Community Plan focuses on those issues, as well as opportunities that relate to the present and future character, and the improvement of the community and its resources.

The special character of Tiverton is derived from the interrelationship among the basic functions and unique qualities of the community, consisting of a unique natural environment and waterfront location, established residential neighborhoods and historic villages, and available land for commercial and industrial opportunities. This special character forms the conceptual basis for the Comprehensive Community Plan. These are the aspects of the town that will continue into the future and should be reinforced through this planning effort.

A UNIQUE ENVIRONMENT

The location of the town, its historical development, and the quality of its natural features are unique factors of Tiverton that should be preserved. The protection of the town's natural and historic features is crucial to retaining the character of the community.
The following are the major issues and opportunities that constitute this unique environment:

GROUND AND SURFACE WATER: Since the lifeblood of the community, the drinking water supply, comes from resources within the town, the protection of those resources is of crucial importance. Stafford Pond, Tiverton's only public water resource, faces continuing contamination threat from failed septic systems, road runoff and recreational use. Both the quality of the current supply and the potential future water requirements should be protected. Both Stafford Pond and Nonquit Pond, serving the City of Newport, are now being monitored by the Environmental Protection Agency's (EPA) Total Maximum Daily Load (TMDL) program for nitrogen and phosphorus. The protection of Tiverton's groundwater, especially in areas served by drinking water wells, is also vitally important. The administrative structure of existing water districts, and the ownership and use of watershed land are also issues. The need to continue a public education program on environmental protection has been identified as crucial in dealing with these issues, as are specific steps such as a program for the inspection and maintenance of septic systems within the watersheds.

WETLANDS: Wetlands play an important role in the community for flood control, water storage, groundwater replenishment and wildlife habitat. They are among the predominant natural features of the town, and monitoring the enforcement of existing wetlands protection regulations and impacts related to sea level rise is an important concern.

STAFFORD POND

SOLID WASTE MANAGEMENT: A committee appointed by the Town Council has assisted in extending the life of the landfill by decreasing the volume of waste through implementation of a "Pay As You Throw" program and increased recycling through a "no bin, no barrel" program. Although the lifespan of the landfill was extended, the closure process has begun and requires a significant amount of funding. The Town has contracted with the Rhode Island Resource Recovery Corporation (RIRRC) as an alternative permanent solution. Other abandoned waste disposal sites in Tiverton, such as the Firestone Dump on Brayton Road, have been identified as possible Super Fund cleanup sites.

VISUAL QUALITY: The visual quality of Tiverton is the heart of its character and charm. Each area of Tiverton possesses its own unique flavor, which should be echoed in both new development and redevelopment. The eclectic architecture of Tiverton should be celebrated and complemented through new development exhibiting unique, high quality design.

OPEN SPACE/FARMLAND: Protected open space and farmland contributes to the scenic and rural character of the community. Additional parks and other open areas are needed in developed portions of town such as North Tiverton. Farmland is a special open space resource with both aesthetic and economic value to the town.

HISTORIC AND SCENIC CHARACTER: Tiverton's historic buildings and waterfront areas contribute to the town's character and encourage tourism and the businesses that serve visitors. Old buildings are particularly vulnerable to loss, yet the Town has neither a regulatory nor an advisory mechanism for their preservation. In the absence of Historic District Zoning, a Historical Preservation Advisory Board has been formed. Many areas of Tiverton have a particular scenic quality derived from the rural landscape, such as mature trees, stone walls and rural roadways. The protection of these elements is a concern. These irreplaceable resources should be identified and protected. Views from heights of land to the waterfront are particularly attractive and should be protected and incorporated in future development.

FARMS AND FIELDS CONTRIBUTE TO TIVERTON'S UNIQUE ENVIRONMENT

MAIN ROAD ALONG NANNAQUAKET POND/SAKONNET RIVER VIEWS

RECREATIONAL RESOURCES: While the town has several parks and recreation areas, many of these have the potential to be further developed and utilized. Small play areas should be located within areas of denser development. There should be walking paths to link these resources to the residential community. There are some extensive trails systems, including those in Fort Barton, Weetamoo Woods and Pardon Gray Preserve, and there have been some efforts to develop safe bikeways in town. Those efforts are ongoing. Tiverton has two public beaches used by residents and non-residents extensively during the summer season.

A Waterfront Town

As a waterfront community, Tiverton has special problems and opportunities. The waterfront serves sometimes conflicting economic, recreational, environmental, commercial and historic functions. There are threats to the waterfront's character, including environmental degradation from a lack of enforcement of existing regulations and natural hazards and climate change.

Tiverton's waterfront consists of: the scenic coastal bluffs and beaches along the Sakonnet River; the coastal marshes and ponds, such as Fogland, Seapowet, Nanaquaket, Nonquit, the harbor basin at Stone Bridge and Bridgeport. It also includes the residentially developed shoreline of Mount Hope Bay in the northern part of town and the industrial fuel depot located at the State line.

The scenic, natural coastline is a crucial element of Tiverton's character. The combination of beaches, shellfish beds and fishing areas, salt marshes and ponds serve to maintain the natural balance and function as a natural, recreational and economic resource for the town. The water quality of the Sakonnet River and Mount Hope Bay is a regional concern.

The Tiverton Basin, located between the Stone Bridge abutment and the Sakonnet River Bridge is a very special resource. The area functions as a beach, mooring and dock sites, fishing grounds and a visual resource to the community. The Basin's marinas have historically served as the main access to the water. To enable these uses to coexist, the Town has prepared a Harbor Management Plan. The Plan identifies the urgent need to protect the Basin by reinforcing the Stone Bridge abutment in a visually attractive manner.

The Rhode Island Department of Transportation has been working with the Town to develop construction plans to rehabilitate the Stone Bridge abutment. The renovation project has

encountered obstacles that have further delayed the 2016 anticipated funding to the Town. The Town will continue working with RIDOT to secure funding and move forward with the project.

The waterfront and its adjoining area at Stone Bridge could berevitalized and enhanced by promoting a mix of uses including small scale commercial. The future public sewer improvements for the Riverside Drive Area, Stone Bridge to Schooner Drive, will help promote mechanisms to encourage small business opportunities. The Town has purchased the old gas station property adjacent to Grinnell's Beach and the Grinnell's Beach Improvement Committee has developed a redevelopment plan for the area. The plans include expansion of the beach and construction of a seaside pavilion. The Town has received a substantial amount of grant funding from RIDEM, the Rhode Island Foundation and CRMC, as well as private donations, to implement the $500,000 project. As of 2018, the project in under construction.

FOGLAND BEACH IS A POPULAR SITE FOR SWIMMING, FISHING AND BOATING

A Residential Community

Tiverton is, and will remain, a desirable place to live. Yet, the quality of the residential environment, and the availability of a range of housing for present and future generations, needs to be addressed. Major issues concern the preservation of existing housing, the types of housing provided, housing costs, the quality of municipal services and the rate at which land is being developed into residential subdivisions.

The maintenance of existing housing units is a key concern in North Tiverton and other areas of town with older housing stock. Also of concern is the maintenance and preservation of the historic and architecturally significant residential buildings located throughout the town.

Tiverton can be characterized as largely a suburban community with single-family detached homes being the majority type of housing units. While this housing is popular among growing families, it can be burdensome for the elderly, small families, single person households and others. Although some progress has been made with recent multi-family development projects, the need remains for a greater diversity in housing types to serve residents in all stages of life.

For some residents, there is a substantial gap between the cost of housing in Tiverton and the ability to pay. Tiverton must confront the need to preserve existing low cost units, and provide for future housing affordability as well as a healthy range of types for residents seeking to move up in the housing market. The Town should consider utilizing developer fees to rehabilitate existing housing stock for occupancy by low and moderate income residents.

The Town must provide services to support the residential community. The availability of public safety services and the quality of the school system has a direct bearing on the desirability of the town as a residential location.

SANDYWOODS FARM

A Location of Business Opportunities

Tiverton serves as a location for neighborhood, community-oriented and family-owned businesses, and for a few small industries. The Bourne Mill is a testament to a previous industrial heritage that was linked to the historic mills in Fall River. Even today, commercial services and industry for the most part are provided by surrounding towns. Commercial development is concentrated within a number of locations in Tiverton including:, along Main Road in North Tiverton, the waterfront in Stone Bridge, Stafford Road, Bliss Corners, and Four Corners. Regional shopping centers are located in nearby communities. The majority of Tiverton residents are employed regionally. Most of the Town's tax revenue is generated by residential uses. An expansion of the commercial and industrial tax base would lessen the burden on the residential taxpayers.

Tiverton is well-located for commercial and industrial development and significant areas are zoned for general commercial or industrial uses. These areas have direct access to the regional transportation network. The lack of other infrastructure, particularly sewers, and natural features constraints are the major factors inhibiting these forms of development.

The Tiverton Business Park (TBP), formerly known as the Tiverton Industrial Park, at the intersection of Route 24 and Fish Road offers the opportunity to generate jobs and diversify the tax base. A substantial area in north Tiverton is also zoned for industry, but is underutilized. In 2012 new guidelines for design and build-out were written and passed by the Town Council for the Business Park. The Town developed a Major Subdivision Plan for the 172-acre TBP, and in 2013 advertised a Request for Proposals (RFP) for opportunity for development. The goal of the RFP is to disposition the Town-owned TBP land in a way that will produce the highest quality development and best financial rate for the Town. As of June 2017, approximately 20 acres (2 lots) are currently under construction for the development of the Longplex Sports and Family Complex. The remaining lots are being marketed by the Town

The historic function of agriculture as a major economic endeavor has eroded in the past few generations. However, although farmland is being sold for housing developments, some residents still earn an income from agricultural activities and a growing number of new agricultural businesses have been incorporated in Tiverton in recent years. The protection and encouragement of this component of the local economy is important.

MAIN ROAD IN NORTH TIVERTON IS THE LOCATION OF MANY RETAIL BUSINESSES

3.2 A Vision for Tiverton

In order to achieve the desired vision for Tiverton, the Comprehensive Community Plan must serve as a guide to future growth and change. The citizens of Tiverton are justifiably proud of their town, and protective of the physical and social qualities, which characterize it as unique. There is thoughtful discussion on how the community should develop. Development pressures throughout the town are expected to continue. The Town should leverage these pressures in a manner consistent with the common good, guided by the perspective of this Comprehensive Community Plan.

It is the intent of the Tiverton Comprehensive Community Plan to present a vision for the future of the town, which combines opportunities for growth and change with the need for preservation of the essential characteristics of the community. This is an integrated vision for the town, and does not substitute for the more specific Future Land Use Plan found in Chapter 5. The following is a description of major components of this Plan:

WATERSHED PROTECTION: The protection of the sources of the town's water supply is a major concern. Protection areas should be carefully guarded around Stafford Pond and Nonquit Pond. Environmentally Sensitive Areas: Environmentally sensitive areas are to some extent protected by State and Federal regulations. The Town should continue to monitor compliance as part of the development review process.

RESIDENTIAL GROWTH: Future residential growth, while providing for affordable housing opportunities throughout town, should consist of density compatible with the existing conditions, available infrastructure and varying housing styles in north Tiverton; and less dense and rural residential style developments in south Tiverton.

THE STAFF AT TIVERTON TOWN HALL WORKS HARD FOR THE CITIZENS

RURAL RESIDENTIAL/AGRICULTURE: The rural character of south Tiverton should be preserved with low density residential, developed according to the principals of conservation design. Agricultural activities, which contribute to the economic base of this area, should be protected. The Farm, Forest and Open Space taxation program is an important tool to encourage the preservation of open space.

CONTEXTUAL DEVELOPMENT: Compatible development which closely matches the existing historic and architectural fabric should be encouraged in all areas of town, particularly the areas of Stone Bridge, Nanaquaket, Puncateest/Fogland and Tiverton Four Corners. Techniques should be developed to encourage the preservation of existing buildings and to discourage demolition. Commercial Revitalization: Targeted areas zoned for commercial uses should be revitalized utilizing a comprehensive array of development tools including grant programs, educational programs and clear and predictable municipal permitting and licensing procedures. Development standards and guidelines for the public and private realm within commercial corridors should be expanded and implemented to ensure high quality development and redevelopment in conformance with the vision of this Comprehensive Community Plan.

EMPLOYMENT: Economic development should focus on new opportunities for the work force to remain local. This effort would have a direct result in growth to the commercial tax base which is much needed, having a positive impact stabilizing the residential tax base.

INDUSTRIAL: Land zoned for industrial uses should be developed in a high quality manner with adequate infrastructure and support services. Industrial areas should be studied to determine the appropriate intensity of uses. Design guidelines should be implemented for areas of commercial and industrial development.

TOURISM: Tiverton has a long history as a destination for seasonal tourism. Local residents and visitors are able to take advantage of the natural open spaces and beaches. Continued economic development capitalizing and marketing these strengths should be encouraged.

SCENIC SHORELINE: The natural features, beaches, cliffs and scenic vistas of the shorefront should be protected from over-development. Design standards to protect scenic values should be developed and included as a criterion for approval of developments. The harbor basin scenic corridor should be maintained.

HARBOR MANAGEMENT: The Harbor Management Plan for the Tiverton Basin encourages the incorporation of water-dependent and related uses along waterfront land; supportive land-side regulations and available parking should be pursued at the same time as the necessary physical improvements to protect the Basin.

SEA LEVEL RISE AND COASTAL RESILIENCY: The Town should take action to prepare for ongoing and predicted sea level rise and to ensure coastal resiliency. Innovative techniques should be considered for possible future implementation to protect the health and safety of coastal residents and the coastal ecological systems. Storm safety and recovery planning spearheaded by the Tiverton Emergency Management Agency and the RI Emergency Management Agency should be supported to ensure that Tiverton is storm ready.

OPEN SPACE NETWORK: A comprehensive open space plan should be maintained.
Visual Buffers: The natural landscape along Route 24 should be preserved as a visual buffer from future development. A protective buffer should be established between residential and commercial uses.

GATEWAYS: Special design consideration should be given for transitional areas into the community. Five such "gateway" areas are identified - two in north Tiverton and three at the Route 24 exits. Secondary gateway areas exist at Bulgarmarsh Road from Westport and on the Main Road from Little Compton.

NEW RESIDENTIAL DEVELOPMENT IN TIVERTON MUST INCLUDE AFFORDABLE HOMES

The following chapters elaborate on these concepts in the context of the goals and policies of the Tiverton Comprehensive Community Plan.

NATURAL AND CULTURAL RESOURCES

4.0 NATURAL AND CULTURAL RESOURCES

4.1 The Special Character of Tiverton

More than anything else, the abundance of natural resources and the town's cultural roots in its past characterize what is special about Tiverton. Farms, broad open spaces, forests and miles of scenic roadways in the south, and the rich ethnic and architectural heritage in the north give the town its fascinating diversity. Along the west side lies the beauty of an unspoiled coastline and established neighborhoods with mature trees, while lightly developed neighborhoods, farmland, and crossroads hamlets are scattered along the eastern portion of the town. The central spine of the town is the north-south low glacial ridge, along which a large contiguous area of undeveloped forest survives in south Tiverton. These are all precious qualities of small town New England that are rapidly disappearing, and qualities that townspeople fear will be lost in Tiverton's future. A central challenge of this plan is to protect these natural and cultural resources while at the same time providing for economic growth and housing needs. This chapter of the Comprehensive Community Plan describes the town's natural and cultural resource assets, and those planning measures needed to preserve them.

4.2 Natural Resources

Tiverton's natural setting is not only beautiful, but it also creates its own brake on development. Extensive wetlands are protected by state and federal wetlands regulations, while many other areas are not suitable for development because of poor soil conditions for residential septic systems. With the Town's Building Official, Planning Board and Conservation Commission monitoring construction activities and state regulatory efforts, development cannot occur in many areas of the town, without massive public expenditures to install public water and sewage disposal systems.

The following sections describe the key natural features of the town and the constraints they impose on future development. The information for this analysis has been compiled from many sources including the Rhode Island Geographic Information System, the U.S. Geological Survey, field observations and the Comprehensive Plan Advisory Committee.

TOPOGRAPHY

The surface relief consists of a gently rolling topography that rises from the waterfront to low bluffs along the Sakonnet River. Low lying wetland areas along the coast and inland occupy large areas of the town. Higher elevations are some 200 to 300 feet above sea level. The highest elevation is Pocasset Hill in north Tiverton at about 320 feet. This elevation forms part of the ridgeline that extends north along Main Road to Fall River roughly parallel to the Sakonnet River.

The bluffs overlooking the Sakonnet River rise steeply from the waterfront in north Tiverton. Further south they are separated from the shoreline by a coastal plain that is up to one mile in width. These bluffs offer many scenic views of Aquidneck Island. They also represent another obstacle to development because of ledge formations near the surface.

Along the coastal plain are several important natural features, including ponds, wetlands, marshes and beaches. A 100-year floodplain forms part of the coastal plain and extends from a narrow strip along the northern shoreline to a broader area in the south. Seapowet Marsh and the Emily Reucker Wildlife Preserve form part of this floodplain.

THE SAKONNET RIVER

SOILS

Soil conditions are poor in many areas of the town– a major factor in any plan for development. An analysis of soils completed using the United States Natural Resources Conservation Service soil survey of Rhode Island showed that large areas of the town are unsuitable for many types of development, and particularly for septic systems. The RIGIS (Rhode Island Geographic Information System) analysis of soils, Figure 4-1, also indicates large areas with development constraints due to poor soil conditions.

FRESH WATER RESOURCES

Surface water includes many small ponds and two relatively large ponds that are totally within Tiverton's geographic area. Stafford Pond is a primary source of the drinking water supply for Tiverton. Although the Stafford Pond Watershed Overlay District regulates development, the Pond is not fully protected because of ongoing recreational uses sanctioned by the State. The protection of Stafford Pond and its watershed is a unique planning challenge because of growing development along its shores, the complexities of its ownership, long standing recreation use and the lack of a single overall management authority. A comprehensive study initiated in 1996 by the RI Department of Environmental Management (RIDEM) identified two major sources of pollution: animal waste runoff from a dairy farm, and storm water runoff from Stafford Road. Since then, "best management practices" (BMPs) have been established to control both sources of pollution. Moreover, a Total Maximum Daily Load (TMDL) plan has been implemented that sets a loading cap of 390 kg/year of phosphorus entering the Pond.

Other steps to protect Stafford Pond include the adoption of a Town ordinance requiring mandatory testing of individual septic disposal systems around the Pond, the publication and

dissemination of a pamphlet entitled "Your Guide to Protecting Stafford Pond" and the proposed creation of a Stafford Pond Watershed Committee, the de-listing of the Pond by the Federal Aviation Administration (FAA) as a seaplane landing area. In August, 2014, the Town Council followed up on the FAA's action by adopting an amendment to Ordinances of the Town of Tiverton, Chapter 15 (Drinking Water Supply Reservoirs) that prohibits seaplane take-offs and landings on the Pond. This action is consistent with R.I. General Laws 46-14-1 that prohibits any activity that will "pollute or corrupt or impair the purity or quality of a public drinking water supply or which renders the water supply injurious to public health or poses a potential significant risk to public health." Nevertheless, the quality of water is still threatened by the widespread use of gasoline motors, jet skis, swimming and other recreational uses not compatible with a drinking water supply. Stafford Pond is among the least protected reservoirs in the state.

The other major public water reservoir is Nonquit Pond, part of the City of Newport's water system. As a public water supply, it is Tiverton's responsibility to take measures, in cooperation with the Newport Water District, to protect Nonquit Pond and its watershed. Since 1997, significant steps have been taken to protect approximately 1,320 acres of Nonquit Pond watershed through the purchase of development rights and the purchase and protection of fields, forests and wetlands, including Weetamoo Woods and the Pardon Gray Preserve. Problematic, however, is the threat of contaminated leachate from the Tiverton Landfill. This landfill abuts Cedar Swamp and several private homes that rely on wells for drinking water. Results from test wells around the perimeter of the landfill indicate the presence of lead, cadmium, arsenic and other contaminants, but in trace amounts well within regulatory limits. In 2001, revisions to the Town's Zoning Ordinance included adding the watershed of Nonquit Pond to the Watershed Protection Overlay District.

In 2014, the Planning Board and the Conservation Commission established a joint committee to consider possible amendments to Tiverton Zoning Ordinance Article VIII: Watershed Protection Overlay District. The committee was being assisted by the University of Rhode Island Cooperative Extension Program and was considering ways to streamline the environmental review procedures, review and improve checklists, identify the exact location of direct tributaries, address commercial/industrial development and better clarify vague and discretionary language. The committee's work is ongoing as RIDEM has begun steps to develop a water quality restoration plan (called Total Maximum Daily Loads or TMDL) for Nonquit Pond. It is anticipated that the committee will utilize information from the TMDL to identify appropriate strategies to improve water quality in the watershed.

Easily overlooked because it is unseen, is the groundwater of Tiverton. This precious natural resource is just as important as surface water because it supplies major portions of the town with fresh water from private residential wells. Protecting groundwater sources and maintaining drinking water is a major public concern. The State of Rhode Island uses a system to classify groundwater. Class GA is used to identify drinking quality groundwater sources. The Town should assure that this classification is maintained. The principal threat to drinking quality groundwater is over-development, with too many houses and other buildings drawing on a limited and finite water source. Given the hydrology and soil conditions of south Tiverton, and especially the Nonquit Pond watershed, the preferred type of housing development is rural compounds. Also threatening this resource are aging underground oil tanks and failing septic systems. Both problems must be addressed if Tiverton's citizens are to be assured of pure drinking water in the future. In 1997 the Town adopted an ordinance prohibiting new underground storage tanks (USTs), and requiring that all owners and operators of USTs register the tanks with the Tiverton Town Clerk. The registration form includes such information as tank size, construction type and material, and contents.

The RI Department of Environmental Management (RIDEM) has delineated wellhead protection areas for all public wells in the state, which define those areas through which water flows in the subsurface to the well. Consistent with RIDEM's wellhead protection program, the Conservation Commission undertook a pollution source inventory for each wellhead protection area to determine potential risks to each well. This effort was followed by a public education program regarding the risks associated with USTs, disposal of household chemicals and septic system maintenance.

The watershed areas of both Stafford and Nonquit ponds, as well as the wellhead protection areas, are depicted in Figure 4-2.

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NONQUIT POND

SURFACE MINING

Surface mining operations of sand and gravel adversely impact ground and surface water by eliminating soil filtering capacity and rendering groundwater vulnerable to contamination. Removing deposits decreases the depth to groundwater, often leading to exposure of the water table. The use of heavy machinery in these operations makes the water table susceptible to diesel fuel, motor oil, hydraulic fluids and solvents. The Zoning Ordinance amendments of 2001 limit the expansion of existing surface mines and new operations are now a prohibited use. In 2010, the Town adopted statutory language (Ordinances of the Town of Tiverton, Chapter 38, Article III, Earth Removal) that addresses hours of operation, setback and fencing requirements, dust control and drainage, among other items. Article III also established a licensing procedure for operations already in existence and penalties for violations.

In March, 2014, the Planning Board finalized proposed amendments to Article III and forwarded them to the Town Council for consideration in a public hearing. These amendments, subsequently adopted by the Town Council, will help to clarify ambiguities, assure public safety, protect groundwater and curb dust, noise and vibration caused by blasting.

WETLANDS

Wetlands form a significant component of the land area of the town and are a major natural feature. Coastal wetlands comprise over 528 acres. These include large areas at Seapowet and Fogland Marshes. Inland wetlands comprise nearly 4,500 acres throughout the town. Major areas include Great Swamp and Cedar Swamp in south Tiverton, and Basket Swamp and Pocasset Cedar Swamp in the northern section of town. Wetland areasare depicted in Figure 4-3 by category.

The impact on coastal wetlands by sea level rise is particularly concerning. Tiverton could lose more than half of its existing 528 acres of coastal wetlands within the community. The R.I. Coastal Resources Management Council and partners have developed a Sea Level Affecting Marshes Model (SLAMM) that predicts wetland loss caused by sea level rise. For Tiverton, the model predicts a loss of 35, 166 and 274 acres of coastal wetland under 1, 3 and 5 feet of sea level rise, respectively. This will have an impact on adjacent upland areas that evolve into wetlands. Coastal adaptation and resiliency efforts undertaken by the town and its partners should include preservation of upland areas adjacent to coastal wetlands that are likely areas of coastal wetland migration.

SEAPOWET MARSH IS AN EXTENSIVE AND SCENIC COASTAL WETLAND AND WILDLIFE HABITAT.

Rhode Island Natural Heritage Program

The Rhode Island Natural Heritage Program is a section of the Department of Environmental Management, Division of Planning and Development. The basic goal of the program is to identify, protect and manage rare species occurrences and ecologically significant natural communities. The Natural Heritage Program has identified special rare species habitats. These areas, shown in Figure 4-4, are described below:

- **Fogland Marsh** is a Nature Conservancy preserve, with adjacent tracts owned by the Rhode Island Department of Environmental Management. It is located on the Tiverton/Little Compton line, surrounding Almy Brook. This wetland is considered one of the best quality salt marshes in the state, never having been ditched or drained for mosquito control, and thus serves as a fertile nursery for fin and shellfish, and critical habitat for shorebirds and wading birds.
- **Seapowet Marsh** is primarily owned by the Rhode Island Department of Environmental Management with the Emily Reucker Wildlife Refuge, owned by the Audubon Society of Rhode Island, lying just to the north. This exemplary wetland provides breeding habitat for two state listed rare bird species, and is an important feeding area for wading birds, including egrets and ibis which breed nearby.
- **Sin and Flesh Brook** is an area that provides important forest habitat for several bird species rare in Newport County. The maintenance of this large, un-fragmented forest is critical to its value as habitat for these species. A long-term plan for conservation of this area would include protection from development as well as the exclusion of roads, utility rights-of-way, and other interruptions of the forest canopy.
- **Weetamoo Woods and the Pardon Gray Preserve** are large areas south of Lafayette Road containing a globally rare coastal oak-holly forest community, and habitat for five State-listed rare species. As threats by encroaching development have grown, the Town's Open Space Commission and the private Tiverton Land Trust have responded by protecting, through State open space funding and private funds, several hundred acres. Additional acquisitions with appropriate management would further protect this site.
- **Stafford Pond** supports a population of the plant, Plymouth Marsh Pink, along its northwest shore. It is one of only four such locations statewide. The plant population is considered regionally significant, since in New England it is found only in southeastern Massachusetts and Rhode Island.

In 2001, a study by The Nature Conservancy Rhode Island field office confirmed and expanded on the findings of the Natural Heritage Program. Entitled "A Conservation Plan for Wetlands and Associated Natural Resource Areas in Little Compton and Tiverton, R.I.", the study confirmed at least five State-listed rare species in the natural communities that make up the coastal forest of south Tiverton. They are: (1) Acadian Flycatcher, (2) Eastern Ribbon Snake, (3) Henry's Elfin Butterfly, (4) Worm-eating Warbler, and (5) Squawroot.

4.3 Cultural Resources

Cultural resources can be thought of as the human imprints on Tiverton that make it an interesting place to live, the archaeological treasures of its ancient past, the architectural treasures of its colonial past, its farmhouses, stone fences and villages, including the textile mill village of North Tiverton. These give the town depth and texture, and must be held onto if Tiverton is to retain its uniqueness. Three important cultural resource areas are considered in this Plan: rural character, scenic resources and historic resources.

Rural Character

Rural character may be difficult to define, but it is unequivocally clear that the people of Tiverton want to keep it. Rural character is a combination of many "small town" things about Tiverton that makes it charming – its open land, extensive forest cover, scenic views, country lanes, stonewalls, historic buildings, farms, wildlife and many other qualities that are associated with "country life" – all the things that disappear in sprawling, unplanned suburban development. But they do not have to disappear if Tiverton is willing to plan and manage its future development. Many tools are available, from administrative actions like zoning and subdivision site plan processes, to volunteer efforts such as land trusts. If these tools are carefully thought-out and implemented, they provide ample opportunity for housing development and economic growth while retaining the town's rural character. In fact, this is not only possible, but studies have shown that such management practices actually enhance rather than inhibit local economies because they ensure a community will continue to be a desirable place to live and work.

Scenic Resources

Tiverton is renowned for its scenic qualities. In 1990, the State of Rhode Island released a landscape inventory of scenic areas throughout the state. Four areas of the town were identified as distinctive or noteworthy. These are Fogland Marsh, Seapowet Marsh, Sin and Flesh Brook and Weetamoo Woods. These areas correspond to the areas identified by the RI Natural Heritage Program as ecologically significant habitat areas, as shown in Figure 4-4. Many roadways in the Town also exhibit scenic qualities worthy of protection. The "Inventory of Rhode Island Roadways with Scenic Character" completed in 1996 for the RI Scenic Roadways Board identified Main Road south of Route 24, Seapowet Avenue, Neck Road, Fogland Road and Pond Bridge Road as all possessing scenic character worthy of designation as state scenic roadways.

Prime Agricultural Land

Farming is a major part of Tiverton's history, and farmland remains an important resource in the town. According to RIGIS there are approximately 4,866 acres of prime agricultural land in Tiverton. Those areas are illustrated in Figure 4-5. Agricultural land is generally well-drained, deep loam soils that are also ideal for building sites. Therefore, there is inevitable pressure to develop on soils that form the best cropland in town. The economic contribution of agricultural lands to the town is discussed in Chapter 10.

The State of Rhode Island, through its Agricultural Land Preservation Commission, provides for the purchase of development rights as a means for preserving farmlands. The program is administered by the RIDEM Division of Planning and Development through its Agricultural Land Preservation Program, which provides funding to assist in the purchase of the rights to develop the land residentially, an amount calculated as the difference between the fair market value of land and its value if restricted to agricultural use. The seller continues to hold title to the land, but a covenant is assigned to the property, which restricts the seller and their heirs from any further subdivision or any development other than for agricultural purposes. Additionally, the State's "Farm, Forest and Open Space Program" allows farmers and other landowners to receive a lower tax assessment on such land, with the resulting tax savings serving as an incentive to keep the land in agricultural use or undeveloped.

The U.S. Department of Agriculture's Natural Resources Conservation Service provides additional incentives for landowners who protect and enhance land and water resources. The Wetland Reserve Program, for example, purchases development rights on wetlands, while the Farmland Protection Program, the Conservation Reserve Program and the Forest Legacy Program provide other financial incentives for landowners. More should be done to acquaint landowners with such land preservation programs.

Historic Resources

An inventory of historic and architectural resources prepared by the Rhode Island Historical Preservation and Heritage Commission (RIHPHC) in 1983 identified significant buildings, historic districts and areas, and historic sites in Tiverton. This inventory serves as a basis for prioritizing historic preservation efforts. Figure 4-6 indicates the locations of the resources identified in this survey that are on or eligible for listing on the National Register of Historic Places. These resources are listed in Table 4-1. As of 2018, there are three historic districts formally listed on the National Register: the Tiverton Four Corners Historic District, the Cook-Bateman Farm Historic District, and the Osborn-Bennett Historic District on Main Road, each containing numerous historic structures. There are also three properties individually listed: Fort Barton, the Bourne Mill, and the First Baptist Church.

THE OSBORN HOUSE IS PART OF TIVERTON'S HISTORY ALONG MAIN ROAD.

Table 4-1: Historical and Architectural Resources		
Site	**Date**	**Location**
National Register Listings		
A. Osborn-Bennet Historic District		Main Road
Bennet/Hambly House	c. 1822	1137 Main Road
Osborn House	c. 1845	1148 Main Road
Thomas Osborn House	c. 1790	1168 Main Road
Judge Joseph Osborn House	c. 1845	1188 Main Road
B. Tiverton Four Corners Historic District		Main Road/East Road
Soule-Seabury House	1770, 1809	3852 Main Road
Arnold Smith House	c. 1750, 1820	3895 Main Road
Chace-Cory House	c. 1730	3908 Main Road
Good Templars Hall/Union Public Library	1867	3832 Main Road
Benjamin F. Seabury House	1840	3842 Main Road
Wilcox-Davol House	1800	3879 Main Road
Andrew P. White Store	1800	3883 Main Road
Pardon Cory House	c. 1850	3920 Main Road
King Cottage	c. 1800	3924 Main Road
Stone Grist Mill	c. 1850	3948 Main Road
Amicable Congregational Church Parsonage	1832	3804 Main Road
Amicable Congressional Church	c. 1812	3736 Main Road
William Bateman/Preserved Tripp's Wheelwright Shop	c.1850	3949 Main Road
C. Cook-Bateman Farm Historic District	c. 1730	Puncateest Neck Road
D. Fort Barton	1776	Highland Road
E. The Bourne Mill	1881-2	1 Mill Street
F. First Baptist Church	1841	7 Old Stone Church Road
Potential National Register Listings		
Puncateest Neck Historic District		Fogland Road/Puncateest Neck Road / Neck Road
Capt. Isaac Church House	c. 1880	1660 Main Road
Col. David Durfee House/Manchester's House	1826	2698 Main Road
William Durfee House	c. 1690, 1768	2794 Main Road
Old Durfee Farm	c. 1800	405 Nanaquaket Road
Homelands	c. 1760	575 Nanaquaket Road
Nathaniel Briggs-Manchester House	pre 1777	68 Indian Point Road
The Stone House	1919	43 Penny Pond Road
Thomas Gray-Durfee House	pre 1833	432 Seapowet Road
Samuel Wilcox House/The Brick Front	pre 1818	200 Neck Road
Cory-Hicks-Borden-Gardner-Stevens House	pre 1750, 1856	4100 Main Road
Edward Cook House	pre 1815	4340 Main Road
Cook Farm	c. 1815	4375 Main Road
White Homestead	c. 1790	4398 Main Road
Abraham Manchester House	c. 1780	733 East Road
Barker House	c. 1700	1975 Crandall Road
Job Gray House	1700's	2930 Main Road
Almy Farm	1700's	1013 Seapowet Road
William Whitridge House	c. 1770	285 Stone Church Road
Source: RI Historical Preservation & Heritage Commission; Tiverton Historical Preservation Advisory Board		

A preliminary archaeological survey by RIHPHC determined that Tiverton is also potentially one of the richest archaeological regions in New England. Its shallow coastal waters and protected upland areas have been home to Native American cultures for thousands of years. The survey resulted in a proposed "Seapowet Archaeological National Register District."

Priorities for the Future

Protection and enhancement of Tiverton's natural and cultural resources over the next two decades will involve an ambitious but achievable public policy agenda. Several priorities are highlighted below.

- Protecting water quality in Stafford and Nonquit Ponds through Planning Board promotion of Low Impact Development (LID) techniques to reduce impervious surface cover and curb polluted runoff, as well as acquiring watershed land as open space or acquiring conservation easements in the watersheds.
- The safeguarding of freshwater and saltwater wetlands by strict and vigilant enforcement of existing state and municipal regulations.
- The protection of significant and highly visible stonewalls which enhance the rural scenic beauty and historic charm of Tiverton.
- Historic district zoning for Tiverton Four Corners to protect the historic fabric of a neighborhood that attracts visitors and customers to the many art galleries, antique shops and other independent businesses because of its historic ambiance.

THE OLD STONE CHURCH

4.4 Natural and Cultural Resources Goal, Policies, and Actions

Goal: Preserve and protect the natural features and unique cultural qualities that contribute to the special character, identity, heritage and environmental quality of Tiverton.

Policies

- Protect the rural character of the community, including working farms, woodlands, the rural landscape and scenic coastline.
- Protect those natural features that sustain the basic functions of the town, including high air quality, surface and groundwater, wetlands and coastal features.
- Preserve biological diversity and integrity through protection and management of State and Federally-listed rare species habitat areas and ecologically significant natural communities, and through public education.
- Protect the environment from potential sources of contamination.
- Preserve and enhance the visual quality of the community and its natural beauty.
- Preserve the historic and architectural features and the special areas of the community that contribute to its unique character.

Actions

RURAL CHARACTER

Action 1: Continue an active program of land acquisition to protect open space and rural character using the selection criteria described in Chapter 9.

Despite areas of urban and suburban development, Tiverton has a strong identity as a rural community. Newcomers and old-timers alike cherish its small town atmosphere and rural setting. Yet there is a delicate balance between the preservation of these qualities and the pressure for growth and change. An active program to identify those areas that should be preserved, and incorporates available conservation techniques, continues to be needed despite the progress made by the Tiverton Open Space Commission and the Tiverton Land Trust in protecting individual parcels of land.

Action 2: Identify and develop an awareness and appreciation of elements of the rural character, such as farms, barns, open fields, stonewalls, mature trees, tree rows, and treed neighborhoods.

Protection of the town's rural character goes beyond aesthetic qualities. It is inextricably linked to other objectives such as protecting water quality, preventing environmental degradation and preserving agriculture. The rural character of Tiverton is defined by the following elements:

agricultural activities; wetlands, coastal ridges and other natural features; woodlots; large open fields; stonewalls, barns, silos and other structures; clustered buildings separated by large areas of open space; and similar features. Each of these landscape features requires a degree of recognition and protection as key values of Tiverton.

Action 3: The Planning Board should work with developers to promote rural residential developments as the preferred type of development pattern, particularly in the town's less developed areas currently zoned R-60 and R-80. Further, the Planning Board should adopt regulations enabling the services of professional design consultants to review Master Plans at the expense of the developer and assure consistency with the state's Low Impact Development goals. (See Policies 5, 6 & 7).

Conventional development regulations, originating in urban settings, are poorly equipped to protect these values. Large lot zoning, as in the R-60 and R-80 districts, while effective in producing large lots, does not necessarily protect rural character as defined above. A combination of techniques to regulate uses, densities and site design are essential (See Figure 4-7)

Rural residential development, a concept that uses Low Impact Development (LID), provides for the evaluation and protection of the character defining features of a site as part of the development process. As an alternative to conventional subdivisions, rural residential developments incorporate conservation design techniques that protect important features through use of flexible zoning, different engineering and design standards, and in some cases, reduced site density. Amendments to the Zoning Ordinance in 2001, followed by those to the subdivision regulations in 2003, authorize alternative development plans in the form of rural residential developments in place of conventional subdivisions. Rural residential developments are mandated within the Watershed Protection Overlay Districts.

Action 4: Promote local stewardship of the town's tree resources utilizing the Plan for Urban and Community Forestry (State Guide Plan Element 156, May 1999) and continue to require protection of significant trees and to specify replacement trees for new developments and subdivisions.

Protection of the town's tree resources has aesthetic and scenic value. By enhancing property values and lessening the impacts of residential development, it has a sustainable economic benefit as well. In 2001, the Tree Commission, the Conservation Commission and the Open Space Commission endorsed a Notable Tree Program to identify and record rare and unusual trees and trees of significant age, size, and visual appeal. In 2002, the Tree Commission established a Tiverton Neighborhood Tree Program to provide a permanent source of resources for street tree planting throughout the town.

Action 5: Minimize the impacts of development to natural features and pre-development hydrology by incorporating into Tiverton's Major Land Development and Subdivision Regulations key provisions of the RI Low Impact Development Site Planning and Design Guidance Manual.

Tiverton is committed to advancing the State's Low Impact Development (LID) goals. As construction occurs, it is essential to protect as much undisturbed open space as possible. This helps maintain pre-development hydrology that allows precipitation to recharge ground water reserves. Equally important is to maximize the protection of natural drainage areas, streams, surface waters, wetlands and jurisdictional wetland buffers. In addition, land disturbance, such as

clearing, grading and blasting of ridges and other natural features, should be minimized to maintain the town's distinctive topography and avoid erosion. Finally, soil compaction as a result of construction activities or prior development should be minimized.

In 2011, RI Department of Environmental Management and the Coastal Resources Management Council drafted the Rhode Island Low Impact Development Site Planning and Design Guidance Manual. This manual provides developers and municipal planners with guidelines designed to implement the goals of LID.

Action 6: Amend Tiverton's Major Land Development and Subdivision Regulations with language from the RI Low Impact Development Site Planning and Design Guidance Manual to assure that land alterations minimize high impacts such as excessive impervious cover, destruction of natural features and the use of inappropriate, high-maintenance vegetation.

An important goal of LID is to decrease stormwater volume, increase groundwater recharge and minimize pollutant loadings from a site. This can be achieved by minimizing impervious cover, leaving natural features undisturbed, and utilizing low-maintenance, native vegetation that encourages water retention and minimizes the need for lawn and garden chemicals.

Action 7: Manage the impacts of construction development at the source to minimize pollution to surface and groundwater.

Another principle of LID is to manage the impacts of construction activities at the source. Examples of this technique would be to:

(a) Filter precipitation near to the point it reaches the ground using vegetated conveyance and treatment systems,

(b) Breaking up or disconnecting the flow of runoff over impervious surfaces,

(c) Providing source controls to minimize pollutants in storm water, and

(d) Re-vegetating previously cleared areas to help restore groundwater recharge and pollutant removal.

VISUAL QUALITY

Action 8: Establish written design standards to assist developers in adopting architectural designs for new commercial and mixed-use development compatible with the town's historic and rural character.

A great number of things make Tiverton a wonderful place to see, including beautiful landscapes, old buildings and some attractive newer developments. There should be aesthetic standards for commercial areas to encourage the creation of safe, attractive and efficient centers, rather than unsightly strips. The town has general standards for signage and the siting of development within commercial zones. These standards should be reviewed on a district-by-district basis. Additional design guidelines for commercial, mixed-use, and major residential developments governing signs, lighting, utility wires, landscaping, buffering, parking and the architectural style and design of development were included in amendments to the subdivision regulations in 2003. In 2005 the town initiated a design standards project to set more detailed building and site design criteria for new development in all commercial districts in town.

Action 9: **Adopt specific design standards for Tiverton Four Corners based on the Secretary of the Interior's 'Standards for the Treatment of Historic Properties' and the RIHPHC's 'Easy Guide to Rehab Standards'.**

Because of the special historic qualities of the area, the local commercial district around Tiverton Four Corners merits special consideration. The 2001 zoning revisions established a Village Commercial District for the Four Corners area. The name 'Village Commercial' does not recognize or appreciate the significance of the federal and state designation of the entire neighborhood as the 'National Register Tiverton Four Corners Historic District'. Additionally, written design guidelines for this area should be prepared with emphasis on architectural compatibility with the existing historic fabric and with pedestrian amenities, lighting, utility wires and signage.

Action 10: **Continue to identify natural and scenic vistas and apply standards for their protection as part of the Planning Board's development review process.**

NEW DEVELOPMENT IN FOUR CORNERS SHOULD COMPLEMENT ITS HISTORIC CHARACTER

SURFACE WATER AND GROUNDWATER SUPPLY

Action 11: Establish procedures to identify parcels of land that may contain significant sources of surface or groundwater pollutants and that might violate local, state and/or federal regulations.

Underground storage tanks (USTs) containing petroleum products and other hazardous materials pose a threat to surface and groundwater supplies. Most of these tanks are constructed of steel, with no corrosion protection. Currently, the Town prohibits new USTs and requires homeowners to register all existing USTs on their property. Federal law (Resource Conservation and Recovery Act, as amended) regulates commercial USTs.

Tiverton should determine the location of abandoned USTs that may be sources of pollution, and establish a program for their clean-up, removal and sealing. In addition, the Town should identify potential sources of pollution from gas stations and private pumps by maintaining current maps monitoring their locations. The RIDEM lists approximately 90 registered and regulated USTs at 30 locations in Tiverton. Figure 4-8 identifies locations of USTs that have experienced leaks and other hazardous sites as identified by RIDEM. Tough federal regulations (40 CFR 280-282) impose new construction, monitoring and reporting requirements on regulated USTs, and mandate specific remedial action if spills/releases occur. The Town currently issues an annual operating license to commercial UST operators, but should require documentation that operators are meeting all federal and state requirements as a condition for receiving an annual license.

The shipment of hazardous materials through Tiverton and the common disposal of household hazardous wastes are other potential sources of pollution that can injure soil and water resources.

In addition to USTs, soil contamination derived from coal gasification waste by-products (cyanide, petroleum hydrocarbons and semi-volatile organic compounds) in the Bay Street area continues to pose human health hazards and requires on-going monitoring and the development and funding of clean-up strategies. Also problematical is the presence in Town of motor vehicle junkyards where decaying vehicles are a potential source of oil and battery acid contamination. This hazard extends to all decaying motor vehicles.

The Town contains at least several former dumps that pre-exist state and federal regulation and that may contain pollutants derived from the industrial waste materials historically dumped by mills and factories in the region many decades ago. Efforts should be made to identify their location and develop and fund remediation measures.

Action 12: Review and update earth removal regulations, designed to protect groundwater, assure public safety and curb dust, noise and vibration caused by blasting.

Earth removal operations that involve quarrying of sand and gravel and the blasting of granite and other hard rock formations pose serious risks to groundwater quality and quantity. The Ordinances of the Town of Tiverton's Chapter 38, Article III 'Earth Removal', adopted in 2010, build upon and improve zoning language, adopted in 2001. However, additional measures may be needed.

STAFFORD POND

Action 13a: Establish a Stafford Pond Watershed Association that includes representatives of the water districts, town boards and commissions, residents and business people which have an interest in the watershed.

Action 13b: Work together with RIDEM, RIDOH, RIDOT and the Stone Bridge Water District to develop and implement a plan for recreational usage that protects and ensures Stafford Pond's long term viability as a drinking water source.

Action 13c: The Tiverton Open Space Commission (TOSC) should investigate the legal and financial feasibility of acquiring developed parcels in the Stafford Pond watershed. The TOSC, working proactively with the Tiverton Land Trust and the R.I. Chapter of The Nature Conservancy, should develop policies that place a higher priority on the acquisition of land in the Stafford Pond watershed in order to protect the Pond's water quality.

The protection of the Stafford Pond watershed is particularly urgent since the Pond is the town's principal supply of public drinking water, as distributed by the town's two water districts (see Chapter 7). The establishment of a citizen watchdog group for that watershed area could be particularly effective in monitoring activities which would impact water quality and educate citizens about the need for watershed protection. This group could also guide the development of a management plan for the Stafford Pond watershed. In addition, while the pond benefits from the restrictions contained in the Watershed Protection Overlay District and the use of best management practices at an abutting dairy farm and the Stafford Road storm water drain, the continued use of gasoline motors on the Pond is detrimental.

Some progress is being made to buy and preserve undeveloped parcels in Stafford Pond's watershed. However, developed parcels that abut the shoreline also contribute to water pollution. Unlike all other drinking water reservoirs in the state, Stafford Pond's east shore has numerous year-round and seasonal residences that pose the threat of polluted storm water run-off, pollution from failed septic systems and pollution from human recreational uses. This threat could be gradually reduced over time by a concerted program of buying shoreline parcels, removing buildings, paved areas and septic systems and returning the land to a natural state.

STAFFORD POND, THE TOWN'S PRINCIPAL PUBLIC DRINKING WATER SOURCE

NONQUIT POND

Action 14: Continue to monitor potential leachate contamination from the Tiverton landfill.

The City of Newport, which owns the water rights to Nonquit Pond, has worked in conjunction with the RIDEM and the Town to protect the watershed through the acquisition of land. These efforts were reinforced when the Watershed Protection Overlay District was extended to the Nonquit Pond watershed as part of town-wide zoning amendments adopted in 2001.

However, the Tiverton landfill is located within the Nonquit Pond watershed, and Borden Brook, which feeds Nonquit Pond, also drains from the landfill. There is clearly potential for contamination by leachate from the landfill. In 2001, the Town Council established a Landfill Committee to monitor possible leachate contamination of Cedar Swamp, Nonquit Pond and private drinking water wells in the area. New monitoring wells have been built and both groundwater and surface water testing has been intensified. Control measures to curb both leachate and surface water runoff through contouring and a new retention pond are being implemented. Closure of the landfill began in 2018. See Action 11 for a brief discussion of contaminants from other Town landfills/dumps that pre-date state and federal regulation.

It should be noted that measures designed to protect Nonquit Pond's water quality also benefit the water quality of drinking water wells which serve the needs of south Tiverton residents.

Action 15: Utilize the services of URI Cooperative Extension to update and improve regulatory requirements in the Zoning Ordinance Article VIII Watershed Protection Overlay Districts.

Tiverton is blessed with an abundance of source water capable of human consumption. But prudent steps must be taken now to assure potable water quality in both ponds ten and twenty years from now when drinking water will be an even more precious commodity than it is at present.

WETLANDS

Action 16: Preserve wetlands to protect groundwater recharge areas, control flooding and preserve wildlife habitats by ensuring compliance with the Rhode Island Freshwater Wetlands Act. Consider additional regulatory measures to protect freshwater wetlands and jurisdictional wetland buffers, consistent with state enabling legislation.

The vast inland and coastal wetlands of the town serve essential functions for water quality such as providing groundwater recharging areas and wildlife habitat. They also assist in flood control as storage areas, and act as giant sponges that slow the velocity of storm water runoff.

The RI Department of Environmental Management has responsibility for the identification of wetlands, the determination of their significance and the regulation of activities that would lead to their decline. An ongoing program to monitor potential infractions of wetlands should be conducted at the local level. Zoning regulations adopted in 2001 require a minimum building area that excludes wetlands and other means to protect these vital natural resources.

COASTAL FEATURES

Action 17: Update the Harbor Management Plan as necessary to ensure protection of environmentally sensitive areas, as required by the CRMC.

There are three components to the Tiverton coastline: the harbor area around the Tiverton Basin, the scenic coastline to the north and south, and the coastal environmental features at Fogland and Seapowet Marshes. Each of these areas requires a different treatment.

The harbor area is Tiverton's working waterfront and is important to the town's economy. It is regulated in accordance with an approved and periodically revised Harbor Management Plan. This plan covers the operation of the Harbormaster's Department, which controls mooring assignment and fee collection, as well as oversight of the Harbor Patrol, which is responsible for boating safety and rescue missions. The Harbor Management Plan, which balances marine uses with protection of the ecosystem, must be approved, when amended, by the RI Coastal Resources Management Council (CRMC).

Action 18: Consider standards for the protection of coastal scenic views as part of the Planning Board's subdivision review process.

Tiverton's scenic coastline contains unique features and vantage points that add to the town's waterfront character. Views from the coastline and from the water to the coastline are important assets that merit preservation. Key vantage points should be identified. Siting of structures along the coastline should consider the impact on coastal views, and the siting of facilities within environmentally sensitive areas of the coast should consider their impact on the area's natural and scenic qualities.

TIVERTON IS KNOWN FOR ITS COASTAL SCENERY

Action 19: Create a study committee to investigate municipal policy options to protect upland areas adjacent to coastal wetlands.

Tiverton could lose up to half of its existing coastal wetlands as a result of sea level rise. The Town should plan for coastal adaptation and resiliency measures for the preservation of upland areas adjacent to coastal wetlands that are likely areas of coastal wetland migration to ensure the continuation of these important ecosystems within the town.

ENVIRONMENTAL QUALITY

Action 20: Enact and enforce the proposed amendments to the Soil Erosion and Sediment Control Ordinance as recommended in the Phase II Stormwater Management Plan. Adopt procedures in the Major Land Development and Subdivision Regulations to assure compliance with the Rhode Island Soil Erosion and Sediment Control Handbook and the RI Stormwater Design & Installation Standards Manual, which went into effect January 1, 2011.

The State of Rhode Island has promulgated standards for the abatement and control of soil erosion and runoff of sediments from construction sites. These standards, found in the RI Soil Erosion and Sediment Control Handbook and the RI Stormwater Design and Installation Standards Manual, are an important resource for review procedures, and serve as a starting point for technical guidelines for applicable construction operations, and for sand and gravel site operations and re-stabilization. Tiverton currently has a stringent soil erosion and sediment control ordinance written in accordance with state guidelines. The Phase II Storm Water Management Plan, adopted by the Town Council in 2003, calls for amendments to the Soil Erosion and Sediment Control Ordinance.

HISTORICAL AND ARCHEOLOGICAL RESOURCES

Action 21: The Historical Preservation Advisory Board should consider policies and programs to encourage the preservation of historic buildings consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties as interpreted by RIHPHC's Easy Guide to Rehab Standards.

The Tiverton Historical Preservation Advisory Board was established by the Town Council in 2010. It is a voluntary program to advise and assist property owners on historic preservation matters, and to create community awareness of the benefits of preservation. This board should also coordinate efforts regarding the proposed Seapowet Archaeological National Register District with the Rhode Island Historical Preservation and Heritage Commission.

With nearly 100 structures either on or potential candidates for the National Register of Historic Places, and another 100 that have been documented by the Historical Preservation Advisory Board, the wealth of historic buildings and structures in Tiverton is notable. These resources strongly influence the character of broad areas of the town, such as Stone Bridge, Bridgeport, Nanaquaket and Punkateest. Yet the town has suffered the demolition of many significant structures in recent years. Demolition, alteration and new construction all have the ability to radically alter the qualities of the community that attract residents and visitors alike. The town's historical resources are not as well documented as they should be. The state survey is not current and many properties eligible for the State and National Register listing have not been listed. Better documentation is needed. This service could be a charge of a local Historical Preservation Advisory Board.

Action 21A: Investigate the feasibility and benefits of historic district zoning in appropriate neighborhoods

Rhode Island law (Chapter 24.1) provides for historical area protection. Although an historic Zoning Ordinance was rejected in the early 1990s, the Town should reflect upon the reasons for defeat and continue to search for ways to encourage the preservation of its historic treasures in the absence of implementing historic district zoning. These steps may include ongoing education regarding the value of historical structures.

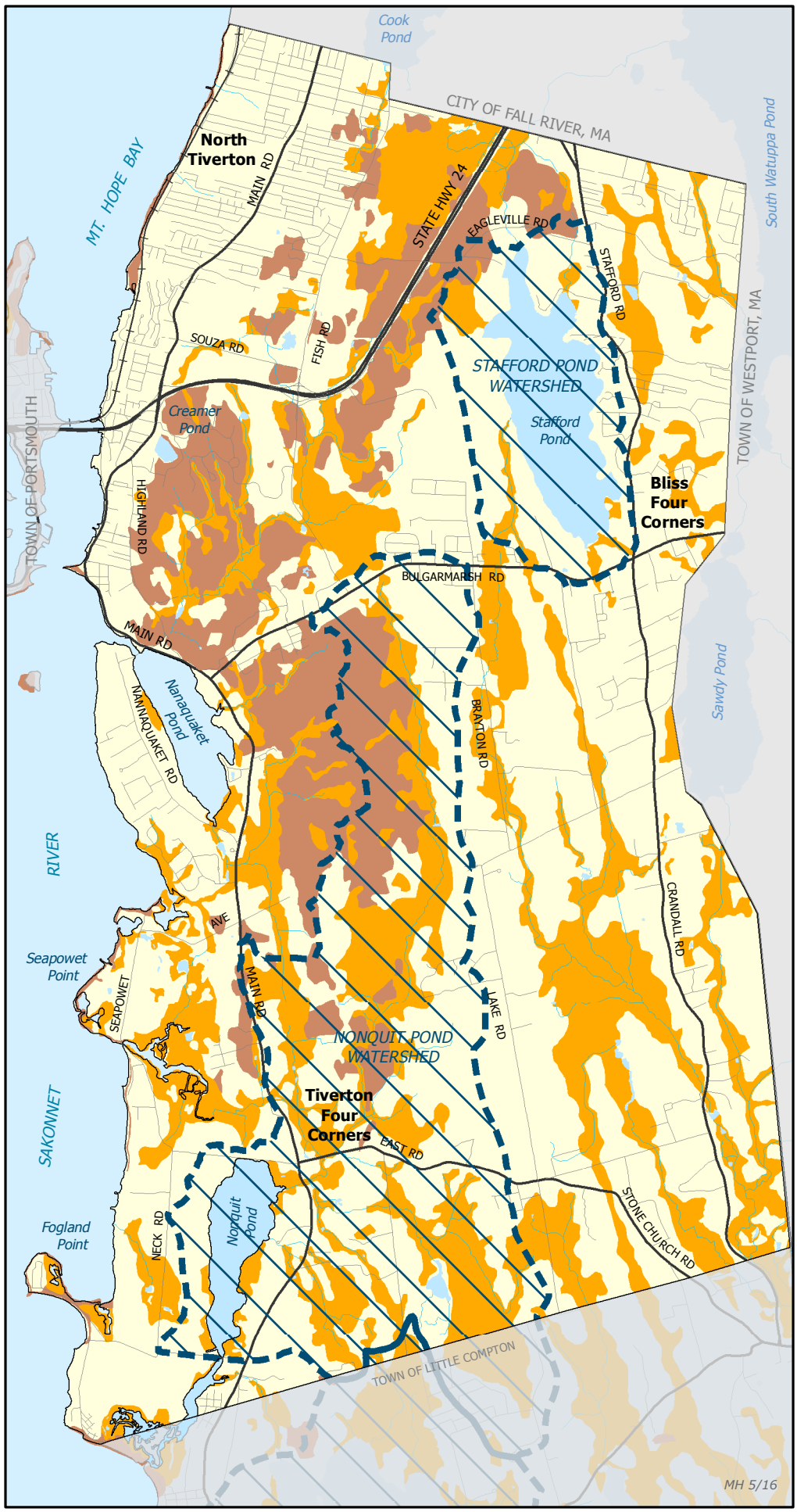
Action 22: Solicit assistance from the Rhode Island Historical Preservation and Heritage Commission to acquire funds to study the origins of the Eight Rod Way archeological remains and develop a protection strategy that correlates with the open space preservation effort described in Chapter 9.

In the original plat of the great lots that comprised the chartered Town Plan for the Pocasset Purchase in 1680, an Eight Rod Highway was laid out as the eastern boundary. Down through history, however, the town grew in different directions, with other roadways becoming more frequented thoroughfares. That portion of the original Eight Rod Highway between Bulgarmarsh Road and East Road ceased to be used and became overgrown by forest. However, there are considerable archeological remains, including stonewalls, cellar holes and dug wells. These remains could represent an extremely valuable link to the original settlement history of the town, and as such should be studied and preserved.

Action 23: The Historical Preservation Advisory Board should undertake an initiative to locate and secure copies of colonial era Land Evidence Records that are presently located outside of Tiverton.

The research that is needed to reconstruct the town's colonial history, particularly with regard to settlements along Eight Rod Way, is severely hampered because of the absence of Town Land Evidence Records prior to the mid-18th century. This reflects the era when Tiverton was part of Plymouth, then the Massachusetts Bay Colony, where Tiverton Land Evidence Records from that time were filed. Unfortunately, those records were never transferred, nor systematically copied and filed in the Tiverton Town Clerk archives. This void hampers not only historical research, but also legal research associated with deeds, titles and surveys.

EIGHT ROD WAY, A LINK TO TIVERTON'S EARLY HISTORY



SOILS DEVELOPMENT GROUP

- GROUP 4 - HYDRIC SOILS, SEVERELY HIGH WATERTABLE (0-18" DEPTH)
- GROUP 5 - BEDROCK & SLOPE CONSTRAINTS (>15% SLOPE)

- SURFACE WATER RESERVOIR WATERSHED
- PONDS, OPEN WATER
- STREAMS
- MINOR ROAD
- MAJOR ROAD
- RAILWAY

Source: USDA/NRCS Soils 2014.

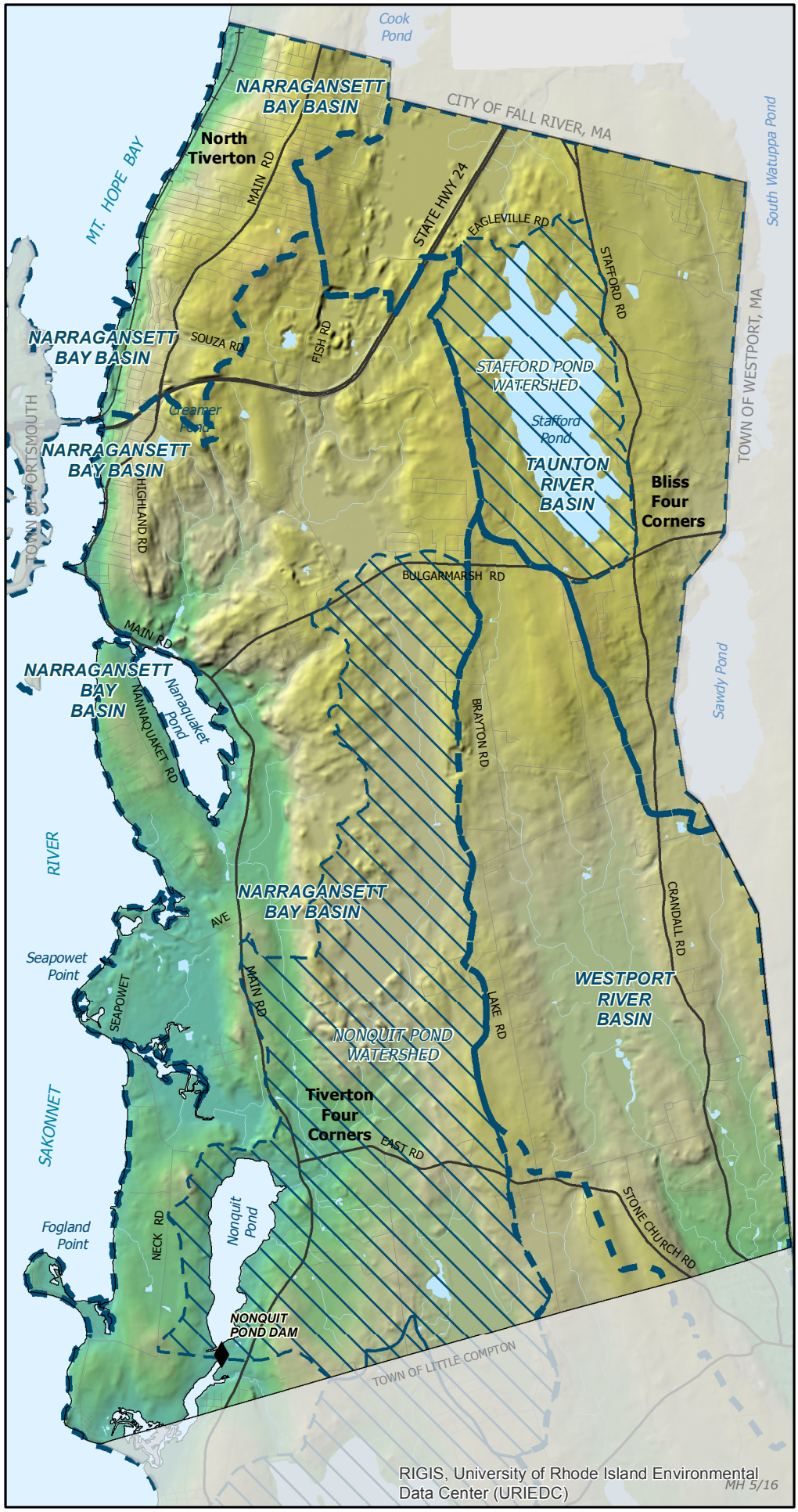
N

0 1 Mile

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Mapping and Planning Services for general reference, informational, planning and guidance use, and is not a legally authoritative source as to the location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. The Town of Tiverton or MPS makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 4-1
SOILS CONSTRAINTS



DRAINAGE BASINS

SURFACE WATER RESERVOIR WATERSHED

DAMS

PONDS, OPEN WATER

STREAMS

MAJOR ROAD

MINOR ROAD

RAILWAY

Source: Shaded Relief (USGS 2011 LiDAR) courtesy of RIGIS and URI-EDC. Surface Water Drainage Basins (RIGIS). Dams (RIGIS, 2014).

N

0 1 Mile

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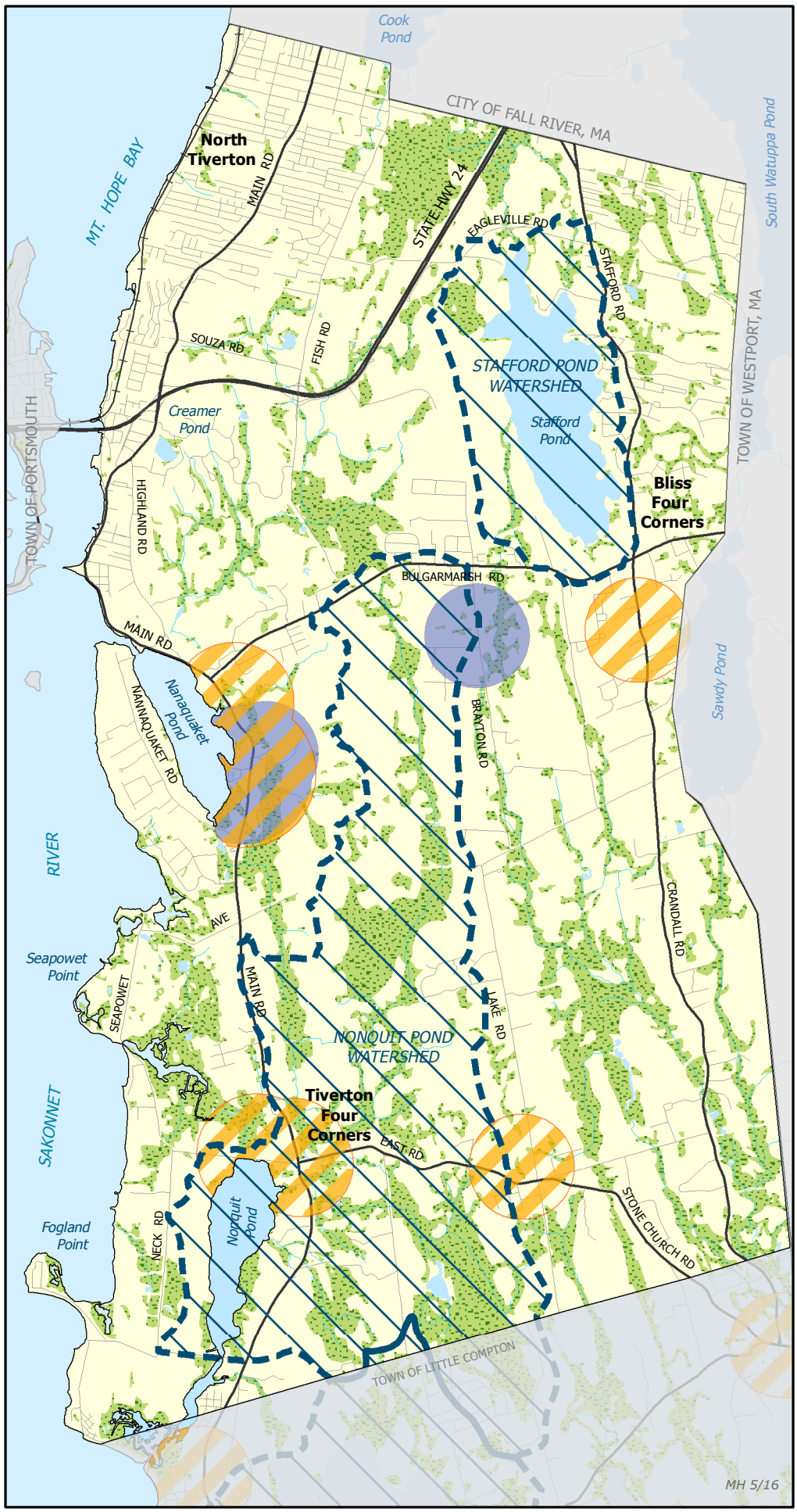
TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 4-2 TOPOGRAPHY & DRAINAGE



PONDS, OPEN WATER

STREAMS

SURFACE WATER RESERVOIR WATERSHED

NON-COMMUNITY WELLHEAD PROT'N AREA

COMMUNITY WELLHEAD PROT'N AREA

WETLANDS

MINOR ROAD

MAJOR ROAD

RAILWAY

Source: RIGIS, Wetlands (1988), RIDEM Community and Non-Community Wellhead Protection Areas (2012), and RIDEM Surface Water Protetction Areas.

N

0 1 Mile

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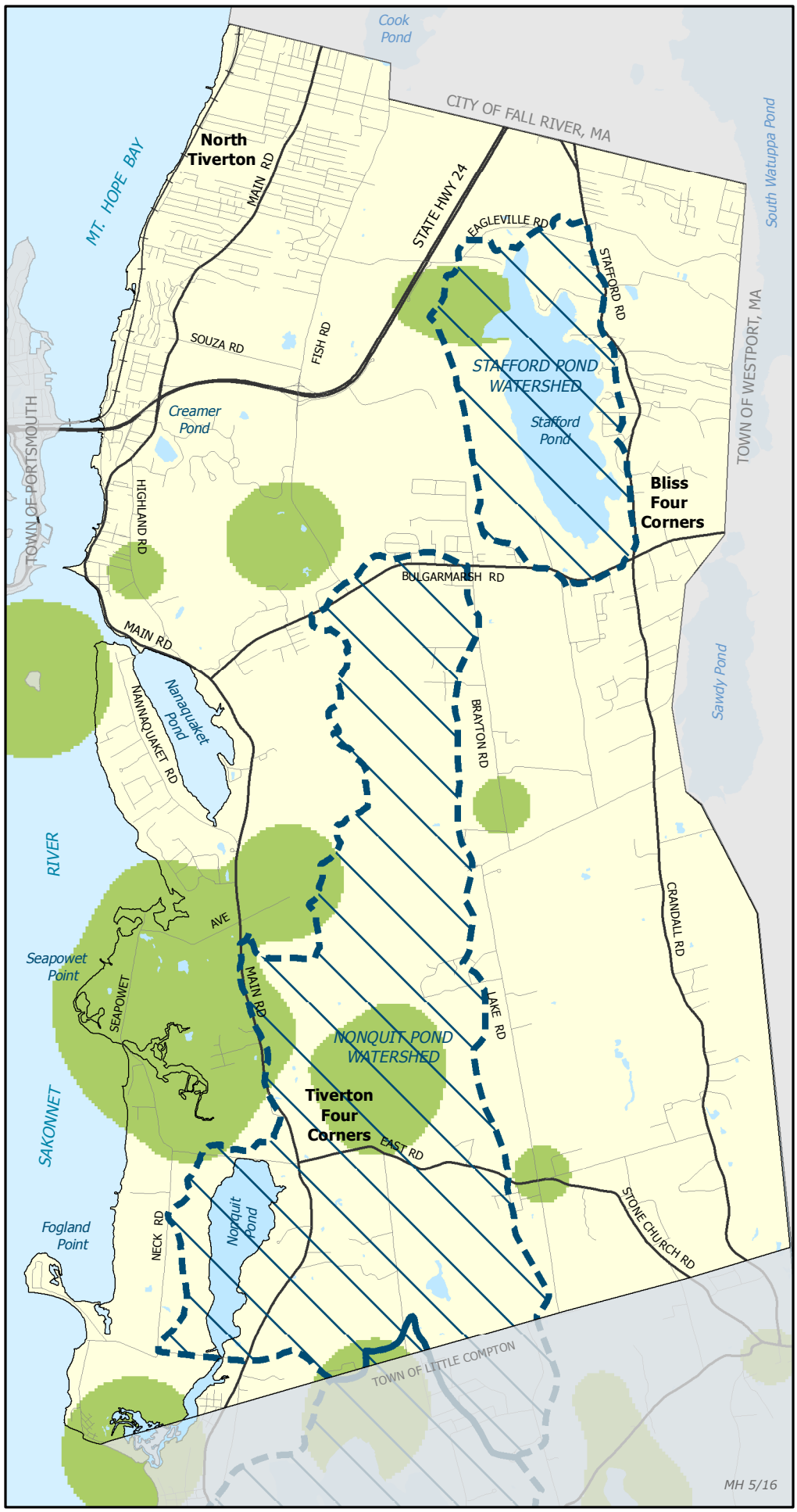
TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 4-3
WATER RESOURCES



NATURAL HERITAGE AREAS

PONDS, OPEN WATER

SURFACE WATER RESERVOIR WATERSHED

MINOR ROAD

MAJOR ROAD

RAILWAY

Source: RIDEM (2014).

N

0 1 Mile

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TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 4-4 NATURAL HERITAGE AREAS

PRIME FARMLAND SOILS

STATEWIDE IMPORTANT FARMLAND SOILS

AGRICULTURAL LAND USE (2011) -- PASTURE, CROPLAND, ORCHARDS, IDLE FARMLAND, etc.

AGRICULTURAL DEVELOPMENT RIGHTS ACQUIRED

PONDS, OPEN WATER

MAJOR ROAD

MINOR ROAD

RAILWAY

Sources: RIGIS (2011) Land Use Land Cover, RIDEM (2014) Local and State Conservation Lands data, and RIGIS/USDA Soils 2012.

N

0 1 Mile

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TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 4-5
CRITICAL FARMLANDS

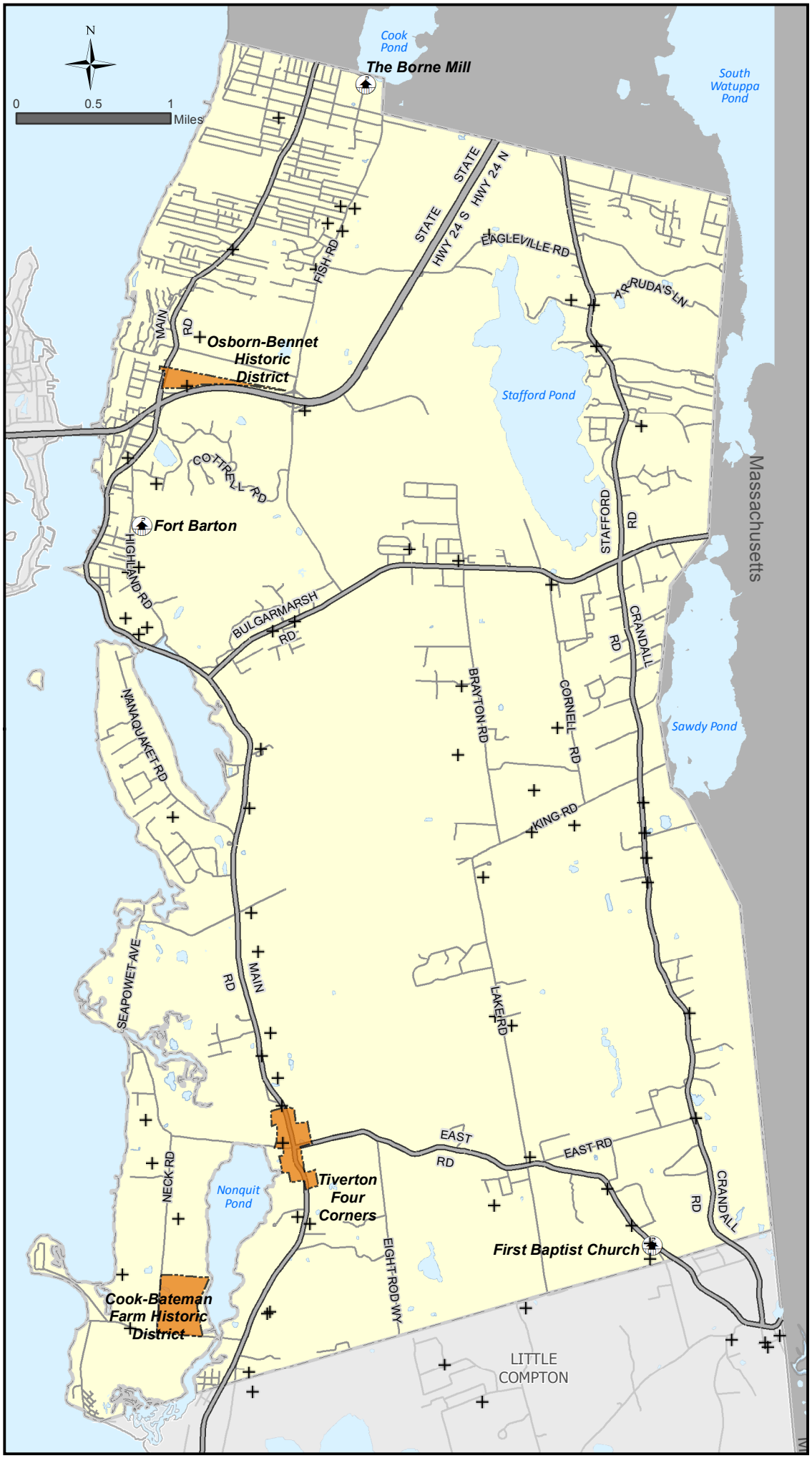


Figure 4-6
HISTORIC RESOURCES

TOWN OF TIVERTON RHODE ISLAND

Comprehensive Plan, 2018

Map Legend

- National Register Districts
- National Register Sites
- Historical Cemeteries

Features

- Highways
- Roads
- Open Water

Boundaries

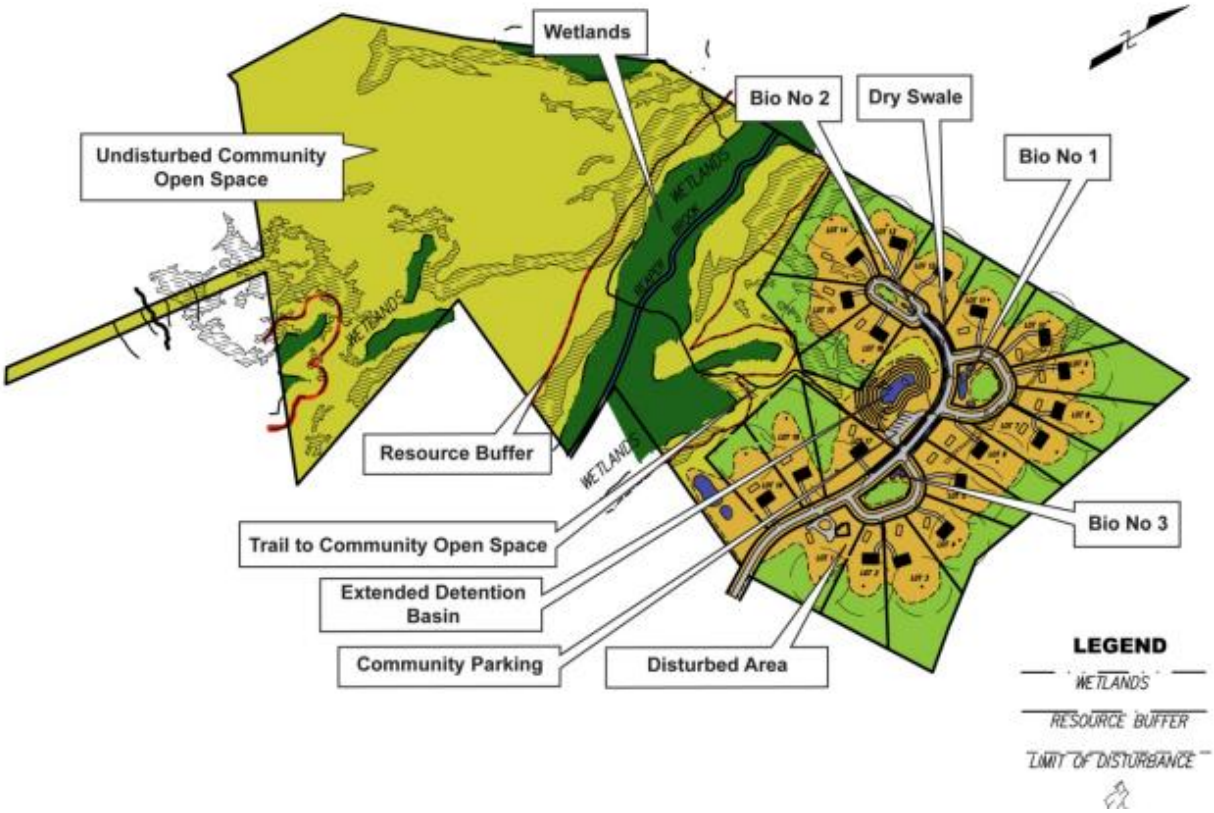
- Little Compton
- RI Municipal
- Other States

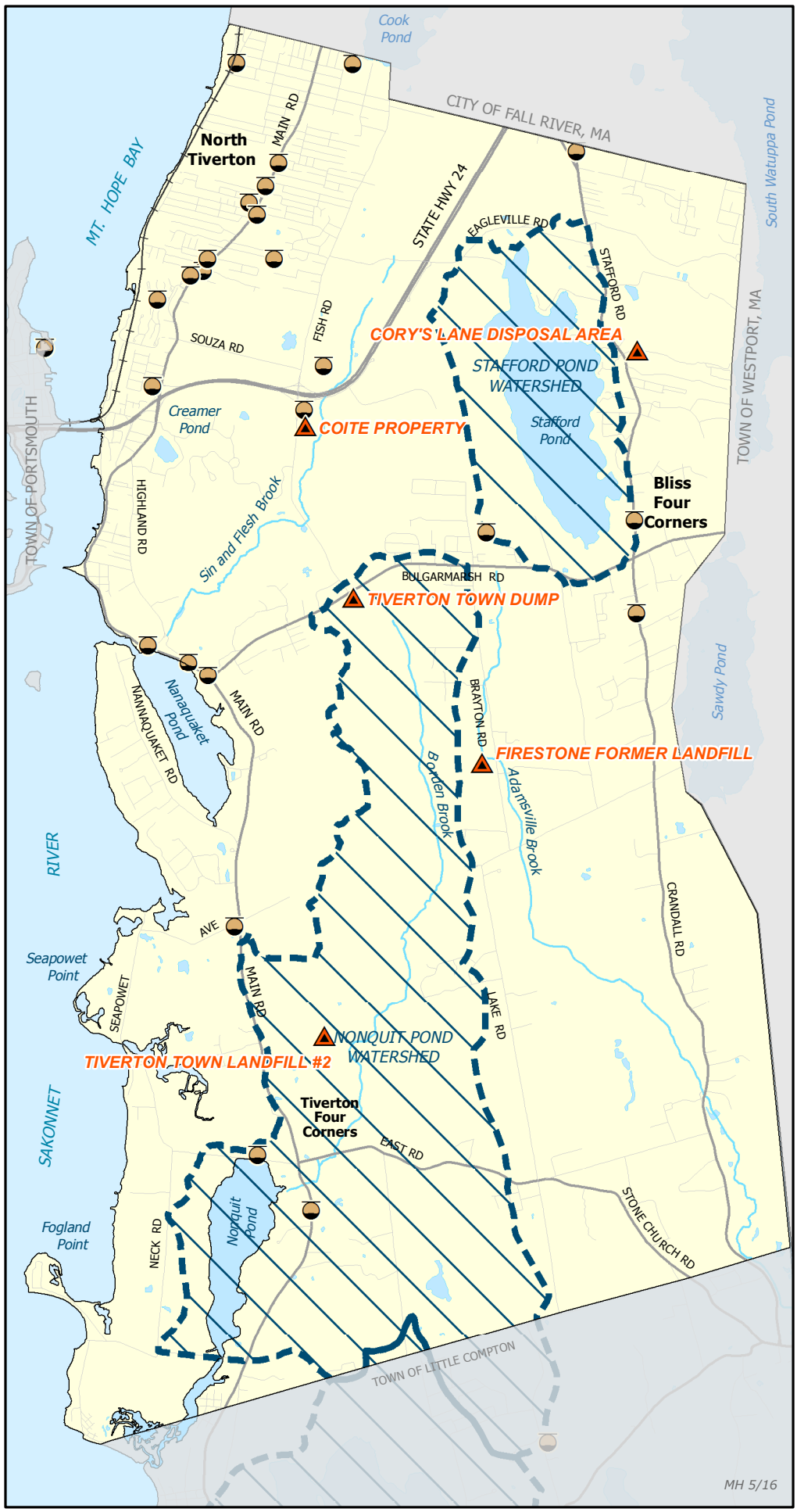
Refer to Table 4-1 for additional information.

RIGIS

Date: 1/29/2018

Figure 4-7: Site Design: Conventional Versus Conservation





APPROXIMATE LOCATION OF HAZARDOUS MATERIAL SITES DESIGNATED BY THE U.S. EPA and RIDEM

UNDERGROUND STORAGE TASKS USED FOR PETROLEUM & CERTAIN HAZARDOUS SUBSTANCES THAT HAVE EXPERIENCED LEAKS AS DETERMINED BY RIDEM.

SURFACE WATER RESERVOIR WATERSHED

MAJOR STREAMS

PONDS, OPEN WATER

MAJOR ROAD

MINOR ROAD

RAILWAY

Source: RIGIS (2013) LEAKING UNDERGROUND TANKS IN RHODE ISLAND. RIGIS (1997) CERCLIS POTENTIAL HAZARDOUS WASTE SITES IN RHODE ISLAND. TOWN OF TIVERTON (2015).

N

0 1 Mile

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TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 4-8
HAZARDOUS SITES

LAND USE


NEW PUBLIC LIBRARY
RECREATIONAL AREA
Mixed-Use with Retail
Community Building
Affordable Housing
PRESERVED AGRICULTURAL SPACE
Wind Turbine
Resident Farmer House, Barn and Ecosystem
Community Artists' Studio
Open Space (17.6 acres)
Market-Rate Housing

5.0 LAND USE PLAN

5.1 Current Land Use

Tiverton occupies 35.5 square miles on the eastern shore of the Sakonnet River. The pattern of land use and development within this area includes four distinct sectors - north Tiverton, Stone Bridge, east Tiverton and south Tiverton.

North Tiverton, the area extending north and west of Route 24, is an area of older residential and commercial development. It includes neighborhood retail and service businesses along Main Road and residential development, primarily single-family units, on the side streets. Along Main Road, small-scale strip commercial uses prevail. The west side of Fish Road, the other north-south corridor in this area of town, is primarily residential while the east side consists of industrial land. This industrial area has seen steady development in the past several years. The vicinity of the Route 24 - Fish Road intersection is an evolving nexus of major non-residential uses. Along the Fall River border is the Bourne Mill, an historic and architecturally distinctive 19th century mill building, which has been redeveloped for residential housing, including affordable units.

Other significant land uses in north Tiverton include Pocasset Elementary School, the eight-acre Pocasset Park, and the age-restricted condominium community called Villages at Mount Hope Bay. One area of specific concern in north Tiverton is the area of Bay Street, where soil contamination was discovered in 2002. Approximately 100 homes were identified as having toxic material within their property boundaries. While remediation is substantially complete for those properties on an as-built basis, there remain significant risks for future development and excavation in the subject area.

South of Route 24 on Main Road is Stone Bridge, one of the historic areas of Tiverton. This area has a maritime atmosphere, with active waterfront uses backed by older residences and several institutional uses. The residential upland is dominated by 19th century homes that give the area its historic character. Waterfront uses include the public Grinnell's Beach, several commercial establishments, the Tiverton Yacht Club, a boat launch, and several marine-related businesses along the Sakonnet River. Recently the Town completed the purchase of the old Seaside Gas station adjacent to Grinnell's' Beach, and has begun a visioning process with the community to determine the best plan for integrating it into the existing beach and park. Also adjacent to the beach is the Stone Bridge abutment, the remains of the old Stone Bridge that connected Tiverton to Portsmouth. The Town has undertaken a project to repair and improve the pedestrian access as well as upgrade the park and car entrance. Homes along Riverside Drive also capture the maritime flavor; several are built on pilings along the shoreline. Other land uses include Fort Barton Elementary School, the Town Hall, and Fort Barton with its Revolutionary War redoubt.

East Tiverton, the area east of Route 24 and north of Bulgarmarsh Road, is predominantly residential. A commercial area at the intersection of Bulgarmarsh Road, Stafford Road and Crandall Road is known locally as Bliss Four Corners, although additional commercial uses extend north along Stafford Road. The Tiverton High School, Tiverton Middle School and Ranger Elementary School are within this area of town, as is the new Bulgarmarsh recreation area, and Sandywoods, an affordable residential arts and agriculture community. The new Tiverton Public Library that opened in 2015 is also located in the Bliss Four Corners, as is Stafford Pond, a principal

source of the town's water supply. Stafford Pond is generally surrounded by residential use with some protected areas along its southwestern shores. West of Stafford Pond, in the area of Route 24 and Fish Road, are municipal uses including the Public Works garage and Police facility, as well as the 228-acre Business Park, whose occupants, as of 2018, are a natural gas-generated electric power plant and a fitness and sports complex. Recently, the Town has seen significant interest in the Business Park and it is expected that several new ventures could be initiated in the near future. Off Stafford Road in the northeast corner of town is an age-restricted manufactured home community called Countryview Estates.

Tiverton Public Library

Another recent area of development in northeast Tiverton involves the casino gaming facility to be developed at the intersection of William S. Canning Boulevard and Stafford Road which will be licensed as a pari-mutuel facility and offer State-operated video lottery games and State-operated casino gaming, such as table games.

On November 8, 2016, the voters in the Town of Tiverton and the State of Rhode Island approved and authorized via affirmative referenda vote, a casino gaming facility to be located in the Town of Tiverton, in accordance with an overall plan of a gambling facility as defined by R.I. Gen. Laws §41-9-1 as set forth in the November 9, 2015 proposal to the Tiverton Town Council.

The overall plan includes restaurant, entertainment and retail venues within the casino, a hotel, shared structured parking and shared surface parking.

South Tiverton, the area south of Bulgarmarsh Road, remains mostly rural and agricultural in character, though suburban-style residential subdivisions are increasingly fragmenting the area. Large estates lie along the shoreline, with small residential developments on Crandall Road, King Road, Brayton Road, Lake Road and East Road, and some large parcels in agricultural use. The historic Tiverton Four Corners has developed into a charming commercial area, and a small commercial cluster exists at the intersection of East and Lake Roads.

Much land has been set aside for open space and to protect environmentally sensitive areas, notably Reucker's Wildlife Preserve, Seapowet Marsh, Fogland Marsh, Pardon Gray Preserve, Eight Rod Management Area and Weetamoo Woods. Additionally, Nonquit Pond and its watershed cover a significant area. This is part of the City of Newport's public water system, and a zoning

overlay to prevent intensive development and protect the watershed is now in place as it is for Stafford Pond.

Specific land uses in south Tiverton include Union Public Library, just north of Tiverton Four Corners, and a significant recreation area called the Town Farm located on Main Road. The Tiverton landfill is located to the east of this recreation area. The area around Four Corners is a National Register Historic District and much of the commercial portion of it is zoned Village Commercial, a district created to protect its historic character. The Seapowet and Fogland areas, including Fogland Beach, are significant environmental, scenic and recreational resources.

SEAPOWET COVE

Tivertonians have indicated that future development be in harmony with Tiverton's "small town, rural character" and this phrase appears repeatedly in this document. Both the data gleaned from the Community Comprehensive Plan Public Open Houses as well as historical public hearing testimony from specific large proposals, indicate a majority of participants share similar viewpoints regarding future development. Defining this concept is a key component in understanding the community's perspective.

Tiverton is not homogenous from a development standpoint. There are areas that are rural, others that are more suburban-like, business districts, and industrial areas. The southern portion of Tiverton is distinctively rural with significant open space and farmland. Importantly though, other areas of town still manage to retain certain rural features, with scattered farmsteads, stonewalls, and older, historic buildings.

Much of the specific character can be traced to Tiverton's history over the past three centuries. The Main Road and Stone Bridge business areas still include properties and buildings that embody the history and development patterns of three hundred plus years. The dense and compact development patterns of north Tiverton as well as the tidy neighborhoods abutting Main Road harken to a time when neighboring Fall River was an industrial force in the area. Small, family-owned farmsteads continue to operate next to industrial uses. The layouts of many of our main roadways are virtually the same as those traveled by residents of 17th century Tiverton. A lot of areas in Tiverton have open view vistas to the Sakonnet River, to open fields or wooded upland. These examples contribute to the nature of Tiverton. The historical context is visible; it's retained and embodied in our land use and development.

BANK AT BLISS FOUR CORNERS

Tiverton residents struggle with the necessity of establishing diverse land uses that include more commercial and industrial uses, which today constitute less than seven percent of the land area, and would increase the tax base, with the desire to maintain the rural community character that is unique to Tiverton. Land areas must be carefully chosen where there is direct access to highways and transportation for commercial and industrial use. Such commercial and industrial development should be evaluated in accordance with the character of the town, the needs of the community, and potential impact locally, as well as, town-wide.

Many Tivertonians feel that the absence of such "sprawling" development is what makes Tiverton unique among its neighbors and helps to define the "small town, rural character" of Tiverton. Particularly with regard to commercial development, a majority of Tiverton residents are open to commercial growth in a scale and nature that is compatible with and helps to maintain Tiverton's unique identity. Tiverton has a visual quality and character that is unique as opposed to ubiquitous. Residents indicate that they are welcoming of development that can be woven into the character of the community and opposed to development that would simply erase it.

Table 5-1 and Figure 5-1 show generalized land use based on land cover data obtained from the Rhode Island Geographic Information System (RIGIS) for the year 2011. The breakdown of land use by acreage is as follows:

Table 5-1: Current Land Use in Acres, 2011

Land Use	Acreage	Percentage
Low Density Residential (> 2 acre lots)	285	1.15%
Medium Low Density Residential (1 to 2 acre lots)	496	2.00%
Medium Density Residential (1 to 1/4 acre lots)	1,747	7.03%
Medium High Density Residential (1/4 to 1/8 acre lots)	1,519	6.12%
High Density Residential (< 1/8 acre lots)	166	0.67%
Commercial (including Commercial Mixed-Use)	268	1.08%
Institutional (including cemeteries)	95	0.38%
Transportation and Utilities	266	1.07%
Airports	2	0.01%
Developed Recreation (including beaches)	138	0.56%
Agricultural	1,887	7.60%
Vacant / Transitional	129	0.52%
Water	1,059	4.26%
Wetland	518	2.09%
Mines, Quarries, Gravel Pits	159	0.64%
Waste Disposal (Landfills and Junkyards)	137	0.55%
Deciduous Forest (>80% hardwood)	13,953	56.18%
Mixed Forest	1,491	6.00%
Softwood Forest (>80% softwood)	273	1.10%
Brush land	250	1.01%
Total	24,838	100%

Source: RIGIS Land Use and Land Cover, 2011

5.2 Land Use Regulation

The establishment of land use districts through zoning is the most widely applied method of regulating land use. The Town's original Zoning Ordinance was adopted in 1964, with a revision in 1970. A complete rewrite was done in 1994 to comply with the Rhode Island Zoning Enabling Act. To ensure consistency with the goals and objectives of the Tiverton Comprehensive Plan that was certified by the State in 1997, major revisions to the Zoning Ordinance were approved in 2001. These included provisions for Rural Residential Developments, the addition of a watershed protection overlay district for Nonquit and Stafford Ponds, the creation of a Village Commercial District for Tiverton Four Corners, a new Open Space/Conservation District, and a new Waterfront District. In 2014, a significant rezoning of the General Commercial District was enacted, which resulted in the creation of three new commercial zoning districts.

Land use is now controlled with four residential districts, seven commercial districts, one industrial district and an open space district as well as the aforementioned Watershed Overlay District. Table 5-2 below reflects the acreage within each existing zoning district, while Table 5-3 summarizes the existing zoning districts, their intent and basic area standards. Figure 5-2, the Tiverton Zoning Map, illustrates the distribution of these use districts throughout the town.

TABLE 5-2: Land Use by Zoning District, 2014

ZONING DISTRICT	ACREAGE	PERCENT BY LAND AREA
VC	13	0.07%
GC	26	0.13%
HC	174	0.89%
I	1409	7.19%
W	160	0.82%
TMS	10	0.05%
NB	44	0.22%
PFD	78	0.40%
R-30	998	5.10%
R-40	1489	7.60%
R-60	2576	13.15%
R-80	10,055	51.33%
OS	1,635	8.35%
Ponds	921	4.70%
TOTAL	**19,588**	**100.00%**

Source: Tiverton Planning Department

Table 5-3: Zoning Districts

DISTRICT	Description (minimum lot areas and allowable uses)
Residential	
R-30	30,000 sq. ft. lots; single- and two-family residential, multi-family, nursing and retirement homes with special use permit
R-40	40,000 sq. ft. lots; single-family residential, nursing and retirement homes with special use permit
R-60	60,000 sq. ft. lots; single- and two-family residential, multi-family, nursing and retirement homes with special use permit
R-80	80,000 sq. ft. lots; single-family residential, nursing and retirement homes with special use permit
Commercial and Industrial	
VC	12,000 sq. ft. lots; small scale retail and commercial uses, design standards for preserving historic character (e.g. Tiverton Four Corners).
GC	12,000 sq. ft. lots; general commercial, community retail and service uses
TMS	10,000 sq. ft. lots, small scale retail and commercial on the first floor with office space or residential above
NB	15,000 sq. ft. lots, community oriented retail, commercial and services; multi-family, apartment houses and mixed-use residential.
PFD	12,000 sq. ft. lots, commercial, retail and services uses. Multi-family, apartment houses and mixed-use residential
HC	20,000 sq. ft. lots; businesses requiring larger areas and highway access
W	10,000 sq. ft. lots; non-residential and mixed-use along Sakonnet River principally for marine dependent commercial uses
I	40,000 sq. ft. lots; industrial uses, including technology and office parks
OS	Coastal land and open space

In addition, the Watershed Protection Overlay District regulates development around Stafford and Nonquit Ponds in order to protect the quality of public drinking water. The overlay areas limit density of residential development, provide for a buffer from the shorelines, and restrict the use of chemicals, fuels, pesticides and other sources of contamination. The Overlay District regulations also require an environmental review statement for proposed developments, which allows the Planning Board to require additional constraints or restrictions on the development.

In 1987, an ordinance was adopted to provide for cluster developments. It allowed modification of certain zoning requirements in order to preserve open space or create recreation areas within a subdivision. As part of the 2001 Zoning Ordinance revisions, the Cluster Ordinance was replaced by regulations that provide for subdivision designs called Rural Residential Developments. This type of development incorporates conservation by design techniques to permit smaller house lots and open space preservation. It also allows privately maintained roads for special subdivisions where oversized lots are created (rural compounds). Road frontage requirements can also be relaxed under certain circumstances with common driveways used in order to decrease the number of curb cuts. Rural Residential Developments are meant to preserve rural character, protect the environment, and lower the long-term public tax burden by decreasing the cost of infrastructure maintenance.

Provisions for elderly housing have also been added to the Zoning Ordinance. The Manufactured Home Elderly Community (MHEC) regulations provide for self-contained communities of moderately priced housing for residents age 55 and older. Other new uses provide for retirement and continuing care facilities, and the Age-Restricted Mixed-Use Community (ARMUC) regulations were established to allow the creation of the Villages on Mount Hope Bay.

Finally, a Large Scale Office Park Development (LSOPD) Ordinance was written to allow the development of a technology/office park within the Industrial District for a site that has a minimum area of 125 acres and is serviced by public water and sewer.

The Tiverton Subdivision Regulations provide the procedures and standards for the division of land, as well as the specifications for street and infrastructure improvements. The subdivision regulations were completely rewritten in 1995 to conform to the Rhode Island Land Development and Subdivision Review Enabling Act. Major amendments in 2003 and 2014 adopted by the Planning Board provided complementary language for commercial and residential development, added site and building design standards for review of commercial and industrial developments, as well as enhanced aesthetic and environmental standards relating to residential subdivisions.

5.3 Development Trends

According to the 2010 U.S. Census, in the decade between 2000 and 2010 the population of Tiverton grew by 3.4%, in comparison to the State of Rhode Island as a whole, which grew by 0.4%. This represents a slowing from the previous decade where Tiverton grew by 6.6%. Along with single-family development projects, large scale multi-family residential developments including the Villages at Mount Hope Bay, Countryview Estates, Bourne Mill, and Sandywoods were built during that time period. Commercial development has included small establishments along Main Road in north Tiverton, at Bliss Four Corners, Stafford Road, and Fish Road.

However, Tiverton is increasingly being influenced by a regional real estate and commercial development market centered in the greater Boston area. Its location in southeastern New

England, convenient highway access, and land available for development have resulted in additional development pressures. This will only be increased with the potential construction of commuter rail service from Fall River to Boston.

Current data from Rhode Island Statewide Planning forecasts limited population growth of approximately 1,150 new persons through the year 2040, yet there are local factors that may add to development pressure. They include: (1) the possible expansion of public sewer service to much of northwestern Tiverton, from the Stone Bridge area north to the state line, (2) interest in the development of the area abutting Route 24 and (3) the development of the Tiverton Business Park, which has significant employment potential and could also result in a demand for both residential and commercial development.

5.4 Build-Out Analysis

A comprehensive build-out analysis completed in early 2006 estimated future residential development potential in Tiverton. The estimated potential number of dwelling units that could be built as-of-right in different areas of the town was calculated based on existing zoning and using digital data from the Rhode Island Geographic Information System (RIGIS).

The acreage of developable land within each zoning district was calculated by eliminating land already developed, land protected from development and land with physical constraints (wetlands and steep slopes). Factoring development activities and conservation easements applied since the 2006 analysis generated updated statistics for this document. Data was also cross-referenced against historical building permits issued. Limitations of the available digital data and the need to make certain assumptions necessitate that the overall and site-specific results should not be used for anything other than general planning purposes.

The current build-out analysis projected that an additional 3,186 single-family dwelling units could be developed as-of-right in Tiverton based on the land available for development and the zoning in place as of 2014. Under this scenario, the total single-family units at build-out would equal 10,653. The acreage within each zoning district is summarized in Table 5-4. An important note is that these numbers represent single-family units only. Zoning changes enacted in 2014 greatly expanded options for mixed-use, two-family and multi-family units. Approximately 3,706 acres of land are now in zoning districts that allow multiple dwelling units by right or special use permit. There is very limited historical data to project the number of dwelling units that may be constructed as other than single-family, but it is expected that Tiverton will see marked growth in categories other than single-family, which would increase the total number of dwelling units significantly.

Figure 5-3 *Conservation Opportunity Areas* identifies high-value areas for safeguarding Species of Greatest Conservation Need (SGCN) and the full complement of Rhode Island's wildlife. These include the largest blocks of intact habitat in the state, referred to as Core Natural Areas; corridors that connect those Core Natural Areas; and sites, which are uniquely rare, resilient, or productive natural systems. These include natural heritage areas, ecological land units, wetlands and hydric soils, unfragmented forest blocks, green corridors, and ponds and streams. The information on this map was developed as a companion to the RI State Wildlife Action Plan, 2015.

TABLE 5-4: Potential Single-Family Residential Units by Zoning District, 2015

Zoning District	Total Acres	Vacant Lot Acres	Buildable Acres*	New SF Units-All Acreage
Village Commercial	13	.	0	0
General Commercial	26	0	0	0
Highway Commercial	174	0	0	0
Industrial	1,409	0	0	0
Waterfront	160	0	0	0
Traditional Main Street*	10	0	0	0
Neighborhood Business*	44	0	0	0
Pedestrian Friendly District*	78	0	0	0
Residential-30*	998	69	180	261
Residential-40	1,489	77	425	462
Residential-60*	2,576	292	950	601
Residential-80	10,055	975	3,650	1,862
Open Space	1,635	0	0	0
Waterbodies	921	0	0	0
Total	**19,588**	**1,413**	**5,205**	**3,186**

*Zoning Districts that allow mixed, and/or multi-family units.
Source: Tiverton Planning Department/RIGIS

5.5 Future Land Use

A significant component of a local Comprehensive Plan is the identification of future land uses based on the interrelationship of historic development patterns, natural characteristics of the land, the transportation network, the availability of public services and facilities, and the desire to protect the natural and scenic qualities of the community. Recommended future land uses, as illustrated on the Future Land Use Map (Figure 5-4), are based on the goals and policies of this Comprehensive Plan and represent Tiverton's land use blueprint for the future. The Future Land Use Map serves as a policy statement directing municipal decision-makers as to what types and intensities of land uses are desired in each area of town over a 20-year planning horizon.

The following section describes the future land use designations as illustrated on Figure 5.4 *Future Land Use Map*.

Publicly-Owned Open Space and/or Lands Zoned Open Space

Publicly-owned lands for open space and conservation and all lands currently zoned open space (some owned by environmental organizations) are depicted in dark green on the Future Land Use Map. The intent of this category of future land use is for the land to be preserved in a natural undeveloped condition, provide recreational opportunities, or preserve habitat areas or agricultural use.

Privately-Owned Open Space Zoned Residential and/or Privately-Owned Agricultural Land Zoned Residential

Lands in the *Privately-Owned Open Space Zoned Residential and/or Privately-Owned Agricultural Land Zoned Residential* land use category are either owned for conservation purposes by an environmental organization or are owned by a private citizen but protected by means of the purchase of development rights by the government or an environmental entity such as a land trust or The Nature Conservancy.

High Density Residential

Located east and west of Main Road in North Tiverton, the *High Density Residential* future land use designation, includes partially or fully developed neighborhoods of both single-family and multi-family residences at an approximate density of one dwelling unit per 30,000 square feet, or greater. The current zoning in this future land use designation is a minimum lot size of 30,000 square feet.

Medium Density Residential

The *Medium Density Residential* future land use designation is generally located north of Bulgarmarsh Road and includes the Highlands and lands east and west off Stafford Road north of Bliss Four Corners. Lands in this future land use designation include partially and fully developed neighborhoods ranging in density from one dwelling unit per 40,000 square feet to 60,000 square feet, and areas for which this residential density is considered appropriate.

Rural Residential / Agricultural

The majority of southern Tiverton land falls into the *Rural Residential / Agriculture* designation. Future development in this designation should preserve to the extent possible the scenic rural landscapes with stonewalls and coastal views that characterize this area of Tiverton. Current zoning for lands located in the *Rural Residential / Agriculture* future land use designation is a minimum lot size of 80,000 square feet. In the *Rural Residential / Agriculture* future land use designation, agricultural land and active agricultural operations, low density residential uses and open space is considered appropriate.

Commercial Uses

There are six general areas designated as *Commercial Uses* on the Future Land Use Map, shown in red, including Bliss Four Corners, Tiverton Four Corners, along Main Road in North Tiverton, Stone Bridge, Fish Road off Route 24, and Stafford Road along the state border. Current zoning districts within the Commercial Uses future land use designation include General Commercial (GC), Traditional Main Street (TMS), Pedestrian Friendly District (PFD), Neighborhood Business (NB), Village Commercial (VC), and Highway Commercial (HC).

Specific uses vary depending on the zoning district. Village Commercial is the area of town known as Tiverton Four Corners which is characterized by small scale retail, restaurant and office uses in a compact and historic setting. General Commercial contains areas of the town which form the basic pattern of retail and service businesses serving the community, and the areas planned for expansion of such businesses. The GC District includes the major commercial area along Main Road in the northwest corner of Tiverton, and the smaller commercial area along Stafford Road, extending north from its intersection with Bulgarmarsh Road. Highway Commercial contains areas of the town where businesses which serve regional needs rely on highway access and larger land areas for parking and development. The HC District includes the commercial area bordering the City of Fall River and lying between Route 24 and Stafford Road, and the commercial area at the interchange of Route 24 and Fish Road and extending west along the south side of Souza Road.

Waterfront-Related Uses

The Waterfront-Related future land use designation includes certain non-residential and mixed-use areas along the Sakonnet River for which primarily water-dependent commercial uses are appropriate and rely on waterfront access for business.

Industrial Uses

This district contains the area of the town currently used for industrial and related uses, and which is considered suitable for future industrial development. This designation includes lands located east of Fish Road and on both sides of Route 24, and a smaller land area west of Fish Road and lying between the R-30 District and Souza Road.

Industrial / Technology

The Tiverton Business Park is shown on the Future Land Use Map with diagonal lines over the *Industrial* designation. This future land use designation is intended to highlight opportunities for new commercial development (high tech industries, office, research and development and light manufacturing) in order to generate jobs and diversify the local tax base. The area is largely undeveloped, serviced by public water and sewer, and has convenient highway access.

Permanently Protected Outdoor Recreational Areas Overlay

Existing, significant, permanently protected outdoor recreational areas are displayed as an overlay and correspond with publicly accessible sites represented on Figure 9-1 Existing Conservation and Open Space Areas.

Casino Gaming Facility Overlay

As described elsewhere in this chapter, the Casino Gaming and Entertainment Overlay District designates the location of the proposed casino gaming facility subject to review under the Tiverton Land Use Regulations.

Reservoir and Ponds

The Reservoir and Ponds future land use category represents lands that are permanently inundated by water and therefore are not suitable for development. Future use is to serve as habitat and/or water supply.

Inconsistencies between the Future Land Use Map and Current Zoning Map

A small number of Zoning Map amendments will be necessary to achieve consistency between the Future Land Use Map and the Zoning Map. See Figure 5-5 for potential Zoning Map amendments. Parcels highlighted are currently zoned residential, however, are owned by the public for open space or conservation purposes. These properties are designated as *Publicly-owned open space and/or Lands Zoned Residential* on the Future Land Use Map. The Town will amend zoning of these properties from residential to open space within two-years of local adoption of this Comprehensive Plan.

Natural Hazards and Climate Change

The Town of Tiverton 2017 Multi-Hazard Mitigation Plan is incorporated in this Comprehensive Plan as Appendix A. Priority natural hazards and climate change trends that are likely to impact Tiverton include:

- **COASTAL FLOODING**
- **HURRICANES AND NOR'EASTERS**
- **WINTER STORMS**
- **SEA LEVEL RISE**

Increased awareness of the threats, effects and vulnerabilities from natural hazards will assist the Town in identifying and implementing effective mitigations actions and preparedness efforts. The four highest ranking risks identified during the hazard mitigation planning process include flood prone drainage systems, potential dam failures, damage to care facilities, and critical municipal hazard response facilities.

Increased storminess, sea level rise, and erosion will impact private and public property, facilities, and infrastructure with increased risk of flooding and other damages, as well as the loss of waterfront property and tax revenue. Recent NOAA scenarios, which CRMC adopted in 2016 for planning purposes (CRMP Section 145), project 2 meters (6.6 feet) of sea level rise by 2100. As a result of sea level rise, both hurricanes and severe winter storms will be more damaging to property and coastal flooding effects will be felt further inland.

The Town of Tiverton will refer to the most current data and research for guidance in coastal high hazard planning, including the Rhode Island Shoreline Change Special Area Management Plan (SAMP) developed to provide guidance and tools for state and local decision makers to prepare and plan for, absorb, recover from, and successfully adapt to the impacts of coastal storms, erosion, and sea level rise.

The Shoreline Change SAMP is a collaborative effort between the state's coastal agency, the CRMC, and a University of Rhode Island (URI) team comprised of both researchers from the College of the Environment and Life Sciences [CELS], the Graduate School of Oceanography, the College of Engineering, and outreach experts from the Coastal Resources Center/Rhode Island Sea Grant College Program [CRC/Sea Grant]. Invaluable expertise is also provided by Roger Williams Law School's Marine Affairs Institute, the Rhode Island Sea Grant Legal Program, and Eastern Connecticut State University. Close collaboration with other state agencies and coastal municipalities is also a key component of the Shoreline Change SAMP. This collaboration ensures that cutting-edge science informs an inclusive policy development process focused on practical solutions and outcomes.

Included as Appendix B are Statewide Planning Program fact sheets for Tiverton that survey residential properties, populations, and transportation infrastructure that may be affected by sea level rise and storm surge. Some key highlights of the studies specific to Tiverton are included below:

- The Socioeconomic of Sea Level Rise Study estimates that there are 41 single-family and 20 mobile housing units vulnerable to inundation under 5 feet of sea level rise scenario in Tiverton.
- Portions of Route 24 are susceptible to inundation due to sea level rise. 308 feet of Route 24 South and 279 feet of Route 24 North could be inundated as a result of just 1 foot of sea level rise. Route 24 S and Route 24 N have been given a State ranking of tenth and twelfth, respectively, as the most vulnerable road assets in the State.

There are four bridges of concern located in Tiverton, two of which are small facilities that may not be eligible for federal aid. Tiverton's bridge infrastructure is the seventh most vulnerable in the Rhode Island to sea level rise. Sea level rise will also have an impact on saltwater marshes. The Rhode Island Coastal Resources Management Council (CRMC) and its partners have developed Sea Level Affecting Marshes Model (SLAMM) Maps for the coastal wetlands of all 21 Rhode Island coastal communities. The purpose of these SLAMM maps is to show how coastal wetlands will likely transition and migrate onto adjacent upland areas under projected sea level rise scenarios of 1, 3 and 5 feet. Under the five-foot sea level rise scenario, Tiverton could lose up to half of its 528 acres of coastal wetlands. SLAMM maps for Tiverton are located at http://www.crmc.ri.gov/maps/maps_slamm/slamm_tiverton.pdf.

5.5 Land Use Goal, Policies and Actions

Goal: Promote land use patterns that are consistent with natural resource constraints, are environmentally and economically sound, minimize incompatibility among uses, reduce vulnerability to natural hazards and climate change impacts, and preserve Tiverton's rural, historic and small town character.

POLICIES

- UTILIZE THE LAND USE PLAN TO GUIDE FUTURE GROWTH AND DEVELOPMENT, AND SERVE AS THE BASIS FOR FUTURE REGULATORY ACTIONS.
- EVALUATE THE EFFECTIVENESS OF CURRENT ZONING DISTRICT DESIGNATIONS, PARTICULARLY THE APPROPRIATENESS OF THE AREAS CURRENTLY ZONED FOR INDUSTRIAL AND HIGHWAY COMMERCIAL USES.
- PROMOTE MARINE-RELATED LAND USES WITHIN THE NON-RESIDENTIAL ZONING DISTRICTS ALONG THE TIVERTON WATERFRONT.
- SUPPORT THE DIVERSIFICATION OF THE TOWN TAX BASE AND INCREASE IN NET TAX REVENUE THROUGH NON-RESIDENTIAL DEVELOPMENT, INCLUDING THE DEVELOPMENT OF THE BUSINESS PARK, IN A MANNER THAT IS COMPATIBLE WITH AND PROTECTS THE PREDOMINANTLY RURAL, HISTORIC, MARITIME AND SMALL TOWN CHARACTER OF TIVERTON.
- IMPLEMENT AND PROMULGATE LAND USE ORDINANCES AND REGULATIONS TO ALLOW FOR THE DEVELOPMENT OF A CASINO GAMING FACILITY, INCLUSIVE OF RESTAURANT, ENTERTAINMENT AND RETAIL VENUES WITHIN THE CASINO, A HOTEL, SHARED STRUCTURED AND SURFACE PARKING.
- INVENTORY AND EVALUATE TOWN-OWNED PROPERTY TO DETERMINE THE USE THAT PROMOTES THE LONG-TERM INTERESTS OF THE TOWN.
- ENSURE THAT MUNICIPAL STAFFING IS ADEQUATE TO MEET THE COMPLEX PLANNING AND REGULATORY CHALLENGES REQUIRED AS DEVELOPMENT PRESSURES INCREASE.
- ENSURE THAT UTILITIES ARE EXTENDED AND PROVIDED ONLY IN A MANNER THAT IS COMPATIBLE WITH DESIRED RATE AND DENSITY OF FUTURE DEVELOPMENT AND DONE WITH CONSIDERATION OF AESTHETIC IMPACTS.
- UTILIZING THE VISUAL AND ANALYTICAL TOOLS AND CAPABILITIES WHICH WILL BE AVAILABLE THROUGH THE TOWN'S GEOGRAPHIC INFORMATION SYSTEM (GIS), UNDERTAKE A TOWN-WIDE PARCEL INVENTORY AND USE STUDY TO DETERMINE WHERE ZONING IS NOT REFLECTIVE OF EXISTING CONDITIONS, ESPECIALLY IN AREAS THAT ARE NEAR BUILD-OUT. MODIFY ZONING TO ENSURE IT IS CONSISTENT WITH AS-BUILT CONDITIONS, PARTICULARLY IN AREAS WHERE EXISTING OR PLANNED WATER AND SEWER INFRASTRUCTURE CAN SUPPORT HIGHER DENSITIES OF DEVELOPMENT.
- CONSIDER A TRANSFER OF DEVELOPMENT RIGHTS (TDR) PROGRAM TO DIRECT MORE INTENSE DEVELOPMENT INTO AREAS WHERE THE INFRASTRUCTURE CAN ACCOMMODATE IT (RECEIVING AREAS) AND AWAY FROM AREAS WHERE OVER-DEVELOPMENT WOULD HAVE NEGATIVE EFFECTS ON THE RURAL QUALITY, SCENIC BEAUTY, AND NATURAL ENVIRONMENT (SENDING AREAS). THE ZONING IN RECEIVING AREAS (PRIMARILY AREAS OF THE NORTH PART OF TOWN WHERE ACCESS TO PUBLIC SEWER AND WATER ARE FEASIBLE INCLUDING INFILL DEVELOPMENT) SHOULD BE AT A LEVEL THAT WILL ALLOW FOR INCREASES IN DENSITY THROUGH SUCH A TDR PROGRAM.

- EVALUATE FUTURE DEVELOPMENT IN AREAS EXPOSED TO NATURAL HAZARDS INCLUDING THE EFFECTS OF SEA LEVEL RISE. REVIEW AND MODIFY ZONING AS NECESSARY TO MINIMIZE RISKS TO LIVES, PROPERTY, AND INFRASTRUCTURE FROM NATURAL HAZARDS.

Actions

Action 1: Ensure that the land use goal and specific visions for desirable future development, as stated in this Comprehensive Community Plan, are achievable with the zoning and subdivision regulations, and that these regulations remain relevant through periodic monitoring and review.

The core of this Comprehensive Community Plan is to shape future land use so that it preserves the rural and small town character of the community. Land use, more than anything else, determines the kind of town Tiverton will be in the future. The starting point for land use planning is the Zoning Ordinance and the Zoning Map (Figure 5-2), which establishes permitted uses and dimensional standards for each of the zones. The Zoning Map resulted from a multi-year process that began with the completion and State approval of the original Comprehensive Plan, and culminated with the adoption of major ordinance revisions in 2001 and several significant updates through 2014. Those revisions were based on the general land use plan and the respective land use policies in the Comprehensive Plan. The fundamentals of the existing ordinance are, therefore, adequate as a regulatory document for future land use in Tiverton. This plan proposes further refinements to the Zoning Ordinance, includes uncompleted policies from the previous Comprehensive Community Plan, and addresses emerging land use issues that need to be considered for future regulatory changes.

In addition to zoning, the development of land is managed by the application of the Tiverton Land Development and Subdivision Regulations, through the subdivision and site plan review process. Design review is also authorized by the Development Plan Review regulations contained in the Zoning Ordinance. These land use regulations control not only use and density, but site and building design; therefore it is important that the town periodically review the effectiveness and suitability of both its Zoning Ordinance and subdivision regulations. There are also environmental limitations that supplement local regulations. Areas of town not suitable for development because of natural constraints and environmental sensitivity are governed by federal and state regulations, which provide for input, or even peremptory action on the part of the town. These regulatory controls, given careful monitoring, and Town Zoning restrictions preventing development on "unsuitable land," will protect these areas without additional regulations.

INDUSTRIAL LAND USES

Action 2a: Evaluate the development potential of the vacant industrial property in Tiverton and allow uses that are compatible with the environment, the surrounding area and the small town character of Tiverton.

Action 2b: Evaluate and consider rezoning the Industrial Zone into lower impact/higher impact zones to minimize conflict between residential and industrial uses.

Approximately 1,400 acres (7%) of the land area of the town is zoned for industrial use. This area, located in north Tiverton, is largely undeveloped but has seen recent growth in both general business and industrial use. There are several older neighborhoods within the district along its border on the east side of Fish Road. A large portion of Fish Road on the western side is densely developed residential district R-30. Recently there have been several conflicts between

residential and commercial/industrial users in this area particularly with regard to noise and traffic. A balance is required to allow business growth and residential property rights to peacefully co-exist. The Town should review the types of industrial uses allowed and also consider whether creating more than one single industrial zone could minimize conflict and stabilize residential property values in this area. One concept would be to create zones based on higher/lower impact with the areas surrounding and/or abutting significant residential tracts limited to lower impact industrial activities.

Action 2c: Evaluate industrial land within the Stafford Pond watershed and consider rezoning to ensure uses are compatible with and minimize risks to the drinking water supply.

Much of the industrial land is wetland and a portion of this land lies within the Stafford Pond watershed, Tiverton's sole public drinking water supply. Future uses of property in the watershed as well as significant wetland areas should be carefully considered to avoid environmental degradation and to maximize public benefit. A review and possible re-zoning of industrial uses in the watershed and significant wetland areas should be undertaken.

Action 2d: Review and modify as necessary regulations with regard to quarrying activities to ensure compliance with state and local governing statutes and to minimize environmental impacts.

Tiverton is home to several active and inactive quarries. Quarrying activities are regulated by a combination of federal, state and local regulations. A review of current local ordinances should be undertaken to ensure the ordinances provide a high level of environmental protection for ground and surface water supplies and to minimize potential damage to surrounding properties.

MARINE & WATER-DEPENDENT USES

Action 3: Complete a comprehensive waterfront plan that evaluates long-term options for redevelopment, improved aesthetics and increased public access from the Fall River line in the north to the Nanaquaket Bridge in the south.

The Tiverton harbor and waterfront is an important, but limited resource that has economic, residential, cultural and recreational value for the community. The Zoning revisions of 2001 included the establishment of a Waterfront District to govern large portions of the Sakonnet River and Mount Hope Bay waterfront areas. This district generally restricts the commercial areas of the waterfront to marine-dependent uses such as boat launches, marinas, fisheries and other maritime activities, but includes residential property as well. A waterfront plan should: explore the possibility of multiple waterfront zones to ensure a compatible mix of commercial and residential uses; consider and plan for sea level rise, maintain public access to the waterfront; and retain existing and create new opportunities for marine-dependent businesses. The waterfront plan study area should be more expansive than the existing waterfront zoning district and include the waterfront areas from the Fall River line in the north to the Nanaquaket Bridge in the south.

Action 4: Complete the repair of the Stone Bridge abutment and improvements to Grinnell's Beach.

The Stone Bridge abutment is slated for significant repair by the Rhode Island Department of Transportation in 2018. The Town recently acquired the former Seaside Gas Station adjacent to

Grinnell's Beach. A project is underway to determine how best to incorporate this newly acquired property into the beach area. The goals include improved aesthetics, public access, marine access from the Sakonnet River, and wastewater management. Completion of this project will help to ensure that Tiverton's historical connections to the waterfront remain strong and accessible to the public.

Action 5: Review and consider modifying zoning regulations in all shoreline areas to minimize effects of natural hazards, especially flooding and hurricane damage as well as future sea level rise.

Like many coastal communities in Rhode Island, our shoreline areas are vulnerable to catastrophic flooding and future sea level rise. This risk crosses both residential and commercial property. It's also not restricted to the immediate shoreline, as the saltwater ponds, marshes, and estuarine areas are equally as vulnerable. Zoning regulations in potentially affected zones should be reviewed to ensure continued public access and opportunity for marine-related activities.

All of the Marine & Waterfront Action Items should be undertaken with consideration to projected sea level rise and hurricane inundation to ensure long term viability. Flood Hazard Areas (Figure 5-6), Sea Level Rise (Figure 5-7), and Hurricane Surge Inundation (Figure 5-8) Maps, included in this Comprehensive Plan, identify areas of concern. STORMTOOLS, is a State sanctioned online mapping tool that assesses exposure of future development and the risk associated with sea level rise and storm surge. The Town should utilize STORMTOOLS when conducting an analysis to modify Zoning regulations.

DIVERSIFICATION OF TOWN TAX BASE

Action 6: Support industrial and commercial uses that result in net tax revenue and desirable employment opportunities, and are compatible with the available infrastructure, the desired character and design objectives of the commercial districts, and are consistent with the small town nature of Tiverton.

There continues to be a need for development that generates net tax revenue in a scale that is consistent with the town's size and character. Considerable efforts by the town to achieve an appropriate balance between commercial development and quality of life has been made; creating new land use regulations for the Tiverton Business Park as well as the existing Main Road and Bliss Four Corners business areas. There are a number of options to diversify the tax base in a manner compatible with the town's character, such as developing the Business Park, supporting and expanding the traditional industries of agriculture and fishing, expansion of marine-related activities, and considering options for expansion of the commercial/industrial zones.

Action 7: Evaluate the Village Commercial District to ensure that the unique identity of Tiverton Four Corners is preserved while protecting the ground and surface water supply in the Nonquit Pond Watershed.

The Tiverton Four Corners area contributes significantly to the identity of the town. Both the Village Commercial District and the Watershed Protection Overlay District regulations currently regulate the area. These commercial regulations should be evaluated to ensure that they provide sufficiently clear standards for building design and reasonable procedures for design review while balancing ground and surface water concerns in the Nonquit Pond Watershed. An inventory of business locations should be undertaken to determine if the area as zoned is appropriate.

TOWN-OWNED PARCELS

Action 8: Inventory and evaluate town-owned property to determine its best use and value.

Town-owned land represents an important resource that can help Tiverton achieve its housing, open space and economic development objectives. While the Town maintains an inventory of all town-owned parcels, there is no comprehensive evaluation of these parcels for the purposes of long-range planning. Such an inventory needs to be regularly evaluated and updated.

UTILITY AND INFRASTRUCTURE

Action 9: Allow the expansion of sewer and water utilities into areas of town that are not presently serviced in a manner that is fully supportable and consistent with the desired land uses and densities as identified in this Comprehensive Community Plan.

A major factor in future land use is the availability of public sewer and water. While the need for sewers in north Tiverton is well documented (see Services and Facilities Chapter 7.0), a more extensive public sewer system would open up areas to development that are presently limited by poor soils that prevent the use of individual septic disposal systems. This is especially true in south Tiverton where the lower density of development gives the area its famed rural character. In addition, installing public water service into areas that do not have public sewers can alter ground water levels and negatively impact the operation of private septic systems. Extension of either public water or public sewer should not be considered until the effect of one on the other is fully evaluated. Land use decisions must be consistent with future plans for municipal services discussed in the Services and Facilities Chapter 7.0. It also is evident that the Town administration must be able to exercise control over future construction of utility infrastructure if it is to effectively manage future land use.

Action 10: Review and consider amending the Watershed Protection Overlay District zoning regulations to provide enhanced protection to ground and surface waters.

Tiverton is responsible for two public drinking water reservoirs: Stafford Pond, which supplies town water via Stone Bridge Fire District and the North Tiverton Fire District, as well as, Nonquit Pond, which is part of the City of Newport water supply. A subcommittee of members from the Planning Board and Conservation Commission is currently reviewing the Town's Watershed Protection Overlay District zoning regulations to ensure best practices are being utilized to protect ground and surface water.

Action 11a: Ensure that development and zoning regulations are consistent with remediation plans and objectives as outlined in RIDEM approved TMDL plans.

Action 11b: Update Tiverton GIS maps to include TMDL locations.

Consistent with federal clean water regulations, the RIDEM utilizes a Total Maximum Daily Load Plan (TMDL) to manage waters that do not meet one or more water quality criteria. At this time, TMDLs exist for Stafford Pond, Sucker Brook, the Robert Gray area and one is under development for Nonquit Pond. Enhanced protection for surface water supplies is crucial to maintain viability of public water sources. TMDL locations should be included on Tiverton's GIS Maps.

Action 12a: Review and consider amending the Zoning Ordinance with regard to development within Public Wellhead Protection Areas.

Action 12b: Update Tiverton GIS Maps to include all RIDEM designated Wellhead Protection Areas.

There are currently ten (10) community and non-community water systems in Tiverton with at least one additional under development, each supplied with groundwater via public well. These water systems supply restaurants, small businesses, pre-schools, and several mobile home parks. The critical surface area surrounding the well, the Wellhead Protection Area (WHPA), deserves special consideration to maintain adequate supply of safe drinking water. Additionally, WHPAs should be incorporated into Tiverton's GIS mapping.

Action 13: Revise applicable local land use regulations to avoid and reduce the impacts of stormwater runoff and to effectively comply with the RI Stormwater Manual's Minimum Standard 1: LID (Low Impact Development) Site Planning and Design Strategies.

While the Planning Board currently encourages developers to incorporate Low Impact Development design options in proposed projects, the Town should review and strengthen local regulations relating to stormwater management by referencing the Rhode Island Stormwater Manual and incorporating specific strategies to:

a) Maintain groundwater recharge to predevelopment levels;

b) Maintain post-development peak discharge rates to not exceed pre-development rates; and

c) Use LID techniques as the primary method of stormwater control to the maximum extent practicable.

Action 14: Review current allowable density regulations in all residential zones and/or zones that allow a residential component and modify as necessary to ensure development is supportable by available water, wastewater and fire suppression capacity.

As detailed in the Services and Facilities chapter, Tiverton has a mixed environment for water and wastewater service. Portions of north Tiverton are served by a mixture of public water and sewer, public water and private wastewater management, and/or private water and wastewater systems. The southern portion and largest land area is served in its entirety by mostly private wells and on-site wastewater treatment systems. Available quantity and capacity for all of these systems requires careful balancing so that long-term drinking water availability is ensured for existing households and environmentally sound wastewater management is achievable. This applies to development in areas served by public infrastructure as well as those requiring groundwater and adequate land capacity to safely manage Onsite Wastewater Treatment systems.

The recent trend in multi-family, townhouse, and mixed-use style development could put additional pressure on municipal utility systems. Allowable density for this development type shall be reviewed, as well as, single-family home subdivisions.

DESIGN STANDARDS

Action 15: Develop regulations with regard to the siting of utility and accessory structures, so that the design and operation of such utilities are consistent with the aesthetic value and character of the surrounding neighborhood.

The siting of such structures as satellite dish antennas, communication towers, wind towers, solar panels, water towers, pumping stations and fixtures, water storage tanks and utility wires should be undertaken with care and concern for their aesthetic impact on the community as a whole. Landscaped screening should be utilized and siting should avoid heights of land where their appearance would be most intrusive on the visual quality of the town. Underground utility wires servicing new major subdivisions and commercial and industrial developments should be encouraged.

Action 16: Consider incorporation of design standards into the Zoning Ordinance as a means to ensure development is consistent with the character and sense of place goals in the ordinance.

Zoning changes adopted in 2014 created three new commercial districts in north Tiverton and one additional district in the Bliss Four Corners area. These new districts and attendant regulations are derived from a hybrid form-based code, where the objective is to create distinctive and attractive commercial districts by focusing in part on character and design. Bliss Four Corners is an emerging commercial center and has seen recent growth as evidenced by the Sandywoods development, Tiverton Public Library, and the Bulgarmarsh recreation area. Main Road in north Tiverton, from Souza Road to the state line, is a mix of residential homes and strip-style commercial development. A significant number of commercial buildings in north Tiverton are currently unoccupied. Many of the commercial buildings were purpose-built and architecturally devoid. Others were built to a short-lived architectural "trend" and are now dated. Using a design and character focus, the new districts will allow for buildings whose exteriors are compatible with the classic architectural styles of coastal New England through the years, and will lend themselves to adaptive reuse in the future. While design guidelines have been adopted, the Town should consider continued refinement of the guidelines, and development of enforceable standards, without becoming overly burdensome to property owners.

Action 17: Monitor development trends in mixed commercial zones and consider modifying allowable density calculations to ensure there is adequate infrastructure and services to support projected growth and meet desired commercial to residential ratios.

A significant change in the zoning of these districts is the inclusion of various types of housing, creating walkable, livable, and workable neighborhoods. All allow mixed-use residential, where residential units may exist on upper floors, multi-family units and small apartment buildings. The potential for residential units is in part tied to infrastructure, particularly public sewer and water, as the land is not well suited to large septic systems due to soil type and ledge constraints. A periodic review of the potential residential buildout should be undertaken to ensure there is adequate infrastructure and services to support the planned growth. Equally important, these zones represent prime commercial land; it is important to maintain a balance that recognizes our desire for business growth.

ADMINISTRATION, ENFORCEMENT AND COORDINATION OF LAND USE REGULATIONS

Action 18: Review zoning enforcement policies and staffing to ensure compliance with the Zoning Ordinance.

Equally important to the planning process is the enforcement of Zoning regulations. Like many communities, Tiverton has had its share of struggles in managing adherence to the zoning code. In some cases, Tiverton has entered into expensive litigation to remediate the violation.

Additionally, zoning disputes over illegal uses pit neighbor against neighbor and can become very acrimonious as time wears on, to the benefit of no one. Consistent application and enforcement of zoning regulations is the most effective way to minimize these conflicts.

Action 19: Consider a process to document pre-existing non-conforming uses especially in cases where significant zoning changes alter the legal status of a property.

As with any town developed prior to adoption of zoning in the 1960's, the issue of pre-existing uses adds an additional level of complexity, particularly as many are not well documented and it becomes difficult to determine legal status without a paper trail. Although one of the goals of new zoning regulations is to minimize the number of non-conforming uses, in some cases it is unavoidable. Special care should be taken to maintain property rights. Significant zoning changes should include a well-publicized effort to assist property owners in documenting legal conforming status.

Action 20: Review, and modify as necessary, the impact fee ordinance to ensure Tiverton's ability to provide quality services and facilities to town residents.

The siting of new public facilities and the expansion or renovation of existing ones is a major initiative of the Town as it strives to improve basic services for present and future residents. The need for new and upgraded facilities is described in detail elsewhere in this Comprehensive Plan. As Tiverton grows, there is increased pressure on the Town's ability to pay for such improvements, and the Town must consider and enact new ways to provide funding. In 2007, the Town adopted an impact fee ordinance, which is currently restricted to major subdivisions. With a new focus on development from housing types besides single-family residential, there is potential for shortfalls between the ordinance fees and required services and infrastructure. A review of the impact fee based on new housing models should be undertaken.

Action 21: Review and modify as necessary policies regarding developments with homeowner associations with responsibilities for road, utility and stormwater maintenance.

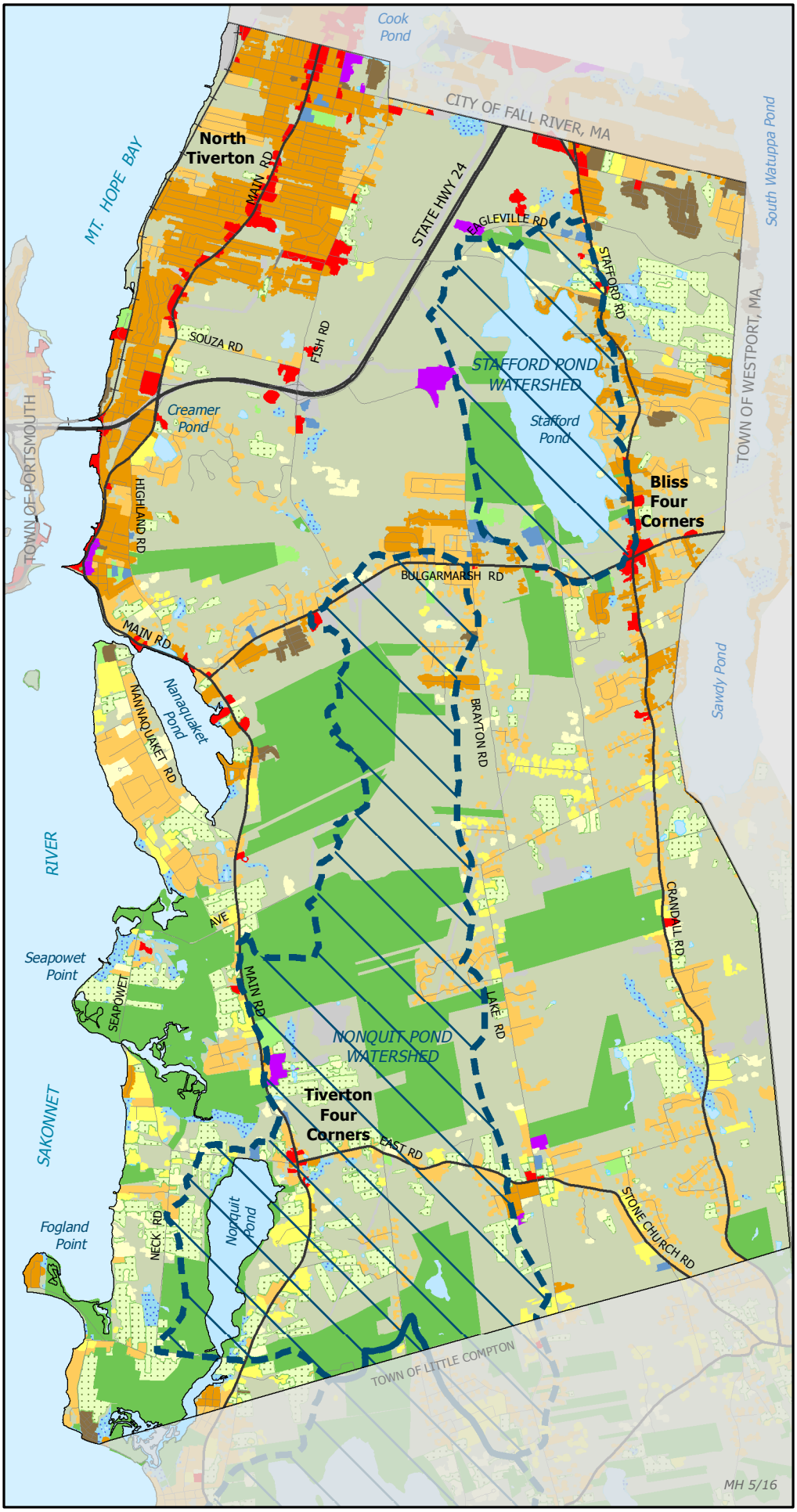
Current subdivision regulations allow for developments designed where homeowners associations are responsible for maintenance and upkeep of roads, utility structures and stormwater management structures. As time passes, the responsibility and financial requirement for ongoing maintenance and upkeep are often in dispute. The Town should review and consider modifying policies to ensure that long-term maintenance is ensured.

Action 22: Evaluate and consider adopting growth management policies.

Like many communities, the cyclical nature of real estate provides challenges in managing growth. These challenges include adequate, timely resources for project review. Equally important is the difficulty in managing the impact on service requirements for the community. Effective management of growth is critical to ensure Tiverton can provide a consistent level of police, fire, educational and other key services to its residents.

Action 23: Achieve consistency between the Future Land Use Map and Zoning Map

The Town will take appropriate steps to ensure that the Zoning Ordinance and Zoning Map are consistent with the Future Land Use Plan as illustrated in Figure 5-4. A small number of potential revisions are identified in Figure 5-5 and involve mainly the rezoning of publicly-owned conservation land from residential to open space.



EXISTING LAND USE (2011)

- Low Density Residential (>2 acre lots)
- Medium Low Density Residential (1 to 2 acre lots)
- Medium Density Residential (1 to 1/4 acre lots)
- Medium High Density Residential (1/4 to 1/8 acre lots)
- High Density Residential (<1/8 acre lots)
- Commercial
- Industrial
- Institutional
- Transportation and Utilities
- Airports
- Conservation/Open Space*
- Developed Recreation
- Agricultural
- Undeveloped/Unprotected
- Water
- Wetland

- SURFACE WATER RESERVOIR WATERSHED
- MAJOR ROAD
- MINOR ROAD
- RAILWAY

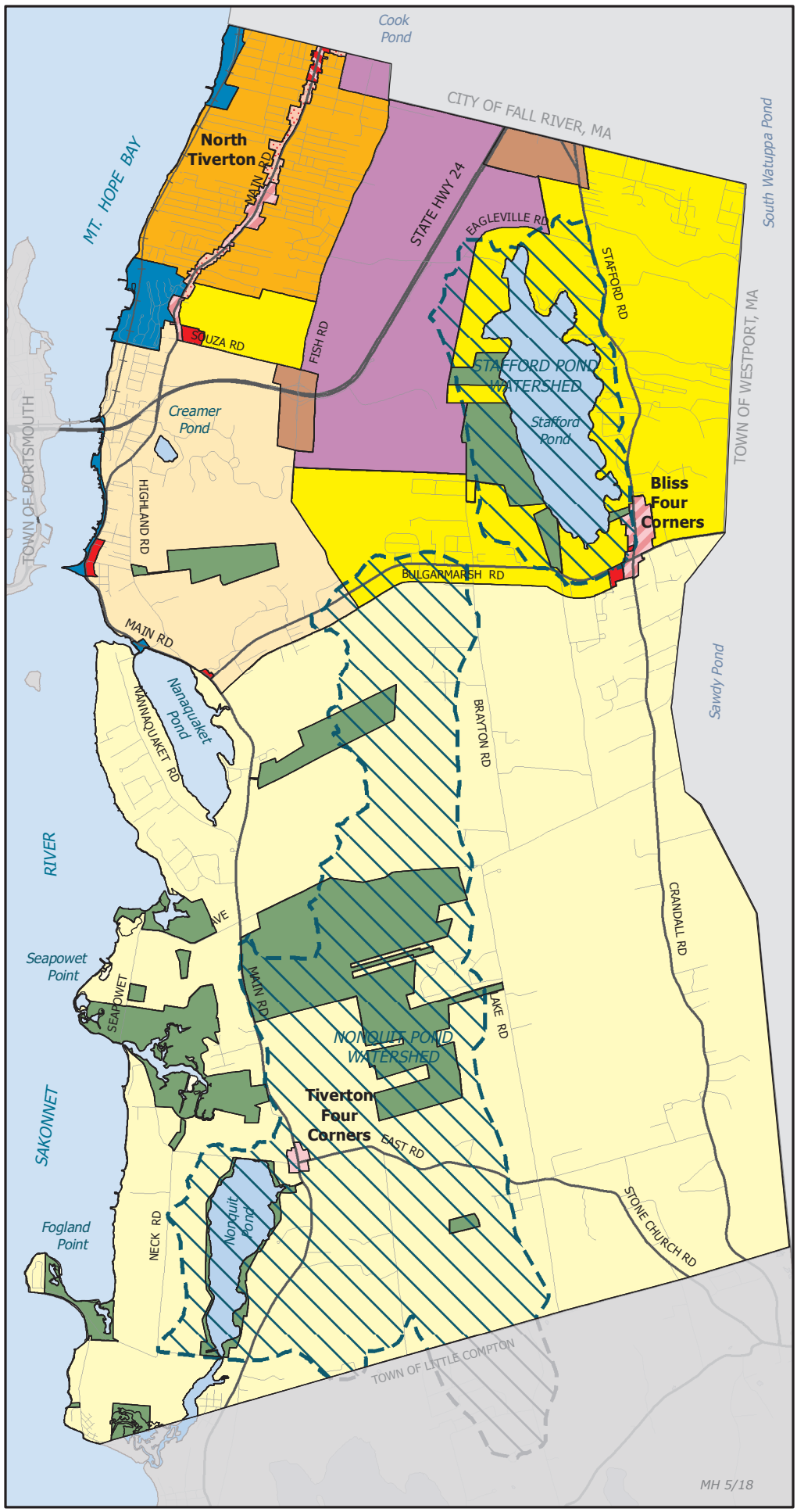
Source: RIGIS Land Use Land Cover 2011 and 2014 State and Local Conservation Lands courtesy of RIDEM (see *)

N

0 1 Mile

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-1
EXISTING LAND USE



ZONING DISTRICTS

- GENERAL COMMERCIAL (GC)
- TRADITIONAL MAIN STREET (TMS)
- PEDESTRIAN FRIENDLY DISTRICT (PFD)
- NEIGHBORHOOD BUSINESS (NB)
- VILLAGE COMMERCIAL (VC)
- HIGHWAY COMMERCIAL (HC)
- INDUSTRIAL (I)
- WATERFRONT (W)
- RESIDENTIAL R-30 (R-30)
- RESIDENTIAL R-40 (R-40)
- RESIDENTIAL R-60 (R-60)
- RESIDENTIAL R-80 (R-80)
- OPEN SPACE (OS)
- WATERSHED PROTECTION OVERLAY DISTRICT

- PONDS, OPEN WATER
- MAJOR ROAD
- MINOR ROAD
- RAILWAY

Source: Tiverton GIS.

N

0 1 Mile

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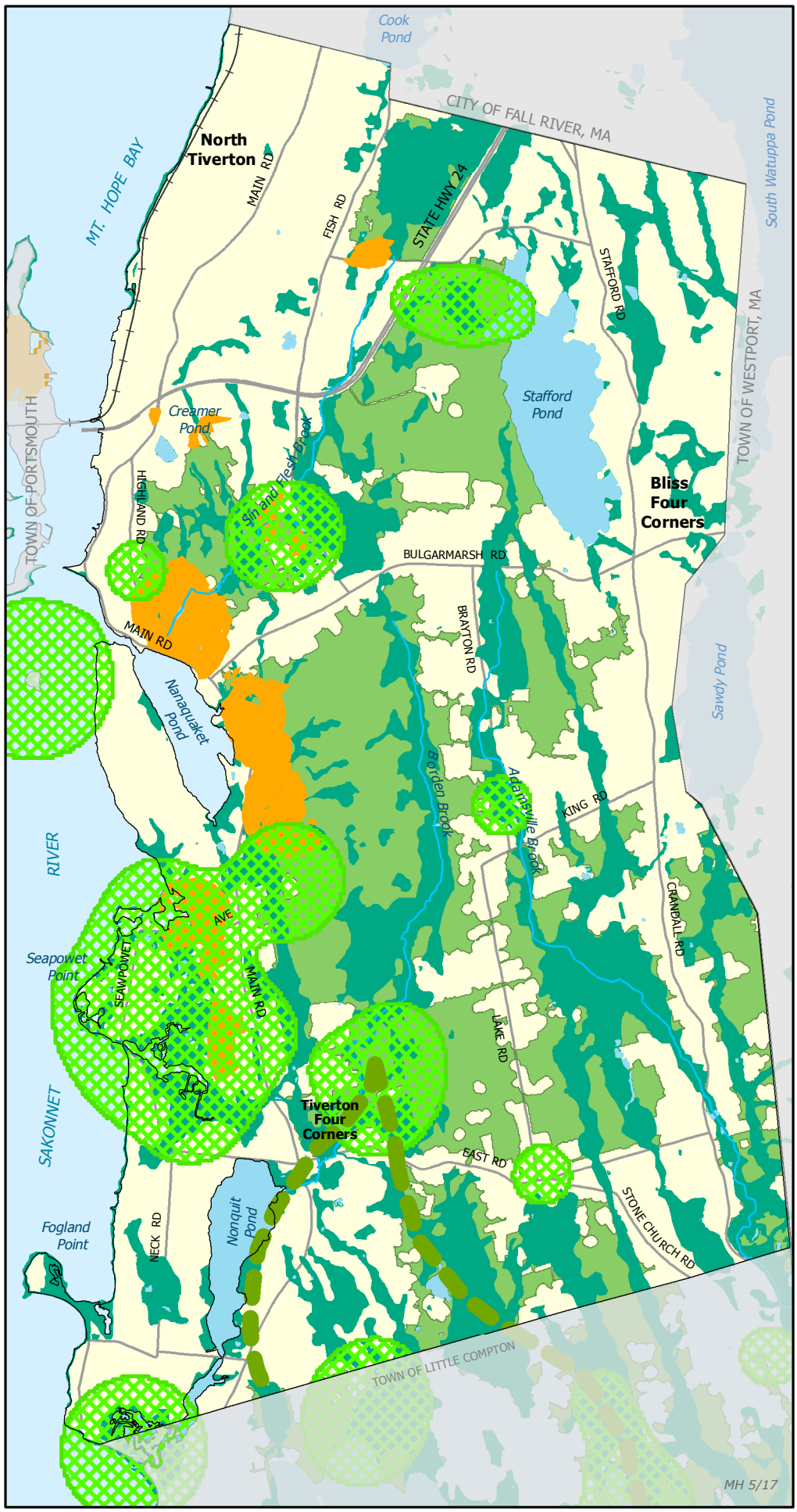
TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-2
EXISTING ZONING

INCLUDES AMENDMENTS THROUGH MARCH 26, 2018



MINOR CORRIDOR

NATURAL HERITAGE AREAS

MAJOR STREAMS

PONDS, OPEN WATER

ECOLOGICAL LAND UNITS -- BEST & BETTER

WETLANDS AND/OR HYDRIC SOILS

UNFRAGMENTED FOREST BLOCKS

MAIN ROADS

RAILWAY

Source: COA's from RI Wildlife Action Plan 2015 (Ch 4) and DEM (2015).

Note: Public access to open space is subject to compliance with various rules and regulations.

N

0 1 Mile

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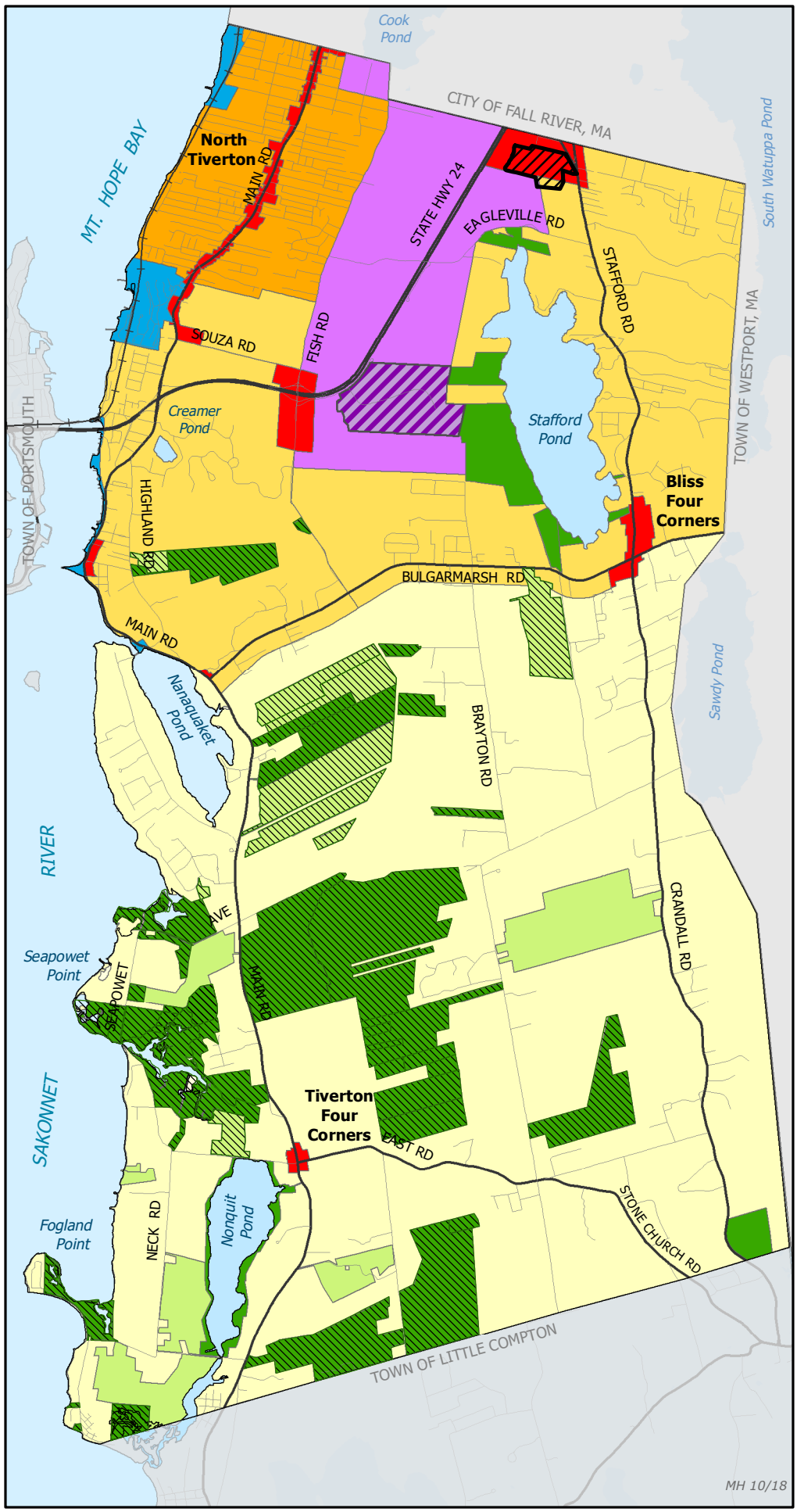
TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-3 CONSERVATION OPPORTUNITY AREAS



FUTURE LAND USE CATEGORIES

- Publicly-owned Open Space and/or lands zoned Open Space
- Privately-owned Protected Open Space zoned Residential and Privately-owned Protected Agricultural land zoned Residential
- High Density Residential
- Med Density Residential
- Rural Residential / Agricultural
- Commercial Uses
- Waterfront-Related Uses
- Industrial Uses
- Industrial / Technology
- Reservoir and Ponds

- Casino Gaming Facility Overlay District
- Significant, Permanently Protected Outdoor Recreation Areas Overlay

Source: Tiverton GIS and Tiverton Planning Department, 2018

N

0 1 Mile

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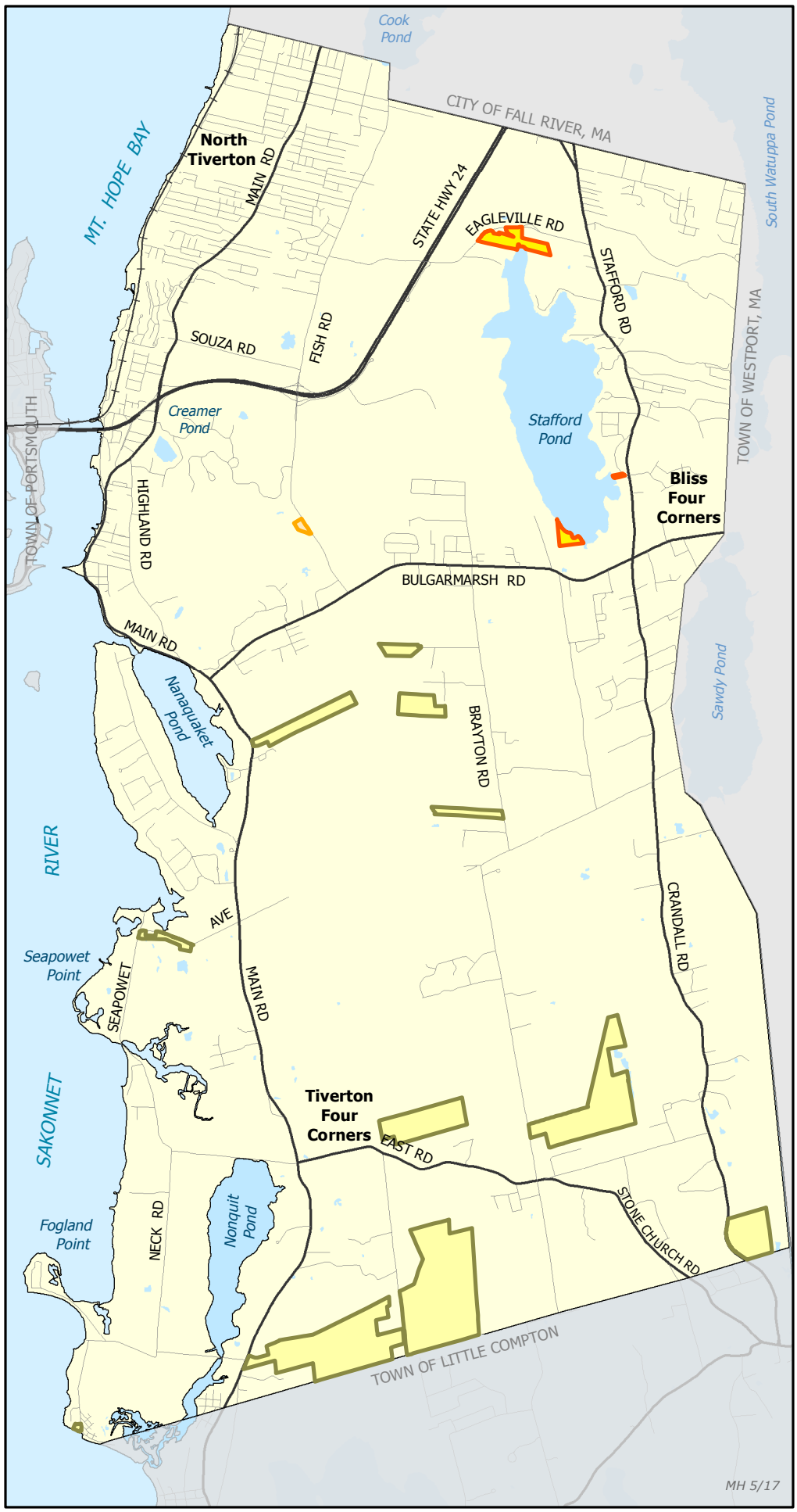
TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-4 FUTURE LAND USE MAP



EXISTING ZONING OF INCONSISTENCIES

- Residential R-40
- Residential R-60
- Residential R-80

Note: All of these areas are proposed as "Publicly-owned Open Space and/or zoned Open Space".

Source: Tiverton GIS, Tiverton Planning Department (2016) and Future Land Use Map (May 2017).

N

0 1 Mile

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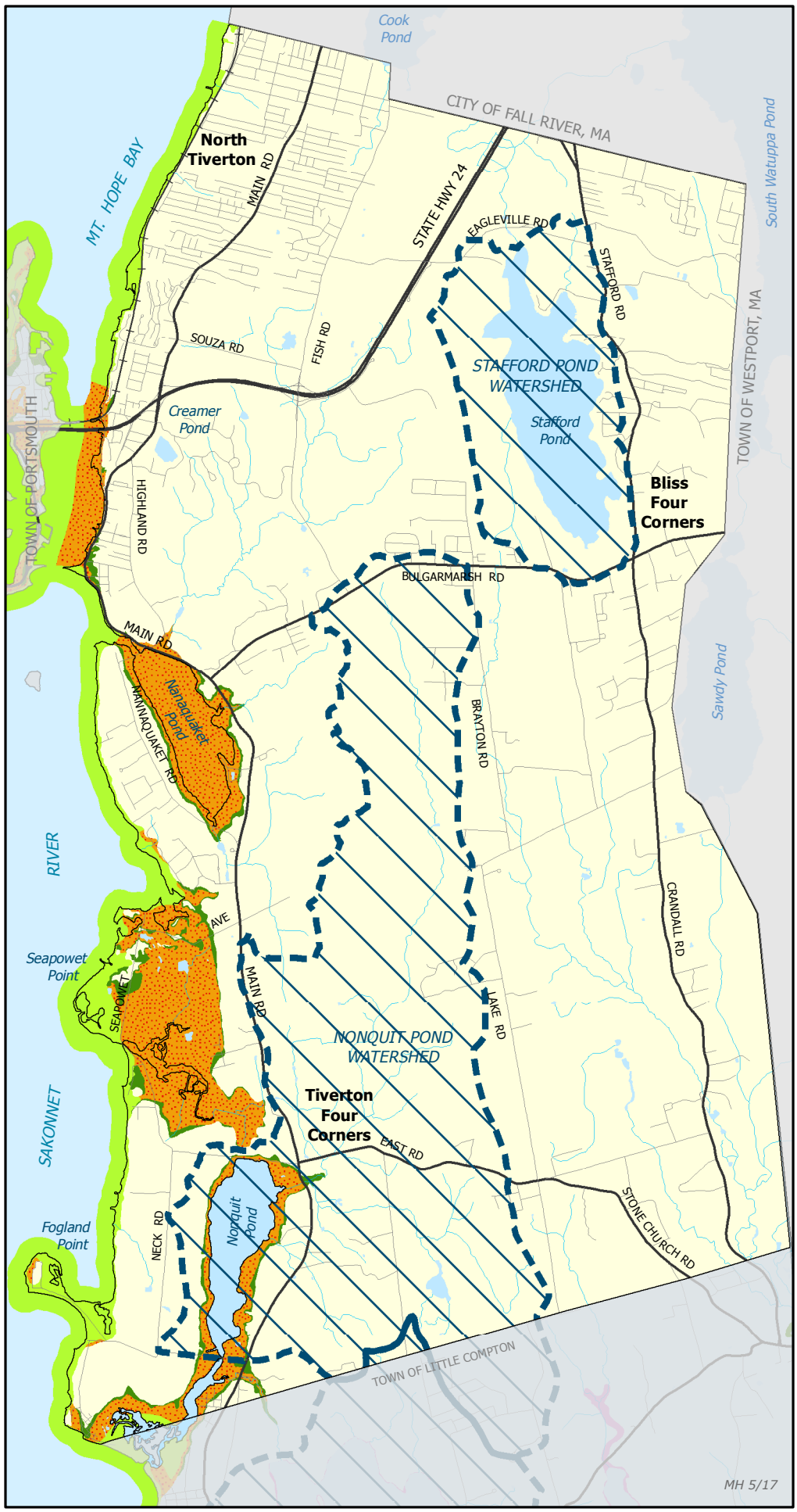
TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-5 FUTURE LAND USE and ZONING INCONSISTENCIES



SURFACE WATER RESERVOIR WATERSHED

FLOOD HAZARD ZONES

- 'A' FLOOD ZONE
- 'AE' FLOOD ZONE
- 0.2 Pct ANNUAL CHANCE FLOOD
- 0.1 Pct ANUAL CHANCE FLOOD

- MAJOR ROAD
- MINOR ROAD
- RAILWAY
- STREAMS
- PONDS, OPEN WATER

Source: Newport County DFIRMs (Sept, 2013) courtesy of RIGIS.

N

0 1 Mile

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TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-6
FLOOD HAZARD AREAS

BRIDGES -- Freeboard Height

- Concern
- Unknown
- No Concern

BRIDGES -- Bridge Access

- Not Accessible
- Unknown
- Accessible

OTHER BRIDGES (07-18-2013)

- OTHER BRIDGES

CONNECTION UNCERTAIN

- MHHW, 1ft, 3ft, or 5ft

SLR INUNDATION* -- Level

- 1 Foot
- 3 Feet
- 5 Feet

- PONDS & MHHW**
- STREAMS
- DAMS
- MAJOR ROAD
- MINOR ROAD
- RAILWAY

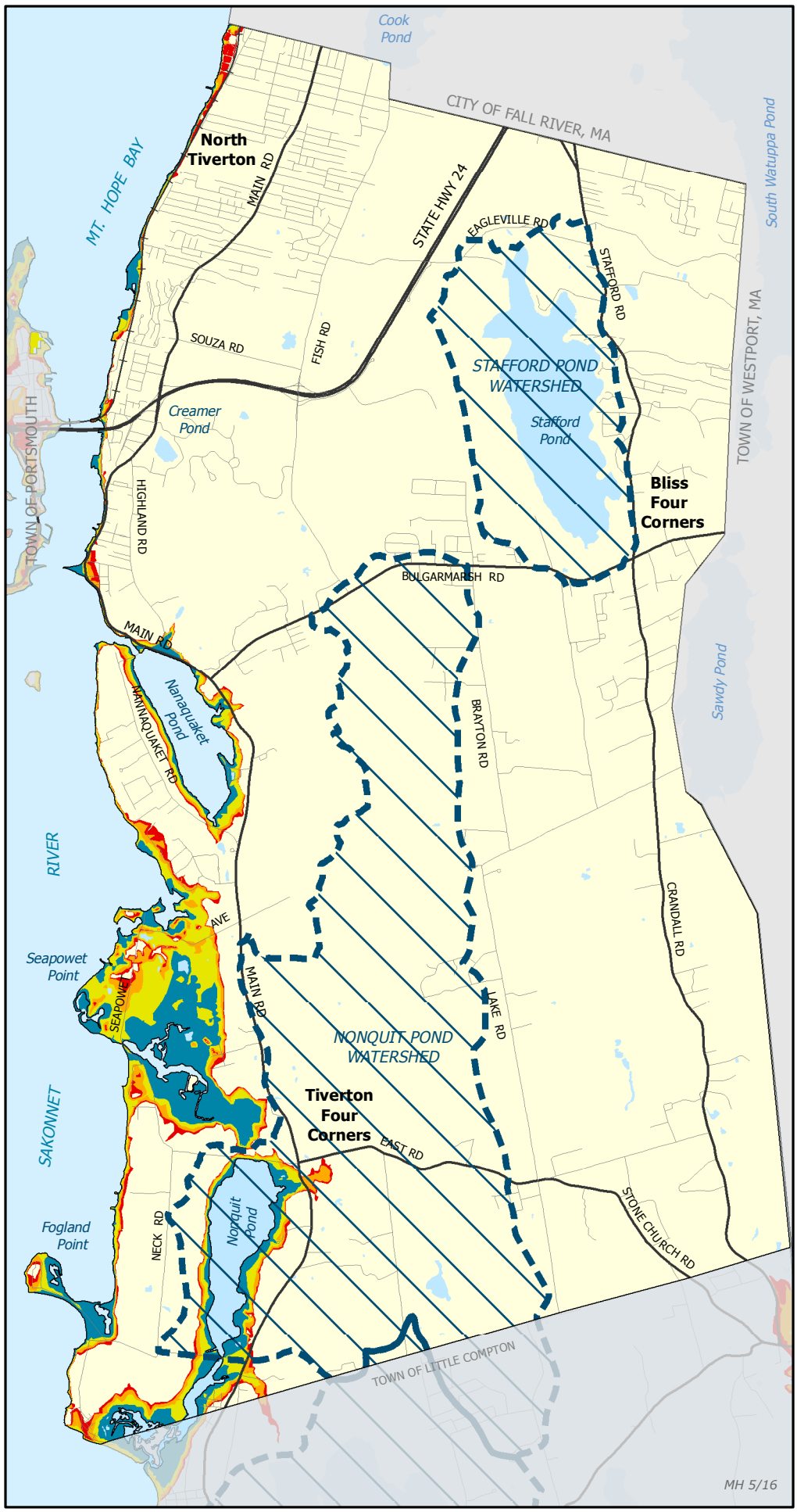
Source: RIGIS (2014), Sea Level Rise, RI Div of Planning.
Notes: * The Sea Level Rise (SLR) Inundation modified bathtub model does not take into consideration future erosion or the effects of shoreline structures.
** Mean High High Water

N

0 1 Mile

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-7
SEA LEVEL RISE INUNDATION



HURRICANE CATEGORY

- Category 1 (74-95 mph)
- Category 2 (96-110 mph)
- Category 3 (111-130 mph)
- Category 4 (131-155 mph)

- SURFACE WATER RESERVOIR WATERSHED
- PONDS, OPEN WATER
- MAJOR ROAD
- MINOR ROAD
- RAILWAY

Source: RIGIS (2010), RI Worst Case Hurricane Surge Inundation Areas.

N

0 1 Mile

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TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 5-8 HURRICANE SURGE INUNDATION AREAS

HOUSING

6.0 HOUSING

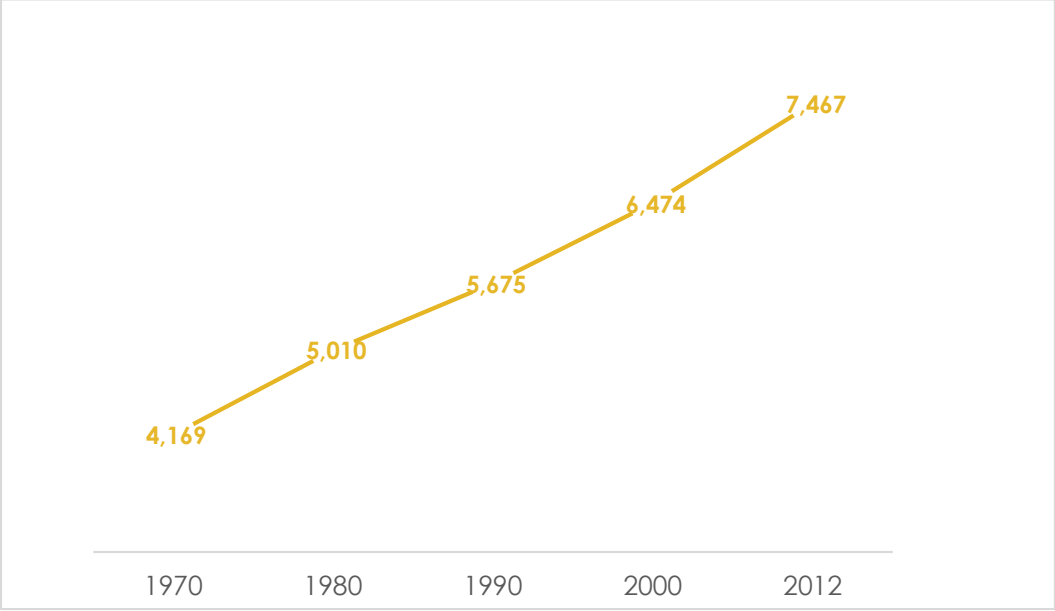
The Housing Chapter identifies and analyzes existing and forecasted housing needs and objectives in Tiverton, a community of primarily single-family houses. Like most towns in Rhode Island, Tiverton is facing a challenge in providing affordable housing for all its residents, and is committed to meeting this challenge while maintaining the principal planning goal of preserving its small town ambiance and rural character. A component of this Housing Chapter is a plan to meet the goal of 10 % affordable housing units as mandated in the Rhode Island Low-and-Moderate Income Housing Act, R.I.G.L. 45-53, as amended. These units are defined as those that are affordable to households earning less than or equal to 80% of the area median income for rental units and up to 120% of the area median income for homeownership units. This affordability is provided through a federal, state or municipality subsidy, which guarantees it for a period of at least thirty years, but preferably ninety-nine years.

6.1 Housing Supply and Demand

Tiverton has developed from its origins in the early 1700's as a series of small hamlets with a farm and fishing based economy, to an attractive residential location close to the region's employment centers. Tiverton's predominantly single-family dwelling housing stock gives the town its residential character, and is regarded by residents as a very important aspect of the town.

Recent data indicates that there are 7,467 housing units in Tiverton. Figure 6-1 below shows the increase in housing from 1970 to 2012. The 1970's showed a 20% increase in housing stock; subsequent decades have averaged 14%.

Figure 6-1: Housing Units 1970-2012



Source: US Census 2002 & American Community Survey (ACS) 2008-2012

Table 6-1 shows the number of housing units by type. According to the American Community Survey (ACS), approximately 76% of the housing units in Tiverton are single-family (both detached and attached). This is consistent with the percentage from the 2000 Census. Multi-family units make up about 16% of the units, a third of which are in large complexes (ten or more units). The number of units in this category has more than doubled since 1990, primarily due to the construction of Sakonnet Bay Manor, a 170-unit continuing care retirement community (independent, assisted living and skilled nursing) and the redevelopment of the historic Bourne Mill Complex which includes 165 apartment units.

MOST HOMES IN TIVERTON ARE SINGLE-FAMILY DETACHED HOUSES

Tiverton has several existing mobile home parks including the Dadson Mobile Estates with 102 units, Four Seasons Mobile Home Association (38 units), Heritage Home Park Cooperative (37 units) and Patchet Brook (8 units).

TABLE 6-1: Housing Units by Type

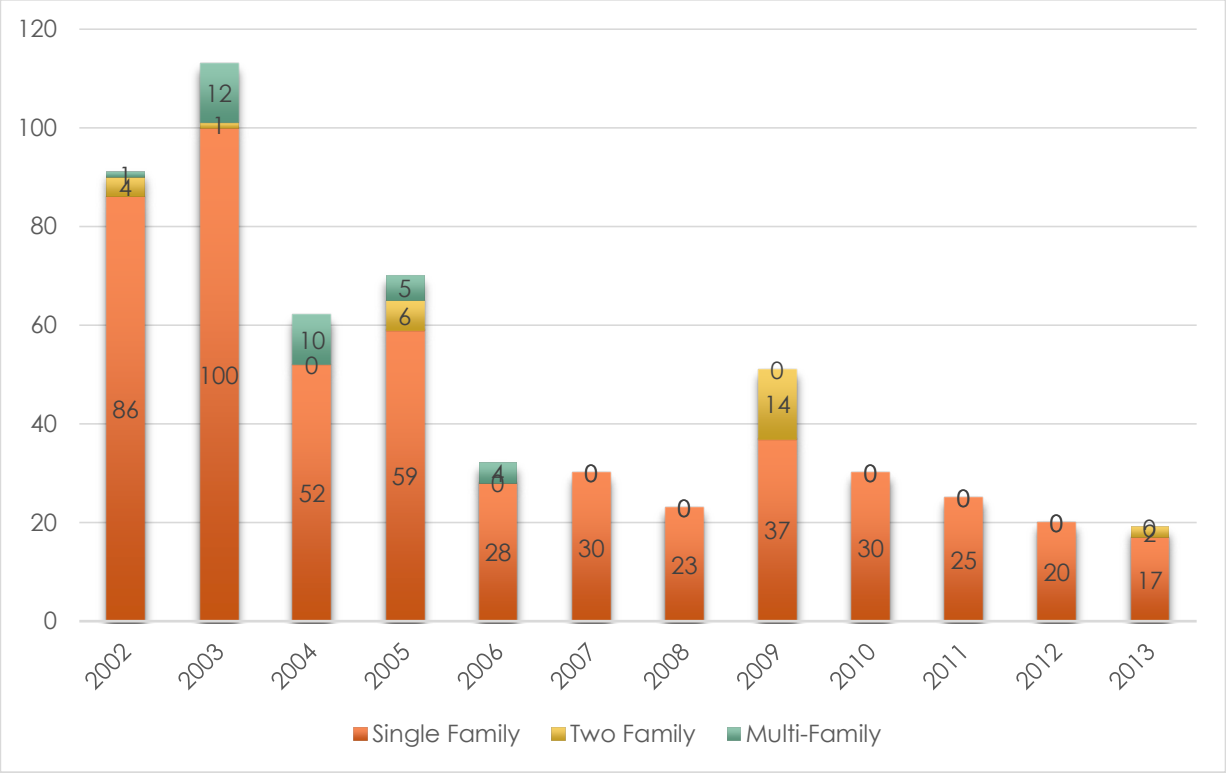
Type of Structure	2000 Total	2000 Percent	2012 Total	2012 Percent
Single-family, detached	5,024	77.6%	5,682	76.1%
Single-family, attached	129	2.0%	275	3.7%
Two to four units	678	10.5%	755	10.1%
Five to nine units	63	1.0%	83	1.1%
Ten or more units	320	4.7%	345	4.6%
Mobile homes*	270	4.2%	327	4.4%
Total housing units	6,474	100%	7,467	100%

** Includes other units such as boat, RV or van*

Source: 2008-2012 American Community Survey

The ACS data indicates that for the period between 2000 and 2012, there were 993 housing units (of all types) constructed. This data measuring the increase in total number of housing units and number of new units is complimented somewhat by data from the Tiverton Building and Zoning Department shown in Figure 6-2, which issues building permits for construction of all authorized new housing units within Tiverton. Of the 566 permits issued from 2002 thru 2013, 70% were issued prior to the economic downturn of 2008. While the Census data indicates overall growth of 15% in new housing units since 2000, the majority of that growth was realized in the first half of the reporting period.

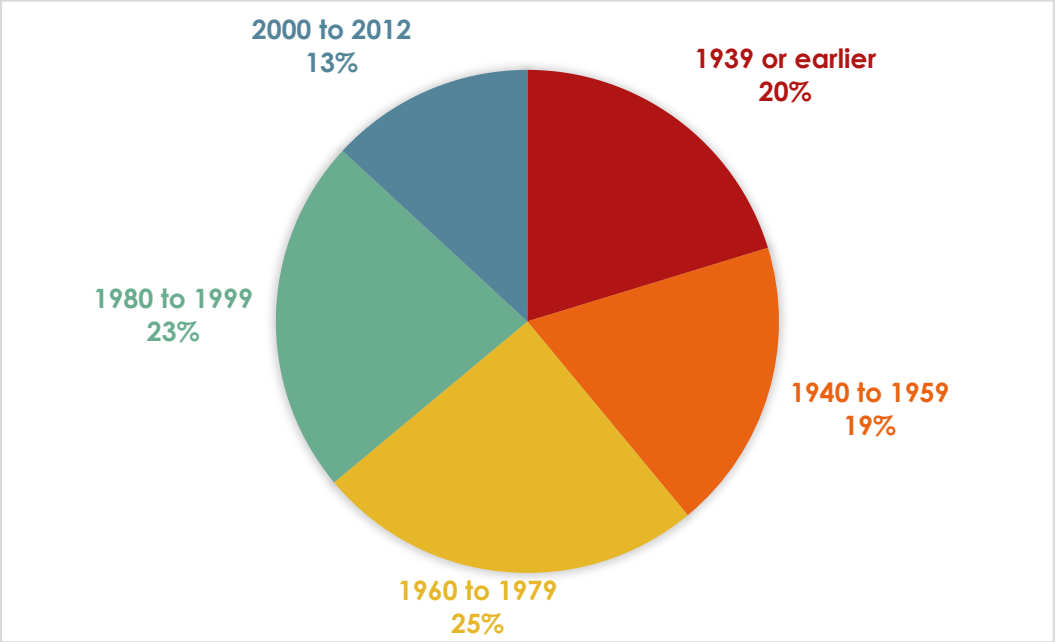
Figure 6-2: Authorized New Housing Units – Building Permits Issued 2002-2013



Source: Tiverton Building & Zoning Department

Figure 6-3 shows the age of Tiverton's housing. While nearly a quarter of the housing stock was built during and immediately after World War II, approximately 60% has been built since 1960. Importantly, approximately 20% of the housing in Tiverton was constructed before 1939, prior to subdivision developments, and it is this portion of the housing stock that contributes most to Tiverton's visual character.

Figure 6-3: Age of Housing Units by Year Built



Source: American Community Survey 2008-2012

The vast majority of Tiverton's housing stock is located in the northern portion of town, north of Route 177 (Bulgarmarsh Road). This portion, although it represents only about a third of Tiverton's land area, includes all of the densest residential zones; R-30, R-40, R-60 and Waterfront. The southern portion of Tiverton is significantly rural with larger R-80 residential lots, agricultural and conservation land. Figure 6-6 Housing Density Map displays the diverse housing densities of Tiverton.

MULTI-FAMILY HOUSES LIKE VILLAGES AT MOUNT HOPE BAY ARE NOW BEING BUILT

Public water is widely available in the northern portion of town as well as limited public sewer. Additional sewer in the area is likely in the future. The southern R-80 zone is served entirely by private wells and private on-site wastewater treatment. This development pattern is consistent with the RI State Land Use Plan 2025 as well as the community's wishes. Tivertonians have consistently voiced their desire that Tiverton's rural character and agricultural heritage be maintained and protected.

Figure 6-4: Housing Distribution by Residential Zone

Source: Tiverton Planning Department

6.3 Natural Hazard Risks to Housing

Flooding, hurricane inundation and sea level rise are the most likely natural hazard risks for housing stock in Tiverton. The Town's Hazard Mitigation Plan (Appendix A) estimates a total of 275 developed residential parcels within FEMA special flood hazard areas. An additional 90 developed residential parcels are located outside of special flood hazard areas but within hurricane inundation zones according to RIGIS data

While most of these properties are single-family detached homes, multi-family and mobile homes are included as well. All of these units are located along the western shore of Tiverton along the Sakonnet River from northern Tiverton to the Little Compton line. Of note are the houses at Fogland Point, which are connected to the rest of Tiverton by a narrow strip of barrier beach. A significant storm could not only affect extensive damage on these houses; should the barrier beach be lost or breached, Fogland Point could become an island.

While this housing stock includes some of Tiverton's most expensive waterfront real estate, there are also a number of modest older neighborhoods at risk. Examples include approximately 42 mobile homes in the Lawrence Court area at the south end of Nanaquaket Pond and the "cottage" community at Fogland Village of 67 homes.

A lesser number of these 365 properties are also at risk from long-term sea level rise, mostly in the lowest lying areas directly on the shoreline or abutting marsh and coastal ponds. STORMTOOLS, an online interactive mapper, provides residents and municipalities of Rhode Island the opportunity to assess vulnerability to sea level rise and storm surge at a property specific level. The mapping tool was developed by URI Ocean Engineering on behalf of CRMC Beach SAMP and is publicly accessible online at www.beachsamp.org/resources/stormtools/.

6.4 Housing Occupancy, Ownership and Costs

Based on the 2010 Census response, Tiverton has an occupancy rate of 90% of its total housing stock, which represents a 4% decrease since 2000, largely attributable to the decline in the real estate market. A small portion is offset by the increase in seasonal housing, with a combination of second home buyers enjoying Tiverton's waterfront locale as well as the "snowbirds", a number of whom are attracted to the age-restricted communities of Countryview Estates and The Villages at Mount Hope Bay, shown in Table 6-2.

TABLE 6-2: Unit Occupancy

	2000 Units	Percent	2010 Units	Percent
Year Round Occupancy	6,077	94%	6,684	90%
Vacant Units	397	6%	762	10%
Seasonal Occupancy	191	3%	308	4%

Source: US Census 2010

Tiverton has maintained a fairly steady owner occupancy rate of approximately 80%, even when considering the increased availability of rental units, the two largest of which are the 165-unit Bourne Mill complex and Sandywoods development, with 50 rental units as shown in Table 6-3.

TABLE 6-3: Unit Ownership

	2000 Units	Percent	2012 Units	Percent
Owner Occupied	4,854	79.9%	5,268	79.7%
Renter Occupied	1,223	20.1%	1,344	20.3%
Total Occupied	6,077	100%	6,612	100%

Source: American Community Survey 2008 -2012

The current median home sale price in Tiverton is $245,000, which represents an increasing trend from 2010 to 2016. The median monthly rental for a 2-bedroom unit in Tiverton in recent years has been over $1,400, $200 more than the range of $920 to $1,238 between 2005 and 2014.

TABLE 6-4: Home Sale Prices

	2000	2005	2010	2015	2016
Median Sales Price	$160,000	$309,450	$229,500	$213,000	$245,000

Source: Home Sales Statistics, Riliving.com

To be considered affordable, monthly housing costs should not exceed 30 percent of household income. Based upon the samples from the 2012 ACS shown in Table 6-4, monthly costs as a percentage of income are provided. These monthly costs are presented for homeowners with and without a mortgage as well as renters.

Based on a sample from the 2012 ACS, the median household income for Tiverton is estimated at $68,706 and the median family income estimated at $81,841. The median selling price of an existing single-family home in Tiverton has increased from $215,000 in 2009 to $226,000 in 2013. The price-to-income ratio is 2.8.

TABLE 6-5: Monthly Housing Costs as Percentage of Household Income

	Owner-Occupied w/o Mortgage		Owner-Occupied with Mortgage		Renter Occupied Units	
	Units	Percent	Units	Percent	Units	Percent
Less than 19.9%	986	62.5%	815	22.3%	329	27.2%
20% to 24.9%	131	8.3%	662	18.1%	197	16.3%
25% to 29.9%	99	6.3%	520	14.2%	126	10.4%
30% to 34.9%	92	5.8%	416	11.4%	115	9.5%
35% or more	269	17.1%	1,247	34.1%	442	36.6%
Not Computed	16	X	15	X	135	X
Total Units*	1,577	100%	3,675	100%	1,209	100%

Source: American Community Survey 2008-2012

* Excluding units Not Computed

A significant number of Tiverton homeowners without a mortgage (77%) spend less than 30% of their income for housing costs, with the majority of those spending less than 20% of income. Of note, however, is that approximately 17% of homeowners without a mortgage are still spending more than 35% of income on housing costs. For homeowners with a mortgage, a little more than half (55%) come in under the 30% of income threshold. On average, 61% of Tiverton homeowners are meeting the "30% of income" standard for housing costs.

The numbers are similar for renters, where a little more than half (54%) spend less than 30% of their income on rent, 46% spend more than 30%. Because the number of units for which a cost range was not computed is relatively high (135 units), it is difficult to state what the true proportion is. The sample data indicates that on average some 40% of Tiverton residents, regardless of housing type, are spending in excess of 30% of monthly income on housing, and that the majority of this group is in the highest spending bracket at 35% or more.

Another measure of housing affordability is data from the 2013 American Housing Survey which estimates the number of households within Tiverton that are housing cost-burdened.

Number of cost-burdened households
(paying more than 30% of their income on housing):
2,299 or 34.4% of total households

Number of severely cost-burdened households
(paying more than 50% of their income on housing):
959 or 14.4% of total households

Number of Low and moderate income (LMI) cost-burdened households:
1,385 or 65.8% of total LMI households

Number of LMI severely cost-burdened households:
765 or 36.3% of total LMI households

Number of LMI cost-burdened households that are renting:
429 or 31.0% of total LMI cost-burdened households

Number of LMI cost-burdened households that own their home:
950 or 68.6% of total LMI cost-burdened households

6.5 Foreclosures, Abandonment and Blight

Like many communities, Tiverton has experienced its share of foreclosures. From a high of 26 units in 2009, foreclosures have moderated to the mid-teens since then. Foreclosed and abandoned property creates a serious problem as even one such property can negatively affect property values in a neighborhood. In response, the Tiverton Town Council passed a Foreclosed and Vacant Properties Ordinance in November 2013. This ordinance requires that vacant and foreclosed properties be registered with the Town and maintained at a minimum standard of upkeep and repair. Figure 6-5 illustrates the number of foreclosures between 2009 and 2013.

Figure 6-5: Foreclosures 2009-2013

Source: RI Housing Works Fact Book

6.6 Low-and-Moderate Income Housing

In general, affordable housing means residential housing that has a sales price or rental amount that is within the means of a household that is moderate income or less. In the case of dwelling units for sale, housing that is affordable means housing in which principal, interest, taxes (which may be adjusted by state and local programs for property tax relief) and insurance constitute no more than thirty percent (30%) of the gross household income for a household with less than one hundred and twenty percent (120%) of area median income, adjusted for family size. In the case of dwelling units for rent, housing that is affordable means housing for which the rent, heat, and utilities other than telephone constitute no more than thirty percent (30%) of the gross annual household income for a household with eighty percent (80%) or less of area median income, adjusted for family size. Tiverton falls within the Providence – Fall River HMFA for determining income limits for eligibility for low-and-moderate income housing. For a family of four, the moderate income limit is $94,350, while the low income limit is $58,250 (FY16 Rhode Island Income Limits for Low-and Moderate Income Households).

Under the RI Low and Moderate Income Housing Act (RIGL 45-53), towns in Rhode Island, including Tiverton, are required to meet a 10% threshold of low or moderate-income units among the total year-round housing units. If this threshold is not met, the community is subject to an expedited review process that housing developers may utilize to gain approval of developments involving affordable units, typically 20% of the total number of units in the development. This procedure, defined as a comprehensive permit, is an alternate land use regulation that replaces local zoning and can supersede use, density and dimensional standards otherwise in place. The denial of such an application is subject to review by an appellate body, the State Housing Appeals Board, who can reverse the community's decision. However, the law also allows a community to develop an Affordable Housing Plan (as part of the Housing component of its Comprehensive Plan) to meet the 10% goal. The finding that a comprehensive permit application for a housing development is not in conformance with the community's affordable housing plan or the Comprehensive Plan in general can be grounds for denial.

In 2016, Rhode Island Housing counted 358 housing units in Tiverton that qualify as Low-and-Moderate Income Housing units (i.e. received a government subsidy and are deed restricted). This equates to 5.1% of Tiverton's total year-round housing stock.

TABLE 6-6: Tiverton LMIH Units by Type, 2016

Type	Total
Family	192
Elderly	120
Special Needs	46
Total	358
Percent	5.1%

Source: Rhode Island Housing, Low-and-Moderate Income Housing Chart

6.7 Summary of Community Housing Needs and Programs

There is a continuing need for housing for single persons and the elderly segments of the population where there is expected to be future growth. In 2000, non-family households constituted 27.5% of all households; in 2013, they constituted 31.7%. The majority of non-family households are individuals living alone. Of those living alone, the largest group (14%) are over the age of 65, although this is an improvement from 2000 when that group comprised about half of those living alone. Developments such as Sakonnet Bay Manor, a 170-unit individual, continued care and assisted living facility, offer additional living options for seniors. Addressing the isolation and marginalization of the single elderly is a major mission of most senior housing programs.

Another area of housing need is accommodating the special needs of people with physical and mental disabilities. The Town of Tiverton has been receptive to the siting of group homes and will continue to support the needs of those in the community with disabilities.

State housing programs will continue to be important to creating housing diversity and affordability. Administered by Rhode Island Housing, the programs include mortgage loans for affordable apartments; tax credits to finance the construction and rehabilitation of affordable rental housing; grants and low interest loans to serve as gap financing or seed money for construction and rehabilitation, and acquisition as well as rental assistance; and a rental housing production program, also for the construction and rehabilitation of affordable apartments. Such units qualify under the Rhode Island Low-and-Moderate Income Housing Act.

Individual programs include various homebuyer and home repair loans, and the Home Equity Conversion Mortgage Program (reverse mortgages for homeowners age 62 or older). Tiverton also participates in the home repair program run by Church Community Housing Corporation. This program offers assistance to eligible families for fundamental housing repairs. The 2012 ACS indicates that there are only 10 units in Tiverton which lack complete plumbing facilities (down from 17 in 2000). There are 110 that lack complete kitchen facilities (up from 51 in 2000).

One of the most important resources Tiverton has access to are the services of the Church Community Housing Corporation (CCHC). CCHC has been instrumental in providing affordable housing in the Town of Tiverton for over thirty years. CCHC itself owns a significant number of rental units in Tiverton and has provided many homeownership opportunities for our residents through its land trust program, which has become the statewide model in securing home ownership for

moderate-income residents. CCHC has extensive knowledge of funding programs for non-profit organizations that provide funding for low and moderate-income resident housing.

CCHC can also work with local developers through a model program it has developed to illustrate to developers how it is possible to provide affordable homeownership units without losing money. The program ties funding sources and a gift from the developer to project, enabling the developer to secure a federal tax deduction.

6.8 Homelessness

Homelessness is not a significant problem in Tiverton at this point. According to the Tiverton Police Department records for 2012-2013, there were four police reports where an individual homeless person was transported to an area shelter. In each case, the subject had either walked to Tiverton from neighboring Fall River, Massachusetts or had traveled with others and was left without return transportation. The East Bay Community Action Program has a facility located in Tiverton, and provides a number of health and human services programs to residents of the East Bay. These include the East Bay Coalition for the Homeless, which manages both a housing program and emergency rental program. A number of Tiverton community organization and churches support the East Bay Community Action Program with fundraising events and ongoing programs throughout the year.

6.9 Affordable Housing Strategy

This section of the affordable housing plan identifies specific strategies to provide the needed Low-and-Moderate Income Housing units in Tiverton for its residents. Meeting the goal of 10% affordable units, as defined, requires certain steps on the part of the town. However, it also requires the active involvement of the development community, as well as partners such as Church Community Housing Corporation, a private non-profit organization dedicated to providing housing options for low and moderate income families and individuals.

In the 2004 Community Comprehensive Plan, Tiverton described its strategy to reach the State-mandated goal of 10% affordable housing stock by 2025 including a numerical build-out in five year segments. The build-out (71 units/year) was based on historical building data and growth projections. However, the economic recession and significant negative impact on real estate development as a result of the financial downturn resulted in a large decrease in the number of new housing units in Tiverton.

A review of the building permits issued by year in Figure 6-2 shows that this assumption in regards to projected number of building permits per year is no longer valid. The last year that was close to 71 permits was 2005 when 70 permits were issued. The average for the years 2006 – 2013 was 29 permits per year.

Nonetheless, Tiverton made significant progress in expanding its affordable housing stock since the 2004 Plan. In 2004, 3.8% of Tiverton's stock met the criteria for Low-and-Moderate Income Housing. In less than ten years that figure increased 48% to over 5% in 2013 with the addition of 124 units. This increase is largely attributed to the Bourne Mill and Sandywoods Farm developments.

The Town was also successful in adopting inclusionary zoning and has been able to set aside several lots for future affordable housing development utilizing this strategy. The recent adoption of zoning that expands land available for multi-family units by right will also increase opportunity for future development of affordable housing.

The following data and analysis indicates that the Town needs to double its 358 low-and-moderate income housing units in order to meet the State's 10% threshold in 20 years.

Number of year-round housing units: 7,070*
10% threshold: 707

Deficit between 10% threshold and existing LMI units: 349 units

20-year population projection: 16,906 (RI SPP)
Average household size: 2.36 (2015 ACS)

20-year housing unit projection: 7,164**
Forecasted 10% threshold: 716

Deficit between the forecasted 10% threshold and existing LMI units: 358 units

*Percent of seasonal housing units from 2010 Census (4.1%) applied to 2015 ACS total housing unit figure

**Calculated by dividing the 20-year population projection by the average household size

Table 6-7 projects the number of units generated for the Town's identified affordable housing strategies:

TABLE 6-7: New LMI Housing Units Generated by Strategy/Project 2017-2037

	Strategy/Project	Units
1.	Inclusionary Zoning – Single-family (20%)	10
2.	Inclusionary Zoning – Multi Family (20%)	40
3.	Agricultural/Rural Compound (not listed in previous plan)	50
4.	Tiverton Housing Authority Elderly Housing Hancock Street (existing strategy)	50
5.	Fee-In-Lieu Rehab & Subsidy (new strategy)	70
6.	Fee-In-Lieu Offsite Construction (new strategy)	10
7.	Apple Creek Conversion Project (existing strategy)	28
8.	Tiverton Affordable Housing Commission Subsidy Conversion (expanded strategy)	100
	Total	358

The section below further describes the affordable housing strategies included in Table 6-7:

1. Article XXI of the Zoning Code addresses Low-and-Moderate Income Housing and provides for a density bonus for major development projects which are required to include 20% affordable units within major single-family subdivision developments. Inclusionary Zoning was an existing strategy and several affordable house lots have been created using this strategy. Due to the recession and impact on the housing market, the strategy did not produce the anticipated number of units. Other factors impacting the success of this strategy include the high costs of development in the lower density residential areas where most subdivision development projects occur. Although lots have been set aside for low-and-moderate income housing, the Town needs both a partner to develop the lots and buyers interested in purchasing moderately-price deed restricted housing. Some moderate income buyers may prefer to purchase a home without a deed restriction or live in a neighborhood rather than the rural and more remote locations of Tiverton.
2. Article XXI of the Zoning Code addresses Low-and-Moderate Income Housing and provides for a density bonus for major development projects which are required to include 30% affordable units within major multi-family land development projects. This strategy was existing, has been implemented, however, it has not generated additional low-and-moderate income units.
3. Although Agricultural/Rural Compound is a newly listed strategy, it is exemplified by the successful Sandywoods Farm development. The project, implemented through a Comprehensive Permit, includes 50 affordable rental units within a rural community dedicated to promoting and supporting the arts, sustainable living, agriculture, affordable housing and land stewardship. The Town has listed agriculture/rural compound as a strategy to encourage a similar style development project.
4. The Tiverton Housing Authority and the Cumberland Affordable Housing Corporation now provide a total of 96 low-income elderly units in two separate structures on Hancock Street (along the state border in the northeast corner of the town). There is

a great demand for additional low and very low-income elderly units. The Housing Authority has eight undeveloped acres as part of its property that is available for the construction of another low-income elderly complex, pending availability of funding. It is estimated that an additional 50 affordable elderly units could be provided through a U.S. Housing and Urban Development (HUD) construction grant. This is an existing strategy.

5. A new strategy was identified to amend Zoning to allow for the collection of a fee in lieu of constructing low-and-moderate income housing units within new major land development projects or subdivisions. The fees collected could be used towards providing current low and moderate income residents subsidies for necessary repairs and upgrades to their properties in exchange for deed restriction.
6. In an effort to address some of shortcomings of the Inclusionary Zoning Ordinance, a new strategy was identified to amend the Zoning Ordinance to permit the collection of a fee in lieu of constructing low-and-moderate income units within new major land development projects or subdivision. The fees collected could be used for the construction of low-and-moderate income housing at an offsite location that may be more suitable for affordable housing (i.e. closer to transportation, services and utilities, lower construction costs, less environmental constraints).
7. Church Community Housing Corporation received grant money specifically earmarked for rehabilitation of the Apple Creek Apartment Complex, a 28-unit, mixed-income family rental development. A number of these units will be specifically reserved for those under the 50% of median income limit and formerly homeless. The project was listed in the former Tiverton Affordable Housing Plan and is ongoing.
8. Creation of a Tiverton Affordable Housing Commission was listed as a strategy in the previous plan, but was not implemented. The Town believes this action would be instrumental in carrying forward affordable housing efforts. The Commission could assist in applying for grants to implement other strategies. The Commission could also oversee a program to provide low-and-moderate income residents with subsidies to rehabilitate or upgrade properties in exchange for deed restriction of the housing unit.

6.10 Housing Goal, Policies and Actions

Goal: Encourage a diversity of housing types that meet the needs of all segments of the population of Tiverton, while maintaining the character of the community. Enact policies that support the creation and sustainment of quality affordable housing and attainment of the State-mandated objective of 10% affordable housing stock.

POLICIES

- ENCOURAGE THE PRESERVATION OF THE EXISTING HOUSING STOCK TO ENSURE OLDER NEIGHBORHOODS REMAIN VIBRANT AND ARE NOT ABANDONED IN FAVOR OF NEW DEVELOPMENT.
- IDENTIFY AND CONTROL THE DEVELOPMENT OF FUTURE RESIDENTIAL AREAS TO ALLOW A MIXTURE OF HOUSING TYPES INCLUDING THOSE TARGETED TO THE ELDERLY, THOSE OF LOW-AND MODERATE-INCOME AND THE DISABLED.
- ENSURE A MIX OF AFFORDABLE HOUSING OPTIONS AND TYPES THAT MEET THE NEEDS OF FAMILIES, INDIVIDUALS, SENIORS AND THOSE WITH SPECIAL NEEDS.
- PROMOTE AFFORDABLE HOUSING OPTIONS THAT ARE WELL INTEGRATED INTO THE COMMUNITY AND FOSTER GEOGRAPHIC, SOCIAL, AND CULTURAL DIVERSITY.

Actions

PRESERVATION, CONSERVATION AND ENHANCEMENT

Action 1: Require, as part of the local review process, owners and developers of historic properties to first consider and prioritize plans that include the preservation and appropriate restoration of existing historic structures over demolition when drafting and submitting redevelopment plans for local approval. Local regulations should be crafted to encourage owners and developers of historic structures considering redevelopment or renovation to submit plans that are compatible in scale, design, and building materials with the historic property and complementary to surrounding established neighborhoods and landscapes.

An intrinsic part of Tiverton's visual character is the presence of 17th, 18th and 19th century residential structures made of building materials exhibiting the architectural style and detail distinctive to the region's history. Given current and future developmental pressure, many of these dwellings are at risk of demolition or inappropriate remodeling - an irreplaceable loss to the town's quality of place. The Historical Preservation Advisory Board was created to provide advice and assistance to homeowners and business owners alike on the preservation of historic structures, as well as, to document their history and elevate the community's knowledge and appreciation of them by means of education and outreach programs.

Developers should be encouraged to incorporate historic home preservation into their overall plans. Moreover, developers should assure that new construction is compatible with the architectural style, scale and building materials of neighboring historic buildings.

Action 2: Explore a broader range of permitted uses for large, older residential structures, including bed and breakfast and offices, which preserve the character of the neighborhood and the architectural integrity of the structure.

Some larger homes built prior to World War I may be at risk of deterioration because their size or location is no longer desirable in the housing market. In these instances, alternative uses, such as offices, condominiums, apartments, or bed and breakfast guesthouses could be allowed, subject to controls to preserve the architectural integrity of the buildings and maintain the visual quality of Tiverton. Increasing the range of allowable uses in the existing structure generally improves the structure's value and consequently, opportunities for preservation.

Action 3: Investigate sources of grant money and other available funds to assist owners in preserving historic and architecturally significant structures.

Architecturally significant buildings and historic structures are a community asset, but owners generally have to bear the burden of the maintenance of the structure. Without strategies to remove some of this burden from owners, these buildings may fall into disrepair and eventually be lost to the community.

Action 4: Annually review home sales statistics, and modify development tools and Zoning regulations to ensure community and economic viability across all of Tiverton's diverse neighborhoods and housing stock.

Tiverton has numerous older neighborhoods that face pressure from newer, more modern developments. It is important that these neighborhoods remain vibrant and viable, and not become subject to blight and loss of economic value. An annual review of home sales statistics by the Planning Board would give Tiverton the opportunity to adjust development tools and Zoning regulations to ensure all types of housing stock remain vital and desirable for current residents as well as prospective buyers.

MIXTURE OF HOUSING TYPES

Action 5: Strengthen and clarify Zoning provisions that allow multi-family dwellings to encourage townhouses or condominium-style developments as an alternative to single-family developments in certain districts, while retaining supportable density, as well as scale and character of the surrounding neighborhood.

The predominance of single-family homes in Tiverton contributes to its unique visual character. It is also a clear goal of this Comprehensive Plan, one which is reflected in the Zoning Ordinance, that lower density single-family development occurs in the large southern portion of town where the small town and historic character is most evident. Alternative housing opportunities for those whose needs are not met by the traditional single-family home can be provided in the more densely developed portion of Tiverton, where permitted by zoning.

Projections indicate that Tiverton's population will continue to age, and household size will remain smaller than in previous periods (not accounting for migration into town as a result of new single-family subdivisions). These smaller, older households will require different housing solutions to those presently offered within the town. In recent years, the Town has addressed this by amending the Zoning Ordinance to allow two types of age-restricted housing: the Manufactured Home Elderly Community (MHEC), and the Age-Restricted Mixed-Use Community (ARMUC).

Prior to 2014, two-family dwellings were permitted only in the R-30 and R-60 zoning districts, and multi-family dwellings or apartment houses are only allowed by special use permit in these districts. In 2014, the existing General Commercial District on Main Road (from Souza Road to the state line) and in the Bliss Four Corners area were rezoned into three new business districts utilizing a Form-Based code. Each of these new districts allows for multi-family and apartment houses to be permitted by right; the Neighborhood Business District allows two-family houses to be permitted by right as well. This zoning change is expected to encourage the development of more affordable units as well as units for smaller households.

Action 6: Continue to evaluate zoning provisions that allow mixed-use residential with supportable density to ensure that providing a residential component in commercial development where appropriate is encouraged.

In 2001, Tiverton revised its Zoning Ordinance to allow mixed-use residential, a structure used for both residential and commercial (apartments over stores) by right in the General Commercial District and by special use permit in the Village Commercial (VC) District. The concept of mixed-use residential provides smaller more affordable housing units within walkable distances of shopping and services. The new zoning districts created in 2014, as outlined above, continue to support this concept with mixed-use allowed by right in all three new districts.

Action 7: Retain and improve through amendments the inclusionary zoning provisions in the Zoning Ordinance to encourage the creation of low-and-moderate income housing units. Continue to require that all single-family developments present a plan that sets aside 20% of the units as affordable and amend inclusionary zoning set aside for multi-family developments to be a minimum of 20% rather than 30% as affordable. Amend ordinance to allow options of fee-in-lieu, off-site construction, and rehabilitation of low-and-moderate income units when providing units on-site is less feasible or desirable.

The Town's current Zoning Ordinance requires applicants of major land developments and subdivisions to submit an alternative concept plan with 30% of the units for multi-family developments and 20% of units for single-family developments be dedicated for Low-and-Moderate Income Housing. In addition, a density bonus of up to 30% over the number of units allowed under zoning may be allowed as an incentive to the developer to increase the number of affordable units by adding some market rate units. Discretion is given to the Planning Board regarding the requirements for set-asides and the allowance of density bonuses.

While property developers have been receptive and willing to set aside lots for affordable housing, some difficulty lies in finding available funding and partnerships to construct these units. Much of the recent, and likely future, subdivision activity centers in the R-60 and R-80 zones as other residential zones have much less land available and are nearly at build-out capacity. These R-60 and R-80 lots are significantly more expensive to develop as they may not have access to public water supplies and require on-site wastewater treatment. They are also often geographically remote from services and public transportation and may require more property maintenance costs for owners.

The recent amendment of RI General Law 45-24-46.1 which allows alternative options to meeting inclusionary zoning requirements could provide a solution. The new amendments now allow off-site construction or rehabilitation. Using these tools, a developer may offer to build affordable

housing or rehabilitate existing property in an off-site location that affordable housing partners and funding sources find more attractive for investment. A second component of the amendment allows developers to pay a fee-in-lieu or donate land. Again, this could be used to develop affordable housing to meet specific needs in Tiverton's program, such as elderly affordable housing or housing that's within walking distance of public transportation, etc. These new regulations could address an issue that has been a stumbling block to achieving more affordable units as part of the inclusionary zoning process.

Adoption of new policies that allow for additional options in the inclusionary zoning regulations such as fee-in-lieu and off-site development will help to address many of the challenges that exist under the current structure.

A significant amount of dollars could be generated through the collection of a fee-in-lieu and off-site development. The fee amounts are fixed by State regulations; as of 2018, the fee for Tiverton is $55,000 per unit. These funds could be put to use in creating more affordable units in a number of ways. One example would link in with the proposed sewer project that would bring public sewer to most of northwest Tiverton, home to sizeable, established neighborhoods in close proximity to services. Estimates for the mandatory sewer tie-in range in cost from $18,000 to $25,000 per property depending on individual property characteristics. Current owners of investment rental property may find it financially attractive to convert to deed-restricted affordable housing in return for subsidy of the tie-in fees. The same may be true for some income qualified, elderly homeowners for whom even the availability of low interest loans may not be feasible on limited fixed budgets.

Additionally, these fees could be put to use in partnership with Church Community Housing or other collaborators to produce in-fill development in established neighborhoods, or the purchase and rehabilitation of existing properties, particularly distressed properties in quality neighborhoods.

Action 8: Encourage the development of multi-family and mixed-use units in designated zones and incentivize the inclusion of low-and-moderate income housing units.

Tiverton has also focused more directly on multi-family development as a way to provide affordable units. A recent example of a successful multi-family development approach to affordable housing is the renovated Bourne Mill Complex, a historic mill building converted to 165 residential apartments which include 67 affordable units. Future multi-family developments include the Apple Creek Apartment Complex and expansion of the Tiverton Housing Authority Hancock Street Complex. The Tiverton Housing Authority and the Cumberland Affordable Housing Corporation now provide a total of 96 low-income elderly units in two separate structures on Hancock Street. The Housing Authority has 8 undeveloped acres as part of its property that is available for the construction of another low-income elderly complex.

BOURNE MILL COMPLEX

As noted earlier in this chapter, two family units are permitted by right in the R-30 and R-60 zones, and with multi-family and apartment houses allowed by special use permit in the same. Recent re-zoning of the majority of the existing General Commercial zone into three new districts allows for multi-family and apartment houses to be permitted by right in a sizable area that was previously unavailable for residential development. One of the new districts, the Neighborhood Business District, allows two-family houses to be permitted by right as well. This rezoning should allow for the creation of affordable units in areas that are pedestrian-friendly, and within walking distance of services, schools and public transportation. Consideration of incentives such as density bonuses could provide an opportunity for significant growth in affordable housing stock.

Currently, there are several proposals for multi-family and townhouse-style developments in various stages of permitting. The aforementioned density bonus of the inclusionary zoning provision is expected to drive a marked increase in affordable apartments and townhouses. These units may be especially attractive for singles and seniors who desire lower property maintenance options.

In a similar vein, the option of mixed-use residential, where business occupies the lower level with residential units above, presents another opportunity to grow affordable housing stock. The new commercial zones now allow mixed-use residential by right, with all the same benefits as the multi-family units mentioned above.

One of the major resources necessary for multi-family development, if not the most important, is the expansion of the sewer lines in the northern portion of the town. The sewer lines extend from Fall River down to the Business Park adjacent to Route 24. A current initiative to expand public sewer in the densest residential portion as well as the main business zones is currently under consideration. In Tiverton's difficult soil environment, expensive advanced treatment systems are now routinely required. Multi-family and mixed-use residential are especially affected by high costs associated with on-site wastewater treatment. Expansion of the sewer lines would have a positive impact on growth of affordable units in these categories.

Action 9: Continue to support the development of specialized residential compounds, such as art and agricultural colonies, which could provide affordable housing options in the more rural portions of Tiverton.

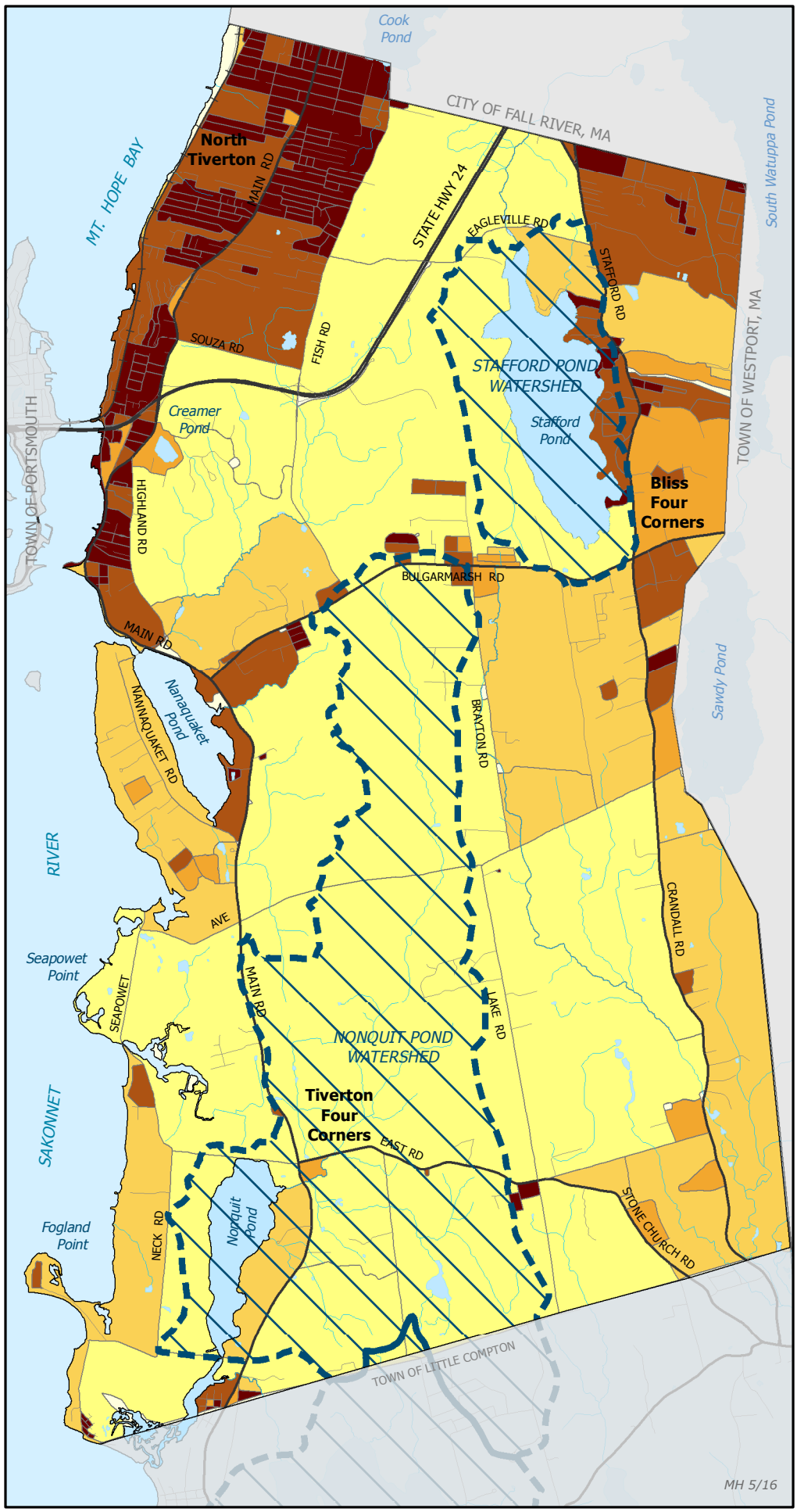
The development of Sandywoods, an arts and agricultural community which includes fifty-two (52) affordable rental units and developed in partnership with Church Community Housing, is an award-winning example of affordable housing. Developed using conservation zoning techniques with significant open space, Sandywoods includes spaces for living, work, recreation and community gathering. Support for specialized compounds that encourage the arts, agriculture and community-style living in the more rural portions of Tiverton allows for a more effective method to develop affordable housing for those who desire "country living".

SANDYWOODS FARM

Action 10: Explore establishing an Affordable Housing Commission to monitor and actively promote the development of affordable housing units in Tiverton.

In Tiverton, as in many communities, residents need to understand what affordable housing is and who is likely to benefit from efforts to increase its availability. While this plan defines our affordable housing goals, general education of the public and advocacy is needed on a continuing basis. For this reason and the need to account for the efforts of the Town to secure affordable housing for its residents, the creation of an Affordable Housing Commission should be explored.

The Affordable Housing Commission, once up to speed on programs and activities, could be responsible for monitoring the Town's progress against its goals, and make suggestions to improve implementation. The Commission could create plans and processes to implement Action #8 as identified earlier in this Chapter. The Commission could work closely with the Planning Board and Church Community Housing and other partners to identify opportunities for additional growth. One example would be to identify existing housing units that currently meet the criteria for affordability but are not counted because no subsidy is provided to ensure affordability over a minimum 30-year period. Subsidies in the form of federal, state or local funding for the rehabilitation of a housing unit with affordability provided through land lease or deed restriction could markedly increase the number of affordable units. The Commission could work to identify additional state and federal partnerships that would provide funding for such conversions.



HOUSING DENSITY (PER SQ MILE)

- 15 - 100
- 101 - 300
- 301 - 500
- 501 - 1,000
- 1,001 - 13,542

- STREAMS
- PONDS, OPEN WATER
- SURFACE WATER RESERVOIR WATERSHED
- MAJOR ROAD
- MINOR ROAD
- RAILWAY

Source: Derived from US Census Bureau SF1, 2010, (based on Housing Units and Census Block Area Sq Miles)

N

0 1 Mile

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Mapping and Planning Services for general reference, informational, planning and guidance use, and is not a legally authoritative source as to the location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. The Town of Tiverton or MPS makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 6-6
HOUSING DENSITY

SERVICES AND FACILITIES

7.0 SERVICES AND FACILITIES

The Services and Facilities Chapter addresses all local government and other public services and facilities related to public safety, education, community services and utilities. Some of the services that Tiverton residents enjoy are funded by the annual real estate tax. These include police, fire, schools, libraries and other community services. Others are paid by the recipient, as in public water and sewer service. All affect the public health, safety and welfare of Tiverton's citizens. The locations of municipal and community buildings are shown in Figure 7-1.

7.1 Public Safety & Emergency Management

Law enforcement and protection of persons and property are provided by the Police Department's 31-member enforcement team, supplemented by 12 civilian employees, including an animal control officer. Although not directly under the jurisdiction of the Police Department, boating safety enforcement is provided by a part-time harbormaster, with assistance from a number of part-time (primarily volunteer) harbor patrol officers, as well as, State fish and game officers.

The Police Department operates a twenty-four hour patrol with three officers per shift. Average response time to an emergency dispatched call is approximately four minutes throughout town. The Police Department is committed to the concept of community policing and community involvement. It plans to continue its ongoing drug and alcohol education program in the schools, and to assist in neighborhood watch programs.

Police Department headquarters are located south of Route 24 at Fish Road. Facility needs identified by the Police Department are additional storage space for records, a new locker room and bathroom.

The Fire Department operates three fire stations (See Figure 7-1) with a staff of 27 full time fire-fighters, plus the Fire Marshall, Fire Chief and a civilian secretary. The fire stations are aging and may not be ideally located given the current population demographics. The Chief's Office and Headquarters are located at 85 Main Road in Station 2 built in 1956. Station 1, located at 287 East Road, was built in 1982 and Station 3 was built in 1975. Recommendations from the Fire Department for future investment consideration include the creation of a fire training facility to enhance fire-fighting skills and to lower fire insurance premiums and also acquisition of fire-fighting equipment and vehicles to provide better access and fire protection services for larger and taller buildings. The Fire Department also manages the emergency rescue service, which consists of two rescue vehicles. The Town currently bills for rescue service.

In 2004, the Town was awarded a grant to centralize and enhance the public safety communications/dispatching system to accommodate all emergency services; police, fire, ambulance and harbormaster. This dispatching system, as well as a statewide 911 system which identifies the locations of calls, have increased local efficiency in responding to emergencies. The Town will continue to seek Federal, including Homeland Security, as well as, State grants and donations to assist the community with the delivery of quality law enforcement and fire protection services.

Since the appointment by the Town Council in 2008 of two volunteer deputy directors of emergency management, significant progress has been made in formalizing Tiverton's emergency management infrastructure, policies and procedures. This includes the development of a formal emergency operations plan, the implementation of a Medical Emergency Distribution System plan and the updating and maintenance of important emergency management plans such as those pertaining to dams and hazard mitigation. Tiverton recently received "Storm Ready Community" designation from the National Oceanographic and Atmospheric Administration.

Future efforts should be focused on updating existing policies and procedures as the need arises and further preparing the town for any potential disaster event.

7.2 Schools

Tiverton's School District covers the incorporated bounds of the town. There are three operating elementary schools: Pocasset, Fort Barton and Ranger; the Tiverton Middle School; and the Tiverton High School. In 2015, the School Department consisted of 178 teachers and 62 non-certified support staff. Although it varies somewhat from year to year, the educational system accounts for about two-thirds of the Tiverton annual budget.

For the 2014-2015 school year, there were 1,917 students enrolled in grades PK-12. In the 2015-2016 school year, the enrollment was 1,843. 2015-2016 was the first academic year for all-day kindergarten. In 2016-2017 and 2017-2018 the enrollment was 1,847 and 1,835 respectively.

Tiverton provides special education services through a regional collaborative program that includes students from Little Compton and Middletown. This allows the Town to contain costs associated with providing services to students with special needs. Federal funds, which offset a portion of these costs, are allocated on a per capita basis. When ready, students are integrated into the regular classrooms.

In 2013, the School Committee approved a Facilities Study that was conducted by RGB Architects. The study reviewed the condition of all five schools and presented recommendations that prioritize the order in which renovations should occur.

Tiverton's school facilities total 405,097 square feet and consist of the school types detailed below. Schools were visited three times during the Statewide Facilities Assessment by teams of specialists in March 2016. This report provides Local Education Agency (LEA) summary findings for the statewide assessment program.

TABLE 7-1: School Facility Size By Type

School Type	Square Feet
Elementary School	117,861
Middle School	142,000
High School	145,236
Total:	**405,097**

Demographics

Enrollment is projected to decrease by 9.9% over the next 10 years in Tiverton. The total LEA enrollment at 5 school(s) is 1,820 students with a total capacity of 2,640 as reported by the LEA. Utilization is calculated by dividing enrollment by capacity, resulting in 68.9% utilization at Tiverton.

Educational Program Space Analysis

In Tiverton there are 178 instructional spaces; of these spaces 12.9% meet or exceed the space size standards. Of the total current deficiencies identified, $2,109,089 are related to the educational program space assessment. Addressing these identified deficiencies will improve the learning environment and bring the school(s) in the district closer to 21st century learning facilities.

Five Year Need Summary

The current deficiencies total $46,032,107, with 34.5% categorized as Priority 2 and another 30.6% as Priority 3. The building systems with the highest current deficiency costs are interior and mechanical. The projected life cycle need in Years 1 through 5 is $9,530,522. It is anticipated that the majority of the need will occur in Year 5. School(s) with the greatest need are represented in the adjacent table and make up 94.7% of the combined 5-Year need at Tiverton.

Five Year Facility Condition Index (FCI)

For master planning purposes, the total current deficiencies, less new construction, and the first 5 years of projected life cycle needs were combined. This provides an understanding of the current needs of a facility as well as the projected needs in the near future. A 5-Year FCI was calculated by dividing the 5-Year need by the total replacement cost. The 5-Year need is $55,562,629 with a district replacement value of $140,396,310. The resulting 5-Year FCI is 39.6%.

The RI Department of Education (RIDE) had annually evaluated all public schools in the State. Table 7-2 shows the latest ratings from 2014. In 2014, Fort Barton School was recognized by the U.S. Department of Education as a National Blue Ribbon School. RIDE has not rated schools since 2014; however, this will change with the new Every Student Succeeds Act (ESSA) which took the place of No Child Left Behind education laws.

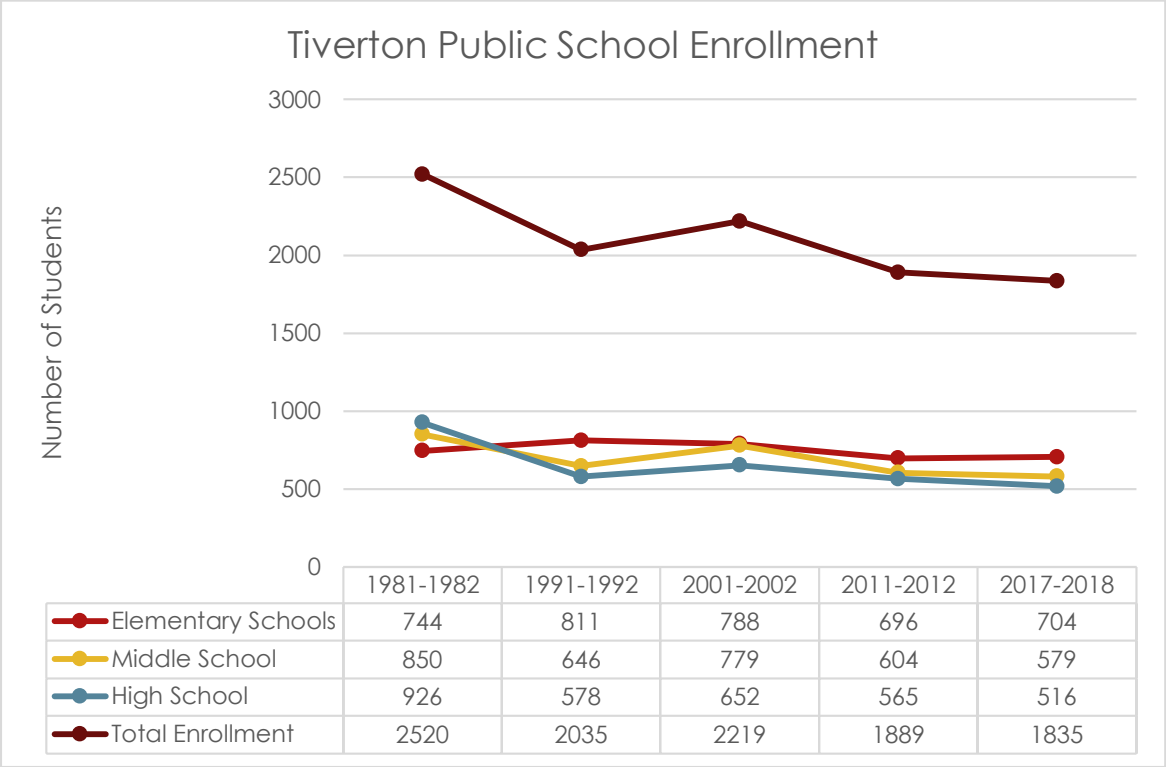
TABLE 7-2: RI Department of Education Ratings 2014

School	Rating
Pocasset	Typical
Fort Barton	Commended
Ranger	Typical
Tiverton Middle School	Typical
Tiverton High School	Leading

The School Committee, as vested by law, has the responsibility to determine expenditures for the school system. An annual budget is prepared, and a detailed review is undertaken by the Town's Budget Committee, before presentation at the Financial Town Referendum, held in May of each year. As required by the State, the School Committee supplies the RI Department of Education with a five-year capital budgeting plan.

In 2007, the Town Council adopted a 'Development Impact Fee' charged to purchasers of new houses, with an exemption for one-bedroom homes, age-restricted homes and certain affordable units. The fee offsets the future cost of educating children in that new household. The fee has remained at $2,980 since 2007. In the fiscal year that began on July 1, 2014 and ended June 30, 2015, the fee raised $59,600 on the sale of 20 new houses. The revenue goes into a dedicated account to be used exclusively for capital improvements on school buildings.

Figure 7a: Tiverton Public School Enrollment



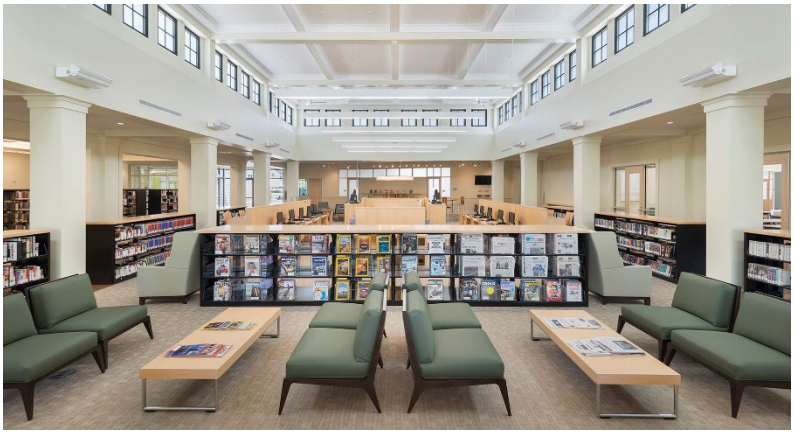
	1981-1982	1991-1992	2001-2002	2011-2012	2017-2018
Elementary Schools	744	811	788	696	704
Middle School	850	646	779	604	579
High School	926	578	652	565	516
Total Enrollment	2520	2035	2219	1889	1835

*Capacity Note: Elementary Schools =861 Students Total or 287 per school based on 2014 letter to Planning Board from Superintendent Rearick; Middle & High Schools = 850 Students each based on 2007 Needs Assessment / Impact Fee Ordinance; Total Estimated System Capacity = 2,561 Students

7.3 Library Services

Tiverton's library system consists of a new Tiverton Public Library that opened in June of 2015 and the second oldest library in Rhode Island, the historic Union Public Library at Tiverton Four Corners.

The new library, near Bliss Four Corners, provides opportunities for an enormous expansion of educational and enrichment activities for the people of Tiverton. With its meeting rooms of various sizes, it offers plenty of space for quiet study and group gatherings.



The Trustees are appointed by the Town Council as legal guardians and custodians of the library to ensure its proper care, staffing, and governance. The Library Director is hired by the Trustees to oversee the daily running of the facility, hire staff, and work with the Trustees on budgeting.

There are two non-profit organizations that help with library services. The Tiverton Library Foundation provides supplemental financial assistance. The Friends of Tiverton Libraries raises funds for library programming and promotes library services in the community.

The Union Public Library is an active branch of the town library system, offering its services with small library charm to customers in the southern part of town. The quaint building has been part of the Tiverton Four Corners scene for almost two hundred years. It is owned and maintained by the Union Public Library Association and leased to the Library Board of Trustees.

Sale of the Essex Library building located in the Tiverton Highlands was authorized by voters during the 2016/2017 Financial Town Referenda. It was sold in 2017 to a private party for residential use.

7.4 Town Hall

The Tiverton Town Hall, located at 343 Highland Road, is the center for town administration, including the offices of the Town Administrator, Tax Assessor, Tax Collector, Building Official, Town Treasurer, Town Planner, Administrative Officer of the Planning Board and Town Clerk, as well as for town records storage. It also serves as the courtroom for sessions of the Municipal and Probate Courts.

Although renovations in 1999 have made the Town Hall more useable, it still lacks office space and climate control and fireproof storage for archival records. Many public meetings of the Town Council, Planning Board and Zoning Board of Review are crowded, often approaching the permissible occupancy of Town Hall. Extensive renovations to Town Hall are needed to meet future space, climate control and communications needs.

7.5 Senior Center

The Senior Center was established in 1978 in the former Barker School on Canonicus Street in northern Tiverton. It currently services more than 1000 members of the community aged 55 and over on a regular basis. With one full-time and four part-time employees and eighty volunteers, the kitchen, meal site, delivery of meals and activities are offered weekdays year-round. The building is also used for public meetings or events on an as needed basis.

Health and wellness programs, tax and financial education and assistance information, door to door bus service for local shopping trips, seasonal programs and daily activities for socialization are just some of the established benefits offered to the community.

The members are also involved in community outreach, utilizing the AARP tax assistance programs, safe driving instruction classes, fundraising through knitting projects to benefit the Star Kids Scholarship program and the Senior Center Chorus which entertains at local nursing homes and adult day care facilities. The most recent year had over 33,000 client participation activities, programs and services. It is rapidly outgrowing its facility and limiting the opportunity for new class and program offerings.

Three annual grants help support the efforts of the Center in addition to a modest membership fee; however, the bulk of the funding for the building and staff is through local taxes. The services and programs offered by the Center are a valuable resource for a growing portion of the population and should continue to be supported.

7.6 Pocasset Hill Cemetery

Tiverton has one town-owned cemetery, Pocasset Hill Cemetery, which is available to all town residents who choose to purchase a burial plot. The operation and management of this cemetery is the responsibility of the Tiverton Cemetery Commission, whose members are appointed by the Town Council. The Cemetery Commission is also responsible for securing additional land to meet the longer-term burial needs of the town's population.

7.7 Drinking Water Utilities

Although all of south Tiverton and sparsely populated areas in the north derive their potable water from wells, most homes and businesses in the more densely settled northwest portion of town are connected to public water. Two water systems serve the town; the Stone Bridge Fire District and the North Tiverton Fire District, both of which were originally established as volunteer firefighting organizations. See Appendix C for the Executive Summary of the Water Supply System Management Plan for the North Tiverton Fire District (October 2014) and Appendix D for the Executive Summary of the Water Supply System Management Plan for the Stone Bridge Fire District (September 2009).

The Stone Bridge Fire District, which draws water from Stafford Pond, serves an L-shaped area extending from Stafford Pond west across Bulgarmarsh Road and north along Main Road to Souza Road. It maintains a storage capacity of 1 million gallons per day in two tanks, one with a capacity of 1 million gallons and the second with 0.5 million gallons. It serves approximately 1,070 households. Because the City of Fall River owns the overflow water rights to Stafford Pond (water coming over the north shore dam and flowing into Sucker Brook which is a tributary of Fall River's South Watuppa Pond), Stone Bridge must pay Fall River a contractual fee for drawing upon any overflow water. The district also has an emergency interconnection with the Town of Portsmouth, which can provide Aquidneck Island with emergency water of up to 175,000 gallons per day.

See Figure F-2 for boundaries of fire districts and Figure F-3 for existing water service areas.

The North Tiverton Fire District also purchases water from the City of Fall River, drawing from North Watuppa Pond, and from the Stone Bridge Fire District for use of Stafford Pond water. This district presently serves nearly 3,000 households, and would potentially serve new developments east of Stafford Pond and south of Bulgarmarsh Road.

Both districts maintain their own distribution system. As required by the Rhode Island Water Resources Board, both districts update their management plans every five years. Stafford Pond, and Nonquit Pond in south Tiverton, which is part of the City of Newport's water supply system and could someday provide drinking water to Tiverton residents, are both protected by means of a Watershed Protection Overlay District (see Chapter 5).

Efforts have begun to address the maintenance and upgrading of septic systems in the Stafford Pond Watershed (see Wastewater Management below). Both the Rhode Island Department of Environmental Management (RIDEM) and the U.S. Environmental Protection Agency have been active in providing funds to mitigate agricultural and stormwater run-off. The Tiverton Conservation Commission has also published a guide for landowners in the Stafford Pond watershed. High levels of phosphorus and nitrogen pose water quality challenges for both Stafford and Nonquit Ponds. For several years, RIDEM has managed a 'Total Maximum Loading Program' (TMDL) - setting limits on the daily discharge of pollutants into water bodies - for Stafford Pond. A TMDL is being developed for Nonquit Pond.

The large increase in the number of homes and other buildings raises the issue of potable water availability. Neither water district has definitive data on how much water could be withdrawn from Stafford Pond or purchased from Fall River to serve new subdivisions and other high volume water consumers such as hotels, casinos and restaurants. A peer-reviewed study should be undertaken to determine how much and what kind of future development can be planned before a limit is reached on affordable potable water for all residents and businesses.

The fact that only about 4,000 households and other buildings are served by the two districts raises the question of consolidation. A merging of the two into a single Tiverton water district might result in cost savings to consumers, an integrated distribution system and an end to the occasional disputes that arise between the existing districts.

THE PROTECTION OF THE WATER QUALITY OF STAFFORD POND IS A CRITICAL ISSUE

7.8 Wastewater Management

ON-SITE WASTEWATER TREATMENT SYSTEMS (OWTS)

Currently it is estimated that 94% of the homes and businesses in Tiverton rely on on-site sewage disposal systems, with an estimated 6,400 separate septic systems, half built before 1970, which implies outdated design concepts. Modern OWTSs work very well even in poor soil conditions provided that they are monitored to insure that the ground water does not become contaminated.

According to soil analyses, 80% of Tiverton's land area is problematic for septic systems; the soils are dense, slowly permeable, and have an underlying restrictive layer of "hardpan" and seasonal high water table.

South of Bulgarmarsh Road, almost all households maintain both individual wells and septic systems. Given the low housing density of the area, and land areas sufficient for adequate septic systems, even in areas of questionable drainage, sewerage expansion is not necessary. It is also unlikely that public drinking water service will be extended to this region.

An **On-site Wastewater Management Program** was adopted in July 2006 by the Town Council to insure that our precious water resources do not become contaminated from failing OWTSs. This Plan, authorized by the Tiverton On-site Wastewater Management Ordinance, calls for the

inspection and upgrading of OWTSs, with priority given to systems near water bodies and other ecologically fragile areas.

On July 22, 2015, Governor Raimondo signed into law an amendment to the 2007 Rhode Island Cesspool Act that requires new owners of real estate to disconnect and replace cesspools within 12 months of acquiring the property. This measure goes into effect on January 1, 2016.

SEWER SYSTEM

The remaining homes and businesses are connected to a wastewater collection system operated by the Town which discharges to the City of Fall River sewage treatment facility.

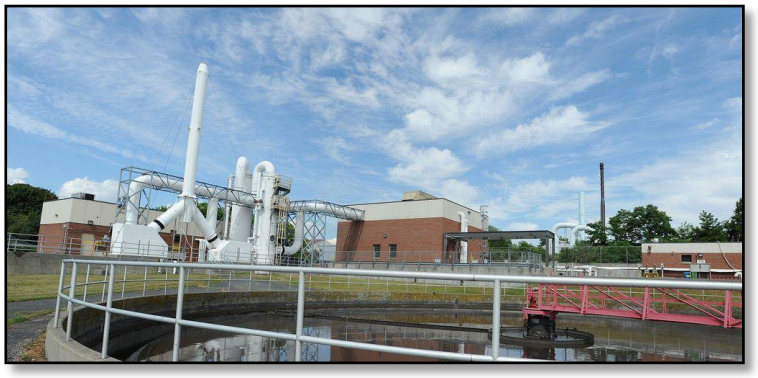
Other privately financed projects have also extended the sewer system within the town. The developer of Countryview Estates, the age-restricted manufactured home community in the northeastern portion of town, installed sewers within that development, including a station to pump the sewage to Fall River's Hancock Street sewer line. Other smaller extensions of the public sewer system include those that tie into the interceptor installed for the Villages on Mount Hope Bay on Main Road, a separate line that services Brookdale Sakonnet Bay Manor assisted living facility on Main Road, and those that tie directly into the Fall River system in the Stafford Road/Hancock Street area as well as the Bourne Mill apartment complex.

In addition, annual funding through the Community Development Block Grant program has provided for limited expansion of the sewers in northern Tiverton in the areas of State Avenue and Shove Street. Such expansion is needed to address the many failed or failing septic systems in that area of town where homes were built on small lots with inadequate leech fields. Installation of sewers is part of the redevelopment of an area that qualifies for federal funding due to the high concentration of low-and moderate-income households, although the amount of funding provided on an annual basis ($110,000) is relatively modest.

In 2014, a Tiverton Waste Water District (TWWD) was established to implement a major sewer expansion project at Riverside Drive, Bay Street and the Robert Gray neighborhood. This project is partially funded by $7.1 million in grants and loans from the U.S. Department of Agriculture's rural sewer and water program. TWWD is proposing construction of a low pressure sewer system. The system has been deemed the most cost effective and efficient way to provide sewer service to this area.

The project will include both public right-of-way work for installation of the sewer lines and curb-to-curb repaving as well as the necessary private property work to complete the connection to the building. Homeowners on Riverside Drive and in the Robert Gray neighborhood approved this project in a special referendum in the Spring of 2015. The TWWD employs one full-time general manager. It is anticipated that construction will begin in 2016.

See Figure 7-4 and Figure 7-5 for an illustration of the existing and proposed sewer locations within Tiverton.



FALL RIVER WASTEWATER TREATMENT PLANT

7.9 Stormwater Management

The Town's requirements for stormwater management within new subdivisions and land development projects are detailed in the Land Development & Subdivision Regulations. Drainage plans are reviewed by the Department of Public Works (DPW) director and the Planning Board's peer review engineer. Best management practices and low impact development techniques are encouraged for stormwater control. Additional requirements such as prohibiting on-draining to public roadways and on-connecting sump pumps to storm sewer are covered in the Code of Ordinance. All projects are required to submit a Soil Erosion and Sediment Control plan (SESC). Strict compliance with the plan will be monitored for the duration of the development by the Town's DPW, Building Official or appointed personnel.

North Tiverton's older developments have minimal drainage systems, many of which have been installed in a piecemeal manner. Most of the older systems discharge directly into receiving waters. Correcting or minimizing problems of basement flooding, septic system failure and the flooding and freezing of run-off onto town streets begins with an engineering analysis of existing conditions and potential area build-out. Based on this analysis, and availability of town funding, the selection of areas for corrective action can be done.

A 'Phase 2 Stormwater Management Plan', mandated by the Federal Clean Water Act, has been implemented and a RIPDES (Rhode Island Pollution Discharge Elimination System) permit has been issued, enabling the Town to drain permitted stormwater into Narragansett Bay. The Town maintains drainage systems within the public right-of-way, including the use of a street sweeper to keep catch basins clean of debris. There are a few stormwater detention basins that, in general, are maintained by homeowner associations, required through the subdivision approval process. The Town has easement rights to access stormwater facilities on private land to complete maintenance as necessary. Funding for personnel and equipment comes from property taxes; there is no stormwater utility accessed in the Tiverton.

BIO-RETENTION DRAINAGE SYSTEM INSTALLATION

7.10 Public Works and Solid Waste Management

The Public Works Department has a staff of 11. It is charged with maintaining the town-owned roads including snow removal, street sweeping, roadside mowing, catch basin cleaning and sign maintenance, as well as the Tiverton landfill operation, maintenance of the Town's two public beaches and the repair and maintenance of town-owned buildings other than those used by the School Department. Municipal solid waste collection is contracted out.

Solid waste generated by the town is disposed at the town-owned sanitary landfill in south Tiverton, the only municipal landfill still operating in Rhode Island. It is located on 33 acres of a 125-acre parcel owned by the Town. The remainder of the parcel serves as a wooded buffer area adjacent to the Town Farm Recreation Area and Weetamoo Woods. The Town is in the process of closing this facility. Once that has been accomplished, solid waste will be sent to the Rhode Island Resource Recovery Corporation (RIRRC). A mandatory recycling 'No Bin, No Barrel' and a town trash bag purchase 'Pay As You Throw' program (generating approximately $400,000 - $450,000 per year) was implemented to extend the life of the landfill and help pay for closure. This program will continue to provide financial benefits when solid waste is sent to RIRRC, as it achieves a decreased amount of solid waste disposal and therefore decreased overall disposal cost. The landfill closure began in 2018 and will take approximately three to four years to complete at an estimated cost of just over $9 million.

Operation of the landfill is governed by state regulations concerning fill methods, permitted types of refuse, impact controls (including leachate control) and projected life span. As required by the State, the Town has retained an engineering consultant to update its landfill management plan, and to provide quarterly monitoring of test wells surrounding the landfill.

7.11 Town Administration

Tiverton has a council/administrator form of government consisting of seven council members and the Town Administrator. The Town Council President is the chief executive, while the Town Administrator manages the day-to-day affairs of the Town. The budget is developed by the Town Administrator, Town Council, and the School Superintendent and School Committee, and reviewed by an elected Budget Committee who makes recommendations before it is voted by the electors at the Financial Town Referendum in May each year. An elected Town Treasurer

oversees the fiscal concerns of the town together with an appointed (part-time) Tax Collector. There are two part-time judges who preside over the Municipal and Probate Courts. The Municipal Court justice is appointed by the Town Council and the Probate Court justice is elected.

Many town functions or community areas of interest, including planning, zoning, conservation, historical preservation, open space and trees, recreation, sewage disposal, harbor and coastal waters, cemeteries, the arts, and economic development, are managed by volunteer committees.

The Tiverton Town Charter was first written in 1994 and revised in 1999 and 2004. Charter review by an elected Charter Review Commission is overdue. Any amendments proposed by the commission must be approved by the voters. The Town Council also has the authority to recommend revisions at any time with changes approved by the voters at a special election.

7.12 Public Information

Tiverton residents experience multiple sources of information. The town is "covered" by four newspapers, the Sakonnet Times (weekly), the Newport Daily News, the Providence Journal and the Fall River Herald News. Legal and public information notices are typically published in one or most of these papers. Videotapes of Town Council and other meetings of wide-spread public interest are broadcast on a local cable network at regular intervals each week, although some sparsely populated areas of town are not covered by this local cable programming.

Tiverton utilizes Geographic Information System (GIS) to provide spatial information and analyses of parcel boundaries, natural resources, utilities and other physical features and data of the town that can be geographically referenced.

7.13 Services and Facilities Goals, Policies and Actions

Goal: To provide community services and facilities which respond to the public safety, educational, governmental, infrastructure and informational needs of Tiverton's residents in a timely, efficient, cost effective and environmentally sustainable manner.

POLICIES

- THE PROVISION OF SERVICES AND FACILITIES SHOULD BE DONE IN A MANNER THAT SUPPORTS LAND USE GOALS, NATURAL RESOURCE PROTECTION AND THE LONG-TERM ABILITY OF THE TOWN TO FISCALLY MAINTAIN INCREASED SERVICES AND FACILITIES.
- DEFINE SPECIFIC COMMUNITY FACILITY AND INFRASTRUCTURE NEEDS ATTAINABLE WITHIN THE CONSTRAINTS OF AVAILABLE RESOURCES, AND ASSURE ADEQUATE CAPITAL PLANNING CONGRUENT WITH MEETING THESE NEEDS.
- EVALUATE AND IMPROVE MECHANISMS FOR EFFICIENT DELIVERY OF PUBLIC SAFETY SERVICES, INCLUDING POLICE, FIRE, AMBULANCE AND EMERGENCY MANAGEMENT.
- MAINTAIN AND IMPROVE AN EFFECTIVE EDUCATIONAL SYSTEM AND LIBRARY SERVICE.
- EVALUATE WAYS TO PROVIDE QUALITY SERVICES TO TIVERTON'S GROWING POPULATION OF SENIOR CITIZENS.
- MAINTAIN AND DEVELOP PUBLIC BURIAL LANDS FOR THE USE OF TIVERTON RESIDENTS.
- PRESERVE, MAINTAIN AND IMPROVE RELIABLE SOURCES OF HIGH QUALITY, AFFORDABLE DRINKING WATER.
- PLAN FOR A COMPREHENSIVE WASTEWATER MANAGEMENT STRATEGY THAT ENCOMPASSES LIMITED SEWER EXPANSIONS WHERE NEEDED, ALONG WITH THE ESTABLISHMENT OF WASTEWATER MANAGEMENT DISTRICTS TO REGULATE ON-SITE SEWAGE DISPOSAL SYSTEMS.
- IMPROVE THE MANAGEMENT, OPERATION AND ADMINISTRATION OF TOWN SERVICES AND FACILITIES, INCLUDING TOWN OFFICES, EQUIPMENT AND TOWN-OWNED PROPERTY.
- PROVIDE MORE EFFECTIVE MECHANISMS OF COMMUNICATION BETWEEN CITIZENS AND TOWN GOVERNMENT.
- CONTINUALLY EXPLORE WAYS TO REDUCE THE COSTS OF DELIVERING SERVICES AND OPERATING FACILITIES WITHOUT COMPROMISING QUALITY.
- PROMOTE WATER CONSERVATION, ENERGY CONSERVATION AND SOLID WASTE REDUCTION AMONG ALL MUNICIPAL SERVICES AND OPERATIONS.
- MEET OR EXCEED THE STATE'S MANDATED 35% RECYCLING RATE AND 50% DIVERSION RATES FOR SOLID WASTE.

Actions

Action 1: **Develop and annually update a five year facilities and capital equipment budget for the various town departments and ancillary services, including public safety, schools, library, water, public sewage and landfill management, which might be realized through taxes, fees, bond issuance and state and federal funding, within the Town's financial capabilities. The plan should also consider adjustments to the existing Development Impact Fee.**

Perhaps at no time in its history has the Town of Tiverton faced such difficult choices in terms of the need to plan for and finance the upgrading of its aging community facilities. For example, the need for an integrated public safety complex has been widely expressed. Consideration should be given to an increase in the Development Impact Fee, adopted in 2007, to cover not just school needs but also fire, police and public works. A frequently updated and publically accessible capital expenditure budget, based on priority needs, will provide a road map for future capital spending.

Action 2: **Develop a Municipal Facilities Study**

The Town should conduct a detailed existing conditions report and physical needs assessment for all municipal buildings and services. The municipal facilities study should include recommendations for capital improvements to extend the useful life of each facility, annual maintenance needs, and date and costs estimates for any new or replacement facilities.

Action 3: **Consider developing a report on the operational readiness of fire protection and law enforcement services and resources in Tiverton including personnel training, department facilities and equipment.**

A need has been identified for assessing the adequacy of Tiverton's fire protection and law enforcement resources. A report and plan to identify needs, goals, and potential future actions and capital improvements, perhaps utilizing the expertise of relevant state and national organizations, should be considered.

Action 4: **Analyze the risk posed by Tiverton's inaccessible forest areas, in coordination with the RIDEM Division of Forestry, the Tiverton Open Space Commission, and the Tiverton Land Trust and develop an appropriate fire control plan.**

There are more than 2,500 acres of undeveloped forested land in Tiverton, large portions of which have limited vehicle access and no service from fire hydrants. In periods of severe drought these areas could pose a risk of wildfire that would be difficult to control.

Action 5: **Provide a broad range of library services for all age groups and cultural-ethnic backgrounds that maximizes the potential of the new Tiverton Public Library, while retaining Union Library as an important program facility and a vital component in the architectural setting of Historic Tiverton Four Corners. Develop a plan for the long-term maintenance of the new Tiverton Public Library building and surrounding grounds.**

The Board of Trustees, working with the Tiverton Library Foundation and the Town Council, should begin immediately to develop a plan for acquiring financial resources to provide adequate

long-term care of the town's newest capital asset. Taking action now, before major facilities repair is needed, will go a long way toward ensuring that funding will be available when those repairs become necessary

Action 6: Establish a 'Friends of the Senior Center' group to organize development and construction of a new facility.

Enlist community support to develop a plan for a new facility to meet the growing needs of an aging population. The existing building does not allow for current programs to grow or the ability to add new programs. It is time to begin to examine strategies for serving the needs of the 'baby boomer' generation as they approach retirement.

Action 7: The Cemetery Commission should address land availability and financial needs to ensure successful operation of the Pocasset Hill Cemetery and other burial lands for the foreseeable future.

As space in the Pocasset Hill Cemetery becomes limited, there is need for additional burial land for town residents. The Cemetery Commission is responsible for addressing both long-term space needs and the adequate financing of the operation and maintenance of town cemetery land.

Action 8: Undertake a comprehensive study of current and future potable water needs in all of Tiverton to determine what constrains exist and how future development and build-out will impact water supplies.

Water management plans for the two water supply districts, Stone Bridge and North Tiverton, are required by the State, and each has prepared a plan. However, a plan addressing water supply for the entire town has yet to be developed. Moreover, the water districts advise the Planning Board on water supply availability for new subdivisions and major developments, but this is done project by project on a piecemeal basis. It is essential for good development planning to understand future water availability and constraints.

Action 9: Work with Tiverton's State Legislative Delegation to investigate options and advocate for improvements in the delivery of public water services in Tiverton including Town oversight. Increase communication and coordination between the water districts and the Town.

North Tiverton Fire District and Stone Bridge Fire District service the northern and eastern parts of Tiverton with treated water for households, businesses and other organizations as well as providing water for fire suppression. Since both districts are chartered by the state, they are not a part of municipal government. The districts have historically operated more or less independently from Town government and there may be a lack of needed accountability. For example, expansion of the treated water system has a significant impact on Town growth, health and safety, and the cost of Town services. Questions have also been raised about water cost, quality and reliability. In particular, the Town needs a more reliable and quantifiable accounting of the impact of water system expansion on existing water consumers and on fire hydrant pressure and volume. Better coordination is needed to promote Tiverton's vision of its future and achieve a greater measure of public accountability from the two districts.

One option to be explored is a merger of the two water districts (North Tiverton Fire District and Stone Bridge Fire District) which may result in lower costs to consumers by achieving economies of scale. Since both districts are chartered by the State, a merger would require State legislative approval following a vote by ratepayers at the districts' annual meetings.

Action 10: Develop a town-wide Drought Management Strategy outlining a joint effort between the Town of Tiverton and the North Tiverton and Stone Bridge Fire Districts.

Such a plan should be developed in accordance with *RI Water 2030 (State Guide Plan Element 721)* and should minimize the effects of drought on public health, safety, economic activity and environmental resources.

Action 11: Continue the work of the Tiverton Waste Water District to implement a phased expansion of sewers in the north end of the town, especially the Bay Street area, the Riverside Drive area, the Robert Gray area and the area north of Judson Street, so as to address the environmental challenges resulting from failed cesspools and outdated septic systems (See Figure 7-5 Proposed Public Sewer Areas). The Town should encourage dialogue and exercise oversight to ensure that sewer expansion is done in a manner consistent with Town goals, policies and programs including those listed in this Comprehensive Plan.

This policy is consistent with the Rhode Island Cesspool Act of 2007, as amended, and with policies of the R.I. Department of Environmental Management. Now that the Tiverton Waste Water District is in place and homeowners in the Robert Gray and Riverside Drive neighborhoods have approved sewer expansion in these areas, the process will move forward with grants and loans from the USDA Sewer and Water Program.

Action 12: New roadways or existing roadways which are to be completely reconstructed should provide for the safety of all users of all ages and abilities including pedestrians, bicyclists, transit users and motorists. Sidewalks are strongly encouraged along roadways where pedestrian use is sufficient. Bicycle lanes and crosswalks are also encouraged where use patterns establish a clear need.

Although Tiverton's roadways are increasingly used by pedestrians and bicyclists, many lack sidewalks, crosswalks and bike lanes. Such amenities can be established for new roads or reconstructed roads without diminishing a high level of service for motorists or involving large expenditures. Tiverton recognizes the many health benefits of walking and biking and further supports greater public transportation opportunities which will create a need for safe and convenient van and bus stops. Roadways should also consider the mobility needs of children, the elderly and people with physical disabilities. The State has adopted a complete streets policy and Tiverton embraces this policy.

Action 13: Execute the closing, capping and monitoring of the municipal solid waste landfill by seeking additional funding sources to cover the cost of closure. Study alternative methods of solid waste disposal.

As noted, the 'Pay As You Throw' and 'No Bins, No Barrels' policies have raised additional funds to augment the landfill closure account. But additional funds may be needed to fill any

projected gap. Following closure, the Town will send solid waste to RIRRC. The Town will still identify and adopt the most convenient and cost-effective method of solid waste management and disposal and take steps to reduce the amount of solid waste sent to RIRRC as a cost savings measure for the Town and as an environmental management best practice. The Town of Tiverton is committee to the three R's of waste management: reduce, reuse, and recycle.

Action 14: Maintain the Town's GIS (Geographic Information System) so that it accurately reflects existing data and employs the most current software available.

An up-to-date Geographic Information System (GIS) provides a valuable planning tool and enables the Town to manage, present and analyze data on the town's physical characteristics, natural resources and infrastructure.

Action 15: Conduct an energy and waste audit of municipal facilities and operations.

In an effort to reduce energy costs and operate in a more environmentally sustainable manner, the Town will conduct an energy audit by inventorying power usage and fuel consumption of all town facilities and vehicles. This information will be used to identify targeted energy saving measures for implementation. The Town will also conduct a solid waste audit to determine where reductions can be made.

Action 16: Provide education and incentives for residents to increase recycling efforts and compost food scraps.

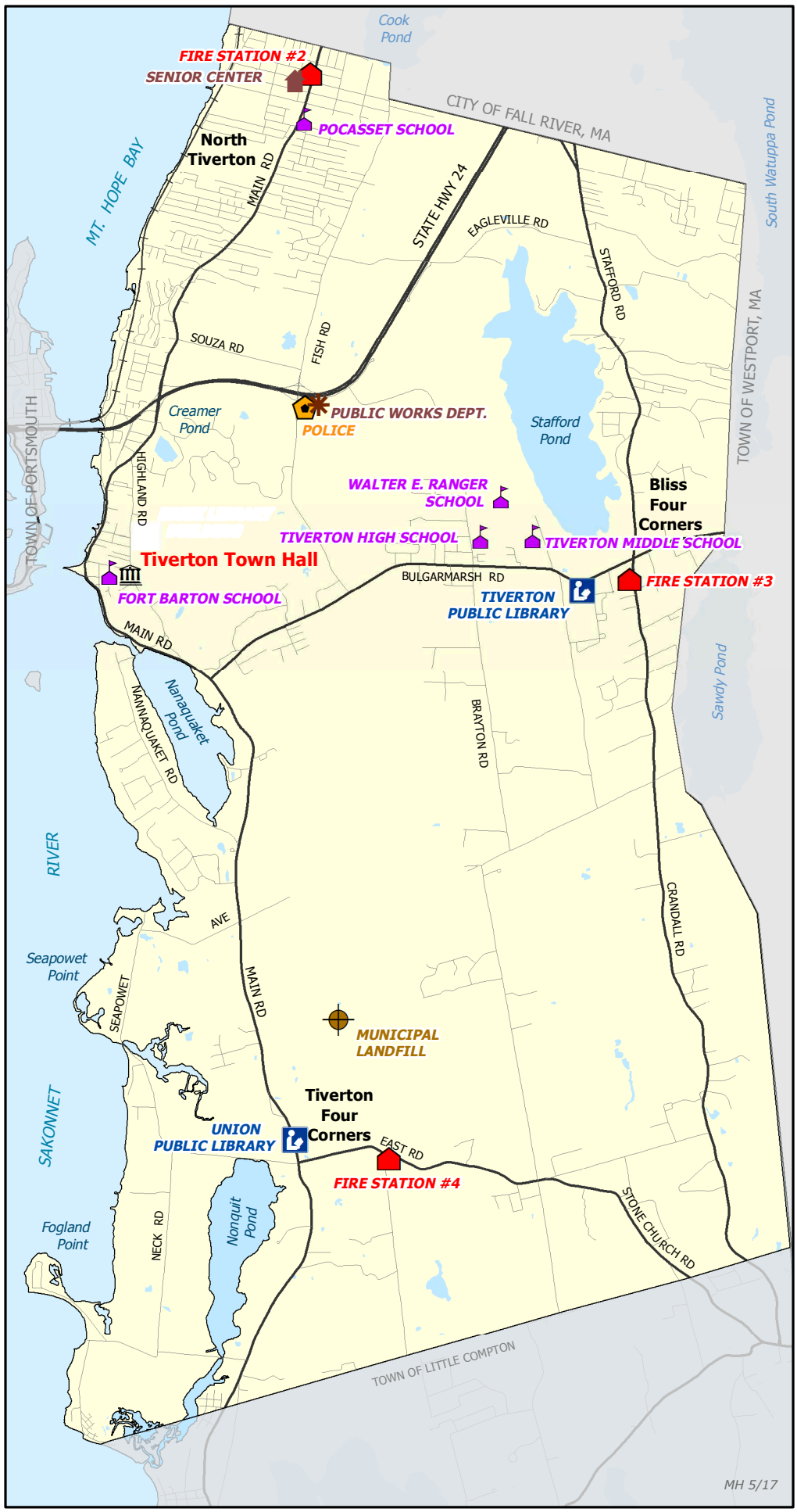
The management of solid waste and recycling should be done in an economical and environmentally sound manner. In order to reduce financial and environmental costs, the Town will implement public educational outreach efforts to encourage a reduction in solid waste generation, increase recycling and composting and ensure proper disposal of household hazardous waste.

Action 17: Update the Town's Onsite Wastewater Treatment Systems (OWTS) Regulations to address the latest methods and technologies and to be consistent with State regulations.

The Town's OWTS/private septic system ordinance and regulations have not been thoroughly updated in several decades. During this time, disposal system methods and technology have improved significantly and the State has passed new regulations. Consideration should be made to ensure that the regulatory burden on property owners does not exceed what is necessary to protect public health, water quality and the environment.

Action 18: Publish a guide to municipal services and an annual report for taxpayers.

The Town should consider creating a guide to municipal services that can be used for residents and businesses. An annual report that provides data and achievements related to operations for each department should also be considered as a means to provide more information to the public and as a management tool.



- TOWN HALL
- POLICE
- FIRE STATION
- PUBLIC SCHOOL
- LIBRARY
- PUBLIC WORKS FACILITY
- COMMUNITY BUILDING
- LANDFILL
- MAJOR ROAD
- MINOR ROAD
- RAILWAY
- PONDS, OPEN WATER

Source: RIGIS and Town of Tiverton

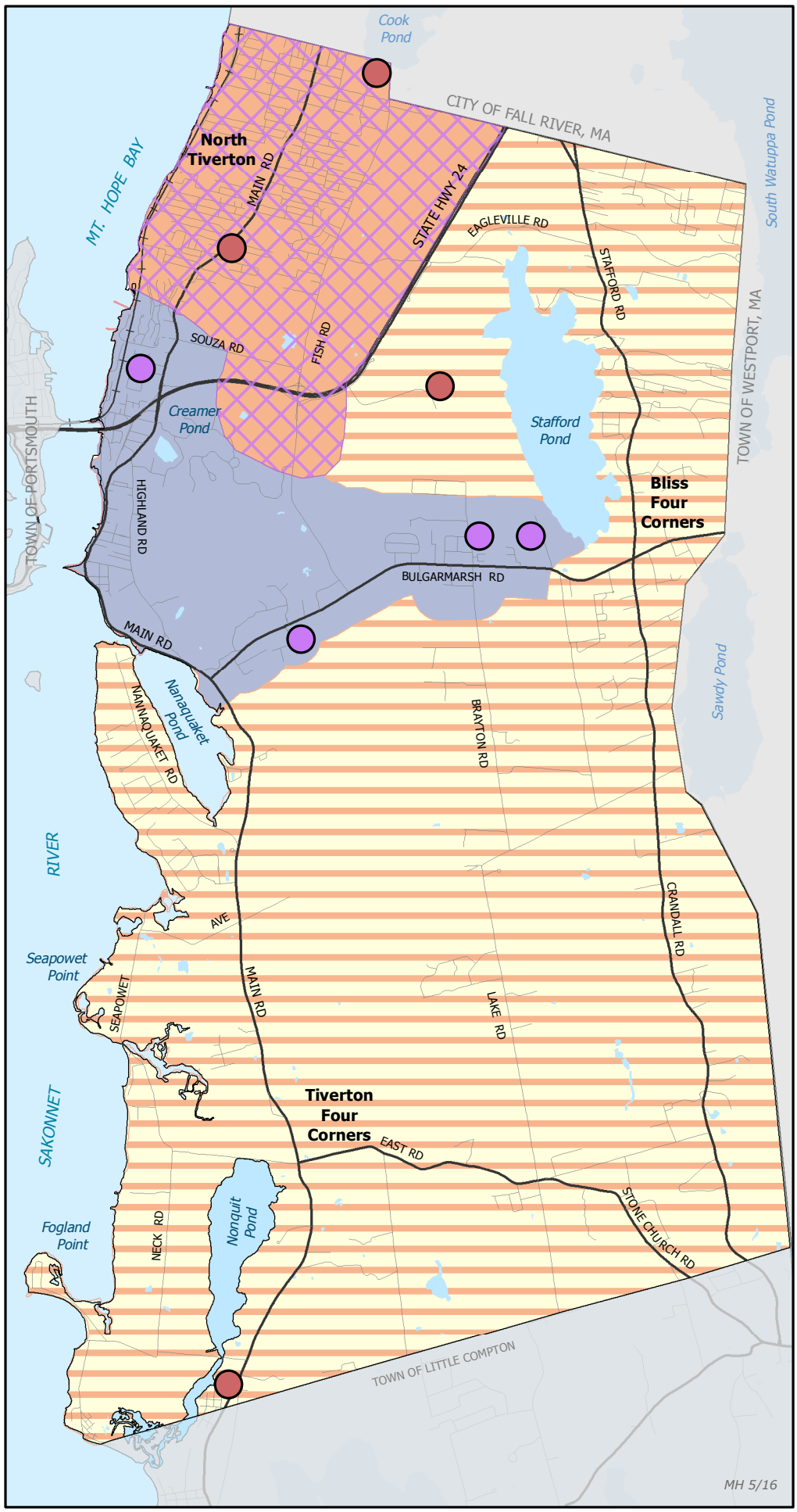
N

0 1 Mile

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Mapping and Planning Services for general reference, informational, planning and guidance use, and is not a legally authoritative source as to the location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. The Town of Tiverton or MPS makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 7-1
COMMUNITY FACILITIES



WATER DISTRICTS

- STONE BRIDGE FIRE DISTRICT
- NORTH TIVERTON FIRE DISTRICT
- EXPANSION RIGHTS AREA for NORTH TIVERTON FIRE DISTRICT

STONE BRIDGE FIRE DISTRICT HIGH WATER USERS

- NORTH TIVERTON FIRE DISTRICT
- OTHER HIGH USER LOCATIONS

NORTH TIVERTON FIRE DISTRICT HIGH WATER USERS

- HIGH USER LOCATIONS

- PONDS, OPEN WATER
- MAJOR ROAD
- MINOR ROAD
- RAILWAY

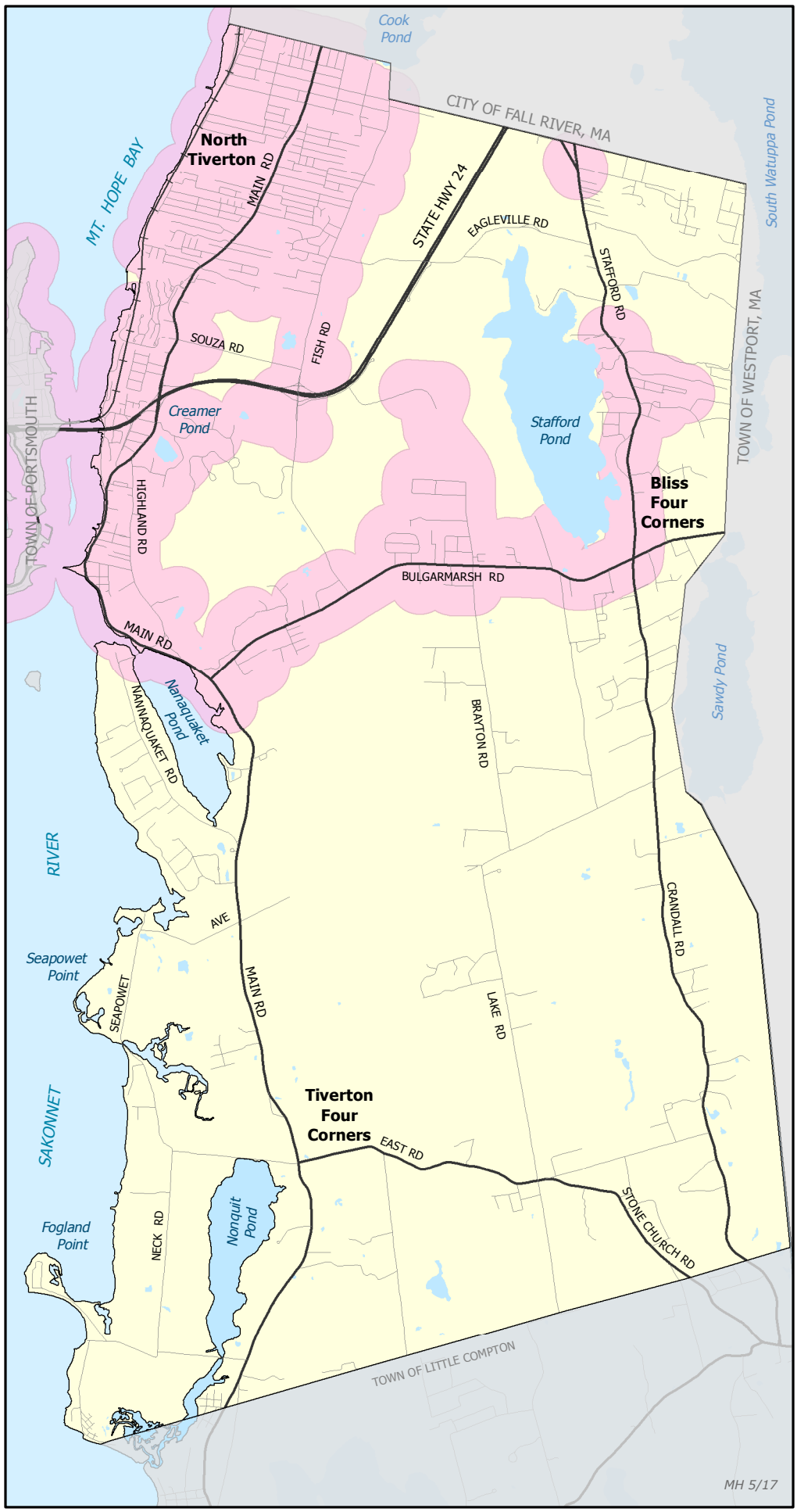
Source: RIGIS and Tiverton Planning Department (2014). North Tiverton Fire District (2014) and Stone Bridge Fire Districts (2014) for the High Water Users.

N

0 1 Mile

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 7-2
WATER DISTRICTS & HIGH WATER USERS



WATER SERVICE AREA

PONDS, OPEN WATER

MINOR ROAD

MAJOR ROAD

RAILWAY

Source: Water Service Areas (2005) courtesy of RIDEM and RIGIS.

N

0 1 Mile

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TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 7-3
EXISTING PUBLIC WATER AREAS

Tiverton Wastewater District
Tiverton, Rhode Island

Figure 9

Lots Receiving Sewer Service

Legend

- Existing Sewer Pump Station
- Existing Sewer Manhole
- Existing Gravity Sewer
- Existing Sewer Forcemain
- Lots to Receive Sewer Service through Abutter Connections Project
- Existing Sewered Lot

Updated
May 7, 2015

North

0 200 400 800
Feet

AECOM

FALL RIVER

TIVERTON

Mount Hope Bay

BAY STREET AREA
CHURCH STREET AREA
MILL STREET AREA
LEPES ROAD AREA
ROBERT GREY AREA
GARDEN HEIGHTS AREA
RIVERSIDE DRIVE AREA

STATE AV
A CONNELL ST
FOSTER ST
CLIFF ST
RUSSELL AV
CARPENTER ST
CHACE AV
GOUDY ST
CLEMENT ST
WAUNUTT ST
UNNAMED 34
BAY ST
BOTTOM ST
HILTON ST
CANONICUS ST
SPOONER ST
CHURCH ST
HOOPER ST
MILL ST
FENNO
JUDSON ST
MATHEW RD
BIRCH ST
WELL MEADOW WY
BORDEN RD
ASH AV
BEECH AV
MATHIAS AV
LEPES RD
CYPRESS AV
KAUFMAN RD
EVERGREEN AV
HORIZON DR
FIR AV
ARBOR TERR
KENYON RD
E BEARDSWORTH RD
BEARDSWORTH RD
DORIS AV
HOPE ST
DURFEE RD
ALAN ST
RUSSELL DR
MERRITT AV
SUMMERFIELD LN
JOHN E DUGGAN RD
BRIARWOOD AV
LAST ST
CLEGG AV
BRAMBLE WY
RANDOLPH AV
PRIMROSE LN
BOURNE AV
E BOURNE AV
KEARNS AV
WARREN AV
OLD COLONY TERR
ROBERT GRAY AV
HARRIS DR
BRACKETT AV
RICHARD DR
CHERYL DR
MAY RD
COLONIAL AV
CARL DR
BELLEVIEW AV
LOUISE DR
EAGLEVILLE RD
BORIS FARM RD
GRINNELL AV
CHARLES DR
GRANDVIEW AV
POCASSET AV
BETH RD
HASKINS AV
HAMBLY RD
PAUL JAMES DR
FISH RD
BISMARK AV
SPRINGER AV
HOBSON AV
MASSEY RD
LINDA RD
DEWEY AV
HAYDEN AV
LAURA ST
WATERMAN DR
SOUTHWARD DR
STANDISH DR
VILLAGE DR
COUTER LN
EDGE ST
SCHOONER DR
SOUZA RD
SALISBURY ST
JOHN ST
WILLIAMSON ST
POPLAR DR
LEWIS ST
SHANNON AV
RIVERSIDE DR
SUNDERLAND PL
PIERCE AV
MAIN RD
ROUTE 24
STATE HWY 138
W RIDGE DR
SILVER BEECH RD
BUSH RD
INDUSTRIAL WY
Stafford Pond Brook
Sin & Flesh Brook

Source: AECOM Technical Services, Inc., June 2013, Wastewater Facilities Plan Update, prepared for Town of Tiverton Wastewater Management Commission.
See Figure 11 - Existing Sewer Service Areas & Types of OWTS, page 68.

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 7-4
EXISTING PUBLIC SEWER AREAS

Tiverton Wastewater District

Tiverton, Rhode Island

Figure 10

Proposed Sewer Service Year 1 Project

Legend

- Existing Sewer Pump Station
- Existing Sewer Manhole
- Existing Gravity Sewer
- Existing Sewer Forcemain
- Proposed Sewer Manhole
- Proposed Gravity Sewer
- Proposed LPSS
- Riverside Area
- Robert Gray Area
- Robert Gray, Alternate 1
- Robert Gray, Alternate 2

Updated May 7, 2015

North

0 200 400 800

Feet

AECOM

ROBERT GRAY AREA

RIVERSIDE DRIVE AREA

TIVERTON

PORTSMOUTH

Mount Hope Bay

Source: AECOM Technical Services, Inc., June 2013, Wastewater Facilities Plan Update, Appendix 4 -- Public Information Meetings

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 7-5
PROPOSED PUBLIC SEWER AREAS

CIRCULATION

8.0 CIRCULATION

Circulation is our community's streets, bicycle and pedestrian facilities and available public transit services that are essential for Tiverton to remain a desirable place to live, work, and visit. Planning for and making investments in our transportation system will be necessary to meet the future needs of the community and goals established in this Comprehensive Plan. In considering transportation policies and strategies, it is essential to provide safe and efficient circulation while maintaining Tiverton's small town and rural qualities and scenic values.

Census data shows Tiverton's work force reliance on the automobile, with nearly 86.4 percent of all commuters driving to work alone and 8.8 percent carpooling (See Table 8-1). Less than one-percent of residents use public transportation and other non-motorized modes of travel. The mean average commute time to work is estimated at 25.6 minutes. About 2,300 (30 percent) work outside Rhode Island, a number influenced by Tiverton's proximity to Massachusetts.

TABLE 8-1: Means of Transportation to Work (workers 16 years and over)

	Number	Percent
Total:	8,001	100%
Cars, Truck or Van	7,615	95.2%
-Drove alone	6,913	86.4%
-Carpooled	702	8.8%
Public Transportation	70	0.9%
Motorcycle	10	0.1%
Bicycle	10	0.1%
Walked	27	0.3%
Other Means	17	0.2%
Worked at Home	252	3.2%
Mean Travel Time to Work	25.6	

Source: 2010-2014 American Community Survey (ACS) data

8.1 Roadway Systems

The roadway system classifies a road or street according to the function it serves or is intended to serve. A roadway can serve two separate functions: provide for through traffic and travel mobility, the principal function of expressways and arterials; and provide access to adjacent land, the major function of local or residential streets and to some degree collector routes.

The Highway Function Classification System defines state and local roads as freeways and expressways, principal arterial, minor arterial, major and minor collector or local. This system of

classification is used by the State and referenced in "State of Rhode Island Highway Functional Classification 2014, Statewide Planning Technical Paper #165". During the development of this report, three state roadways in Tiverton, Bridgeport Road, Highland Road and Souza Road, were changed from local maintenance to "proposed for federal aid eligible" See Figure 8-1 for the functional classification of major roadways within Tiverton.

Tiverton has approximately 43 miles of State and locally maintained roadways (See Table 8-2). Tiverton's major artery is Route 24, running north-south from the Massachusetts State line to the Sakonnet River Bridge. Route 24 provides alternative routing from Interstate 195 and services Routes 81 and 77 as routes to beaches and local destinations including to alternative transportation modes.

Main Road is a major arterial roadway running north-south from the Massachusetts State-line to Little Compton town line. The north section of Main Road is the main commercial corridor in town and provides a secondary connection to Fall River. Main Road to the south is scenic road and the travel corridor to Tiverton Four Corners and Little Compton.

TABLE 8-2: Classification of Tiverton Roads

Type	Miles	% of Total
Other Freeway/Expressway	3.89	2.93%
Principal Arterial	1.92	1.44%
Minor Arterial	30.27	22.79%
Major Arterial	6.80	5.11%
Local*	80.00	60.20%
Local (Unacceptable streets)	10.00	7.53%
Total	132.88	100

*Estimated based on GIS data & DPW
Sources: RIDOT, Town GIS data & DPW (for local roads total)

Other State-owned and maintained roads in town include: Stafford Road, Eagleville Road, Evans Avenue, Bulgarmarsh Road, Warren Road, Bay Street, Canonicus Street, Hooper Street, East Road, Stone Church Road and Nanaquaket Road. The State also owns and maintains eleven bridges in town: Nanaquaket, Nanaquaket Pond, Seapowet, Nonquit Pond, Main Road, Eight Rod Way-Fish Road, Eagleville Road, Evans Avenue and Schooner Drive.

The majority of other roadways are owned and maintained by the Town, with a small number of remaining streets privately owned. Tiverton has been historically plagued by the ambiguous legal status of many streets which have never been formally accepted as town streets, yet received varying degrees of town services. In other cases, private streets have been petitioned for takeover by the Town but have not been built or maintained to Town standards. A policy has been put in place that created a Street Advisory Committee appointed by the Tiverton Town Council. The Street Advisory Committee is reviewing the status of various roadways to make an effort to resolve these issues.

8.1.1 Traffic Data

In general, traffic volumes have held steady or grown slightly since the late 1990s, with some minor declines in recent traffic levels assumed to be attributed to the recent recession. Annual average daily traffic (AADT) for Main Road in the northern commercial district increased slightly between counts taken in 2004 to 2014, when the AADT of Main Road totaled 9,000. Counts taken at other locations in Tiverton are shown in Table 8-3.

TABLE 8-3: Traffic Counts-Annual Average Daily Traffic (AADT)-2014

Road	Segment	AADT
Route 24	Sakonnet River Bridge	40,000
Main Road	North of Route 24	9,500
Main Road	South of Bulgarmarsh Road	9,000
Fish Road	North of Souza Road	4,600
Fish Road	At Route 24 interchange	7,500
Stafford Road	At Mass State Line	15,100
Stafford Road	North of Bliss Four Corners	12,400
Bulgarmarsh Road	at Roosevelt Avenue	8,500
Crandall Road	Near Stone Church	3,700
Souza Road	Near Main Road	2,000
East Road	Near Main Road	3,000

8.1.2 Traffic Safety

The Tiverton Police Department maintains accident records for roadways in the town. Roadways reporting ten or more accidents in 2014 are shown in Table 8-4.

TABLE 8-4: Traffic Accidents by Roadway, 2014

Roadway	# Accidents
Main Road	110
Bulgarmarsh Road	53
Route 24	44
Fish Road	43
Stafford Road	41
Crandall Road	25

Source: Tiverton Police Department 01/01/2014-12/31/2014

According to the Police Department, the majority of these accidents were due to speeding and roadway alignment difficulties, although the relatively high number of accidents on Main Road resulted from the number of intersections, driveways and other obstacles. Main Road is a 10-mile stretch of roadway transcending from the Fall River City line to Little Compton. This roadway is the main thoroughfare through Tiverton, with the highest accident location at the Route 24 interchange. A breakdown of the locations of accidents along Main Road for the year 2014 is shown in Table 8-5.

TABLE 8-5: Traffic Accidents along Main Road, 2014

Main Road Section	# Accident
State Line to Judson Street	12
Judson Street to Warren Ave	14
Warren Ave to Route 24 (includes 24)	32
Route 24 to Central Ave	5
Central Ave to Bridgeport	17
Bridgeport to Lafayette Road	11
Lafayette Road to Pond Road	14
Pond Bridge Road to Little Compton	5
TOTAL	110

8.1.3 Form-Based Code Zoning

On June 30, 2014, the Town Council adopted Commercial Form-Based Code zoning that includes design standards and design guidelines. This zoning was designated to replace the General Commercial districts on the northern portion of Main Road and Bliss Four Corners. As a Form-Based Code, the standards and guidelines apply to both site development and associated roadway infrastructure. Consequently, the design standards and design guidelines in the Commercial Form-Based Code include a section on Rights of Way Design Guidelines. These sections of the Design Guidelines describe improvements to Main Road (a state-owned right-of-way) and the state roads in Bliss Four Corners, as well as recommended standards for pedestrian, bicycle, and vehicular travel improvements on any road in or outside the districts. These standards could be used as street improvement criteria for similar roads in Tiverton. This could include improvements to state-owned roads when the Town coordinates design criteria with the State.

MAIN ROAD

8.1.4 Recent and Planned Roadway Improvements

The State Transportation Improvement Program (TIP) is a list of transportation projects the State of Rhode Island intends to implement using United States Department of Transportation (USDOT) funds. A project's inclusion in the TIP is a critical step, but it does not represent an allocation or obligation of funds. Projects supported with federal dollars are only guaranteed funding after the Rhode Island Department of Transportation (RIDOT) or the Rhode Island Public Transportation Authority (RIPTA), or the USDOT reviews the design, financing, and environmental impacts of a project. Project sponsors must work cooperatively with RIDOT, RIPTA, and federal agencies to guarantee the federal funding identified in the TIP. The TIP is prepared by the Division of Statewide Planning for adoption by the State Planning Council. The current TIP covers the required four-year time period of federal fiscal years 2018-2021, with additional information included for federal fiscal years 2022-2027.

The Sakonnet River Bridge project including Main Road Bridge, Evans Avenue Bridge and Central Avenue project was completed by RIDOT in 2013, and dramatically improved the appearance of Main Road, Central Avenue and Riverside Drive. The project included the complete replacement of the Sakonnet River Bridge on a new alignment with an exclusive share-use path on the north side of the bridge, boat ramp and parking facility along Riverside Drive, elimination of the Central Avenue ramps, reconstruction of Central Avenue including a bike lane, replacement of Main Road Bridge, signalization and striping.

SAKONNET RIVER BRIDGE

In 2009 RIDOT also resurfaced Main Road/Route 138, including curbing, sidewalk drainage and guardrail improvements, from John Street to the Massachusetts State line (2.3 miles). Future desired improvements on state-owned roadways must be programmed in the State Transportation Improvement Plan (TIP). Today, Tiverton roadway projects are programmed into the TIP:

- **PAVEMENT MANAGEMENT: FISH ROAD PAVEMENT MANAGEMENT PROGRAM FROM ROUTE 177 BULGARMARSH ROAD TO THE MASSACHUSETTS STATE LINE.**
- **INTERSECTION SAFETY IMPROVEMENTS: ROUNDABOUT AT WILLIAM S. CANNING BLVD., STAFFORD ROAD, AND HURST LANE.**
- **TRANSPORTATION ALTERNATIVE PROJECT: OLD STONE BRIDGE PROJECT TO STABILIZE ABUTMENT TO FORMER BRIDGE DESTROYED DURING THE 1954 HURRICANE TO SERVE AS BREAKWATER TO MARINA/BOAT BASIN IN TIVERTON.**

Future project:

- **INTERSECTION SAFETY IMPROVEMENTS: ROUNDABOUT AT BLISS FOUR CORNERS.**

8.2 Bikeway Systems

The new Sakonnet River Bridge shared use path brought bike access to Evans Avenue and Central Avenue where both roadways have been reconstructed to include a signed and striped bicycle lane on both sides of the road. This Sakonnet River Bikeway begins at the shared use path and continues down Central Avenue to the intersection of Main Road.

The RIDOT Tiverton Bike Path, a 2.6-mile bicycle path from the Sakonnet River Bridge to the Massachusetts State line via the Newport Railroad Line is currently cited as under study and

development. While the Tiverton Bike Path would be confined to a relatively short stretch, it would ensure broader connectivity to the biking community at large by serving as an essential link to the Aquidneck Island Bikeway, an extended bicycle/pedestrian proposed for our county. In 2016, the State accepted the project as part of its Transportation Improvement Plan for 2024. Commitment to construction of an off-road, multi-use pathway along Mount Hope Bay through north Tiverton is a worthy undertaking which offers long-lasting recreational amenities. However, the bike/pedestrian trail should not preclude the redevelopment of a rail line. A rail with trail system should remain an option.

A 1997 study funded by the RIDOT focused on the feasibility of an on-road bike route through southern Tiverton. The so-named Sakonnet River Bikeway would connect the Town Hall with the waterfront at Stone Bridge and follow along scenic roadways including Nanaquaket Road, Seapowet Avenue and Puncatest Neck Road to the border with Little Compton. While this bikeway was not pursued further by the Town due to safety concerns and narrow roads, many of the roadways remain very suitable for bicycling.

BIKE LANE ALONG CENTRAL AVENUE

8.3 Sidewalk Systems

There are limited sidewalks throughout the Town of Tiverton. The 2.3-mile Main Road improvement project completed sidewalks from the Massachusetts State line to Central Avenue in 2009, and the completion of the new Sakonnet River Bridge continued the sidewalks from the Main Road Bridge to Central Avenue, including Central Avenue, Evans Avenue and Tucker Avenue. There are other isolated areas within Tiverton that include sidewalks, such as Main Road near Stone Bridge and Bliss Four Corners.

The Bliss Four Corners intersection, future location of a round-about will include sidewalks and pedestrian access for safety. The sidewalk will continue down Bulgarmarsh Road in front of the BayCoast Bank. As part of the new Tiverton Public Library and the Stafford View Farm Subdivision, sidewalks are planned along Bulgarmarsh Road as an effort to connect this activity area to the middle and high schools.

NEW SIDEWALK ALONG BULGARMARSH ROAD

The Town requires sidewalks to be included in new projects within all new subdivisions and commercial areas.

8.4 Public Transportation

The only present means of public transit serving Tiverton is the RI Public Transit Authority (RIPTA) bus service. Unfortunately, Tiverton isn't well integrated into the network, as RIPTA operates commuter buses in the morning and evening that link Tiverton to Newport and Providence through Bristol, Warren and Barrington through one park and ride facility in town.

The Rhode Island Department of Transportation operates the Tiverton East Bay Park & Ride, with a design capacity of 92 parking spaces, at the intersection of Route 24 and Fish Road.

RIPTA does not operate either its "Flex Service" minivan service or its RIde paratransit bus service in Tiverton. This leaves Tiverton without any access to public transportation for local transport to medical facilities, senior centers and retail establishments. Efforts should be made to bring this or similar type of public transportation service to Tiverton.

A commuter rail system in not an immediately foreseeable means of public transit serving Tiverton. The Sakonnet River swing bridge, once linking Tiverton to Portsmouth was removed by the Rhode Island Department of Transportation with the construction of the new Sakonnet River Bridge. The current rail line from the Sakonnet River Bridge to the Massachusetts State line, a right-of-way owned by the RI Department of Transportation, is under study and development for a bicycle path as stated above. The use of this rail line for a bicycle path is a desirable use for this corridor in keeping with the small town and rural qualities of this Comprehensive Community Plan.

Long-term plans by the Massachusetts Bay Transportation Authority (MBTA) include the New Bedford-Fall River Commuter Rail Extension, referred to as the South Coast Rail (SCR). This project, now in the final design environmental study and permitting stages, will extend the existing

Stoughton Line from Boston to New Bedford and Fall River and will include construction of new track, bridges, grade crossings and ten new commuter rail stations. It will serve an estimated 5,670 new daily inbound riders. When the project is complete, the ability to commute to Boston from nearby Fall River will have an impact on growth potential for Tiverton and job opportunities for its residents.

8.5 Future Traffic Impacts of Larger-Scale Development Projects

Growth and development in the northern portions of Tiverton along Main Road, Souza Road, Fish Road and the Tiverton Business Park, as well as in communities to our south have the potential to further increase congestion along the roadways. The Town owns the 172-acre site off Fish Road that it purchased in 1988 to develop as a business park. Formerly, Tiverton Power, an electric power plant, was the Park's only tenant. At the end of 2013, the Tiverton Business Park Request for Proposals (RFP) was finalized with a preliminary plan designed. Recently, the Town sold 17 acres to a development of an indoor sports complex that would be the second tenant in the park. The Town should consider evaluating the potential roadway impacts on Industrial Way, Fish Road and the Route 24 interchange with the planned used for the Park.

8.6 Circulation Goals, Policies and Actions

It is our goal to provide for the safe and efficient management of automobile, bicycle and pedestrian traffic while encouraging alternative forms of circulation that complement the community's special character and quality of place. Based on the critical issues described in the Circulation Chapter and the overarching goal stated above, this section presents the goals and policies developed by the Town of Tiverton to guide its circulation planning.

Goal 1: Provide a safe and well-maintained transportation system throughout town.

POLICY: TIVERTON'S SAFE AND EFFICIENT TRANSPORTATION SYSTEM CAN BE MAINTAINED AND ENHANCED WITHOUT SACRIFICING THE COMMUNITY'S ATTRACTIVE APPEARANCE. ROADWAYS SHOULD BE BOTH FUNCTIONAL AND AESTHETICALLY PLEASING TO MAINTAIN QUALITY OF PLACE.

Action 1a: All roads should be built only in accordance with the standards of a public road.

Action 1b: Consider adoption of the Rights of Way Design Guidelines in the Commercial Form-Based Code Zoning as additional design standards for all roadway improvements, including RIDOT project.

Action 1c: Continue with an annual pavement management program as recently adopted.

Action 1d: Utilize the Tiverton Police Department accident data statistics, monitor areas where accident frequency is high and increasing. Consider design changes or improvements to mitigate accidents and improve safety.

Goal 2: Provide a balanced multi-modal transportation system throughout town to help reduce automobile dependency, enhance our community's character and improve the health and well-being of our citizens.

POLICY: ENCOURAGE SAFE ALTERNATIVE FORMS OF TRANSPORTATION, INCLUDING BICYCLE, PEDESTRIAN AND WATER TRANSPORTATION, PROVIDED IT CAN BE ACCOMPLISHED IN A SAFE MANNER.

Action 2a: Develop a Complete Streets Plan.

Action 2b: Maintain and install sidewalks in high priority areas, defined as those areas within schools on major roads, within commercial districts, and in other areas where pedestrian activity is to be encouraged.

Action 2c: Utilize the railroad corridor as a bicycling/walking greenway and as an off-road, multi-use path for safe intermodal transportation and recreation.

Goal 3: **Support economic development through a well-planned and high quality transportation system without losing key elements of the Tiverton's rural character.**

POLICY: IMPLEMENT DESIGN GUIDELINES THAT ASSURE SAFE AND EFFICIENT ACCESS AND EGRESS TO COMMERCIAL ESTABLISHMENTS AND HOUSING SUBDIVISIONS.

Action 3a: Apply access management tools to site plan reviews for commercial development and residential subdivision to reduce congestion and improve safety.

Action 3b: Continue to set high standards for design of parking facilities including landscaping, buffering, handicapped accessibility, pedestrian walkways and lighting.

Action 3c: Coordinate with state and local economic development agencies to develop a design plan for infrastructure improvements needed to sustain the increase in traffic generated by the development of the Business Park.

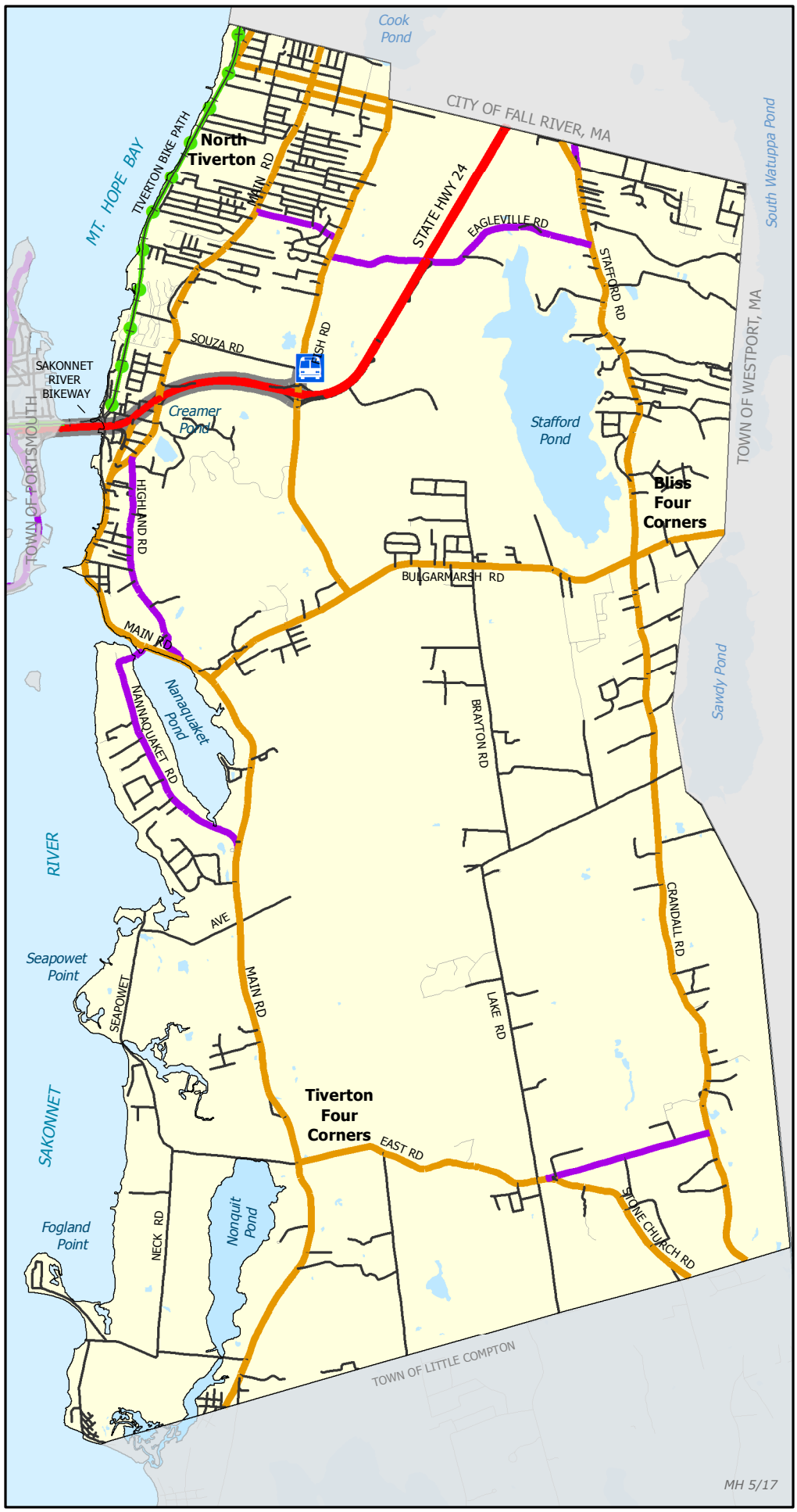
Goal 4: Secure funding for ongoing maintenance and safety improvements projects on local and State roads.

POLICY: COORDINATE WITH RIDOT ON A REGULAR BASIS REGARDING THE CONDITION OF STATE ROADS IN TIVERTON AND ASSOCIATED SAFETY, ENVIRONMENTAL, AND OTHER CONCERNS.

Action 4a: Submit eligible projects for consideration in the State Transportation Improvement Program, or other sources of Federal and State funding, in order to leverage local funding.

Action 4b: Maintain and update local priorities for local pedestrian, bicycle and roadway improvements based on the adopted TIP. These priorities should be submitted for consideration in the State's biennial TIP.

Action 4c: Develop zoning and land development standards requiring Rights of Way Design Guidelines in the Commercial Form-Based Code Zoning as additional design standards for all roadway improvements.



RIPTA PARK-N-RIDE STOP

RIPTA PARK-N-RIDE ROUTE (Route 61X)

BICYCLE ROUTES & PATHS

2005-2015 FUNCTIONAL CLASSIFICATION

URBAN PRINCIPAL ARTERIAL - OTHER

URBAN MINOR ARTERIAL

URBAN COLLECTOR

URBAN NON CLASSIFIED

PONDS, OPEN WATER

MINOR ROAD

RAILWAY

Source: RIDOT and RIPTA, courtesy of RIGIS.

N

0 1 Mile

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Mapping and Planning Services for general reference, informational, planning and guidance use, and is not a legally authoritative source as to the location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. The Town of Tiverton or MPS makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 8-1
ROAD FUNCTIONAL CLASSIFICATION

OPEN SPACE, COASTAL RESOURCES AND RECREATION

9.0 OPEN SPACE, COASTAL RESOURCES AND RECREATION

This Chapter addresses Tiverton's preserved open space areas, its coastal resources and recreational facilities. Continued efforts to preserve high value open space is emphasized, along with developing means for the sustained stewardship of public land. Other high priority objectives include updating the Town's Recreation, Conservation, and Open Space Plan, and developing long-term strategies to protect farmlands and coastal resources from rising sea levels.

9.1 Existing Resources

Rhode Island public support for open space and recreational resources has remained strong, with the passage of many state bonds over the past thirty years for that purpose. Tiverton has taken full advantage of the bonds, with the town securing multiple open space acquisition grants from RIDEM through the efforts of the Open Space Commission. These successes were supplemented by additional properties protected by the Tiverton Land Trust, made possible by private donations from Tiverton citizens, and by the Rhode Island office of The Nature Conservancy. These joint efforts have resulted in the consolidation of Weetamoo Woods, the acquisition of Pardon Gray Preserve, Basket Swamp, Highland Woods, and the Pocasset Ridge Conservation Area.

This effort should continue, using a strategy that balances with other community needs – housing, economic opportunity and active recreation facilities. Open space provides critical environmental benefits (clean water, flood control) to the community that would cost millions to replace if the land were developed. It also is an engine for the local economy in preserving scenic natural areas that have become regional attractions.

The development of new recreation facilities at the Town Farm and Bulgarmarsh Recreation Area-Skate Park have also been made possible by public funding. Several groups provide recreation programs, including the Little League and Boy Scouts. The town employs a Recreation Coordinator to assist the Recreation Committee expanding year-round programs. The coordinator serves as liaison between public agencies and private groups for the utilization of town facilities.

Public beaches in the community offer diverse summer activities. Each has distinct characteristics to be protected. Fogland Beach is intensively used for recreation, but its barrier beach dune and salt marsh is also a sensitive natural area needing protection. Those competing interests have been successfully represented by the Fogland Beach Oversight Committee, a partnership between the Conservation Commission, the Open Space Commission, and the Recreation Committee. Grinnell's Beach, next to the Stone Bridge abutment, is used for swimming, and fishing from the bridge abutment is popular year round. Both town beaches will be adversely affected by sea level rise in the coming years and many decisions will need to be made about their future.

In 1989, the Recreation Committee modified the Tiverton Recreation, Conservation and Open Space Plan. That revision helped obtain grants for new recreational fields at the Town Farm, but it is now 25 years old. A complete review and revision is needed to guide planning for the best use of resources to provide a broad range of recreational facilities.

There is a continuing need for more open space and recreational resources in the northern sector of Tiverton. Unfortunately, that sector of town, with its high population density, has the least amount of available undeveloped land. Moreover, grant funding to acquire land is generally available only for properties with significant wildlife habitat value. Nonetheless, every opportunity should be explored to create more public green space in North Tiverton.

Tiverton's open space, coastal access, and recreational resources are shown in the following tables and maps.

TABLE 9-1: Publicly Accessible Open Space

Map Key	Open Space Area	Acreage	Jurisdiction
A	Pardon Gray Preserve	230	Tiverton Land Trust
B	Weetamoo Woods	610	Town Open Space Commission
C	Pocasset Ridge Conservation Area	541	Note 1
D	Eight Rod Farm Management Area	337	RIDEM
E	Seapowet Marsh Wildlife Refuge	342	RIDEM[2]
F	Emilie Ruecker Wildlife Refuge	45	Audubon Society of RI
G	Fort Barton-Highland Woods	80	Tiverton Land Trust and Town Open Space Commission
H	Basket Swamp	93	Tiverton Land Trust
I	Fogland Beach Conservation Area	25	Fogland Beach Oversight Committee
J	High Hill Point[3]	1.4	Town OpenSpace Commission

Notes:

1. Owned and managed cooperatively by Open Space Commission, RI Nature Conservancy, Tiverton Land Trust, and the RI Department of Environmental Management.

2. RI Department of Environmental Management.

3. No parking; access only by foot/bicycle

TABLE 9-2: Private Land Protected by Easement

Area (map reference)	Acreage	Owner/Easement Authority
Stone Bridge Fire District Watershed (orange on map)	171	Water Authorities
Mill Pond (orange, South Crandall Rd.)	35	City of Newport
Middle Acres Farm (yellow, Crandall Rd.)	235	TNC[1]
Hathaway Farm (yellow, Main Rd.)	72	RIDEM[2]
Nonquit Pond Watershed Protection Area (orange, Nonquit shore)	30 +/-	City of Newport
Ferolbink Farm / Fogland Marsh (yellow, Neck Rd. Nonquit vicinity)	90	TNC / RIDEM
Rod & Gun Club Conservation Area (green, Lake Rd.)	142	RIDEM

Notes: 1. The Nature Conservancy; 2. RI Department of Environmental Management

Weetamoo Woods was dedicated in 1990, after aggregating several parcels purchased with a matching grant from the State of Rhode Island. More parcels have been added to the original area, including a 12-acre meadow now preserved as grassland habitat. Adding to the ecological value of the large forest, and integrated with the public trail network, is the adjacent Pardon Gray Preserve, protected by the Tiverton Land Trust. That property includes 65 acres of farmland, an historic Gray family cemetery, and 155 acres of forest with trails that integrate with those in Weetamoo Woods.

SLAB BRIDGE ON EIGHT ROD WAY IN WEETAMOO WOODS

LATE SEASON HAYING IN PARDON GRAY PRESERVE

POCASSET RIDGE CONSERVATION AREA

TABLE 9-3: Parks and Recreation Resources

	Facilities	Acres	Recreation Use
1	Bay Street Recreational Area	2	multipurpose playfield, playground
2	Florence Street Field	2	multipurpose field
3	Pocasset School	8	baseball, softball and soccer fields
4	Sakonnet Bridge Boat Ramp	0.5	boat ramp with trailer parking
5	Independence Park (Doughboy Green)	0.5	park
6	Grinnell's Beach	2.5	fishing, swimming, scenic overlook
7	Fort Barton Elementary School	3.5	playground and baseball field
8	Fort Barton Revolutionary Redoubt	3	park, scenic overlook, natural area, trails
9	Ranger Elementary School	4.6	playground and field
10	Tiverton High School	18	track, football, playing fields, tennis courts
11	Tiverton Middle School	5	baseball and multipurpose fields
12	Bulgarmarsh Recreation Area	11.4	skate park, basketball, softball, playground, walking path
13	Stafford Pond boat access	0.4	DEM boat ramp
14	Pardon Gray Preserve	219	natural area, trails, passive recreation
15	Town Farm Recreation Area	3	baseball, softball, soccer fields, walking track, tennis courts, playground
16	Emily Ruecker Wildlife Refuge	51	natural area, trails, passive recreation
17	Seapowet Marsh Wildlife Refuge	316	RIDEM fishing beach
18	Fogland Beach	20	playground, swimming, fishing, wind surfing, kayaking, boat launch
19	Eight Rod Farm Wildlife Management Area	338	natural area, trails, passive recreation
20	South Field	2	baseball field
21	Weetamoo Woods	600	natural area, trails, passive recreation
22	Tiverton Yacht Club		Private marina, beachfront, swimming pool, sailing programs / racing
23	Longplex	15	Private 150,000 sf indoor and outdoor sports complex, trails

Narragansett Bay and its tributary bays, Mount Hope Bay and the Sakonnet Passage, provide expansive opportunities for recreational boating. The Tiverton Harbor and Coastal Waters Management Plan (incorporated herein by reference) identifies a need for additional protected boat launch facilities. There is a public boat launch ramp at Fogland Beach and another one under the Sakonnet River Bridge. New public waterfront facilities are part of the Villages on Mount Hope Bay development, and the Harbor Commission was a planning participant in that project. Planning for expanded public use of the Stone Bridge abutment area is also underway (see Land Use and Circulation Chapters), as well as developing more public waterfront facilities in northern Tiverton.

MANY OF TIVERTON'S RECREATIONAL OPPORTUNITIES CENTER ON ITS WATERFRONT

9.2 Private Recreational Resources

During the summer season, The Tiverton Yacht Club at 58 Riverside Drive offers swim lessons in their heated swimming pool to approximately 40 children of Club member, while older children may participate in the Sail Training Program. During the 2016 season, 94 teens and pre-teens participated. The ability to expand the program is seriously constrained by the small beachfront and marina. The Club also offers adult sailboat racing and other organized recreational activities.

Construction on a 130,000 square foot sports complex in the Business Park at Progress Road began in 2016. This Longplex Sports and Family Complex is sited on approximately 15 acres and will include indoor sports courts and outdoor sports fields and hiking trails.

9.3 Planning for the Future: the Next 20 Years

It is frequently noted that North Tiverton lacks adequate recreational facilities. There is no boat ramp on Mt. Hope Bay and there is only one outdoor sports facility behind Pocasset Elementary School. The three priorities for future recreational development in North Tiverton include (1) at least one new sports field capable of hosting Little League and other children's organized sports activities, (2) a public boat ramp off Bay Street or elsewhere along the shore of Mt. Hope Bay and (3) a paved pedestrian and bicycle path stretching from the new Sakonnet River Bridge bike path north along the former Old Colony Railroad tracks to the Fall River, MA border.

With respect to open space, the top three priorities over the next two decades include completing protection of the Holly Oak Forest and the Borden Brook groundwater reserve that underlies both Weetamoo Woods and the Pocasset Ridge Conservation Area, (2) protecting the Stafford and Nonquit Pond watersheds, and (3) pursuing all possible means to secure undeveloped land in the underserved north part of town, to be used for public green space and/or recreation.

Table 9-4 Recreation Needs Assessment

To what extent does the Town meet the demand for the following?	Recreation programs are limited to special events like tree lighting and small amount of summer camps. We are looking to expand programs. Recreation facilities are dated and in need of upgrades. Bulgarmarsh Park, which went through a recent upgrade, is the exception. We have a part time recreation director and no full time staff.
The state or general quality of the Town's recreation facilities are ranked as follows.	Outdoor sports fields are below average/average. Parks range from poor, below average, to average. Open space is above average. There are no indoor recreation facilities or recreation offices.
The adequacy of the Town's recreation programs for various age groups is ranked as follows.	Children -inadequate Adults -none Seniors -none
Changes to the Town's recreation budget since the last SCORP.	Budget decreased about 40%
Funding for the following area is ranked as follows.	Programs – inadequate Maintenance and upkeep – adequate, but needs improving Staffing – inadequate Land Acquisition – inadequate
Frequency of use of the Town's recreation facilities ranked by age.	Children 0-10 – highest Adolescents 11-18 – next highest Adults 19-60 – next highest Seniors – least
Percentage of use of the	Children 0-10 40%

Town's recreation facilities by the following groups	Adolescents 11-18 30% Adults 19-60 20% Seniors 10%
The Town reports the following changes in use of recreation facilities in the last 5 years.	Multipurpose fields and designated sports fields: Increase in use to the point of overuse; and the Town has no dedicated soccer fields. Passive parks: use remains consistent. Indoor facilities: none. Designated trails and bike paths: increase in use.
The Town reports the following levels unmet demand by facility type.	Hiking trails and passive parks – high. Multipurpose fields – significant. Indoor rec facilities – little. Designated sports fields – significant.

9.4 Open Space, Coastal Resources and Recreation Goal, Policies and Actions

Goal: Protect and maintain open space and coastal resources, and provide a wide range of recreational opportunities for the citizens of Tiverton.

POLICIES

- PURSUE OPEN SPACE ACQUISITION WITHIN A COMPREHENSIVE STRATEGY THAT ESTABLISHES CRITERIA AND PRIORITIES, ACCOUNTS FOR THE DIFFERING NEEDS AND OPPORTUNITIES OF THE VARIOUS REGIONS OF THE TOWN, AND COORDINATES THE EFFORTS OF BOTH PUBLIC AND PRIVATE ENTITIES.
- PRESERVE FARMLAND AS AN IMPORTANT ELEMENT OF TOWN HISTORY AND A GROWING SEGMENT OF THE LOCAL ECONOMY.
- PRESERVE THE TOWN'S ONLY PUBLIC WATER SUPPLY BY PROTECTING THE WATERSHED OF STAFFORD POND THROUGH PURCHASE OF LAND OR DEVELOPMENT RIGHTS BY THE TOWN; SEEK THE SUPPORT OF THE TIVERTON LAND TRUST AND THE NATURE CONSERVANCY.
- PRESERVE GROUNDWATER RESOURCES AND NATURAL FLOOD MITIGATION BY PROTECTING WETLANDS.
- PROTECT THE ENVIRONMENTAL QUALITY, RECREATIONAL OPPORTUNITY, AND SCENIC VIRTUES INHERENT IN THE TOWN'S COASTAL WATERS, SHORELINES, AND WOODLANDS.
- PLAN FOR THE EVENTUAL IMPACT OF SEA LEVEL RISE ON THE TOWN'S COASTAL AREAS.
- DEVELOP NEW RECREATION PLAYING FIELDS AND IMPROVE THE QUALITY OF EXISTING FIELDS AND THEIR ASSOCIATED STRUCTURES.
- ENHANCE CURRENT RECREATION PROGRAMS AND OPPORTUNITIES TO INCLUDE OLDER AGE GROUPS, IN COORDINATION WITH THE SENIOR CENTER.
- SEEK A STRONGER CONNECTION BETWEEN TIVERTON PUBLIC SCHOOLS AND THE EXTENSIVE OPPORTUNITIES FOR LEARNING THAT IS INHERENT IN THE TOWN'S PUBLIC OPEN SPACES AND HISTORIC SITES.

Actions

OPEN SPACE

General discussion. The importance of saving quality open space has increased dramatically as the demand for housing in Tiverton continues to increase. The town's rural character, abundant scenery, small-town intimacy, and quality schools have made Tiverton a desirable place to live. Demographic trends clearly indicate the urgency of preserving open space. A built-out Tiverton is conceivable within the time-line projection of this plan, and with each passing year saving open space becomes more difficult and expensive. But, there may be no public expenditure that achieves more strategic goals of this plan than preserving open space. Consider the following:

QUALITY OF LIFE: Preserving open space maintains the town's desirable rural character and scenic quality by saving forest, fields, and streams rather than permitting the town to develop into a continuum of residential subdivisions, stores, parking lots and malls.

TAX BURDEN: Although residential development expands the gross tax base, those new tax revenues are almost always exceeded by larger public expenditures for additional community services, i.e. schools, storm drainage, street lights, fire and police protection, etc. As a result, typical residential development eventually costs more to local communities than it provides in tax revenues. When the economics of environmental "services" (flood control, water purification, recreational benefits, agricultural activities, home values, is considered, the cost-benefit advantage of open space is even greater.

This calculus holds, even when open space and farmland receive preferential tax treatment. Indeed, taxing these properties at "highest and best use" can force landowners to sell out to developers. Many studies have proven this assertion. One study by the American Farmland Trust concludes that undeveloped land costs taxpayers less than one-third of what it takes to provide services for residential developments, as indicated in Table 9-4.

Table 9-5: Average Expenditures per Land Use

Land Use	Average Expenditures per $1.00 Tax Revenue
Commercial / Industrial	**$0.27**
Farm / Forest	**$0.36**
Residential	$1.15

Source: The Cost of Community Services: Making the Case for Conservation American Farmland Trust, 2002

WATER QUALITY AND FLOOD CONTROL: Open space has direct economic benefit by protecting ground water recharge areas. This purifies ground water and maintains it at sufficient levels to provide drinking water for approximately 40% of the town area in the south where wells are required. This eliminates the need for building a publicly funded water system. Open space also reduces and purifies surface stormwater runoff, which is important for flood control and critical to keeping the town's estuarine marshes and harbors healthy.

ENVIRONMENTAL BENEFITS: Preserving quality open space keeps a portion of the land in a natural condition, thereby preserving habitat for wildlife and promoting biodiversity. Studies at Harvard Forest show that an acre of forest absorbs about a ton of atmospheric carbon per year, and our forests serve as a huge cooling-filtering agent, improving the air we breathe. It is also well documented by studies that show salt marshes are a vital part of the natural filtering needed for healthy marine ecosystems. Tiverton can be proud that its preservation of open space is an example of "thinking globally, acting locally."

There are two fundamental requirements for land to be protected as open space. It has to be "open" (not developed), and landowners have to be willing. Beyond that, the general imperatives for selecting land to preserve in Tiverton are as follows:

AUGMENTING EXISTING MAJOR OPEN SPACE AREAS – PARDON GRAY PRESERVE, WEETAMOO WOODS, FORT BARTON-HIGHLAND WOODS, AND THE HOLLY OAK FOREST AND POCASSET RIDGE CONSERVATION AREA – FOR THE FOLLOWING REASONS:

- Historic connections to Native American culture and to early town farm sites along Eight Rod Way.
- Wetlands and exposed bedrock and glacial stone make those areas more valuable for biodiversity, more expensive for development, and less expensive for preservation.
- The natural communities in those areas (e.g., mixed oak – American Holly Forest, Atlantic White Cedar Swamp) are documented as rare forest types, a compelling argument for open space grants.
- The high ecological value of these areas is due to their large, continuous canopy forests. This important quality is documented by the Rhode Island Natural Heritage program and The Nature Conservancy, which provides compelling support for grant funding, and for managing them as "conservation areas" with minimal human disturbance.
- A high level of public benefit – flood control, protection of Nonquit Pond and Stafford Pond watersheds, and the quality and quantity of regional ground water supplies.

Other open space preservation priorities:

- **LAND IN THE WATERSHED OF STAFFORD AND NONQUIT PONDS**
- **LAND WITH DESIRABLE SCENIC VALUE OR HISTORIC CONNECTIONS**
- **LAND WHICH WOULD BE PART OF A REGIONAL GREENWAY**
- **LAND THAT WOULD CREATE OR ENHANCE WATERFRONT ACCESS**
- **LAND WITH HIGH POTENTIAL FOR PASSIVE RECREATION, EDUCATIONAL VALUE, OR AGRICULTURAL USE**

Action 1: Pursue the preservation of open space in accordance with the criteria described above, and in coordination with the Tiverton Land Trust, The Nature Conservancy of Rhode Island, and the RI Department of Environmental Management (RIDEM).

The establishment of the Tiverton Land Trust has greatly increased the potential for protecting open space in the town. Private land trusts have funding opportunities and flexibility in financing land protection that is not available to public entities. Coordination between the Tiverton Land Trust, the Tiverton Open Space Commission, The Nature Conservancy of RI, and RIDEM will significantly enhance the preservation of open space in Tiverton

Action 2: The Open Space Commission shall work with community groups and the Recreation Committee to identify sources of funding, such as Community Development Block Grants, for acquiring open space in the more urbanized areas of Tiverton, to include the idea of establishing "pocket parks" on small parcels to provide neighborhood green spaces.

There is a long-standing need for public open space in parts of town with high population density. Unfortunately, those areas have little open space to acquire. Additionally, open space grants for such areas are rare because most of them are given by environmental organizations

whose primary goal is the preservation of natural habitat. Nonetheless, town agencies must continue the effort to identify funding for acquiring green space in high population areas.

Action 3: Establish procedures in the subdivision review process to include a written report from the Open Space Commission regarding proposed open space areas of subdivision plans. Their report will include a review of the proposed open space area and its management plan.

Setting aside private open space is now provided for in the Rural Residential Development regulations of the Town's Zoning Ordinance. Management plans are also required, and it is important for them to be environmentally positive, yet practical. These open space areas should be selected and managed to optimize linkages with open space areas in abutting developments, or other existing preserved open space. To this end, the Planning Board should receive input from the Open Space Commission on all subdivision proposals with open space set-asides.

Action 4: Encourage and assist owners of farmland in acquiring funding to preserve land that would remain in agricultural use, to include the acquisition of agricultural easements, and in promoting use of the Farm, Forest and Open Space Program that provides tax relief to land owners who wish to keep their open land undeveloped.

A primary cause of the loss of open space is the difficulty of retaining farmland for economically viable agricultural use. The problem is complex, with many factors outside the control of the town. There are state programs, however, for tax relief or development rights purchased from landowners who agree to retain land in agricultural use.

Action 5: Develop a long term strategy for the coordinated management of all preserved open space land in the town, to include the possibility of establishing a "conservation land manager" position, the cost of which could be shared by all the owners of protected open space.

The success over the past twenty years in protecting large areas of undeveloped, wild natural habitat in Tiverton has created an increasing burden on town volunteers to responsibly manage that land. This includes keeping them safe for public enjoyment, and preserving their ecological integrity. Responsible stewardship of these properties has many challenges in preventing illegal activities and monitoring acceptable uses over an extensive area, much of which is without vehicle access. Add to this the complex job of preventing ecological degradation from invasive alien plant species and an increasingly over-populated deer herd. A coordinated effort and shared expense between ownership agents (Town, land trust, RIDEM, TNC) would be a major step in effective management of all the conservation properties in Tiverton.

Action 6: In cooperation with the Tiverton Land Trust, support the development of Highland Woods to enhance the value of Fort Barton as a destination historic site and a visitor-friendly natural area.

The purchase of Highland Woods by the Tiverton Land Trust has dramatically enhanced the value of town-owned Fort Barton historic redoubt and the adjoining Sin and Flesh Brook natural area. Access to both is now much easier, and the possibilities are exciting for developing the complex into a destination historic site and natural area.

COASTAL RESOURCES

Action 7: Develop a plan to identify public rights of way to the waterfront and erect markers or signage that clearly marks the public right-of-way and prevents abutting property owners from closing access.

The waterfront has always been integral to the history, culture, scenic beauty, and life-styles of Tiverton residents. As with all coastal communities, public access to the waterfront has become limited due to development and neglect of existing rights of way.

Action 8: Continue monitoring the health of Tiverton's coastal and freshwater bodies by sustained funding of water sampling and analysis as part of the URI Watershed Watch, or similar program.

The health of both our estuarine and marine ecosystems – salt marshes, salt water ponds, and beaches are under increasing threat from a variety of point and nonpoint pollution sources, including storm drainage from roads, high nitrogen runoff from residential lawns and livestock pastures, and failed septic systems. The only means for monitoring the extent of this pollution and its effect on the health of our waters is through the URI Watershed Watch program. This program uses local volunteers to sample, test, and report water quality parameters in fresh water ponds, streams, and coastal water bodies. It is extremely important that this program continues by funding it and recruiting volunteers.

Action 9: Appoint a task force to begin the development of a strategic plan that prepares the town for future rising sea levels.

The threat of rising sea levels to Tiverton's natural ecosystems and built environment is profoundly disturbing. It is now widely documented and accepted that sea levels have begun to rise, with the only question being how much and how fast. The issue is extremely broad in its ramifications, with few unaffected organizations in town. Therefore, it is extremely important that the Town of Tiverton plans for rising sea levels and considers this when making future investments in public infrastructure and facilities. STORMTOOLS and the CRMC SLAMM maps and data, publicly available online, should be utilized when conducting vulnerability analyses.

Action 10: Include in the planning for the Stone Bridge – Grinnell's Beach Park complex the possibility of a public pier for free temporary boat dockage.

The planned renovation of the Stone Bridge abutment, along with the acquisition of the gas station property gives the town an unusual opportunity for developing a major scenic and recreational attraction. One option that should be considered is the construction of a public pier similar to the one that existed into the 1970s. This would provide free temporary docking space to permit access by boat to the beach and nearby businesses, to increase both public enjoyment and economic activity in this complex.

Action 11: Explore options for the installation of a new public boat ramp for access to Mt. Hope Bay.

The town is lacking a boat ramp for public access to Mt. Hope Bay. Potential locations, including off Bay Street, should be investigated for the installation of a new public boat ramp along the shore of Mt. Hope Bay.

RECREATION

Action 12: Prepare a plan of action and timeline for completing a revision of the Recreation, Conservation and Open Space Plan.

The Tiverton Recreation, Conservation and Open Space Plan is in need of updating to reflect changes in both inventory of land and facilities, and the needs of the community since it was last prepared. The plan should address the management and improvement of town-owned properties. An up-to-date local recreation and open space plan is imperative for the Town to have a capital plan for future needs, and for the Town to be competitive in the obtainment of RIDEM grants for open space and recreational land acquisition and improvements. A properly prepared plan will take a major effort that would be greatly facilitated by assistance from a professional planner.

Action 13: Develop additional capacity by acquiring and/or improving land and developing facilities to meet the active recreation needs of Tiverton residents, with priority given to constructing athletic fields and associated facilities on land donated by the Stone Bridge Fire District.

Despite the absence of an updated recreation plan, the Tiverton Recreation Committee has documented the need for more baseball, soccer and lacrosse fields. The existing fields are used for more than one sports activity, which involves most of the calendar year. Such dual use leaves little time for the fields to rest and be properly maintained, resulting in higher maintenance costs. The Recreation Committee estimates that, at a minimum, an area equivalent to the Town Farm Recreation Area on Main Road is needed to develop additional playing fields and other recreational facilities.

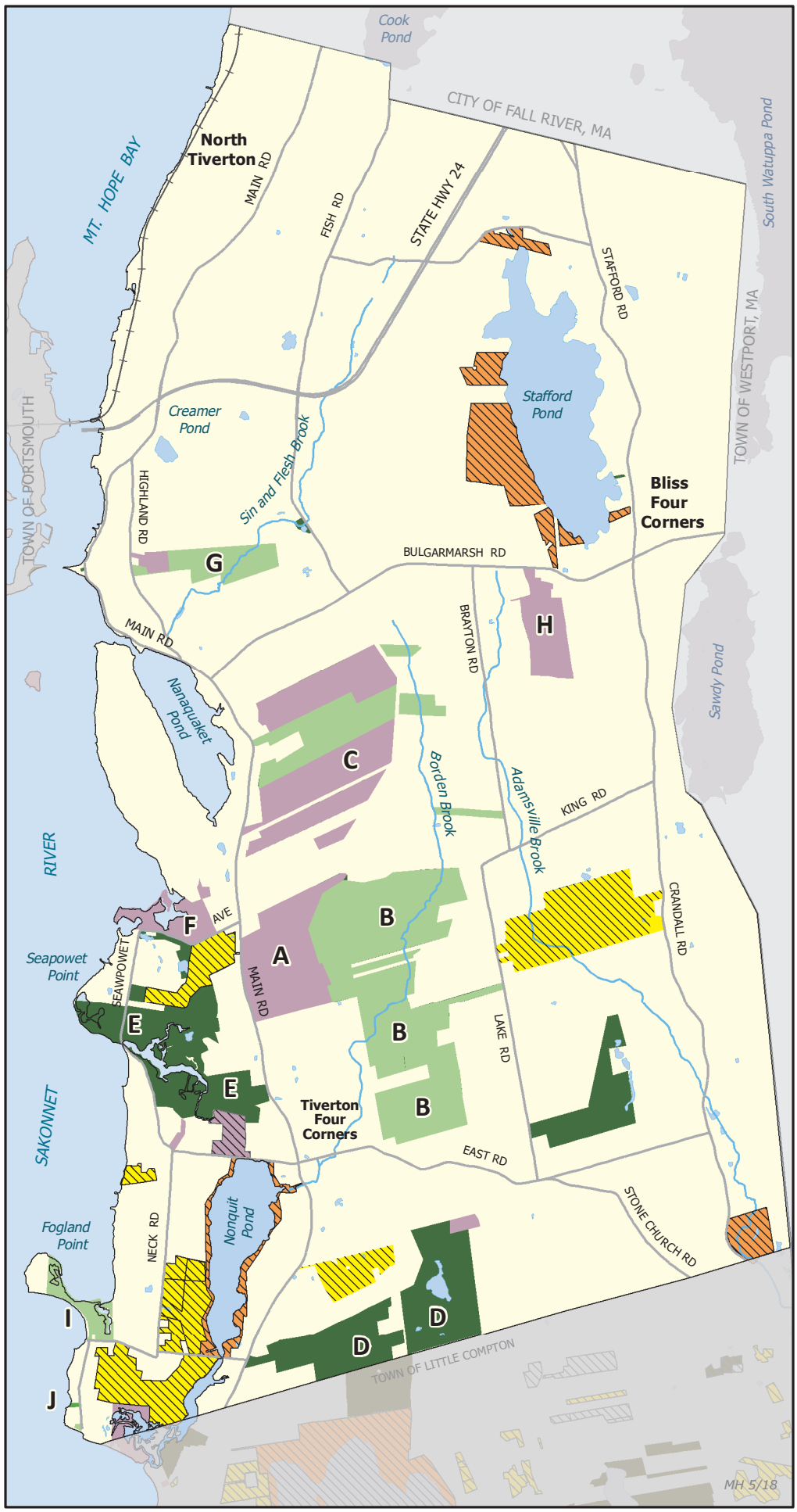
Action 14: Pursue the planning, funding, and development of Tiverton Bicentennial Green, Grinnell's Beach and the Stone Bridge abutment to ensure high esthetic standards and maximum public benefit.

A substantial renovation is in the future for Grinnell's Beach, to include development of a plan for use of a former gas station property now owned by the Town. Also, renovation of the Stone Bridge abutment will create opportunities for an integrated, multi-use public area that includes Tiverton Bicentennial Green, Grinnell's Beach, and the Stone Bridge abutment. This will be an opportunity for the community to protect and promote its valuable scenic and waterfront resources and provide maximum enjoyment for its citizens.

Action 15: Publish a town-wide map showing recreational and open space resources, picnic areas, trails and waterfront rights-of-ways and CRMC designated right of way.

A recreation and open space map available at the libraries and Town Hall and accessible on the town website would encourage use of the areas as well as build public support for open space and recreation programs.

PARDON GRAY PRESERVE



PUBLIC ACCESS STATUS

NO PUBLIC ACCESS

CONSERVATION AREA OWNER - LAND MANAGER

- TOWN OF TIVERTON
- RI DEM
- WATER AUTHORITIES (Tiverton, Newport, Fall River)
- ENVIRONMENTAL ORGANIZATIONS (Tiverton Land Trust, The Nature Conservancy, Audubon Society of RI)
- PRIVATE LAND (preserved by easement or dev rights)

KEY TO MAJOR CONSERVATION AREAS

A PARDON GRAY PRESERVE
B WEETAMOO WOODS
C POCASSET RIDGE CONSERVATION AREA
D EIGHT ROD FARM MANAGEMENT AREA
E SEAPOWET MARSH WILDLIFE REFUGE
F EMILIE RUECKER WILDLIFE REFUGE
G FORT BARTON WOODS
H BASKET SWAMP
I FOGLAND BEACH CONSERVATION AREA
J HIGH HILL POINT

- MAIN ROADS
- RAILWAY
- MAJOR STREAMS
- PONDS, OPEN WATER

Source: 2016 State and Local Conservation Lands courtesy of RIDEM, Tiverton Open Space Committee (2015) and TNC (2017).

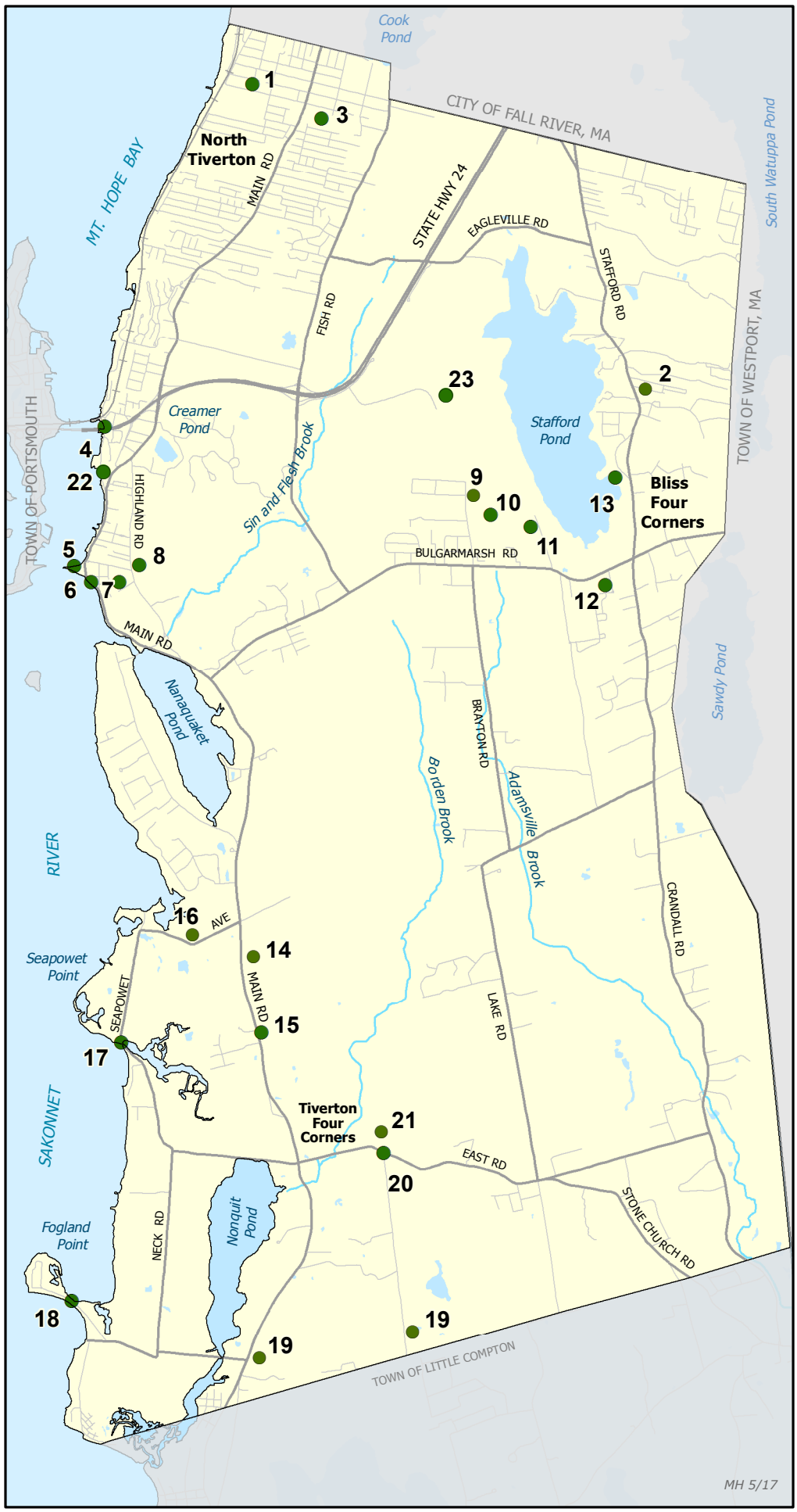
Note: Public access to open space is subject to compliance with various rules and regulations.

N

0 1 Mile

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 9-1
EXISTING CONSERVATION & OPEN SPACE AREAS



SEE TABLE 9-2 FOR DETAILS

RECREATION AREAS & FACILITIES (PUBLIC & PRIVATE)

1 BAY STREET RECREATIONAL AREA
2 FLORENCE STREET FIELD
3 POCASSET SCHOOL
4 SAKONNET BRIDGE BOAT RAMP
5 INDEPENDENCE PARK
6 GRINNELL'S BEACH
7 FORT BARTON ELEMENTARY SCHOOL
8 FORT BARTON REVOLUTIONARY REDOUBT
9 RANGER ELEMENTARY SCHOOL
10 HIGH SCHOOL
11 MIDDLE SCHOOL
12 BULGARMARSH RECREATION AREA
13 STAFFORD POND BOAT ACCESS
14 PARDON GRAY PRESERVE
15 TOWN FARM RECREATION AREA
16 EMILIE RUECKER WILDLIFE REFUGE
17 SEAPOWET MARSH WILDLIFE REFUGE
18 FOGLAND BEACH
19 EIGHT ROD FARM WILDLIFE MGT AREA
20 SOUTH FIELD
21 WEETAMOO WOODS
22 TIVERTON YACHT CLUB
23 LONGPLEX

MAIN ROADS
MINOR ROADS
RAILWAY
STREAMS
PONDS, OPEN WATER

Sources: RIDEM (2014) Local and State Conservation Areas. Tiverton Open Space Committee (2015). Tiverton Planning Board (2017).

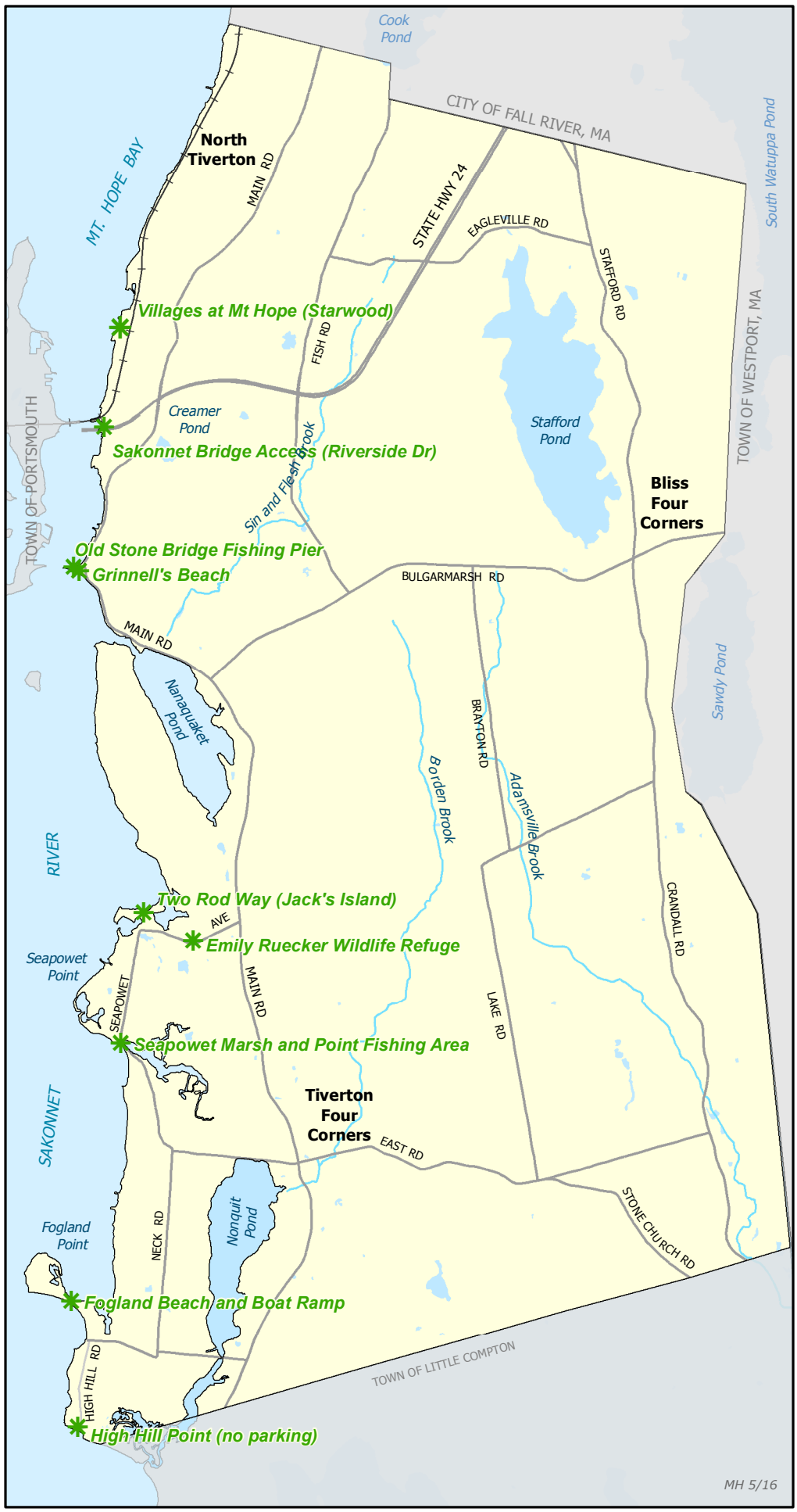
N

0 1 Mile

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Mapping and Planning Services for general reference, informational, planning and guidance use, and is not a legally authoritative source as to the location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. The Town of Tiverton or MPS makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 9-2
PUBLIC & PRIVATE RECREATIONAL RESOURCES



COASTAL PUBLIC ACCESS LOCATIONS

MAIN ROADS

RAILWAY

MAJOR STREAMS

PONDS, OPEN WATER

Source: RI CRMC Public Access Points (2003), courtesy of RIGIS and Tiverton Open Space Commission (2015).

N

0 1 Mile

Disclaimer: This map is not the product of a Professional Land Survey. It was created by Mapping and Planning Services for general reference, informational, planning and guidance use, and is not a legally authoritative source as to the location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. The Town of Tiverton or MPS makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

TIVERTON COMPREHENSIVE COMMUNITY PLAN

Figure 9-3
COASTAL PUBLIC ACCESS

ECONOMIC DEVELOPMENT

10.0 ECONOMIC DEVELOPMENT

The quality of life in a small town coupled with favorable economic factors, make Tiverton an ideal location for knowledge-based enterprises, as well as traditional firms that are committed to commercial sustainability and minimal environmental impact. Tiverton's challenge for the future lies in the balance of supporting residential, commercial, and industrial development that is economically sustainable so that its tax base is strengthened and diversified, and jobs are provided for its residents, while also protecting its open spaces and maintaining its small-town character.

10.1 Economic Environment

Tiverton is a geographically diverse community of 15,700, with several distinct neighborhoods. It is bounded by the Sakonnet River to the west, the city of Fall River, Massachusetts to the north, and the rural, coastal communities of Westport, Massachusetts to the east and Little Compton, Rhode Island to the south. Rhode Island's largest city, Providence, lies 20 miles northwest, and Newport, a major international tourist destination, is 14 miles southwest. Greater Boston with its information technology, biotechnology, medical and financial industries is less than 70 miles away with Route 24 as the primary highway corridor. Tiverton has approximately 2,000 acres of commercial and industrial zoned land.

Tiverton residents also have employment opportunities on Aquidneck Island with its extensive military presence. These include the Naval base, the Naval War College, the Naval Military Justice School, and the Naval Undersea Warfare Center (NUWC). There is also a community of local defense contractors that support the Navy installation.

In recent years, an increasing percentage of the Town's working sector commutes from Tiverton to Providence and Boston for employment opportunities. To remain vibrant in the future, Tiverton should continue to take advantage of regional employment opportunities and strive to develop a thriving local economy with increased revenue and good jobs for its residents.

As in any community, there are some challenges for Tiverton, including areas of the commercial and industrial zones that lack full development of their infrastructure. These needs should be addressed as the Town strives to expand its economic base *as referenced in the Services and Facilities chapter of this Plan.*

To enhance the Town's tax base while maintaining the character and quality of life of Tiverton that is valued by its citizens, it is important that commercially and environmentally sustainable enterprises are entertained. Firms may be from the traditional sector of the economy that now exist in Tiverton or from new growth industries such as information technology, biotechnology, medical technology, defense, cyber security, and the hospitality industry. Any new developments should be evaluated on their impacts to public water and sewer, traffic and parking, schools, public safety, and surrounding neighborhoods. The Town should therefore seek enterprises with the greatest positive tax revenue and job creation that fit within our value parameters of low environmental impact and maintaining Tiverton's coastal and rural character.

10.2 Town Districts

Tiverton occupies 35.5 square miles on the eastern shore of the Sakonnet River. The pattern of land use and development within this area includes four distinct sectors **- north Tiverton, Stone Bridge, east Tiverton, northeast Tiverton, and south Tiverton**.

North Tiverton, the area extending north and west of Route 24, is an area of older residential and commercial development. It includes neighborhood retail and service businesses along Main Road and residential development, primarily single-family units, on the side streets. The Main Road commercial area from Souza Road north to Fall River is the closest thing to a "Main Street" in Tiverton. In 2014, a Form-Based Code was adopted for this area creating new zoning districts. The three zoning districts are categorized as: Traditional Main Street, Pedestrian-Friendly and Neighborhood Business, and reflect the local character and development patterns.

The storefronts which line Main Road, particularly along the northern end near Fall River, are a potential resource for the establishment of small businesses. At the southern end of this commercially-zoned section, close to the Villages on Mount Hope Bay, opportunities exist for the redevelopment of vacant or underutilized parcels into new commercial retail and service development.

The vicinity of the Route 24 - Fish Road intersection is an evolving hub for commercial and retail development. Along the Fall River border is the Bourne Mill, an historic and architecturally distinctive 19th century mill building, which has been redeveloped for residential housing, including affordable units. Other land uses in north Tiverton include Pocasset Elementary School, the eight-acre Pocasset Park, and the 55+ condominium community, Villages at Mount Hope Bay.

South of Route 24 on Main Road is **Stone Bridge**, one of the historic areas of Tiverton. This area has a maritime aura, with active waterfront uses backed by older residences and several institutional uses. The residential area includes 19th century homes that give the area its historic character. Waterfront uses include the public Grinnell's Beach, several commercial establishments, the Tiverton Yacht Club, a boat launch, and several marine-dependent businesses along the Sakonnet River. Recently the Town completed the purchase of the old Seaside Gas station

adjacent to Grinnell's Beach, and has begun a visioning process with the community to determine the best plan for integrating it into the existing beach and park.

Also, adjacent to the beach is the Stone Bridge abutment, the remains of the old Stone Bridge that once connected Tiverton to Portsmouth. The Town has undertaken a project to repair and improve the pedestrian access as well as upgrade the park and car entrance. Numerous retail and service-related businesses line the water's edge in the area. The Planning Board has recognized the importance of this area and has prioritized the inventory, evaluation, and revision of the current zoning to enhance economic development opportunities while respecting residential neighborhoods and minimizing environmental impacts.

Homes along Riverside Drive also capture the maritime flavor; several are built on pilings along the shoreline. Other land uses in this historic area include Fort Barton Elementary School, the Town Hall, the Town Gazebo and Fort Barton with its Revolutionary War redoubt.

East Tiverton, the area east of Route 24 and north of Bulgarmarsh Road, is predominantly residential. A commercial area at the intersection of Bulgarmarsh Road, Stafford Road and Crandall Road is known locally as Bliss Four Corners, although additional commercial uses extend north along Stafford Road. Bliss Four Corners received a recent zoning update in 2014 with the adoption of the hybrid Form-Based Code. The District was rezoned as a Pedestrian-Friendly District. A major transportation improvement project has been proposed by the RI Department of Transportation for the complete reconstruction of roadways at the intersections of Stafford, Crandall, and Bulgarmarsh Roads. These transportation improvements will support the trend of economic growth in this area.

Tiverton High School, Tiverton Middle School and Ranger Elementary School are also within the East area of town, as is the new Bulgarmarsh Recreation Area, and Sandywoods, an affordable residential arts and agriculture community. The new Tiverton Public Library is in Bliss Four Corners, as is Stafford Pond, a principal source of the Town's water supply. Stafford Pond is generally surrounded by residential use with some protected areas along its southwestern shores. Municipal facilities, including the Public Works garage and Tiverton Police facility, are located west of Stafford Pond, in the area of Route 24 and Fish Road. The Town's 228-acre Business Park is also in this area, and currently contains a natural gas-generated electric power plant and an indoor/outdoor sports complex.

Another recent area of development, in **northeast Tiverton**, is the casino gaming facility currently under construction at the intersection of William S. Canning Boulevard and Stafford Road. The development and operation of the Casino Gaming Facility will provide for an operational hotel in Town which will support economic development. The Casino Gaming Facility will also provide for the diversification of the Town's tax base, and an increase in General Fun revenue. The overall plan submitted to the Town Council in November of 2015 projected revenue to the Town of approximately $4M per year, $3M is gaming revenues to the Town in scenarios that assume the addition of gaming venues in the Commonwealth of Massachusetts. Furthermore, the Rhode Island General Assembly enacted legislation which guarantees the level of gaming revenues to the Town through legislative and contractual projections. When the Casino Gaming Facility becomes operational, Twin-River – Tiverton, LLC has projected 375 to 400 full-time equivalent jobs.

Also, in the northeast corner of town, off Stafford Road, is a 55+ manufactured home community called Countryview Estates.

South Tiverton, the area south of Bulgarmarsh Road, remains mostly rural and agricultural in character, though suburban style residential subdivisions are increasingly populating the area. Large estates lie along the shoreline, with small residential developments on Crandall Road, King Road, Brayton Road, Lake Road and East Road, and some large parcels in agricultural use. The historic Tiverton Four Corners is home to a National Historic Register District, a recognized arts district and a thriving Village Commercial District. An eclectic mix of art and artisans, shops and eateries offer local goods, agricultural products, and unique finds. By legislative act, original art sold within the district is exempt from State sales tax. The area is also categorized by historic homes and community facilities such as the Union Public Library.

10.3 Current Economic Base Industries: Agriculture, Fishing, Marine-Dependent Industries and Tourism

Tiverton's economic base has historically been derived from its abundant natural resources. From its origins as a farming and fishing community, the Town has seen growth in manufacturing, light industry and local commercial enterprises. Local businesses include unique artisan shops, marine services, health care, including medical, dental, pharmacies, legal services real estate, banking and hardware.

10.3.1 AGRICULTURE

Agriculture is an economic activity in Tiverton that is reflective of the Town's rural and historic character. Its family farms contribute to the unique visual quality of the Town and preserve open space and natural resources while providing economic and quality of life benefits. For example, The Pardon Gray Preserve, land acquired in 2000 by the Tiverton Land Trust, is being used by a local farmer as part of its management plan. This serves to maintain its economic and scenic contribution to the community. Supporting agriculture by protecting existing farmland and engaging in creative partnerships is a critical component of Tiverton's future.

Agricultural enterprises range from larger commercial entities such as expansive Christmas tree and horse farms to small, seasonal roadside stands. The agricultural sector benefits the community in many ways. Farm and farmland in Tiverton are of critical importance to the local and State economy, environment, community character and livability. See Figure 4-5, *Critical Farmland*, which depicts on a map an estimation of areas in Tiverton devoted to agricultural use and those which have been protected from development. Rhode Island's agricultural sector has expanded and diversified production in response to increased demand for Rhode Island-grown farm products.

Increasing consumer demand for fresh, local, organic foods and agri-tourism activities has increased and, as a result, businesses are being established or transitioning to meet that demand. According to Farm FreshRI, six agricultural operations in Tiverton have been established since 2003. These farm businesses offer either organic-certified produce or advertise organic-only practices.

Encouraging the maintenance of agricultural businesses and undeveloped land benefits both the land owner and the Town. Overall as transportation costs increase for non-local farm products, it will benefit Tiverton residents if there is a reservoir of good farmland that can be utilized for food production close to home. Connecting farmers with agencies that make information available about innovative farming methods may be worth pursuing.

FARMING: AN ECONOMIC ACTIVITY THAT IS A TRADITIONAL INDUSTRY IN TIVERTON

10.3.2 FISHING AND MARINE-DEPENDENT INDUSTRIES

Tiverton has been associated with the fishing and marine industries throughout its history, due to its location along the eastern shores of the Sakonnet River and Mount Hope Bay. The local quahoggers, lobstermen and fishermen operate in Mount Hope Bay, the Sakonnet River and up to 100 miles offshore. Some of the enterprises are seasonal, but many operate year-round, selling their catch to various wholesale and retail merchants located along the waterfront. The viability of fishing stock and the Mount Hope Bay shellfish industry is dependent upon maintaining the water quality and inherent stock of the Sakonnet River and the streams that feed into it.

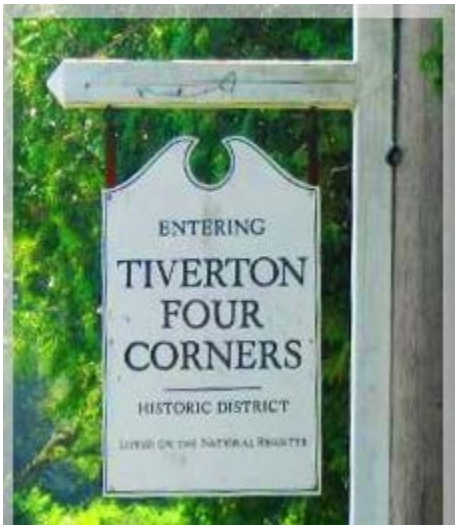
Narragansett Bay and its tributary bays, including Mount Hope Bay and the Sakonnet River provide expansive opportunities for recreational boating, which is an integral part of both the State's image and economy. Tiverton has several marine-dependent businesses, including boat sales, suppliers and a number of boatyards and marinas along Riverside Drive and Main Road in the area known as the Tiverton Basin. The boat sales and services include inboard and outboard motor boats, sailboats, paddleboards, canoes and kayaks. The Tiverton Basin, located between the Stone Bridge abutment and the Sakonnet River Bridge, is considered a safe harbor protected from the prevailing southwest winds by the manmade abutments that once formed the Stone Bridge. Railroad abutments on the north end of the basin as protection from wave actions resulting from northerly winds. Wind surfing, paddle-boarding, and kite surfing have become a popular draw at Fogland Point, which has been identified as a pre-eminent area for sports.

The establishment of a Waterfront District in 2001, as part of comprehensive amendments to the Zoning Ordinance and map, and its application to waterfront land from Nanaquaket Bridge north to the state border, provides a regulatory means to encourage marine-dependent uses. The opportunity exists to provide such uses and appropriately scaled development along Tiverton's waterfront that would enhance both the local economy and preserve the Town's scenic mix of residential and maritime traditions.

FISHING IS A TRADITIONAL ECONOMIC ACTIVITY IN TIVERTON

10.3.3 TOURISM

Tiverton offers numerous historical, waterfront and artistic venues that have become recognized throughout the South coast region. Tiverton Days events are popular, and the South Coast Artists, Inc. Open Studio days bring discerning spenders from throughout the New England region.



As a waterfront community, Tiverton can develop its natural assets to encourage tourism. Marketing the beaches and encouraging boat traffic into Tiverton would be a step toward that goal. The Town is currently restoring the Grinnell's beach area and adjacent abutment which will attract visitors who will patronize local businesses. Tiverton's geography also lends itself to sporting events including biking, running and triathlons.

Tiverton Four Corners is a unique and attractive village shopping area focusing on the arts

10.4 Jobs, Services and Industry

Although Tiverton provides approximately 2,623 jobs, it is primarily a net exporter of workers. According to the Rhode Island Department of Labor and Training, 16.8% of Tiverton residents work within Tiverton, 30.8% work in Massachusetts, and 51.6% work in other Rhode Island communities. The 2008-2012 Census counted 8,710 town residents over the age of 16 as employed. Those who commute to work have a mean commute time of 29 minutes.

The breakdown by employment category is shown in Table 10-1.

TABLE 10-1: Employment by Category, Tiverton Residents

	Number	Percent
Arts and Entertainment	771	9%
"Other Industries" *	396	5%
Self-Employed	783	9%
Education, Health and Social Services	1,903	22%
Professional, Scientific and Waste	815	9%
Public Administration	353	4%
Finance, Insurance and Real Estate	636	7%
Manufacturing	974	11%
Wholesale and Retail	954	11%
Agriculture	110	1%
Construction	507	6%
Information Industry	196	2%
Transportation	312	4%
Total	**8,710**	**100%**

Source: US Census 2008-2012

*Services Industries not including Public Administration

Table 10-2 highlights industries that showed an increase in employment within Tiverton between 2006 and 2015. The top three industries with employment growth included Accommodation & Food Services, Transportation & Warehousing, and Health Care & Social Assistance. Industries showing the largest decrease in employment within Tiverton are construction, professional and technical services, and real estate, rental and leasing.

Table 10-2: Tiverton Employment				
Establishment Employment	2006	2009	2015	% Change from 2006 to 2015
Total Private & Government	2,703	2,566	2,623	-3%
Total Private Only	2,221	2,018	2,100	-5%
Retail Trade	575	458	552	-4%
Government	482	547	523	9%
Accommodation & Food Services	310	289	422	36%
Health Care & Social Assistance	301	324	352	17%
Construction	312	217	158	-49%
Other Services	125	121	109	-13%
Wholesale Trade	107	100	85	-21%
Manufacturing	69	57	80	16%
Transportation & Warehousing	53	*	70	32%
Professional & Technical Services	134	138	69	-49%
Finance & Insurance	52	57	54	4%
Administrative Support & Waste Management	52	72	51	-2%
Arts, Entertainment, & Recreation	27	30	26	-4%
Agriculture, Forestry, Fishing & Hunting	38	32	25	-34%
Real Estate & Rental & Leasing	14	6	5	-64%
Educational Services	*	5	*	N/A
Utilities	*	*	*	N/A
Management of Companies & Enterprises	*	*	*	N/A
Information	3	23	0	N/A
Mining	33	*	0	N/A
*Source: RIDLT (*not available - may identify individual business)*				

10.5 Public Finance

For the fiscal year ending June 30, 2018, the Town had a total budget of **$49,385,580**. Of this amount, $38,207,312, or 77.4% of the revenue, was generated from property taxes (including motor vehicle and business inventory taxes, that are being phased out by State law). State funding sources, including funding for education and reimbursement for the partial phase-out of the motor vehicle tax and revenue sharing, provide $11,178,268 or approximately 22.6% of total annual revenue. The rest is generated by various fees, permits and licenses, and other assessments, including payment in lieu of taxes by the Tiverton power plant. Tiverton property tax is levied at 100% of the assessed value, and in 2017-2018, the Town Tax Rate was $19.05 per $1,000 assessed valuation.

All Town financial transactions undergo an extensive annual audit by a professional external accounting firm. This is done to ensure responsible handling of public expenditures. Similar attention should be given to the income side of Town finances, the majority of which is from real estate taxes. An audit, by an external professional, of the Town's real estate tax system would seek to ensure every tax exemption and special category is still in the Town's interest and is still

accomplishing its purpose. A secondary goal would be to determine the effectiveness of the Town's reevaluation system every three years.

Table 10-3 shows the breakdown of property tax revenue for the tax roll year 2017, which clearly shows that the greatest percentage of property taxes comes from residential properties.

TABLE 10-3: Property Tax Revenue, Tax Roll Year 2017

Category	Amount	% of Total
Residential	$ 31,665,056	82.87%
Commercial	$ 3,030,251	7.94%
Industrial	$ 230,591	0.60%
Farm/Forest/Open Space	$ 963,255	2.52%
Motor Vehicle	$ 1,493,635	3.91%
Business Tangible Property	$ 824,524	2.16%
Total	$ 38,207,312	100.00%

Expenditures for the 2017-2018 fiscal year are shown in Table 10-4. Financing the public-school system accounts for the bulk of the Town expenses or 60.53% of annual expenditures. This is followed by expenses for Municipal Government at 30.61%. The debt service is 8.86% of our total $49,385,580 budget.

TABLE 10-4: Appropriated Expenditures, FY 2017-2018

Category	Appropriated	% of Total
General Education	$ 29,893,257	60.53
Schools, Capital Expenditures*	$ 0	0.00
School Department, Total	$ 29,893,257	60.53
General Government	$ 1,067,252	2.16
Financial Administration	$ 5,211,573	10.55
Protection to Persons & Property	$ 5,881,927	11.91
Public Works	$ 1,797,995	3.64
Grants and Health **	$ 570,750	1.16
Parks and Recreation	$ 75,140	0.15
Associated Activities ***	$ 131,616	0.27
Municipal, Capital Expenditures	$ 442,476	0.90
School Resource Officer-School Share	($ 61,073)	(0.12)
Municipal Government, Total	$ 15,117,656	30.61
Debt Service (Principal & Interest		
Fort Barton School	$ 749,400	1.52
Pocasset School	$ 861,963	1.75
Ranger School & High School	$ 1,036,500	2.10
TIF Area Sewer Debt	$ 684,254	1.39
THS & TMS Capital Repairs	$ 515,000	1.04
Library	$ 527,550	1.07
Debt Service Total	$ 4,374,667	8.86
Total	**$ 49,385,580**	**100**

* Does not include capital expenditures paid from prior year's School surplus funds.
** Includes library services, payments to social service organizations.
***Includes senior services and payments to various (non-regulatory) commissions.

Town expenditures in the two general categories, Municipal and Education, shown in Table 10-5 for five recent fiscal years, show a steady and significant increase in expenditures.

TABLE 10-5: Expenditures, FY 2013-2018

YEAR	MUNICIPAL	EDUCATION	TOTAL
2013-2014	$18,419,880	$28,729,425	$47,149,305
2014-2015	$18,617,212	$29,275,439	$47,892,651
2015-2016	$19,021,173	$29,455,785	$48,476,958
2016-2017	$19,065,194	$29,623,224	$48,688,418
2017-2018	$19,492,323	$29,893,257	$49,385,580

At the time of the original printing of the Comprehensive Community Plan (1992), budget data from the fiscal year ending in June 1990 was provided; for fiscal year 2017 the total budget was $49,385,580 with 19,492,323 appropriated to municipal expenses and 29,893,257 appropriated to education. Over the period (1990-2017), the Town's budget has nearly doubled, with the municipal expenses growing at a faster rate than the education expenses.

10.6 Economic Growth Opportunities

A focus on tourism, technology and health and medical services will provide new economic growth opportunities for Tiverton.

Business Park

Tiverton has actively worked to develop its Business Park, located to the east of Route 24 near the Fish Road exit. Recently Tiverton approved an overlay district to promote and encourage development on the 172-acre parcel. The presence of the Algonquin Natural Gas Pipeline spur which runs through the site has made it possible for a 290-megawatt combined cycle natural gas turbine to be built. The Town should work with the State to promote available development sites within the Business Park which currently has two tenants. Efforts to redevelop the Park and recruit tenants should be consistent and strategic.

In 2016, the State published a report, RI Innovates: A Competitive Strategy for the Ocean State. This report was a study of the overall current economic status of business conditions in Rhode Island. It identified areas it considered growth industries based on emerging technologies and needs. Included in these areas were industries that would easily translate into businesses that already have a start in Tiverton such as Marine, Medical labs and Healthcare, and Tourism. By working with the State to promote the Tiverton Business Park as a possible site for these industries, the Town could avail itself of needed expertise.

Tourism

Developing a multi-faceted tourism market is a potential economic engine for the Town. Strategies include collaborating with other local communities, developing Tiverton's waterfront assets, spotlighting its art galleries and attractions and attracting new tourist ventures.

Collaborating with other local communities and "Discover Newport" to market its historical, waterfront and artistic venues as part of a broader experience, and effectively offering attractions is economically advantageous for Tiverton. With its colonial roots, Tiverton can also generate income by attracting discerning travelers interested in historic tourism.

As a waterfront community Tiverton can develop and use its natural assets to encourage tourism. Marketing the beaches and encouraging boat traffic into Tiverton would be a step toward that goal. Tiverton's geography also lends itself to sporting events including biking, running and triathlons.

In November 2015, Tiverton residents approved the proposal from Twin Rivers to build a Casino in the northeast corner of the Town. As part of the Casino complex there will be an 84-room hotel

that will encourage longer stays in town. It is hoped that Casino visitors will contribute to a potential base for the Town's tourism program.

Sculpture outside art gallery at Tiverton Four Corners

Technology

Tiverton has the opportunity to transform into a technology hub, but this will require providing the infrastructure, space and workforce to attract employers and increasing education in the areas of science, mathematics, engineering and technology.

Tiverton's High School has programs designed to introduce students to various careers and provides them opportunities to participate in local and regional enterprises. Advanced education is available at nearby community colleges and at both public and private universities through the Doctorate level. These programs help provide an educated workforce ready for the emerging technological needs in upcoming 21st century industries.

Health and Medical Services

Tiverton is in a prime location to organically attract health services and medical research enterprises. In Rhode Island Innovates A Competitive Strategy for the Ocean State, a report prepared by the Battelle Technology Partnership in association with the Brookings Institution, five industries were identified as potential "growth" areas for RI. One of these is "Biomedical

Innovation", which is described as "advances in scientific knowledge of biological processes converging with technological developments in electronics, and information technology." Attracting enterprises in this field could provide Tiverton with high paying research and development opportunities. Tiverton, with its easy access to Providence and Boston colleges and universities and Naval technological resources, is well positioned to take advantage of this new emphasis and should work with the state for growth in these areas.

NEW MEDICAL CENTER MAIN ROAD TIVERTON

10.7 Economic Development Goals, Policies and Actions

Goal: Expand Tiverton's economic base to support increased non-residential tax revenue and desirable employment opportunities that pay living wages while protecting the environment, established residential neighborhoods and the small-town, waterfront character of the community.

POLICIES

PLAN FOR AND SUPPORT DIVERSIFIED COMMERCIAL, INDUSTRIAL, AND MIXED-USE DEVELOPMENTS THAT WILL PROVIDE NET TAX BENEFITS AND ARE AT A SCALE AND DESIGN THAT IS CONSISTENT WITH THE CHARACTER OF THE TOWN.

- ENCOURAGE SMALL BUSINESS DEVELOPMENT AND REVITALIZATION TO ENABLE START-UP BUSINESSES TO FIND SUITABLE SPACE AND SUCCEED IN THE TOWN OF TIVERTON.
- MAXIMIZE THE ECONOMIC OPPORTUNITIES OF THE TIVERTON BUSINESS PARK.
- SUPPORT THE GROWTH AND EXPANSION OF EXISTING LOCAL BUSINESSES.
- SUPPORT THE TRADITIONAL ECONOMIC DRIVERS OF AGRICULTURE, MARINE INDUSTRY AND TOURISM IN TIVERTON.
- PROMOTE AND SUPPORT THE ARTS AS AN ECONOMIC ACTIVITY THAT ENHANCES THE QUALITY OF LIFE IN TIVERTON.
- ENCOURAGE ADAPTIVE REUSE OF EXISTING COMMERCIAL BUILDING OVER EXPANSION OF COMMERCIAL ZONING.

Actions

Action 1: Determine high priority areas in town for business development/redevelopment based on identified commercial town centers such as Main Road in North Tiverton and Bliss Four Corners in East Tiverton.

Action 2: Support an appropriate data-based impact assessment for proposed commercial, industrial, and mixed-use developments to determine the impact on the Town's tax revenue versus cost of Town services.

Action 3: Actively pursue enterprises with the best potential for positive tax revenue, creation of job opportunities and sustainable environmental impact. Firms may be from the traditional sectors of the economy that currently exist in Tiverton or from growth industries, such as information technology, biotechnology, medical technology, health services, defense, cyber-security and tourism.

Action 4: Work with Twin River-Tiverton, LLC to provide a thorough and orderly review of the development plans for the casino gaming facility to ensure consistency with the November 9, 2015 proposal, consistency with the Comprehensive Plan, and to promote timely construction on the project, so that the Town can begin to participate in revenues generated from operations projected to begin in July 2018.

Action 5: Enhance commercial prosperity in Tiverton through functional collaboration between the Town Planner, Planning Board, Economic Development Commission, Newport County Chamber of Commerce, Newport Tourism Agency and the State Economic Development Agency. Establish a procedure to notify appropriate commissions when new a business requests information about opening in Tiverton.

Action 6: Explore the possibility of Pop-ups, incubators, and shared office space developments to assist with start-up small business opportunities.

Action 7: Continue to work with the State to implement the Commerce RI LEAN program and e-permitting to help new business owners navigate and expedite the regulatory processes of the Town and State.

Action 8: Facilitate the formation of small business district associations to provide mutual support.

Action 9: Partner with state and local agencies including Commerce RI and Newport County Chamber of Commerce to assist with marketing available space to maximize the economic opportunities of the Tiverton Business Park.

Action 10: Partner with the Tiverton Arts Council, Discover Newport, and the Newport Chamber of Commerce on projects encouraging destination tourism so that Tiverton, with its active arts scene and unique history, can promote the development of the arts as another form of economic activity. Create a tourism map of Tiverton.

Action 11: Promote expansion of agricultural activities in the Town by partnering with relevant agencies such as URI, the R.I. Department of Environmental Management (DEM) the Christmas Tree Growers Association, Eastern Rhode Island Conservation District Office, etc.

Action 12: Continue the use of tax alternatives/incentives that encourage preservation of agricultural land for farming.

Action 13: Complete a waterfront plan to promote utilization of Tiverton's waterfront for marine-dependent uses that would enhance the local economy while maintaining the Town's maritime and residential character.

Action 14: Establish a database of vacant commercial and industrial properties throughout the Town.

Action 15: Partner with local business owners to identify barriers to expansion and possible solutions to support growth resulting in increased tax revenue for the Town.

Action 16: Perform a comprehensive analysis of Tiverton's real estate tax income, to evaluate its overall effectiveness as the Town's major revenue source. Evaluate the effectiveness of tax exemptions to determine if they are accomplishing their intended purposes, and whether the purpose is worth the loss of revenue to the Town.

Action 17: Perform a comprehensive analysis of Tiverton's fiscal health and potential future earnings.

Action 18: Implement a streetscape improvement program to promote attractive commercial districts with cohesive public amenities such as sidewalks, lighting, benches and receptacles.

MUDDY MOOSE CAFE

PLAN IMPLEMENTATION

11.0 PLAN IMPLEMENTATION

This final chapter of the Tiverton Comprehensive Community Plan assigns responsibility for attainment of the goals, objectives and policy actions contained in the preceding chapters.

11.1 CONTINUOUS PLANNING

The Comprehensive Community Plan is part of a continuous planning and implementation process. At the time of adoption, the Plan reflects the objectives and priorities of the Town, and shall serve as a guide to the Town Council, Planning Board and Town Administration in making assignments, pursuing grants, and allocating funds. The Town Administrator and department heads will actively contribute to updates to the Plan to ensure it reflects the best available information and keeps pace with the needs and desires of the community. An informational report will be filed at the five-year mark on the status of the following implementation program (actions).

The Plan serves as the foundation for a detailed review of the Town's Zoning Code. State law requires that the Zoning Code be reviewed and amended as necessary to conform to the Comprehensive Community Plan. The initial review of the Zoning Code will be undertaken by the Planning Board as the first and most critical implementation action following final adoption of the Plan. The Planning Board serves as custodian of the Plan. The Board must drive the process to update the Plan every ten years.

11.2 IMPLEMENTATION CONSIDERATIONS

Each of the Plan elements in Chapters 4 through 10 contain numerous "actions" designed to support the overarching goals and detailed objectives of the Plan. The Town has determined that this Plan is a guide for activity that will have an impact not only on policy setting, but also the agenda and working time of its volunteer boards and commissions and Town staff.

The chart which follows assigns "actions" to the most appropriate Town agency for implementation. The authority ultimately responsible for binding action or policy choice is noted as the "primary responsibility," for each action item. The actual implementation work is often shouldered by the "supporting responsibility" as noted. Early chart entries note the Town agency's source of authority; as the chart progresses, knowledge of the source of authority is assumed.

The actions are assigned implementation timeframes of short-term ("ST"), medium-term ("MT"), long-term ("LT"), or ongoing ("ON"). It is intended that short-term actions be completed within three years of plan adoption, medium-term action be completed within six years of Plan adoption, and long-term action be completed prior to the next Plan update (within ten years). Ongoing is assigned to those actions that should be continually implemented.

An annual review of implementation progress will be made by the Planning Board. A report will be transmitted to the Town Council as part of the budget process. Elements requiring capital or operating budget allocations will be reprioritized annually based on changing conditions. Currently, no expansion or replacement of public facilities is reflected in the Town's Capital Improvement Program.

Action #	Action Description	Primary Responsibility	Supporting Responsibility	Notes	Time-frame
ELEMENT 4: NATURAL AND CULTURAL RESOURCES					
Action **1**	Continue an active program of land acquisition to protect open space and rural character using the selection criteria described in Element 9.	• Town Council must approve final action on all land acquisition • Open Space Commission conducts all activities required to prepare grant applications and administers funds	• Open Space and Land Preservation Commission conducts this activity to meet Town Charter mandate at Section 1004, reports to Town Administrator • Town Solicitor provides all legal support for real estate transactions, including closing and recording • Town Treasurer holds all open space funds in a restricted fund account	• Coordination of activities with private land conservation entities is a sustaining and vital part of meeting this action item • Availability of grant funds and land meeting selection criteria set the pace for meeting this action item	ON
Action **2**	Identify and develop an awareness and appreciation of elements of the Town's rural character, such as farms, barns, open fields, stonewalls, mature trees, tree rows, and treed neighborhoods.	• Conservation Commission (per Town Charter Section 1003) and Town Planner will coordinate to document and inventory unique places to inform planning, design review and conservation efforts			ST
Action **3**	The Planning Board should work with developers to promote rural residential developments as the preferred type of development pattern, particularly in the Town's less developed areas currently zoned R-60 and R-80. Further, the Planning Board should adopt regulations enabling the services of professional design consultants to review Master Plans at the expense of the developer and assure consistency with the state's Low	• Planning Board	• Administrative Officer, especially at ad-hoc/pre-application, technical review and development review stages		ON

Action #	Action Description	Primary Responsibility	Supporting Responsibility	Notes	Time-frame
	Impact Development goals. (see Policies 5, 6 & 7).				
Action **4**	Promote local stewardship of the Town's tree resources utilizing the Plan for Urban and Community Forestry (State Guide Plan Element 156, May 1999) and continue to require protection of significant trees and to specify replacement trees for new developments and subdivisions.	• Tree Commission must identify assets to be protected	• Support from Zoning and Planning Boards through issuance of approvals conditioned upon compliance with Tree Commission recommendations	• Permanent / transparent record could be created through GIS data layer	ON
Action **5**	Minimize the impacts of development to natural features and pre-development hydrology by incorporating into Tiverton's Major Land Development and Subdivision Regulations key provisions of the RI Low Impact Development Site Planning and Design Guidance Manual.	• Planning Board may amend Subdivision Regulations provided process in Appendix B Article 12 of the Tiverton Ordinance	• Conservation Commission may assist through research and recommendation, under its individual mandate to consider all matters of natural environment		ST
Action **6**	Amend Tiverton's Major Land Development and Subdivision Regulations with language from the RI Low Impact Development Site Planning and Design Guidance Manual to assure that land alterations minimize high impacts such as excessive impervious cover, destruction of natural features and the use of inappropriate, high-maintenance vegetation.	• Planning Board may amend Subdivision Regulations provided process in Appendix B Article 12 of the Tiverton Ordinance			ST
Action **7**	Manage the impacts of construction development at the source to minimize pollution to surface and groundwater.	• Planning Board – establish subdivision regulations to support this goal • Administrative Officer, Consulting Engineer: enforcement of	• Zoning Official: enforce all requirements for Environmental Review Statements in watershed overlay and other zones /		ON

Action #	Action Description	Primary Responsibility	Supporting Responsibility	Notes	Time-frame
		existing and new regulations	situations where required		
Visual Quality					
Action **8**	Establish written design standards to assist developers in adopting architectural designs for new commercial and mixed-use development compatible with the Town's historic and rural character.	• Design book approved by Planning Board as part of deliberations concerning Tiverton Crossings must now be enforced by Administrative Officer and the Planning Board	• Support from Town Solicitor may be required	• Attention must be paid to the drafting of the language in any design guidelines to prevent unintended consequences arising from vague provisions	ON
Action **9**	Adopt specific design standards for Tiverton Four Corners based on the Secretary of the Interior's 'Standards for the Treatment of Historical Properties' and the RIHPHC's 'Easy Guide to Rehab Standards'.	• Planning Board may amend Subdivision Regulations provided process in Appendix B Article 12 of the Tiverton Ordinance	• Historical Preservation Advisory Committee must document covered properties and support Planning Board deliberations		MT
Action **10**	Continue to identify natural and scenic vistas and apply standards for their protection as part of the Planning Board's development review process.	• Planning Board may amend Subdivision Regulations provided process in Appendix B Article 12 of the Tiverton Ordinance	• Conservation Commission to identify key areas and incorporate into database / GIS data layer		ON
Surface Water and Groundwater Supply					
Action **11**	Establish procedures to identify parcels of land that may contain significant sources of surface or groundwater pollutants and that might violate local, state and/or Federal regulations.	• Conservation Commission for establishing procedures	• Where local regulations are violated, reference to appropriate enforcement authority must be made – Zoning Official, Police • Enforcement actions must be supported by Town Administrator and, when applicable, the Town Council if		ON

Action #	Action Description	Primary Responsibility	Supporting Responsibility	Notes	Time-frame
			licensing issues are involved		
Action **12**	Review and update earth removal regulations, designed to protect groundwater, assure public safety and curb dust, noise and vibration caused by blasting.	• Earth Removal Ordinance is within the purview of the Town Council to amend • Specific authorization from the General Assembly may be required to regulate certain mining activities	• Town Solicitor to interface with General Assembly delegation and draft State and local language as needed		ST
Stafford Pond					
Action **13a**	Establish a Stafford Pond Watershed Association that includes representatives of the water districts, town boards and commissions, residents and business people which have an interest in the watershed.	• The Town Council could form a committee of these stakeholders, but would be best if it were assigned a specific task		• A more general Association would take private action / cooperation	ST
Action **13b**	Work together with RIDEM, RIDOH, RIDOT and the Stone Bridge Water District to develop and implement a plan for recreational usage that protects and ensures Stafford Pond's long-term viability as a drinking water source.	• Town Council	• Conservation Commission	• RIDEM • RIDOT • Stone Bridge Water District	MT
Action **13c**	The Tiverton Open Space Commission (TOSC) should investigate the legal and financial feasibility of acquiring developed parcels in the Stafford Pond watershed. The TOSC, working proactively with the Tiverton Land Trust and the R.I. Chapter of The Nature Conservancy, should develop policies that place a higher priority on the acquisition of land in the Stafford Pond watershed in order to	• Open Space Commission	• Conservation Commission may advise on highest priority acquisitions given research into parcels with greatest impact on water quality	• This work is ongoing, negotiations for undeveloped parcels near Stafford Pond are ongoing	ON

Action #	Action Description	Primary Responsibility	Supporting Responsibility	Notes	Time-frame
	protect the Pond's water quality.				
Nonquit Pond					
Action **14**	Continue to monitor potential leachate contamination from the Tiverton landfill.	• Department of Public Works, utilizing assigned engineering / environmental testing firm(s)	• Recycling Committee • Conservation Commission		ON
Action **15**	Utilize the services of URI Cooperative Extension to update and improve regulatory requirements in the Zoning Ordinance Article VIII Watershed Protection Overlay Districts.	• Town Council takes final action on Zoning Code amendments	• Town Planner coordinates activity to generate recommendations		ST
Wetlands					
Action **16**	Preserve wetlands to protect groundwater recharge areas, control flooding and preserve wildlife habitats by ensuring compliance with the Rhode Island Freshwater Wetlands Act. Consider additional regulatory measures to protect freshwater wetlands and jurisdictional wetland buffers, consistent with State enabling legislation.	• Planning Board	• Conservation Commission		ST

Coastal Features					
Action **17**	Update the Harbor Management Plan as necessary to ensure protection of environmentally sensitive areas, as required by the CRMC.	• Harbor Commission			ST
Action **18**	Consider standards for the protection of coastal scenic views as part of the Planning Board's subdivision review process.	• Planning Board	• Advice from Harbor, Conservation and Open Space Commissions • Administrative Officer has role to play in implementation		LT
Environmental Quality					
Action **19**	Create a study committee to investigate municipal policy options to protect upland areas adjacent to coastal wetlands.	• Town Council	• Conservation Commission		ST
Action **20**	Enact and enforce the proposed amendments to the Soil Erosion and Sediment Control Ordinance as recommended in the Phase II Stormwater Management Plan. Adopt procedures in the Major Land Development and Subdivision Regulations to assure compliance with the Rhode Island Soil Erosion and Sediment Control Handbook and the RI Stormwater Design & Installation Standards Manual, which went into effect January 1, 2011.	• Planning Board	• Town Council when and if necessary (for matters outside of subdivision regulations)		MT

Historical and Archeological Resources					
Action **21**	The Historical Preservation Advisory Board should consider policies and programs to encourage the preservation of historic buildings consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties as interpreted by RIHPHC's Easy Guide to Rehab Standards.	• Historical Preservation Advisory Board	• Planning Board and Town Council support as appropriate		MT
Action **21A**	Investigate the feasibility and benefits of historic district zoning in appropriate neighborhoods	• Historical Preservation Advisory Board and Planning Board	• Town Council		MT
Action **22**	Solicit assistance from the Rhode lsland Historical Preservation and Heritage Commission to acquire funds to study the origins of the Eight Rod Way archeological remains and develop a protection strategy that correlates with the open space preservation effort described in Element 9.	• Historical Preservation Advisory Board, with direct support from Town Administrator and /or Town Planner	• Open Space Commission support necessary for successful completion, Town Administrator to coordinate activities of boards		MT
Action **23**	The Historical Preservation Advisory Board should undertake an initiative to locate and secure copies of colonial era Land Evidence Records that are presently located outside of Tiverton.	• Historical Preservation Advisory Board	• Tiverton Public Library resources may be of some assistance in this effort		LT

ELEMENT 5: LAND USE					
Action **1**	Ensure that the land use goal and specific visions for desirable future development, as stated in this Comprehensive Community Plan, are achievable with the zoning and subdivision regulations, and that these regulations remain relevant through periodic monitoring and review.	• Ultimate responsibility for Zoning Code review and updates lies with Town Council • Planning Board responsible for updating Subdivision Regulations	• Town Planner and Zoning Official identify areas of concern • Planning Board makes recommendations regarding zoning • Ad hoc Land Use Procedure Improvement Committee should continue to meet to identify issues (Town Council should extend time period of mandate)	• Town Administrator, Town Solicitor and Town Clerk (codification) have significant support roles to establish and refine pace and content of updates	ST
Industrial Land Uses					
Action **2a**	Evaluate the development potential of the vacant industrial property in Tiverton and allow uses that are compatible with the environment, the surrounding area and the small town character of Tiverton.	• Town Planner			ST
Action **2b**	Evaluate and consider rezoning the Industrial Zone into lower impact/higher impact zones to minimize conflict between residential and industrial uses	• Town Planner			ST
Action **2c**	Evaluate industrial land within the Stafford Pond Watershed and consider rezoning to ensure uses are compatible with and minimize risks to the drinking water supply.	• Town Planner	• Conservation Commission		ST

Marine & Waterfront-Dependent Uses					
Action **3**	Complete a comprehensive waterfront plan that evaluates long-term options for redevelopment, improved aesthetics and increased public access from the Fall River line in the north to the Nanaquaket Bridge in the south.	• Town Planner	• Harbor Commission		MT
Action **4**	Complete the repair of the Stone Bridge abutment and improvements to Grinnell's Beach	• RI Department of Transportation to complete design and administer construction at Stone Bridge • Town Council and Administrator must allocate resources to meet match requirements of RI Department of Environmental Management recreation development grant to fund Grinnell's Beach project	• Recreation Commission • Harbor Commission • Conservation Commission	• Grinnell's Beach Committee has completed its work but members still involved in crafting final work plan	ST
Action **5**	Review and consider modifying zoning regulations in all shoreline areas to minimize effects of natural hazards, especially flooding and hurricane damage as well as future sea level rise.	• Town Planner	• Harbor Commission • Conservation Commission		ST

Diversification of Town Tax Base					
Action **6**	Support industrial and commercial uses that result in net tax revenue and desirable employment opportunities, and are compatible with the available infrastructure, the desired character and design objectives of the commercial districts, and are consistent with the small town nature of Tiverton.	• Town Council (Business Park) • Planning Board	• Town Planner: tailors efforts to develop park according to community preferences • Town Solicitor: review of restrictive covenants etc. relating to Industrial Park land to assure that objectives of this action item are being met		ST
Action **7**	Evaluate the Village Commercial District to ensure that the unique identity of Tiverton Four Corners is preserved while protecting the ground and surface water supply in the Nonquit Pond Watershed	• Town Planner	• Conservation Commission		ST
Town-Owned Parcels					
Action **8**	Inventory and evaluate town-owned property to determine its best use and value.	• Town Administrator	• Tax Assessor	• Land of low value sale is overdue; Tax Collector should pursue	ST
Utility and Infrastructure					
Action **9**	Allow the expansion of sewer and water utilities into areas of town that are not presently serviced in a manner that is fully supportable and consistent with the desired land uses and densities as identified in this Comprehensive Community Plan.	• Planning Board			ON
Action **10**	Review and consider amending the Watershed Protection Overlay District zoning regulations to provide enhanced protection to ground and surface waters.	• Town Council	• Conservation Commission		ST
Action **11a**	Ensure that development and zoning regulations are consistent with remediation plans and	• Town Planner conducts review			ST

	objectives as outlined in RI DEM approved TMDL plans.				
Action **11b**	Update Tiverton GIS maps to include TMDL locations.	• Town Planner			ST
Action **12a**	Review and consider amending the Zoning Ordinance with regard to development within Public Wellhead Protection Areas.	• Town Planner conducts review	• Conservation Commission		MT
Action **12b**	Update Tiverton GIS Maps to include all RIDEM designated Wellhead Protection Areas.	• Town Planner			ST
Action **13**	Revise applicable local land use regulations to avoid and reduce the impacts of stormwater runoff and to effectively comply with the RI Stormwater Manual's Minimum Standard 1: LID (Low Impact Development) Site Planning and Design Strategies.	• Planning Board	• Town Planner		ST
Action **14**	Review current allowable density regulations in all residential zones and/or zones that allow a residential component and modify as necessary to ensure development is supportable by available water, wastewater and fire suppression capacity.	• Town Council	• Planning Board • Town Planner • Town Solicitor	• Tiverton Waste Water District, North Tiverton Fire District and Stonebridge Fire District all key players in providing information and taking concrete actions to support this action item	ST

Design Standards					
Action **15**	Develop regulations with regard to the siting of utility and accessory structures, so that the design and operation of such utilities are consistent with the aesthetic value and character of the surrounding neighborhood.	• Town Council	• Planning Board reviews language and makes recommendation • Town Planner • Zoning Official • Town Solicitor	• Issue identified as a zoning code matter to be enforced by Code Enforcement office	MT
Action **16**	Consider incorporation of design standards into the Zoning Ordinance as a means to ensure development is consistent with the character and sense of place goals in the ordinance.	• Town Council takes final action	• Planning Board makes recommendation	• Town Planner initiates inquiry	MT
Action **17**	Monitor development trends in mixed commercial zones and consider modifying allowable density calculations to ensure there is adequate infrastructure and services to support projected growth and meet desired commercial to residential ratios.	• Town Council takes final action	• Planning Board makes recommendation	• Town Planner initiates inquiry	ON
Administration, Enforcement and Coordination of Land Use Regulations					
Action **18**	Review zoning enforcement policies and staffing to ensure compliance with the Zoning Ordinance.	• Town Administrator	• Town Council	• Town Solicitor	ON
Action **19**	Consider a process to document pre-existing non-conforming uses especially in cases where significant zoning changes alter the legal status of a property.	• Zoning Official, oversight by / reports to Town Administrator			ST
Action **20**	Review, and modify as necessary, the impact fee ordinance to ensure Tiverton's ability to provide quality services and facilities to town residents.	• Town Council	• Town Administrator • Treasurer • Town Solicitor	• School Department also plays a key role in providing information and analysis	ST

Action **21**	Review and modify as necessary policies regarding developments with homeowners associations with responsibilities for road, utility and stormwater maintenance.	• Planning Board	• Department of Public Works	•	MT
Action 22	Evaluate and consider adopting growth management policies.	• Planning Board • Town Council	• Finance	•	MT
Action 23	Achieve consistency between the Future Land Use Map and Zoning Map	• Planning Board • Town Council	•	•	ST

ELEMENT 6: HOUSING					
Preservation, Conservation and Enhancement Actions					
Action **1**	Require, as part of the local review process, owners and developers of historic properties to first consider and prioritize plans that include the preservation and appropriate restoration of existing historic structures over demolition when drafting and submitting redevelopment plans for local approval. Local regulations should be crafted to encourage owners and developers of historic structures considering redevelopment or renovation to submit plans that are compatible in scale, design, and building materials with the historic property and complementary to surrounding established neighborhoods and landscapes	• Town Council • Planning Board	• Historical Preservation Advisory Committee	• Feasible both through designation of historic district or Subdivision Regulations (or both)	MT
Action **2**	Explore a broader range of permitted uses for large, older residential structures, including bed and breakfast, and offices, which preserve the character of the neighborhood and the architectural integrity of the structure	• Town Council, with recommendation from Planning Board	• Zoning Official and Planner identify targeted areas where alternative designation or use table amendments might be harmonious with existing zoning / settlement pattern	• Model ordinance from other RI communities would be helpful (if existing)	MT
Action **3**	Investigate sources of grant money and other available funds to assist owners in preserving historic and architecturally significant structures	• Historical Preservation Advisory Committee, with support via Town website		• Grants available only to private parties can be advertised	ST
Action **4**	Annually review home sales statistics, and modify as necessary, development tools and Zoning regulations to ensure community and economic viability across all of	• Town Council and/or Planning Board	• Town Planner • Economic Development Commission		ST

	Tiverton's diverse neighborhoods and housing stock				
Mixture of Housing Types					
Action **5**	Strengthen and clarify Zoning provisions that allow multi-family dwellings to encourage townhouses or condominium-style developments as an alternative to single-family developments in certain districts, while retaining supportable density, as well as scale and character of the surrounding neighborhood.	• Town Council	• Town Planner, advising Planning Board, which must decide recommendations to make to Town Council		ON
Action **6**	Continue to evaluate zoning provisions that allow mixed-use residential with supportable density to ensure that providing a residential component in commercial development where appropriate is encouraged.	• Town Planner			ON
Affordable Housing Plan					
Action **7**	Retain and improve through amendments the inclusionary zoning provision of the Zoning Ordinance to encourage the creation of low-and-moderate income housing units. Continue to require that all single-family developments present a plan that sets aside 20% of the units as affordable and amend inclusionary zoning set aside for multi-family developments to be a minimum of 20% rather than 30% as affordable. Allow options of fee-in-lieu, off-site construction, and rehabilitation of low-	• Administrative Officer to the Planning Board • Town Council	• Planning Board • Town Planner	•	ST

	and-moderate income units when providing units on-site is less feasible or desirable.				
Action **8**	Encourage the development of multi-family and mixed-use units in designated zones and incentivize the inclusion of low-and-moderate income housing units.	• Town Planner	• Zoning Official	• This action item presumes a proactive stance, a desired but atypical approach for a small, busy department	ON
Action **9**	Continue to support the development of specialized residential compounds, such as art and agricultural colonies, which could provide affordable housing options in the more rural portions of Tiverton.	• Town Planner	• Zoning Official	• This action item presumes a proactive stance, a desired but atypical approach for a small, busy department	ON
Action **10**	Explore establishing an Affordable Housing Commission to monitor and actively promote the development of affordable housing units in Tiverton	• Town Council			ST

ELEMENT 7: SERVICES AND FACILITIES					
Action **1**	Develop and annually update a five-year facilities and capital equipment budget for the various town departments and ancillary services, including public safety, schools, library, water, public sewage and landfill management, which might be realized through taxes, fees, bond issuance and State and Federal funding, within the Town's financial capabilities. The plan should also consider adjustments to the existing Development Impact Fee.	• Town Council • Town Administrator	• Planning Board • Department heads		ST
Action 2	Develop a Municipal Facilities Study	• Town Administrator	• Town Council		ST
Action 3	Consider developing a report on the operational readiness of fire protection and law enforcement services and resources in Tiverton including personnel training, department facilities and equipment,	• Town Administrator • Town Council	• Fire Department • Police Department		ST
Action **4**	Analyze the risk posed by Tiverton's inaccessible forest areas, in coordination with the RIDEM Division of Forestry, the Tiverton Open Space Commission, and the Tiverton Land Trust and develop an appropriate fire control plan.	• Fire Department Chief	• Open Space Commission	• Issue identified and discussed as part of Hazard Mitigation Planning process	ST
Action **5**	Provide a broad range of library services for all age groups and cultural-ethnic backgrounds, which maximizes the potential of the new Tiverton Public Library. Retain Union Library as an important program facility and a vital component in the architectural setting of	• Library Board of Trustees	• Tiverton Public Library staff		ON

	historic Tiverton Four Corners. Develop a plan for the long-term maintenance of the new Tiverton Public Library building and surrounding grounds.				
Action **6**	Establish a 'Friends of the Senior Center' group to organize development and construction of a new facility.	• Town Council	• Town Administrator • Senior Center Director		LT
Action **7**	The Cemetery Commission should address land availability and financial needs to ensure successful operation of the Pocasset Hill Cemetery and other burial lands for the foreseeable future.	• Cemetery Commission			ON
Action **8**	Undertake a comprehensive study of current and future potable water needs in all of Tiverton to determine what constraints exist and how future development and build-out will impact water supplies.	• North Tiverton Fire District • Stonebridge Fire District	• Town Planner	• Fire Chief has a direct role in planning fire suppression capacity and capabilities	ST
Action **9**	Work with Tiverton's State Legislative Delegation to investigate options and advocate for improvements in the delivery of public water services in Tiverton including Town oversight. Increase communication and coordination between the water districts and the Town.	• Town Council • Town Administrator	• North Tiverton Fire District • Stonebridge Fire District		MT

Action **10**	Develop a town-wide Drought Management Strategy outlining a joint effort between the Town of Tiverton and the North Tiverton and Stone Bridge Fire Districts.	• Emergency Management Director (Fire Chief)	• North Tiverton Fire District • Stonebridge Fire District	• Issue identified and discussed as part of Hazard Mitigation Planning process	ST
Action **11**	Continue the work of the Tiverton Waste Water District (TWWD) to implement a phased expansion of sewers in the north end of the town, especially the Bay Street area, the Riverside Drive area, the Robert Gray area and the area north of Judson Street, so as to address the environmental challenges resulting from failed cesspools and outdated septic systems. The Town should encourage dialogue and exercise oversight to ensure that sewer expansion is done in a manner consistent with Town goals, policies and programs including those listed in this Comprehensive Plan.	• Tiverton Waste Water District		• OWTS inspection program (Town funded, administered by TWWD) requires adequate funding to support cesspool phase out and sewer expansion efforts	ON
Action **12**	New roadways or existing roadways which are to be completely reconstructed should provide for the safety of all users of all ages and abilities including pedestrians, bicyclists, transit users and motorists. Sidewalks are strongly encouraged along roadways where pedestrian use is sufficient. Bicycle lanes and crosswalks are also encouraged where use patterns establish a clear need.	• Planning Board			ON
Action **13**	Execute the closing, capping and monitoring of the municipal solid waste landfill by seeking additional funding sources to cover the cost of	• Town Administrator • Department of Public Works Director	• Landfill and Recycling Commission		ST

	closure. Study alternative methods of solid waste disposal.				
Action **14**	Maintain the Town's GIS (Geographic Information System) so that it accurately reflects existing data and employs the most current software available.	• Town Planner			ST
Action 15	Conduct an energy audit of municipal facilities and operations	• Town Administrator	All Departments		MT
Action 16	Provide education and incentives for residents to increase recycling efforts and compost food scraps	• Department of Public Works	Town Council		ST
Action 17	Update the Town's Onsite Wastewater Treatment Systems (OWTS) Regulations to address the latest methods and technologies and to be consistent with State regulations.	• Planning Board	Town Council		ST
Action 18	Publish a guide to municipal services and an annual report for taxpayers.	• Town Administrator			ON

ELEMENT 8: CIRCULATION					
Roadway Maintenance					
Action **1a**	All roads should be built only in accordance with the standards of a public road.	• Planning Board	• Department of Public Works • Consulting Engineer (for the Town)	• Planning Board policy regarding release of surety is a key element the Town must improve upon to meet this action item	ON
Action **1b**	Consider adoption of the Rights of Way Design Guidelines in the Commercial Form-Based Code as additional design standards for all roadway improvements, including RIDOT projects.	• Town Council	• Planning Board • Town Planner	• Proposal must be fully vetted before presentation to Town Council for final action long-term planning elements must be fully documented	ST
Action **1c**	Continue with an annual pavement management program as recently adopted.	• Department of Public Works			ON
Action **1d**	Utilize the Tiverton Police Department accident data statistics, monitor areas where accident frequency is high and increasing. Consider design changes or improvements to mitigate accidents and improve safety.	• Department of Public Works	• Police Department		ON
Balanced Multi-Modal Transit Planning					
Action **2a**	Develop a Complete Streets Plan	• Town Planner			MT
Action **2b**	Maintain and install sidewalks in high priority areas, defined as those areas within schools on major roads, within commercial districts, and in other areas where pedestrian activity is to be encouraged.	• Department of Public Works • Planning Board	• Administrative Officer • Town Planner	• Maintaining existing sidewalks is the responsibility of DPW • Requirement of sidewalks in new development governed by Section 23-59 of the subdivision regulations;	LT

				Planning Board should mandate sidewalks as required by policy, without reference to cost	
Action 2c	Utilize the railroad corridor as a bicycling/walking greenway and as an off-road, multi-use path for safe intermodal transportation, while maintaining the option to re-develop rail service along the corridor.	• Town Planner • Consulting engineer	• Department of Public Works	•	MT
Emphasize Design Elements in Circulation Planning					
Action **3a**	Apply access management tools to site plan review for commercial development and residential subdivision to reduce congestion and improve safety.	• Planning Board	• Town Planner		ST
Action **3b**	Continue to set high standards for design of parking facilities including landscaping, buffering, handicapped accessibility, pedestrian walkways and lighting.	• Planning Board	• Administrative Officer • Town Planner	• Enforcement is a necessary component of this action plan	ON
Action **3c**	Coordinate with state and local economic development agencies to develop a design plan for infrastructure improvements needed to sustain the increase in traffic generated by the development of the Business Park.	• Town Planner • Consulting engineer			ST
Transportation Improvement Program (TIP)					
Action **4a**	Submit eligible projects for consideration in the State Transportation Improvement Program, or other sources of Federal	• Town Council	• Planning Board • Town Administrator • Town Planner • Department of Public Works	• The final TIP list is approved by the Town Council based upon recommendations of all other	ON

	and State funding, in order to leverage local funding.		• Tiverton Police Department • Tiverton Fire Department	noted parties; this is a routine process of local government	
Action **4b**	Maintain and update local priorities for local pedestrian, bicycle and roadway improvements based on the adopted TIP. These priorities should be submitted for consideration in the State's biennial TIP.	• Town Planner • Department of Public Works			ON
Action 4c	Develop zoning and land development standards requiring Rights of Way Design Guidelines in the Commercial Form-Based Code Zoning as additional design standards for all roadway improvements.	• Planning Board • Town Planner			

ELEMENT 9: OPEN SPACE					
Action **1**	Pursue the preservation of open space in accordance with the criteria described above, and in coordination with the Tiverton Land Trust, The Nature Conservancy of Rhode Island, and the RI Department of Environmental Protection.	• Open Space Commission	• Town Planner • Town Administrator	• Officials with breaking information must keep Open Space in the loop	ON
Action **2**	The Open Space Commission shall work with community groups and the Recreation Commission to identify sources of funding, such as Community Development Block Grants, for acquiring open space in the more urbanized areas of Tiverton, to include the idea of establishing "pocket parks" on small parcels to provide neighborhood green spaces.	• Open Space Commission	• Recreation Commission • Town Planner		ST
Action **3**	Establish procedures in the subdivision review process to include a written report from the Open Space Commission regarding proposed open space areas of subdivision plans. Their report will include a review of the proposed open space area and its management plan.	• Planning Board	• Town Planner • Open Space Commission • Conservation Commission		ST
Action **4**	Encourage and assist owners of farmland in acquiring funding to preserve land that would remain in agricultural use, to include acquisition of agricultural easements and promoting use of the Farm, Forest and Open Space Program that provides tax relief to land owners who wish to keep their open land undeveloped.	• Town Planner • Tax Assessor			ON

Action **5**	Develop a long-term strategy for the coordinated management of all preserved open space land in the town, to include the possibility of establishing a "conservation land manager" position whose budget could be jointly underwritten by all the owners of protected open space.	• Town Council • Town Administrator	• Open Space Commission		MT
Action **6**	In cooperation with Tiverton Land Trust, support the development of Highland Woods to enhance the value of Fort Barton as a destination historic site, and Fort Barton Woods as a visitor-friendly natural area.	• Open Space Commission • Historical Preservation Advisory Board	• Town Administrator • Town Council		ON
Coastal Resources					
Action **7**	Develop a plan to identify public rights-of-way to the waterfront and erect markers or signage that clearly marks the public right-of-way and prevents abutting property owners from closing access.	• Harbor Commission	• Town Administrator • Town Council		ON
Action **8**	Continue monitoring the health of Tiverton's coastal and freshwater bodies by sustained funding of water sampling and analysis as part of the URI Watershed Watch, or similar program.	• Conservation Commission • Harbor Commission	• Town Administrator • Town Council • Budget Committee		ON
Action **9**	A task force should be appointed to begin the development of a strategic plan that prepares the town for future rising sea levels.	• Town Council	• Town Planner • Harbor Commission • Zoning Official (CFM)		ST
Action **10**	Include in the planning for the Stone Bridge – Grinnell's Beach Park complex the possibility of a public pier for free temporary boat dockage.	• Town Council • Town Administrator	• Town Planner • Harbor Commission		ST

Action **11**	Explore options for the installation of a new public boat ramp for access to Mt. Hope Bay.	• Engineering consultant • Harbor Commission	• Town Planner		MT
Recreation					
Action **12**	Prepare a plan of action and timeline for completing a revision of the Recreation, Conservation and Open Space Plan.	• Town Planner	• Recreation Commission • Open Space Commission		ST
Action **13**	Develop additional capacity by acquiring and/or improving land and developing facilities to meet the active recreation needs of Tiverton residents, with priority given to constructing athletic fields and associated facilities on land donated by the Stone Bridge Fire District.	• Town Council	• Town Administrator • Recreation Commission		MT
Action **14**	Pursue the planning, funding, and development of Tiverton Bicentennial Green, Grinnell's Beach and the Stone Bridge abutment to ensure high esthetic standards and maximum public benefit.	• Town Council	• Town Administrator • Town Planner • Grinnell's Beach Committee	• Grinnell's Beach Committee includes representation from all boards and commissions with subject matter interest	ST
Action **15**	Publish a town-wide map showing recreational and open space resources, picnic areas, trails and waterfront rights of way and CRMC-designated rights of way.	• Town Planner	• Open Space Commission • Recreation Commission	• Town webmaster to put downloadable copies on the Town website.	ST

ELEMENT 10: ECONOMIC DEVELOPMENT					
Action **1**	Determine high priority areas in town for business development/redevelopment based on identified commercial town centers such as Main Road in North Tiverton and Bliss Four Corners in East Tiverton.	• Town Planner		•	ST
Action **2**	Support an appropriate data-based impact assessment for proposed commercial, industrial, and mixed-use developments to determine the impact on the Town's tax revenue versus cost of Town services.	• Economic Development Commission			ON
Action **3**	Actively pursue enterprises with the best potential for positive tax revenue, creation of job opportunities and sustainable environmental impact. Firms may be from the traditional sectors of the economy that currently exist in Tiverton or from growth industries, such as information technology, biotechnology, medical technology, health services, defense, cyber-security and tourism.	• Economic Development Commission	•	•	ON
Action **4**	Work with Twin River-Tiverton, LLC to provide a thorough and orderly review of the development plans for the casino gaming facility to ensure consistency with the November 9, 2015 proposal, consistency with the Comprehensive Plan, and to promote timely construction on the project, so that the Town can begin to participate in revenues generated from	• Planning Board	• Town Planner • Building/Zoning Official		ST

	operations projected to begin in July 2018.				
Action **5**	Enhance commercial prosperity in Tiverton through functional collaboration between the Town Planner, Planning Board, Economic Development Commission, Newport County Chamber of Commerce, Newport Tourism Agency and the State Economic Development Agency. Establish a procedure to notify appropriate commissions when new a business requests information about opening in Tiverton.	• Town Planner • Economic Development Commission	• Town Administrator		ON
Action **6**	Explore the possibility of Pop-ups, incubators, and shared office space developments to assist with start-up small business opportunities.	• Economic Development Commission	• • Town Planner	•	MT
Action **7**	Continue to work with the State to implement the Commerce RI LEAN program and e-permitting to help new business owners navigate and expedite the regulatory processes of the Town and State.	• Town Clerk • Building Official		•	ST
Action **8**	Facilitate the formation of small business district associations to provide mutual support.	• Economic Development Commission	•	•	LT
Action **9**	Partner with state and local agencies including Commerce RI and Newport County Chamber of Commerce to assist with marketing available space to maximize the economic opportunities of the Tiverton Business Park.	• • Town Administrator	• Town Planner • Economic Development Commission		ON

Action **10**	Partner with the Tiverton Arts Council, Discover Newport, and the Newport Chamber of Commerce on projects encouraging destination tourism so that Tiverton, with its active arts scene and unique history, can promote the development of the arts as another form of economic activity. Create a tourism map of Tiverton.	• • Economic Development Commission	•		ON
Action **11**	Promote expansion of agricultural activities in the Town by partnering with relevant agencies such as URI, the R.I. Department of Environmental Management (DEM) the Christmas Tree Growers Association, Eastern Rhode Island Conservation District Office, etc.	• Conservation Commission	• Tax Assessor		ON
Action **12**	Continue the use of tax alternatives/incentives that encourage preservation of agricultural land for farming.	• Tax Assessor			ON
Action **13**	Complete a waterfront plan to promote utilization of Tiverton's waterfront for marine-dependent uses that would enhance the local economy while maintaining the Town's maritime and residential character.	• Town Planner	• Harbor Commission		ST
Action **14**	Establish a database of vacant commercial and industrial properties throughout the Town.	• Economic Development Commission	•		ST
Action **15**	Partner with local business owners to identify barriers to expansion and possible solutions to support growth resulting in increased tax revenue for the Town.	• Economic Development Commission			ST

Action **16**	Perform a comprehensive analysis of Tiverton's real estate tax income, to evaluate its overall effectiveness as the Town's major revenue source. Evaluate the effectiveness of tax exemptions to determine if they are accomplishing their intended purposes, and whether the purpose is worth the loss of revenue to the Town.	• Town Administrator	Tax Assessor		MT
Action **17**	Perform a comprehensive analysis of Tiverton's fiscal health and potential future earnings.	• Town Administrator			ST
Action **18**	Implement a streetscape improvement program to promote attractive commercial districts with cohesive public amenities such as sidewalks, lighting, benches and receptacles.	• Town Planner			LT

APPENDICES

Appendix A:	Tiverton Hazard Mitigation Plan, 2017
Appendix B:	Statewide Planning Program Factsheets for Tiverton on Recent Sea Level Rise Studies
Appendix C:	Executive Summary of the Water Supply System Management Plan for the North Tiverton Fire District (October 2014)
Appendix D:	Executive Summary of the Water Supply System Management Plan for Stone Bridge Fire District (September 2009)

Appendices are provided for reference only.

APRIL 2017

Town of

Tiverton, RI

Multi-Hazard Mitigation Plan Update

Adopted June 2017

CDR MAGUIRE

TOWN OF TIVERTON, RHODE ISLAND
TOWN CLERK'S OFFICE

Nancy L. Mello
Town Clerk

November 14, 2017

On Monday, June 12, 2017 the Tiverton Town Council held a regular Town Council meeting. Councilor Edwards motioned, seconded by Councilor Lebeau to Approve the Acceptance and Adoption of the Hazard Mitigation Plan rewrite as approved by RIEMA and FEMA Region 1 subject to any Town Personnel changes that may be reflected in the document. The motion passed unanimously.

A true attest copy:

Nancy L. Mello,
Town Clerk

343 Highland Road · Tiverton, Rhode Island 02878 · Phone: (401) 625-6703 · Fax: (401) 625-6705

TOWN OF TIVERTON, RHODE ISLAND
TOWN COUNCIL

TOWN COUNCIL RESOLUTION
"ADOPTION OF THE 2017 TOWN OF TIVERTON NATURAL HAZARD MITIGATION PLAN"

WHEREAS, the Town of Tiverton recognizes the threat natural hazards pose to people and property within our community; and

WHEREAS, the Town of Tiverton has prepared a Multi-Hazards Mitigation Plan, hereby known as the "2017 Tiverton Multi- Hazard Mitigation Plan" in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the 2017 Plan identifies mitigation goals and guidelines for short-term and long-term actions to reduce or eliminate risk to people and property in Tiverton from impacts of future hazards and disasters; and

WHEREAS, the Plan serves as guidance to help the Town of Tiverton reduce their losses and vulnerabilities relating to natural hazards; and.

WHEREAS, adoption by the Town Council demonstrates their commitment to hazard mitigation and achieving goals outlined in the 2017 Tiverton Natural Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED: that the Town of Tiverton Town Council accepted and adopted the 2017 Town of Tiverton Natural Hazard Mitigation Plan at their regularly scheduled Town Council Meeting on June 12, 2017.

By Order of the Tiverton Town Council
January 22, 2018

Denise M deMedeiros
Denise deMedeiros, Town Council President

Acknowledgements

The Town of Tiverton commends the efforts of its Hazard Mitigation Committee in completing this important plan. The effort is sure to result in the protection of life and property and special thanks are extended to Committee members:

Town Administrator

Paul McGreevy
Matthew Wojcik (left in 2017)

Business Owner- Fred Almeida

Public Works Director- William Anderson /Stephen Berlucchi (left in 2016)

Police Chief- Thomas Blakey

Code Enforcement- Neil Hall

Fire Chief/EMA Director- Robert Lloyd

School Department- Mike Mendes

Town Planner- Marc Rousseau (left in 2017)

RI Emergency Management Agency- Jessica Henry (left in 2017)

Deputy EMA Director- Bill Tavares

2016/7 Tiverton Town Council

Joan Chabot, President

Denise deMedeiros, Vice President

John Edwards, V

Patricia Hilton

Randy Lebeau

Joseph Perry, Jr.

Christine Ryan

Tiverton Town Hall
343 Highland Road
Tiverton, RI 02878

Executive Summary

This Multi-Hazard Mitigation Plan (HMP) is a product of the Tiverton Hazard Mitigation Committee (THMC). It has been approved by the Tiverton Town Council, the Rhode Island Emergency Management Agency, and the Federal Emergency Management Agency in accordance with the Disaster Mitigation Act of 2000.

The THMC's overview of past natural hazard occurrences verifies that the Town is vulnerable to diverse events including blizzards, floods and hurricanes. The discussion puts the likelihood of these events into historical perspective and recognizes that although the probability of thunderstorm, high wind and lightning events may be higher; the intensity and potential impacts from less likely events such as hurricanes and earthquakes can be far greater.

The risk assessment portion of the plan confirms that the Town has much to lose from these events. The four highest ranking risks identified include flood prone drainage systems, potential dam failures, damage to care facilities, and critical municipal hazard response facilities.

To address these risks the HMP put forth a clear mission, a distinct set of goals and 25 specific mitigation and non-mitigation actions. The Town's hazard mitigation mission is to protect and enhance the quality of life, property and resources by identifying areas at risk and implementing appropriate mitigation actions. The specific goals include protecting the lives and property of the Town of Tiverton's residents, protecting its critical facilities and infrastructure, and protect the town's cultural, historical, natural, and economic resources. Each of the subsequent mitigation actions for achieving these goals summarizes specific problems and possible solutions, details the primary tasks to be undertaken, identifies an appropriate lead and anticipated funding sources.

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Chapter 1: Introduction

1.1 Plan Purpose

The purpose of this MultiHazard Mitigation Plan is to set forth guidelines of short-term and long-term actions, which will reduce the actual or potential loss of life or property from hazardous events such as flooding, severe winter storms/extreme cold, lightning, hurricanes/Nor'easters, drought/extreme heat, dam failure, brushfires, tornadoes, and earthquakes. This plan was constructed using input from a variety of municipal and private stakeholders and the general public involved in the planning process. This plan serves as guidance to help the Town reduce their losses and vulnerabilities relating to natural hazards.

1.2 Hazard Mitigation and its Benefits

Hazard mitigation planning is advance action taken to identify specific areas that are vulnerable to natural and man-made hazards within a town, and seeks to permanently reduce or eliminate the long-term risk to human life and property. It coordinates available resources and identifies community policies, actions, and tools for implementation that will reduce risk and the potential for future losses town-wide. The process of natural hazard mitigation planning sets clear goals, identifies appropriate actions, and produces an effective mitigation strategy that can be updated and revised to keep the plan current.

States and communities across the country are slowly, but increasingly, realizing that simply responding to natural disasters, without addressing ways to minimize their potential effect, is no longer an adequate role for government. Striving to prevent unnecessary damage from natural disasters through proactive planning that characterizes the hazard, assesses the community's vulnerability, and designs appropriate land-use policies and building code requirements is a more effective and fiscally sound approach to achieving public safety goals related to natural hazards.[1]

In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest federal legislation to improve this planning process. It reinforces the importance of natural hazard mitigation planning and establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP) or other annual funding opportunities. Section 322 of the Act specifically addresses mitigation planning at the state and municipal levels of government. It identifies new requirements that allow HMGP funds to be used for planning activities. As a result of this Act, states and communities must now have an approved natural hazard mitigation plan in place prior to receiving post-disaster HMGP funds. In the event of a natural disaster; municipalities that do not have an approved natural hazard mitigation plan will not be eligible to receive post-disaster HMGP funding.

The purpose of this plan is to recommend actions and policies for the Town of Tiverton to minimize the social and economic loss of hardships resulting from natural hazards. These hardships include the loss of life, destruction of property, damage to crucial infrastructure and critical facilities, loss/interruption of jobs, loss/damage to businesses, and loss/damage to significant historical structures. Hazardous events that affect Tiverton include severe weather, hurricanes, conflagration, floods, and earthquakes. To protect present and future structures, infrastructure and assets and to minimize the social and economic hardships, the Town of Tiverton implements the following general actions and policies:

- Revisions to the town's comprehensive plan
- Incorporation of hazard mitigation into the site plan review process
- State and local building code review
- Public education/outreach
- Post-disaster recovery opportunities/strategies

The Town of Tiverton also recognizes the important benefits associated with hazard mitigation, its interaction with municipal land use and infrastructure planning, and the need for a comprehensive planning approach, which accommodates these interdependencies. The Town's state-approved comprehensive community plan (2009) addresses natural and cultural resources, land use, housing, services and facilities, traffic circulation, open space, economic development, and future development trends.[1] While the entire hazard mitigation plan will not be formally incorporated into the Comprehensive Plan, certain, applicable mitigation actions will be incorporated during the update process. The Town recognizes coordination between the HMP and the Comprehensive Plan to be of benefit because it will ensure a unified planning approach into the future and ensure that risk reduction remains a critical element of municipal planning. This is also in alignment with current goals of Rhode Island Statewide Planning.

A second benefit of hazard mitigation allows for a careful selection of risk reduction actions through an enhanced collaborative network of stakeholders whose interests might be affected by hazard losses. Working side by side with this broad range of stakeholders can forge partnerships that pool skills, expertise, and experience to achieve a common goal. Proceeding in this manner will help the Town ensure that the most appropriate and equitable mitigation projects are undertaken.

A third benefit of hazard mitigation would be endorsing a proactive planning approach focused on sustainability, whereby the Town of Tiverton could minimize the social and economic hardships that have resulted from the occurrence of previous natural disasters. These social and economic hardships include: the loss of life, destruction of property, interruption of jobs, damage to businesses, and the loss of historically significant structures and facilities. This proactive planning approach would look for ways to combine policies, programs, and design solutions to bring about multiple objectives and seek to address and integrate social and environmental concerns. Linking sustainability and loss reduction to other goals can provide a framework within the state and local governments that will bring the comprehensive planning process full circle.

Lastly, the participation in a hazard mitigation planning process will establish funding priorities. The formal adoption and implementation of this plan will allow the Town of Tiverton and its residents to become more involved in several programs offered by the Federal Emergency Management Agency (FEMA) including: the Community Rating System Program (CRS); the Pre-Disaster Mitigation Program (PDM); Flood Mitigation Assistance Program (FMA); and the Hazard Mitigation Grant Program (HMGP). Money spent today on preventative measures can significantly reduce the cost of post-disaster cleanup tomorrow.

1.3 Goals

The Town of Tiverton has established the following mission statement:

"Preserve and enhance the quality of life, property, and resources by identifying areas at risk from natural hazards and implementing priority hazard mitigation strategies designed to protect Tiverton's population, infrastructure, historical, cultural, natural and economic resources".

The Town of Tiverton has established the following mitigation goals:

- Implement actions which protect the lives and property of the Town of Tiverton's residents
- Implement actions which protect the Town of Tiverton's critical facilities and infrastructure
- Implement actions which protect the Town of Tiverton's cultural, historical, natural and economic resources

[1] Town of Tiverton, RI, Comprehensive Community Plan, Amended June 22, 2009.

1.4 Background

The land, which comprises the present day Town of Tiverton, was acquired from Native Americans in two separate purchase activities. These were the Punkatest Purchase of 1631 and the Pocasset Purchase of 1676. Tiverton was incorporated by the Province of Massachusetts in 1694 and annexed by royal decree to Newport County in the colony of Rhode Island in February 1746.

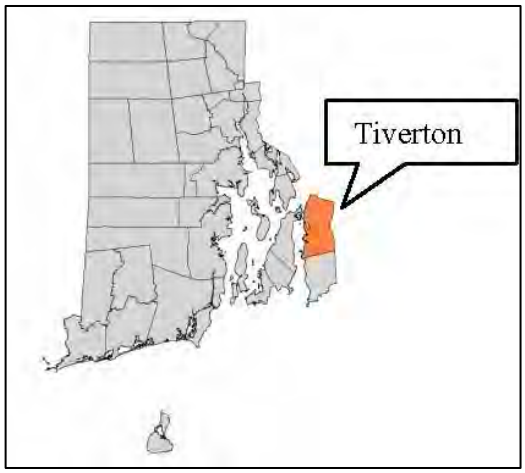


Figure 1: Location

The Town of Tiverton occupying 35.5 square miles, is located in Newport County, in the southeastern section of Rhode Island. Tiverton is bordered by the city of Fall River, Massachusetts to the north, by the town of Westport, Massachusetts to the east, by the town of Little Compton, Rhode Island to the south, and by the Sakonnet River to the west. The Town of Portsmouth, Rhode Island lies across the Sakonnet River.

More than anything else, the abundance of natural resources and the town's cultural roots in its past characterize what is special about Tiverton. Farms, broad open spaces, forests and miles of scenic roadways in the south, and the rich ethnic and architectural heritage in the north give the town it's fascinating diversity. Along the west side lies the beauty of an unspoiled coastline, treed neighborhoods, while low lying heather, bogs and swamps alternate with farms and crossroads hamlets in the eastern portion of the town.

The Town of Tiverton has a population of roughly 15,813 residents (2010 Census) with a 48.5/51.5 proportion of male to female. The median age of our residents is 46.2. Approximately 8% of the population is over 65. According to the 2013 US Census Bureau the town is predominantly white 96.5%, Black or African Americans make up 1 % of the population. English is spoken in nearly 100% of the homes.

According to the 2010 U.S. Census Bureau, the town has approximately 7,446 housing units with an occupancy rate of 90%. 18% of the homes were built before 1939. Most are of wood construction. The median income for a family household is $73,438. Six percent of the population has income in the poverty level.

In general, the majority of an evacuated population (87%) do not use public shelters.[2] Evacuees will likely seek shelter by making other arrangements such as staying with family or friends, particularly if the event is forecasted or predicted to occur. The same trend is anticipated in Tiverton. Currently the American Red Cross Shelter in Tiverton is the Tiverton Middle School.

The Town of Tiverton is a blended community with agricultural, residential, commercial and industrial areas. Natural disasters could have a devastating effect on the whole community or one particular neighborhood. Homes are nestled among forests, along rivers, next to businesses. The total gross assessed value of real and tangible property in the Town of Tiverton as of 2015 is $1,920,290,000 dollars.

Properties that are agricultural, forest and brushland, and wetlands account for 70% of the total land area. Approximately 3,918 acres are designated as residential, and 756 acres are for commercial industry as well as

[2] Mileti, Dennis S., John H. Sorensen and Paul W. O'Brien. 1992. "Toward an Explanation of Mass Care Shelter Use in Evacuations." International Journal of Mass Emergencies and Disasters 10 (1): 25-42.

utility/transportation/waste disposal. "A 2006 buildout analysis projected that an additional 3,681 dwelling units could be developed as-of-right in Tiverton based on the land available for development and the zoning in place as of 2005."[3]

According to the 2009 Comprehensive Plan[4], the town has approximately 450 mobile or manufactured homes in Tiverton. The newest development, Countryview Estates is in northeastern Tiverton. Additional manufactured home developments include Dadson Mobile Estate (102 units), Four Seasons Mobile Home Association (38 units), and Heritage Home Park Co-Op (37 units). None are located in a regulatory flood zone.

The town has several group homes which provide 50 beds that also count as low and moderate income units. Staff live full time in these residences. The Tiverton Housing Authority also operates 45 housing units for low income elderly people. The Cumberland Affordable Housing Corporation has 51 apartments for very low income elderly people on Hancock Street. SK Properties owns and manages 23 units for the elderly, disabled, and handicapped neat Stafford Pond. Church Community Housing Corporation is a non-profit housing organization that has nearly 20 units for low and moderate income individuals.[5]

Our Government

Tiverton is governed by an elected Town Council with seven (7) members, elected every two years. Day to day operation of the town is delegated to an appointed Town Administrator who reports to the Town Council.

Public Safety

Law enforcement and protection of persons and property is provided by the Police Department's 30-member enforcement team, supplemented by 12 civilian employees, including the animal control officer. The Police Department operates a twenty-four hour patrol with three officers per shift. Average response time to an emergency dispatched call is approximately four minutes throughout town.

The Fire Department is operating its three fire stations with a staff of 28 full-time firefighters, plus the Fire Chief, Fire Marshall, and a civilian secretary. The town no longer has the assistance of volunteer firefighters and is currently increasing recruitment efforts for permanent staff. The Fire Chief currently serves as the Emergency Management Director, appointed by the Town Administrator and supported by the Deputy Emergency Management Director.

Roads and Bridges

There are approximately 156 miles of roads in Tiverton[6] and 3 major bridges of concern (Pond Bridge Road Bridge, Route 24/138 Bridge, and Nanaquaket Road Bridge).

Swales and culverts are the primary historical means for stormwater control in Tiverton. More developed areas include systems with catch basins, connecting pipes, and detention posts to control stormwater runoff.

Utilities

Stafford pond is the primary source of the drinking water supply for Tiverton, distributed by the town's two water districts. Some of the Town's drinking water also comes from Fall River. Tiverton residents are serviced by both public

[3] Town of Tiverton, RI, Comprehensive Community Plan, Amended June 22, 2009.
[4] As of the date this hazard mitigation plan is submitted for review, the 2017 Comprehensive Plan is still in draft form.
[5] The Comprehensive Community Plan, June 2009, Tiverton, RI
[6] Rhode Island GIS, January 2016

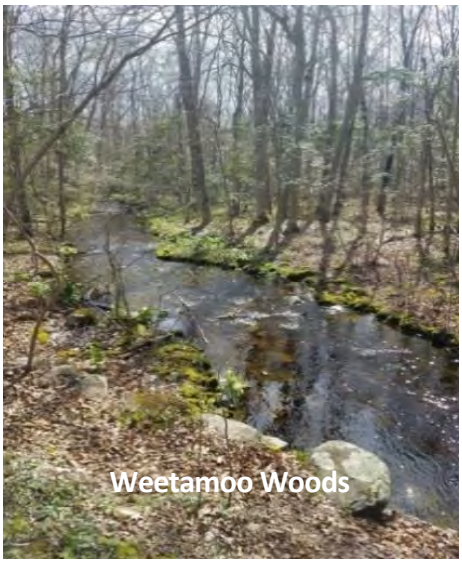
water and private wells, depending on location. "Although all of south Tiverton and most sparsely populated areas in the north derive their water from wells, most homes and businesses in the more densely settled northeast portion of town are connected to public water. Two water systems serve the town, the Stone Bridge Fire District and the North Tiverton Fire District."[7] Both districts maintain their own distribution system and update their management plans every five years as required by the Rhode Island Water Resources Board.

Approximately 94% of the homes and businesses in Tiverton rely on on-site sewage disposal systems, with an estimated 6,400 separate septic systems, half built before 1970, which implies outdated design concepts. Disposal of wastewater through inadequately maintained or failing on-site disposal systems can adversely affect the Town's drinking water supply. The remaining 6% of homes and businesses are connected to a wastewater collections system operated by the town which discharges to the City of Fall River, Massachusetts sewage treatment facility.[8] These connections are north of Bulgarmarsh Road.

Forest and Open Space

Tiverton is known for its rich abundance of natural areas. The town is mostly a forest community with over 50% of the land area dedicated to forests and wetlands. The Rhode Island Natural Heritage Program has identified the following areas as rare species habitats: Fogland Marsh, Seapowet Marsh, Sin and Flesh Brook, Weetamoo Woods and the Pardon Gray Preserve, Stafford Pond.[9]

Weetamoo Woods (541 acres) is the largest contiguous forest area in Tiverton. There are trails that traverse the southern end of Weetamoo Woods but emergency access into some of the dense interior forest is challenging.



[7] The Comprehensive Community Plan, June 2009, Tiverton, RI
[8] The Comprehensive Community Plan, June 2009, Tiverton, RI
[9] The Comprehensive Community Plan, June 2009, Tiverton, RI

Chapter 2: Planning Process

2.1 Overview

The Town of Tiverton initiated the hazard mitigation planning effort in February 2015 at the recommendation of the Tiverton Emergency Management Director. A plan update had been drafted prior to 2015 but was not submitted to FEMA for approval. The draft sat dormant until 2014 when the Town hired a consultant to resume planning efforts. This Hazard Mitigation Plan is the result of a dedicated group of individuals working for six (6) months identifying natural hazards and proposing ways to improve Tiverton's resiliency.

2.2 Tiverton Hazard Mitigation Committee

This Hazard Mitigation Plan (HMP) is a product of the Tiverton Hazard Mitigation Planning Committee (THMC). Committee members include:

Town Administrator- Matthew Wojcik

Business Owner- Fred Almeida*

Public Works Director- Stephen Berlucchi (left in 2016)

Police Chief- Thomas Blakey

Code Enforcement- Neil Hall

Fire Chief/EMA Director- Robert Lloyd

School Department- Mike Mendes*

Town Planner- Marc Rousseau

RI Emergency Management Agency- Jessica (Stimson) Henry

Deputy EMA Director- Bill Tavares*

*denotes Tiverton resident

2.3 The Planning Process

This 2017 HMP is the result of a 7 step process that was initiated in August 2015 with the establishment of the THMC by invitation from the Town Emergency Management Director. It took nearly 6 months for the Town to hire a contractor to assist with this planning effort. Step two started the plan development process and included the first meeting of the THMC on February 19, 2016. The Town's previous plan was dated 2005, so the first meeting focused on re-ranking hazards and discussing the process for updating the plan. The THMC met regularly at the Tiverton Fire Station on Main Road and completed individual assignments between the meetings to help further the efficacy of the times everyone was together. The resulting process is summarized below for convenience and detailed procedural methodologies are presented within the plan's respective chapters.

Step three began with the THMC meeting on March 20, 2016. After reviewing the hazards of concerns, the THMC identified critical infrastructure and community assets within the town. Twelve areas of vulnerability were identified: Flood prone drainage systems, bridges, wastewater, water, electrical facilities, dams, critical municipal hazard response facilities, populations, businesses, schools, recreational facilities, and historic resources. During this time, the Town's consultant reviewed the existing Comprehensive Plan, local ordinances, and dam safety plans, and gathered information on current infrastructure projects going on within the Town.

Step four was the review of mitigation items proposed in the existing plan that would help reduce the risk from natural hazards. Included in this step were proposing new actions, establishing action timelines, costs, and identifying responsible parties.

Step five entailed the THMC reviewing and adjusting specific mitigation goals and individual mitigation actions. Follow-up meetings of the THMC were then held to review the drafts and finalize the content of Chapters 5 and 6.

Step six focused on the prioritization of the mitigation actions and the development of the implementation, evaluation and revision schedule. This prioritization was completed through individual review of the draft actions.

Step seven furthered the public input and review process with the Tiverton Planning Board, Town Council, and the general public for review and comment. The plan was posted on the Town's website. Facebook, and made available at Town Hall and Library for public review. The THMP was also emailed to Emergency Management Directors in the neighboring towns of Little Compton, Portsmouth, and Fall River, MA for their review and comments. No comments were received. At the Town Council meeting on 1/23/2017, there were a few suggested edits to the plan which were incorporated. The school locations were corrected on the map and further clarification was added as to why Nonquit Pond/Pond Bridge Road Bridge was labeled as a low priority. At the meeting the new Town DPW director was also brought up to speed on the plan. Table 1 below provides a summary of the Committee's meeting dates and the activities that they conducted:

Table 1: Summary of THMC Activities

Date	Meeting Summary
8/12/2015	Initial meeting of the THMC
2/19/2016	Kick off meeting with new contractor, CDR Maguire. THMC discussed the plan purpose and hazards of concern
3/4/2016	The THMC reviewed the hazards of concern and listed critical infrastructure and community assets
4/1/2016	Discussions with Fall River EM Director about risks to Tiverton as identified in their plan. Review of critical facilities and planning effort with State Hazard Mitigation Officer and Region 1 Hazard Mitigation Specialist
4/19/2016	Using the identified critical facilities as the backbone of their planning efforts, the committee began reviewing mitigation actions that would help reduce risk from natural hazards.
5/5/2016	Continued discussion about mitigation actions
5/9/2016	Finalized mitigation actions, discussed prioritization and current capabilities
6/8/2016	Draft plan sent to THMC for review
1/5/2017	Draft of 2017 HMP posted for public comment and promoted through social media and on the Town's website.
1/5/2017	2017 HMP was emailed to neighboring Emergency Management Directors for review.
1/23/2017	2017 HMP was presented to Town Council and public
1/25/2017	Town's consultant made document changes as per public comments and final edits.
1/30/2017	Sent to RIEMA for review.
3/22/1017	Comments received from RIEMA. Edits made to draft plan by Town's consultant under the guidance of the Tiverton Emergency Management Director
4/17/2017	Sent to FEMA for review
	Edits made to draft plan by Town's consultant under the guidance of the Emergency Management Director
	Plan approved and adopted by Planning Board/Town Council

Chapter 3: Natural Hazards

This history of natural hazard events verifies that the area is vulnerable to diverse events including blizzards, floods and strong storms. This discussion puts the likelihood of these events into historical perspective and recognizes that although the probability of, thunderstorms, high wind and lightning events may be higher; the intensity and potential impacts from less likely events such as hurricanes, flooding, and winter storms can be far greater.

The hazards identified by the THMC are in line with those discussed in the State Hazard Mitigation Plan and are of greatest concern to the Town. However, there are a few hazards discussed in the State plan that are not addressed in this Hazard Mitigation Plan. Tiverton is situated along the Sakonnet River and has not experienced or is concerned about coastal issues like storm surge and coastal erosion. However, the Sakonnet River is rather large and properties along it are considered coastal. Therefore, coastal flooding is discussed as a hazard.

The following hazards will not be addressed in this Hazard Mitigation Plan: avalanche, expansive soils, land subsidence, landslides, volcanoes, and tsunamis. Theses hazards were not considered due to the lack of frequency in which they occur and the minimal probability of their occurrence.

The primary sources of data researched to identify occurrences of natural hazard events in Tiverton were the RI State Hazard Mitigation Plan 2014 Update, National Climatic Data Center within the National Oceanic Atmospheric Administration (NCDC-NOAA) (http://www.ncdc.noaa.gov/stormevents/, the United States Geological Survey (USGS) Earthquake Hazards Program (http://neic.usgs.gov.), the 1998 Journal-Bulletin: Rhode Island Almanac, and the Taunton, MA, National Weather Service Forecast Office. The parameters and description of particular events are limited to the availability of information contained in the aforementioned sources.

3.1 Hazards of Concern

The Hazard Mitigation Planning Committee recognizes the following hazards as having the most potential to inflict damage to people and or property of the Town of Tiverton.

- Coastal Flooding
- Severe Winter Weather
- Hurricane/Nor'easter
- High Winds
- Extreme Temperatures

The following are considered less of a risk due to a combination of their frequency and damage extent:

- Brushfire
- Dam failure
- Drought
- Earthquake
- Riverine Flooding
- Hail
- Lightning Storms
- Tornado

At the kick-off meeting on February 19, 2016, the Committee identified the following hazards in Table 2 and their associated risks.

Frequency
Low - 1%- 10% probability within 100 years
Medium - 10%-100% probability within 10 years
High - 100% probability within 1 year-5 years

Damage Potential
Low - some local property damage not town wide, minor injuries/ loss of life
Medium - 50 % of property could be damaged and possible injuries/ loss of life
High - major town wide property damage, injuries and loss of life

Priority Rank
Developed by the THMC to rank the various hazards based on frequency and damage potential.
Low - Not expected to occur with any frequency, damages will be limited.
Medium - Will occur within the next 10 years but the Town has resources to reduce risks.
High - Expected to occur within the next 5 years, and is a major concern for the Town.

Probability of Future Occurrence
Developed by the THMC based on past events and future predictions.
Highly Likely: Near 100% probability within the next year
Likely: Between 10% and 100% probability within the next year, or at least one chance in the next 10 years
Possible: Between 1% and 10% probability within the next year, or at least one chance in the next 100 years
Unlikely: Less than 1% probability in the next 100 years.

Table 2: Natural Hazards

Type	Frequency	Damage Potential	Impacts (populations, infrastructure, natural environment, economy)	Priority Rank	Future Probability
Flooding (Coastal)	High	High	Property damage, life safety, road/bridge damage, businesses shut down, oil storage, mobile parks.	High	Highly Likely
Hurricane/Nor'easter	High	High	Power loss, property damage, economic losses post-disaster, debris, natural environment	High	Highly Likely
Severe Winter Weather	High	Medium	Roadways, utilities, infrastructure, Power outages, tree damage, roof collapse, businesses shut down	High	Highly Likely
High Winds	High	Medium/High	Population inconvenience, debris, closed roads, downed utility wires	Medium	Highly Likely
Extreme Temperatures	High	Low	Vulnerable aging populations, road infrastructure	Medium	Likely

Type	Frequency	Damage Potential	Impacts (populations, infrastructure, natural environment, economy)	Priority Rank	Future Probability
Brushfire	High	Low (5-10 acres)	Localized to immediate population and natural environment	Low	Highly Likely
Lightning Storm	Medium	Low (Localized)	Brush and wildfires, house fires, power loss, propane tank explosion	Low	Likely
Hail	Medium	Low	Personal property, vehicles	Low	Likely
Drought	Medium	Low/Medium	Localized if short term. Long term drought could affect water supply quantity.	Low	Likely
Earthquake	Medium	Low	Minor structural damage expected	Low	Unlikely
Dam Failure	Creamer- low Nonquit- low Mill Pond- low	Creamer- High loss of life Nonquit- low, marsh is downstream Mill Pond- low	Creamer- population, infrastructure Nonquit- natural environment, public drinking water Mill Pond- natural environment	Low	Possible
Flooding (Riverine)	Low	Low	Natural resources (marsh)	Low	Possible
Tornado	Low	Low (Localized)	Infrastructure, personal property, debris	Low	Unlikely

The THMC chose to review the above hazards based on past experiences and present vulnerabilities. The Rhode Island State Hazard Mitigation Plan was reviewed for comparison. Due to the Town's rural inland location, the THMC did not consider storm surge or sea level rise.

Table 3: Manmade Hazards

Hazard	Application Mode	Hazard Duration	Impacts	Of Specific Concern	Mitigating and Exacerbating Conditions
Terrorism	Targeted attack on or near target via person, vehicle, or projectile	Minutes to days	Varies based on target and explosive device.	• Fuel storage and transportation • Natural gas pipelines • Power plant • Proximity to war college • Bridges • Water infrastructure • Power plant	Inadequate security can allow easy access to target, easy concealment of weapons and undetected initiation of an attack.
Hazardous Material Release	Solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers.	Hours to days	Chemicals may be corrosive or otherwise damaging over time. Contamination of drinking water supply. Contamination of the ground outside of homes, businesses, and recreation areas.	• Fuel storage and transportation • Stafford Pond	Weather conditions (rain and wind) will directly affect how the hazard develops.

The above were manmade hazards that were discussed as a concern for the THMC. Mitigating these hazards requires a highly facility-specific approach not explored in depth in this plan. However, including them in this plan was important for the Committee to explore all the hazards that they are concerned about.

3.1.1 Flooding

Description

According to the Rhode Island 2014 Hazard Mitigation Plan Update, "Flooding is a localized hazard that is generally the result of excessive precipitation. Flooding is the most commonly occurring natural hazard, due to the widespread geographical distribution of river valleys and coastal areas, and the attraction of human settlements to these areas. Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss."

"A flood, which can be slow or fast rising but generally develops over a period of days, is defined by the National Flood Insurance Program (NFIP) as:

- A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from: overflow of inland or tidal waters; unusual and rapid accumulation or runoff of surface waters from any source; or a mudflow; or
- The collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above."[10]

Tiverton is not on the ocean coast but is bordered on the west by the tidally influenced Sakonnet River. The smaller rivers and streams that crisscross the town are generally surrounded by marsh and are not known to cause destructive flooding. Historically, runoff during torrential rain storms, tidally influenced water tables, and the Sakonnet River are the main cause of flooding in Tiverton, Rhode Island. For the purpose of this plan, the area adjacent to the Sakonnet River will be discussed in terms of being affected by coastal, not riverine flooding.

Severe storms with heavy rain can generate flash floods which strike and end quickly. Less common in Tiverton, flash flooding isn't limited to streams and rivers but also streets.

Flooding due to runoff occurs when water runs over the land's surface impervious surfaces (paved areas, building subdivisions, and highways). Two major environmental modifications are primarily responsible for drastically altering the rain fall-runoff relationship.

1. Making the land surface impervious by covering it with pavement and construction work.

2. Installing storm sewer systems that collect urban runoff rapidly discharging large volumes of water into stream networks and/or freshwater wetland system

Location

The Town of Tiverton is bordered by and divided by rivers and streams. The town has approximately 1,352 acres of flood hazard areas representing 6% of total acres in the town. Floodplains in Tiverton include "A" and "AE" zones. "A" zones are areas that would be inundated by the 1% annual chance flood. "The A Zone is that portion of the Special Flood Hazard Area that is not subject to high velocity wave action during the base flood and is not designated as Zone V due to primary frontal dune considerations. The source of flooding in an A Zone can be a stream or river that overflows its banks; a lake; or coastal storm surge accompanied by wave heights and wave run-up depths less than 3 feet."[11] "AE" zones area zones depicted using specific elevation data. The Tiverton Resources map in Section 4 depicts the FEMA flood zones which are mainly clustered along the Sakonnet River and the southwest corner around Nonquit Pond. The inland streams and areas around Stafford Pond, Sawdy Pond, and Cedar Swamp are not designated as Special Flood Hazard Areas. The areas whose flooding causes the most concern is 3 Rod Way at Fogland Beach, Riverside Drive, Souza Road at Main Road, and the northwest corner of the Villages at Mount Hope Bay property. All of the specific areas of concern are listed in Table 19.

Probability of Future Occurrence

Highly likely. As one of the top concerns of the THMC, coastal flooding is expected to occur in Tiverton, especially on the western side of town along the Sakonnet River.

[10] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update
[11] "CRS Credit for Coastal A Zone Regulations." http://training.fema.gov/EMIWeb/CRS/

Extent

Tiverton receives an average of 46 inches of rain each year.[12] The single day record rainfall was 6.3 inches which fell on August 10, 1992.[13] Based on recent historic data (see table below), Tiverton experiences one flood event a year which results in road closures.

Impact

Town officials and residents are most concerned about street flooding that cuts off access and damages the road infrastructure. This usually occurs in low lying and coastal areas after a heavy rain when the water table is higher than normal. Fortunately, there are few reports of private residents routinely being affected by flooding. This may create a false sense of security to the home and business owners that have literally built over the water along Main Road and Riverside Drive. During a storm, when the wind comes up the Sakonnet River, the long fetch pushes water up into the bay, creating a greater chance of flooding along Riverside Drive.

Flooding of local roads limit access for the population, may strand residents, and hinder emergency response or evacuation efforts. In an effort to prevent future losses or repetitive losses this HMP will identify projects to reduce losses from flooding in Chapter 6.

The Town of Tiverton also participates in the National Flood Insurance Program (NFIP). There are currently 177 NFIP policies in effect covering $44,538,000 in property value. There have been 89 claims made since 1978, which paid out $471,939 to policyholders. Currently there are two residential and 1 non-residential Repetitive Loss properties in the Town of Tiverton. A Repetitive Loss property is defined as an insurable building for which two or more claims of more than $1,000 were paid out by the NFIP within a 10 year period.[14]

History

Historically in Tiverton, torrential rainfall, thunderstorms, and snowmelt are the causal events that result in street, basement, and stream flooding.

Table 4: Recent Flood Events[15]

Date	Type	Damage	Comments
3/30/2010	Flood	$3,52,000	5-8 inches of rain fell across Newport County, resulting in flooded roads in Tiverton.
8/50/12	Flood	$0	Several roads were flooded near Tiverton Four Corners, the amount of water overwhelming storm drains.
6/7/2013 (Last flood event of record)	Flood	$15,000 est.	3-5 inches of rain fell across Newport County from the remnants of Tropical Storm Andrea. Significant urban flooding.

[12] https://rainfall.weatherdb.com/l/25822/Tiverton-Rhode-Island
[13] Ibid
[14] As per communication with the Rhode Island State Hazard Mitigation Officer on 7/8/15
[15] NOAA http://www.ncdc.noaa.gov/stormevents

3.1.2 Hurricanes/Nor'easters

Hurricane Description

"Tropical cyclones, a general term for tropical storms and hurricanes, are low pressure systems that usually form over the tropics. These storms are referred to as "cyclones" due to their rotation. Tropical cyclones are among the most powerful and destructive meteorological systems on earth. Their destructive phenomena include very high winds, heavy rain, lightning, tornadoes, and storm surge. As tropical storms move inland, they can cause severe flooding, downed trees and power lines, and structural damage.

There are three categories of tropical cyclones:

1. Tropical Depression: maximum sustained surface wind speed is less than 39 mph.
2. Tropical Storm: maximum sustained surface wind speed from 39-73 mph.
3. Hurricane: maximum sustained surface wind speed exceeds 73 mph.

Once a tropical cyclone no longer has tropical characteristics it is then classified as an extratropical system. Most Atlantic tropical cyclones begin as atmospheric "easterly waves" that propagate off the coast of Africa and cross the tropical North Atlantic and Caribbean Sea. When a storm starts to move toward the north, it begins to leave the area where the easterly trade winds prevail, and enters the temperate latitudes where the westerly winds dominate. This produces the eastward curving pattern of most tropical storms that pass through the Mid-Atlantic region. When the westerly steering winds are strong, it is easier to predict where a hurricane will go. When the steering winds become weak, the storm follows an erratic path that makes forecasting very difficult. Howling winds associated with Nor'easters also have the potential to produce significant storm surge, similar to that of a Category One hurricane. In addition, these types of storms can also produce wind gusts to near hurricane force as well as flooding rain and crippling snowfall.

Hurricanes are categorized according to the Saffir/Simpson scale with ratings determined by wind speed and central barometric pressure. Hurricane categories range from 1 through 5, with Category 5 being the strongest (winds greater than 155 mph). A hurricane watch is issued when hurricane conditions could occur within the next 36 hours. A hurricane warning indicates that sustained winds of at least 74 mph are expected within 24 hours or less."[16]

The Saffir-Simpson scale below is based primarily on wind speeds and includes estimates of barometric pressure and storm surge associated with each of the five categories. It is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall."[17]

[16] Rhode Island Hazard Mitigation Plan, 2013 http://www.riema.ri.gov/prevention/mitigation/RI%20SHMP%2011-26-2013.pdf
[17] Hurricanes and Tropical Storms: Saffir-Simpson Hurricane Scale" *Weather.com*. The Weather Channel, 1995-2001. http://www.thefreedictionary.com/hurricane

Table 5: Saffir/Simpson Hurricane Wind Scale[18]

Category	Central Pressure		Winds		Damage
	Millibars	Inches	(mph)	(kts)	
1	>980	>28.9	74-95	64-83	Minimal
2	965-979	28.5 - 28.9	96-110	84-96	Moderate
3	945-964	27.9 - 28.5	111-129	96-112	Extensive
4	920-944	27.2 - 27.9	130-156	113-136	Extreme
5	<920	<27.2	157+	>137	Catastrophic

While there is at least a 10% chance that a hurricane will significantly impact the Town in the next five years, one direct hit on the State of Rhode Island could be catastrophic for all of the cities and towns. Tiverton has been impacted by hurricanes several times throughout the past century, all of which are referenced in Table 6. Changing global climate conditions may lead to stronger, more intense storms with hurricane-force winds in the region.

Nor'easter Description

An extra-tropical coastal storm, known as a Nor'easter, is typically a large, counterclockwise wind circulation around a low pressure center. The storm radius is often as large as 1,000 miles, and the horizontal storm speed is about 25 miles per hour, traveling up the eastern United States coast. Sustained wind speeds of 10-40 MPH are common during a nor'easter, with short term wind speeds gusting up to 70 MPH. Unlike hurricanes and tropical storms, nor'easters can sit off shore, wreaking damage for days.[19]

Nor'easters are a common winter occurrence in New England (September to April) and repeatedly result in flooding, various degrees of wave and erosion induced damage to structures, and erosion of natural resources, such as beaches, dunes and coastal bluffs. In this region, Nor'easters can bring rain or snow but because of the high wind component, they were included with hurricanes in this hazard mitigation plan.

Location

Being along a tidal river, Tiverton may be susceptible to tide surges associated with coastal storms. The entire town is vulnerable to the wind and rain damage that a hurricane or Nor'easter may bring.

Probability of Future Occurrence

Highly Likely. Nor'easters or Hurricanes are expected to at least pose a minor threat to Tiverton in the next few years.

Extent

Hurricanes that strike the Eastern United States originate in the tropical and subtropical North Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico. The Atlantic hurricane season spans a six-month period (June 1st through November 30th). Hurricanes that approach Rhode Island are usually weak (Category 1) or downgraded tropical systems. The wind speeds may be less but the storms can still bring a lot of rain. Nor'easters are not frequent (one every couple of years) but have a tendency to stall and unload precipitation for a few days.

Impact

[18] Saffir-Simpson Hurricane Wind Scale http://www.nhc.noaa.gov/pdf/sshws_2012rev.pdf

[19] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update

The Town of Tiverton is developed along the coast and heavily wooded inland. Areas farther inland would be susceptible to wind damage with tree damage and potential power losses. Also the potential for flash flooding and water damage from heavy rains exists. There is a risk of high water and coastal flooding along the western side of town.

History

The two hurricanes that resulted in the largest loss of life in the State were "The Great New England Hurricane of 1938" and "Hurricane Carol". "The Great New England Hurricane" occurred on September 21st, 1938, and is considered the worst disaster in Rhode Island history. It resulted in the deaths of 262 people and caused damage estimated at $100,000,000. The eye of this hurricane tracked to the west of Rhode Island and hit at high tide. During the storm, two storm surges almost 30' high destroyed most of the beach homes along the South Shore of Rhode Island. In downtown Providence, the surge flooded the area to a depth of more than 13'9" above the mean high-water mark. As a result, persons drowned trying to escape automobiles submerged in the streets and from buildings where the first floors were flooded to the ceiling.[20]

Throughout Rhode Island, the American Red Cross (ARC) spent $433,485 for the rehabilitation of 3,074 families. A total of 19,695 families suffered property loss; 797 permanent homes were destroyed; 1,169 summer homes were washed away; 899 boats destroyed and 888 damaged, 177 barns and 1,800 other buildings of various types were destroyed.[21]

On August 31, 1954, "Hurricane Carol" hit Rhode Island, in the same manner as "The Great New England Hurricane of 1938". As a result, downtown Providence was flooded when the water reached 13' above mean high-water level.

The winds from Hurricane Gloria in 1985, Hurricane Bob in 1991, and Tropical Storm Irene in 2011 caused downed tree limbs and power outages.

The most recent significant weather event to affect the State was a downgraded hurricane. On October 29th 2012, Hurricane Sandy which had been sweeping up the Mid-Atlantic Coast had been downgraded by the time it had reached Rhode Island. Superstorm Sandy hit Rhode Island with strong winds, and storm surge, causing significant coastal erosion. Along the south coast, the storm surge was 4 to 6 feet and seas from 30 to a little over 35 feet were observed in the outer coastal waters. The very large waves on top of the storm surge caused destructive coastal flooding along stretches of the Rhode Island exposed south coast. Washington and Newport Counties suffered the most damage and received FEMA disaster declarations. More than $39 million has been paid in federal support. Sadly, at least 182 people nationwide lost their lives in what turned out to be the nation's second most costly weather disaster. Fortunately there were no disaster-related deaths in Rhode Island. Tiverton did not have any significant damage from Superstorm Sandy, just fallen trees and brush.

[20] Providence Journal-Bulletin, 1998 Journal-Bulletin: Rhode Island Almanac 112th ed. (Providence, RI: Providence Journal Company, 1998) 255.
[21] Ibid

Table 6: Recent Hurricanes in Rhode Island[22]

Hurricane	Date	Description
1938	9/21/1938	The hurricane of September 21, 1938 brought major devastation to the State, with 262 persons losing their lives and damage estimated at $100 million. Another major hurricane occurred on September 14, 1944; no lives were lost, but property damage was over $2 million. The coastal area from Westerly to Little Compton experienced the heaviest damage, but there was no tidal wave, since the storm hit at ebb tide. Sustained winds of 95 MPH recorded; damage estimated at $100 million; 262 fatalities. Tide 15 feet above mean sea level (at USGS gage in Westerly). Virtually all the State was without power. Ten percent of electric customers still without power 12 days after hurricane.
1944	9/14/1944	Affected Rhode Island and southeastern Massachusetts; $2 million property damage, no loss of life.
Carol	8/31/1954	On August 31, 1954, Hurricane Carol swept into Rhode Island with little warning. The result was 19 deaths and $200 million in property damage. The storm center passed to the west of Providence and came at high tide. The central area of Providence was flooded to a depth of 13 feet, and 3,500 cars were inundated in the downtown areas. Hurricane Edna occurred 12 days after Carol, with heavy rain and major river flooding. There were 19 fatalities in New England, $200 million property damage and 13' flooding. In Providence, wind speed of 90 MPH, with 115 MPH gusts; nearly 3,800 homes destroyed. Tide 12.2 feet above mean seal level (at USGS gage in Westerly). Most of State without power. Four days after storm, approximately 50% had power restored; 90% after seven days.
Edna	9/11/1954	Heavy rain and major flooding in the Blackstone River Valley.
Diane	8/ 17-20/1955	In 1955, remnants of the August Hurricane Diane swept over Rhode Island, but its wind velocities were far below hurricane force because of its long inland trip over North Carolina, Virginia, and Pennsylvania. Damage to power lines was high, and at one time 82% of Rhode Island's homes were without electricity. Ample warning permitted people to return home from school and work early, and as a result, only two lives were lost. Property damage amounted to $170 million, most resulting from torrential rains which caused serious river flooding. Heavy rain; Blackstone River crests 15' above normal; $170 million in property damage. Heavy rain and 6' tidal surge; $5 million in property damage; 82% of electric customers lose power.
Donna	9/12/1960	Heavy rain and major flooding in the Blackstone River Valley.
Esther	9/21/1961	Heavy shore damage at Sakonnet Point in Little Compton and Misquamicut in Westerly.

[22] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update. Most comprehensive hurricane history.

Hurricane	Date	Description
Gloria	9/27/1985	Two fatalities in New England; property damage estimated at $19.8 million; 8,596 of electric customers lose power an estimated 23,700 people evacuated.
Bob	8/18/1991	Southern New England damage at $1.5 billion; 60% of residents across Southeastern New England lost power; 6'-10' storm surge in Narragansett Bay; Two (2) unconfirmed tornadoes in Rhode Island. There were 18 fatalities in Southern New England, although none in Rhode Island.
Irene	8/27/2011	Preliminary damage assessment report from FEMA brings the total Public Assistance cost to $9,260,898. Irene knocked down trees and power lines, leaving up to half of Rhode Island residents without power. Gusts of wind up to 71 MPH were reported, and storm surge in Narragansett Bay caused some coastal damage. However, the majority of damage was caused by wind. The storm surge experienced along the coast was generally in the two to four foot range with a high of 4.78 feet at Fox Point in Providence, Rhode Island. The highest sustained wind speed was 54 knots (62 MPH) at the Physical Oceanographic Real Time System station at Conimicut Light in Narragansett Bay, RI. Newport County reported trees downed onto wires.
Sandy	10/29/2012	Hurricane Sandy swept through the region in October 2012 leaving significant damage all along the coast. Beaches along Westerly, including Misquamicut, were devastated and almost unrecognizable. More than 122,000 people lost power. Tiverton experienced damaging winds. It is estimated that more than $39.4 million in support from four federal disaster relief programs is helping RI recover from this disaster, a majority of which is from the NFIP ($31.1 million).

3.1.3 Severe Winter Weather

Description

The majority of Rhode Island lies outside the heavy snow and ice regions of the northeast. Due to its maritime climate, Rhode Island generally experiences cooler summers and warmer winters than inland areas. However, snow and ice do occur and can be more than an inconvenience and cause extensive damage. The two major threats from these hazards are loss of power due to ice on electrical lines and snow loading on rooftops. Additionally, loss of power could mean loss of heat for many residents.

Winter storms vary in size and strength and can be accompanied by strong winds that create blizzard conditions and dangerous wind chill. There are three categories of winter storms. A **blizzard** is the most dangerous of the winter storms. It consists of low temperatures, heavy snowfall, and winds of at least 35 miles per hour. When four or more inches of snow accumulates in a twelve-hour period, the event is classified as a **heavy snow storm**. is experienced when. An **ice storm** occurs when moisture falls and freezes immediately upon impact. For the purpose of this plan, severe winter weather include heavy amounts of snow and ice. All of which may occur independently or at the same time.

Location

All of Tiverton is susceptible to severe winter weather.

Probability of Future Occurrence

High Likely. The Town expects to experience severe winter weather once a year.

Extent

On average, Tiverton receives 33.8 inches of snow throughout the winter. The record single day snowfall is 20 inches on February 7, 1978. The average winter temperature in Tiverton is 43.2 Fahrenheit. [23]

Impact

The town is in a rural area and many of the roads are lined with trees. A winter storm could create a long-term power outage, which would have an effect of isolating residents with downed trees and loss of power. The loss of power could affect heating systems and water for those properties that use private wells. It would also have a major effect on emergency response. Failed Internet and phone switches could affect town wide communication.

Severe winter weather could have a serious impact in private, and public structures, as well as the general population throughout Tiverton. Those most at risk to extreme cold are the elderly and those who work outside.

History

Historically, severe winter storms for Rhode Island have resulted in the closing of schools/businesses, power outages, fallen trees/wires, disruption of transportation systems, and damage to commercial and residential property. The winter of 1978 is considered one of the worst winters on record. On January 13, 1978 an ice storm hit the State. Statewide the storm destroyed thousands of trees and left nearly 120,000 people without power and heat in some circumstances. A little more than three weeks later, on February 6, 1978, the State was pounded by what became known as the "Blizzard of 78". In Warwick, the official measure of snowfall at T.F. Green Airport was 28.6".

Since then, numerous winter storms events have occurred across the State: January 7, 1996 (12-24 inches), January 22, 2005 (15-25 inches), February 8, 2013 (24 inches-30 inches), and March 22, 2013 (12-24 inches). The severe winter storm that Rhode Island experienced on March 22, 2013 was declared a major disaster (DR-4107) by the Federal Emergency Management Agency. This large storm which stretched from New Jersey into Canada brought more than two feet of snow to Rhode Island in less than 24 hours. National Grid estimated more than 180,000 customers in Rhode Island lost power.

Rhode Island experienced a winter storm from January 26-29, 2015that resulted in 18 inches of snow and created treacherous icing conditions on the roads, forcing the State to implement a driving ban. Tiverton received a total of 19 inches. Subsequent storms only added to the snow load as melting was late to occur.

Table 7: Recent History of Winter Weather in Newport County, RI[24]

Date	Type	Comments
2/10/2010	Winter Storm	5-8 inches of snow fell across Newport County
12/26/2010	Winter Storm	6-10 inches of snow fell across Newport County
1/12/2011	Winter Storm	6-10 inches of snow fell across Newport County

[23] https://temperature.weatherdb.com

[24] NOAA http://www.ncdc.noaa.gov/stormevents Winter weather is not a localized event in Rhode Island towns. The best available data was for Newport County, of which Tiverton is a part of.

Date	Type	Comments
1/26/2011	Heavy Snow	5-7 inches of snow fell across Newport County
1/21/2012	Heavy Snow	8-9 inches of snow fell across the coast
12/29/2012	Heavy Snow	5-8 inches of snow fell across Newport County
2/8/2013	Blizzard	13-16 inches of snow fell across Newport County. Blizzard of 2013 also produced prolonged period of very strong winds.
1/2/2014	Heavy Snow	7-9 inches of snow fell across Newport County
1/21/2014	Heavy Snow	5-8 inches of snow fell across Newport County
2/15/2014	Heavy Snow	6-8 inches of snow fell across Newport County
1/26/2015	Blizzard	16-19 inches of snow fell across Newport County
2/14/2015	Heavy Snow	9-10 inches of snow fell across Newport County
3/05/2015	Heavy Snow	8-11 inches of snow fell across Newport County
1/23/2016	Heavy Snow	4-9 inches of snow fell across Newport County
2/8/2016	Winter Weather	4-6 inches of snow fell across Newport County

3.1.4 High Winds

Description

Wind is the movement of air caused by a difference in pressure from one place to another. Local wind systems are created by the immediate geographic features in a given area such as mountains, valleys, or large bodies of water. National climatic events such as high gale winds, tropical storms, thunderstorms, nor'easters, hurricanes, and low-pressure systems produce wind events in Rhode Island. Wind effects can include blowing debris, interruptions in elevated power and communications utilities, and intensification of the effects of other hazards related to winter weather and severe storms.

Location

Wind events are expected throughout the year in Tiverton.

Probability of Future Occurrence

Highly Likely- The Tiverton HMP Committee agreed that there is a very high likelihood of strong winds causing damage in Tiverton within the next year. This is consistent with the geographic extent of winds throughout Rhode Island.

Extent

Wind speeds in neighboring Providence are indicative of Tiverton (local data unavailable). "With an average wind speed of 9.3 MPH, Providence is a windy city, 1.00 MPH higher than the national average. The average wind speed in Providence is about the same as the [State] average. The windiest season in Providence is spring, with spring wind speeds reaching 10.27 MPH on average - 1.17 MPH higher than in the rest of the U.S."[25]

[25] Weather DB https://wind-speed.weatherdb.com/l/206/Providence-Rhode-Island. Best available data.

Additionally, the Beaufort Wind Scale is a 17 level scale used to describe wind speed and observed wind conditions at sea and on land. A wind classification of 0 has wind speeds of less than 1mile per hour are considered calm. On the other end, a classification of 10 with wind speeds reaching 63 miles an hour will blow down trees and cause considerable damage.

Table 8: Wind Speeds

Beaufort Wind Chart – Estimating Winds Speeds

Beaufort Number	MPH Range	MPH Average	Terminology	Description
0	0	0	Calm	Calm. Smoke rises vertically.
1	1-3	2	Light air	Wind motion visible in smoke.
2	4-7	6	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	11	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	15	Moderate breeze	Dust and loose paper is raised. Small branches begin to move.
5	19-24	22	Fresh breeze	Smaller trees sway.
6	25-31	27	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	32-38	35	Near gale	Whole trees in motion. Some difficulty when walking into the wind.
8	39-46	42	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	50	**Severe gale**	**Light structure damage.**
10	55-63	60	**Storm**	**Trees uprooted. Considerable structural damage.**
11	64-73	70	**Violent storm**	**Widespread structural damage.**
12	74-95	90	**Hurricane**	**Considerable and widespread damage to structures.**

Impact

Strong wind gusts of 40 miles an hour (Beaufort Scale of 8) can blow off twigs and small branches from trees. Occasional gusts and sustained winds at this speed (and above) are of concern to the Town. Damages from wind events range from power outages, property damage to vehicles and buildings and fallen trees/limbs. Wind events in Tiverton have resulted primarily in power outages and downed tree limbs with minimal property damage. It is important that the Town of

Tiverton maintain their public tree trimming program that will reduce the likelihood of fallen trees/limbs from disrupting transportation routes and/or taking down power lines.

History

Table 9provides a history of significant wind events for the Newport County area.

Table 9: High Wind Events[26]

Date	Magnitude (mph)	Damage Comments
3/14/2010	57 mph	Rain and strong winds resulted in numerous downed trees and wires, and some minor structural damage in Newport, Middletown, and Portsmouth.
2/25/2011	57 mph	Heavy snow and wind brought down telephone poles in nearby Middletown.
10/30/2011	61 mph	Rare Nor'easter brought down utility lines in Middletown.
10/29/2012	60 mph	Hurricane Sandy brought heavy winds. Numerous trees were downed in Middletown, Tiverton, and Little Compton.
11/2/2014	46 mph	Downed wires in Middletown
1/19/2016	46 mph	Utility wires were downed in Tiverton, blocking Crandall Road.
2/25/16	57 mph	Trees and wires were downed in Tiverton.
9/5/2016	50 mph	A tree was downed onto wires, a garage, and a car on Gibbs Avenue in Newport. The downed lines sparked a brush fire. A tree was downed onto a transformer on Rhode Island Avenue. In Tiverton, a tree was downed onto a house. Wires were downed onto East Road. In Middletown, trees were downed on Indian Avenue and Goldenrod Drive.

3.1.5 Extreme Temperatures

Description

Excessive heat warnings are generally issued when the maximum heat index temperature is expected to be 105 degrees Fahrenheit or higher for at least 2 days and night time air temperatures will not drop below 75 degrees Fahrenheit.[27]

Extreme cold is regionally defined. In Rhode Island, it usually involves temperatures below zero degrees Fahrenheit. Wind conditions can drive the temperature down even further. The wind chill index attempts to quantify the cooling effect of wind with the actual outside air temperature to determine a wind chill temperature that represents how cold people and animals feel, based on the rate of heat loss from exposed skin. A wind chill index of -5 indicates that the effects of wind and temperature on exposed flesh are the same as if the air temperature alone were 5 degrees below 0, even though the actual temperature could be much higher. The NWS issues a wind chill advisory when wind chill temperatures are potentially hazardous and a wind chill warning when the situation can be life-threatening.[28]

Location

All of Tiverton is susceptible to extreme heat and extreme cold periods.

[26] NOAA Storm Events Database
[27] NOAA Heat Safety http://www.nws.noaa.gov/os/heat/ww.shtml
[28] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update

Probability of Future Occurrence

Highly Likely. Periods of extreme heat and cold are expected to be more frequent in Tiverton.

Extent*

In 2011, Newport State Airport reported heat indexes of 106 to 110 over an eight-hour period. Wind chills of 32 below zero were reported at Newport State Airport in 2016.

*Newport State Airport (4 miles southwest of Tiverton) is the closest reporting station.

Impact

Personal exposure to dangerous heat conditions may lead to heat cramps, heat exhaustion, and heat stroke. These are especially important to monitor in children, and vulnerable populations that are not able to move to cooler conditions. Extreme cold conditions may occur during, after, or without any connection to a winter storm. Exposure to extreme cold can lead to hypothermia and frostbite.

Extreme temperatures could have a serious impact on private and public structures, as well as the general population throughout Tiverton. Those most at risk to extreme temperatures are the elderly and those who work outside.

History

The table below summarizes some of the recent periods of extreme heat and cold within the region.

Table 10: Extreme Temperatures[29]

Date	Type	Comments
7/22/11	Excessive Heat	Heat indexes of 106 to 110 over a five-hour period in Newport County
2/16/2015	Extreme Cold/Wind Chill	Wind chills as low as 26 below zero reported at Newport State Airport.
2/14/2016	Extreme Cold/Wind Chill	Wind chills as low as 34 below zero were reported at Newport Airport.

3.1.6 Brushfire

Description

A brushfire is a fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.[30] Favorable fire conditions arise from extended periods of hot, dry weather and accumulated vegetation. While wildfires are generally associated with thousands of acres of trees burning, brushfires tend to be smaller, confined to the understory, and manageable.

Various natural (i.e. lightning) and human actions (i.e. campfires or auto accidents) can ignite brushfires. Fuel (dry grasses, leaves, and dead trees), topography and weather (wind conditions and humidity) will dictate the extent of a brushfire.

Greater wildfires that cover thousands of acres of land are classified by their size and progression. Once a wildfire has been detected and the area is assessed, the wildfire is assigned one of the following categories from lowest to highest: Category 1 (incipient- initial), Category 2 (growing and threatening), Category 3 (major aggressive fires), Category 4 (major aggressive fire of at least 5,000 acres expanding at 400 acres per hour), or Category 5 (major very aggressive fire

[29] NOAA Storm Events Database www.ncdc.noaa.gov. Best available data.
[30] National Park Service, USDA Forest Service http://www.fs.fed.us/nwacfire/home/terminology.html

of at least 16,000 acres expanding at 1000 acres per hour or more). These categories may change as the wildfire continues to burn. Fires do not grow to that size in Tiverton due to the small land area, lack of fuel, and quick response to brushfires.

Probability of Future Occurrence

Highly Likely. Changes in climate patterns may yield longer periods of dry conditions.

Location

When drought conditions are present, the brushfire threat increases. Approximately 16,000 acres of land in Tiverton (about 70%), remains unimproved, including 4,253 acres of open space and conservation areas. [31] The largest track of contiguous forest is Weetamoo Woods (541 acres) in the center of Tiverton.

Extent

The U.S. Forest Service has established the National Fire Danger Rating System (NFDRS) to determine the daily risk to fire experienced by different regions of the country (Table 10). The system uses mathematical formulas including wind speed and fuel type to determine a fire index. The fire indexes are grouped into five groups based on severity, and each group has an associated class rating (Classes 1 through 5) and an associated fire risk level. A fire index of zero occurs when there is snow on the ground or there has been a prolonged period of substantial rain.[32]

Table 11: National Fire Danger Rating System

Fire Index	Rating	Description
0	Class 1	No rating
1-30	Class 2	Low danger
31-60	Class 3	Medium danger
61-80	Class 4	High danger
81+	Class 5	Extreme

Impact

A large brushfire in Tiverton could destroy large tracts of forest, threaten homes and utility lines, and affect power, internet and phone service. Smoke inhalation could cause breathing problems to residents.

History

Historically, brushfires (up to 2-3 acres) have burned through vegetated areas. Most of the smaller brushfires were at the southern part of town. The last major brushfire of record occurred in 1995, it burned for three days underground, affecting 1-3 acres. The last controlled burns were in the 1960s and 70s. The debris cover is currently too thick to safely do a controlled burn without the danger of the fire going underground.

[31] Tiverton Comprehensive Community Plan, 2009
[32] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update

3.1.7 Thunderstorms

Description

Thunderstorms are formed when the right atmospheric conditions combine to provide moisture, lift, and warm unstable air that can rise rapidly. Thunderstorms occur any time of the day and in all months of the year, but are most common during summer afternoons and evenings and in conjunction with frontal boundaries. The National Weather Service (NWS) classifies a thunderstorm as severe if it produces hail at least one inch in diameter, winds of 58 MPH or greater, or a tornado. About 10 percent of the estimated 100,000 annual thunderstorms that occur nationwide are considered severe.[33] Thunderstorms affect a smaller area compared with winter storms or hurricanes, but they can be dangerous and destructive for a number of reasons. Storms can form in less than 30 minutes, giving very little warning; they have the potential to produce lightning, hail, tornadoes, powerful straight-line winds, and heavy rains that produce flash flooding.[34]

All thunderstorms contain lightning. Thunderstorms can occur singly, in clusters, or in lines. Therefore, it is possible for several thunderstorms to affect one location in the course of a few hours. Thunderstorms usually bring heavy rains (which can cause flash floods), strong winds, hail, lightning, and tornadoes.[20] Lightning is caused by the attraction between positive and negative charges in the atmosphere, resulting in the buildup and discharge of electrical energy. Lightning is one of the most underrated severe weather hazards, yet ranks as the second-leading weather killer in the United States. "Hundreds of people across the nation are injured annually by lightning, most commonly when they are moving to a safe place but have waited too long to seek shelter. Lightning strike victims often suffer long-term effects such as memory loss, sleep disorders, weakness and fatigue, chronic pain, depression and muscle spasms. Lightning has the potential to start both house fires and wildfires. Lightning causes an average of 55-60 fatalities, 400 injuries, and over $1 billion in insured losses annually nationwide."[35] Lightning often strikes as far as 10 miles away from any rainfall.

Probability of Occurrence

Likely. The THMC perceives lightning to be a likely threat to the Town.

Location

All areas of Tiverton are vulnerable to damage from thunderstorms.

Extent

There is no universally accepted standard for measuring the strength or magnitude of a lightning storm. Lightning events are often measured by the damage they produce.

Impact

Large tracts of forested land and homes could be struck by lightning causing fires. In general, buildings are more likely to be struck by lightning if they are located on high ground or if they have tall protrusions such as steeples or poles which

[33] National Oceanic and Atmospheric Administration, http://www.nws.noaa.gov/om/severeweather/resources/ttl6-10.pdf.
[34] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update
[35] Ibid

the stepped leader can jump to. Electrical and communications utilities are also vulnerable to direct lightning strikes.

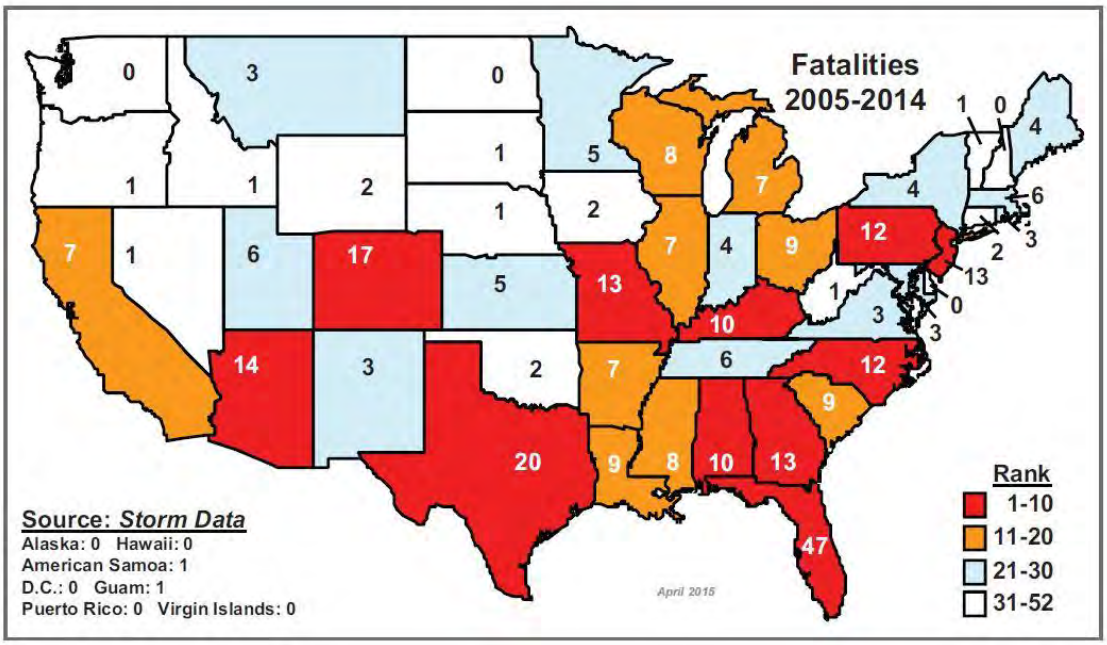


Figure 2: Number of lightning deaths in the United States, 2005-2014

Damage to these lines has the potential to cause power and communications outages for businesses, residencies, and critical facilities.

History

Every year there are 2-3 reported lightning strikes in Tiverton. Some are more notable than others. From 2008-2016, fire department records estimate $11,000 in damage from fires initiated by lightning strikes. The table below highlights recent thunderstorms storms that have affected Tiverton.

Table 12: Recent Damaging Thunderstorms Events Near Tiverton[36]

Date	Type	Damage	Comments
7/4/1999	Lightning	unknown	Thunderstorms with lightning moved across RI and started a house fire in Tiverton.
6/24/2008	Lightning	Fatality	Man struck by lightning while fishing on a jetty in Bristol (Bristol is 2 miles from Tiverton)
8/5/2009	Lightning	$20,000	Lightning struck a house on North Lane in Bristol, resulting in a house fire (Bristol is 2 miles from Tiverton).
6/5/2010	Lightning/Thunderstorm	$20,000	Several trees and wires were downed by lightning strikes. Portsmouth fire communications were knocked out by a lightning strike (Portsmouth is adjacent to Tiverton).
7/28/2015	Lightning/Thunderstorm	$5,000	Lightning struck a house on Main Road in Tiverton and knocked down a tree.

[36] NOAA http://www.ncdc.noaa.gov/stormevents Tiverton fire department records are inconclusive to accurately state specific lightning strikes. NOAA data was used to show nearby events.

3.1.8 Hail

Description

One of the less life-threatening yet very damaging natural hazard events is hail. Hail is not discussed in depth in the State hazard mitigation plan but is briefly mentioned here. Hail is formed in towering cumulonimbus clouds (thunderheads) when strong updrafts carry water droplets to a height at which they freeze. Eventually, these ice particles become too heavy for the updraft to hold up, and they fall to the ground at speeds of up to 120 MPH. Hail falls along paths called swaths, which can vary from a few square acres to up to 10 miles wide and 100 miles long.[37] Hail larger than ¾ inch in diameter can do great damage to both property and crops, and some storms produce hail over 2 inches in diameter. Hail causes about $1 billion in damages annually in the U.S.[38]

During a thunderstorm, severe downdrafts may cause microbursts, a rapid column of airflow with the force of tornado able to knock down mature trees. Microbursts are capable of creating wind speeds over 150 mph. In 2002 the Town of Hopkinton suffered a microburst resulting down trees and minor damage to property. A similar event occurred in 2015 in Cranston and Warwick.

Location

All of Tiverton is susceptible to hail.

Probability of Occurrence

Possible. Changing climatic conditions may lead to more frequent or severe hailstorms.

Extent

The size of hailstones is best determined by measuring their diameter with a ruler. In the absence of a ruler, hailstone size is often visually estimated by comparing its size to that of known objects as shown in Table 12.

Table 13: Hail Size[39]

HAIL DIAMETER	SIZE DESCRIPTION
1/4"	Pea Size
1/2"	Mothball Size
3/4"	Penny Size
7/8"	Nickel Size
1" (Severe Criteria)	Quarter Size
1 1/4"	Half Dollar Size
1 1/2"	Walnut or Ping Pong Ball Size
1 3/4"	Golf Ball Size
2"	Hen Egg Size
2 1/2"	Tennis Ball Size
2 3/4"	Baseball Size
3"	Teacup Size
4"	Grapefruit Size
4 1/2"	Softball Size

[37] University Corporation for Atmospheric Research, http://www.ucar.edu/communications/factsheets/Hail.html.
[38] Ibid
[39] National Weather Service http://www.weather.gov/btv/skywarn_hailwind

Tiverton has experienced localized events with hailstones up to 1 inch in diameter.

Impact

Large hail can dent automobiles, break windows, and destroy roofs.

History

The table below summarizes the recent history of damaging hail near Tiverton, RI

Table 14: Hail Events

Date	Location	Size	Comments
8/7/2014	Little Compton, RI	Penny (0.75")	Showers and thunderstorms produce large hail (0.75 inches in diameter)
8/4/2015	Fall River, MA	Nickel (0.88")	Line of severe thunderstorms produced high winds and hail 0.88 inches in diameter.
6/21/2016	Newport, RI	Penny (0.75")	Showers and thunderstorms produced hail

3.1.9 Drought

Drought is a gradual phenomenon that occurs slowly, over a multi-year period. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Due to its coastal location in a temperate climate, Rhode Island rarely experiences extended periods of drought. However, seasonal droughts have occurred when precipitation levels are low. Drought conditions can impact crops, water available for fire suppression, and reservoir levels. In Rhode Island, drought conditions can trigger fire hazard warnings.

There are four different ways that a drought can be defined:

1. Meteorological – A measure of departure of precipitation from normal. Due to climatic differences, what is considered a drought in one location may not be a drought in another location.
2. Agricultural – refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
3. Hydrological- occurs when surface and subsurface water supplies are below normal.
4. Socioeconomic- refers to the situation that occurs when physical water shortage begins to effect people.

Location

According to the Rhode Island Water Resource Board the potential for a drought exists every eleven years in Rhode Island. Although temporary drought conditions may occasionally exist in Rhode Island, affecting Tiverton, devastating, long term drought conditions are not indicative of this temperate region.

Probability of Future Occurrence

Likely. Drought is likely but due to Tiverton's coastal location, humidity is present from sea breezes.

Extent

Characteristics and impacts of drought differ in many ways, so it is difficult to quantify drought. An existing index called the Palmer Drought Severity Index (PDSI) that used temperature and precipitation levels to determine dryness, measuring a departure from the normal rainfall in a given area. The PDSI uses temperature and precipitation levels to determine dryness. The advantage of the PDSI is that it is standardized to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions. A monthly PDSI value below -2.0 indicates moderate drought, and a value below -3.0 indicates severe drought.

Table 15: Palmer Drought Severity Index

Severity	Index Value
Extreme Drought	-4 or less
Severe Drought	-4 to -3
Moderate Drought	-3 to –2
Mild Drought	-2 to –1
Incipient Dry Spell	-1 to –0.5

According to the National Weather Service Rhode Island receives on average 39" to 54" annually. Notwithstanding the same, the State experiences extended periods of dry weather. Some type of drought in Rhode Island occurs approximately once every 11 years.

Impact

Roughly 45-50% of the town residents get their water from private wells on their property. Many of those wells are shallow and use ground water for their source. A long-term drought could affect those wells and their homes water supply leading to health and sanitation issues. Further, the Town's drinking water resources come from within the town at Stafford Pond. Prolonged drought conditions could also impact town water supplies and water available for firefighting.

Tiverton has approximately 2,000 acres of land used for agricultural (11% of total land area). The land is primarily used for potatoes, corn, and livestock feed. Long-term drought could have a major effect on these farmers suffering crop loss. An extended period of drought would also degrade stream health and impact recreational fishing areas.

History

Past drought events in Rhode Island have affected the entire state. It is generally not an issue that is handled at the local level although the Town can enforce particular water bans as dictated by the State. Due to the broad nature of droughts, the Town of Tiverton does not have specific mitigation actions for this hazard. For specific statewide mitigation efforts, refer to the current Rhode Island State Hazard Mitigation Plan located on the Rhode Island Emergency Management's website (www.riema.ri.gov).

Table 16: Recent Droughts in Tiverton, RI[40]

Date	Type	Damage
4/12/ 2012 – 5/15/12	Severe Drought (Meteorological)	None. Very high fire danger, small pond levels were reduced, soil moisture was well below normal.
9/13/2016 –10/31/16 (On 11/1/16, the U.S. Drought Monitor reduced the drought designation in Newport County)	Severe Drought (Meteorological)	None. A unique situation to Tiverton is a lack of water to fight fires. There are no fire hydrants in Tiverton so firefighters rely on nearby ponds and rivers for their tanker trucks. With ponds and rivers well below their normal levels, it has become more and more difficult for firefighters to draw water from these sources.

3.1.10 Earthquake

Description

An earthquake (also known as a quake, tremor or temblor) is the result of a sudden release of energy in the Earth's crust that creates seismic waves. The seismicity or seismic activity of an area refers to the frequency, type and size of earthquakes experienced over a period of time. Earthquakes are measured with a seismometer. The size or magnitude is recorded on a device known as a seismograph. Earthquakes with a magnitude 3 or lower are mostly imperceptible (too low to recognize) and magnitude 7 earthquakes cause serious damage over large areas.

Although earthquakes are not considered to be a major problem in the Northeast United States, they are more prevalent than one might expect. Table 13 presents historical seismic activity for Rhode Island. It highlights the earthquake epicenter, the Richter magnitude at the epicenter, and the Mercalli Intensity Level

Location

Rhode Island is located in the North Atlantic tectonic plate and is in a region of historically low seismicity. Only three (3) or four (4) earthquakes of Modified Mercalli Intensity Scale (MMI) V or greater have been centered in Rhode Island, including the 1951 South Kingstown earthquake of magnitude 4.6 on the Richter scale.[41] The Town of Tiverton is about 20 miles northeast of South Kingstown.

Probability of Future Occurrence

Unlikely. Damaging earthquakes do not normally occur in this region.

Extent

The magnitudes of an earthquake is represented by a single, instrumentally determined value. Richter magnitudes are technical quantitatively based calculations that measure the amplitude of the largest seismic wave recorded. Richter magnitudes are based on a logarithmic scale and are commonly scaled from 1 to 8. See the graphic below. The higher the magnitude on the Richter Scale, the more severe the earthquake. Mercalli intensity levels are based on qualitative criteria that use the observations of the people who have experienced the earthquake to estimate the intensity level.

[40] NOAA http://www.ncdc.noaa.gov/stormevents

[41] Rhode Island Emergency Management Agency (RIEMA) Rhode Island 2014 Hazard Mitigation Plan Update

The Mercalli scale ranges from I to XII. The higher the intensity level on the scale, the closer the person is to the epicenter.[42]

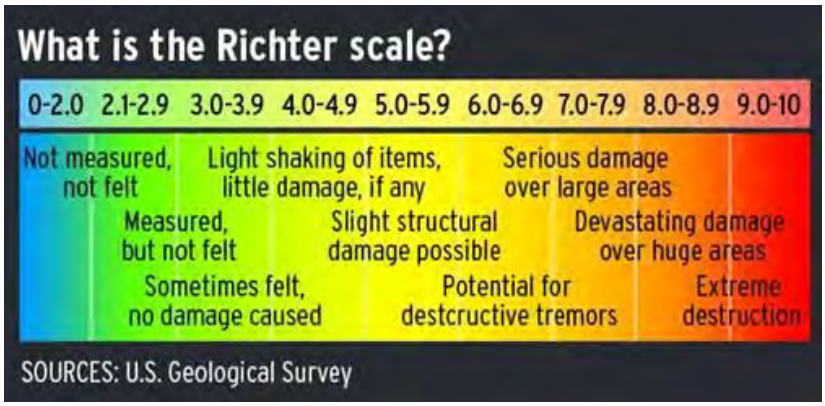


Figure 3: Richter Scale

Table 17: Modified Mercalli Scale

Modified Mercalli Intensity	Description of Intensity Level
I	Not felt except by a very few under especially favorable circumstances.
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all; many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motorcars.
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings with

[42] Michelle Wood. "UPSeis: An Educational Site for Budding Seismologists," 21 May. 1997, 5 January, 2004. http://www.geo.mtu.edu/UPSeis/intensity.html.

Modified Mercalli Intensity	Description of Intensity Level
	partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level distorted. Objects thrown into the air.

Rhode Island is located in an area of "moderate" seismicity and "high" risk. Seismic risk applies to the seismic hazard, location demographics, and regional economics to the vulnerabilities of the structure or lifeline on the site. However, based on past occurrences, current geologic makeup and future climate changes, the Town of Tiverton is not anticipating any disturbances higher than a Class IV intensity.

Impact

The committee recognizes that the potential for an earthquake to strike the Town of Tiverton is low but the hazard could afflict town wide damage, causing; power outages, building collapses, water main breaks, dam failures, gas leaks, fires and injuries or deaths. Buildings that are most at risk from earthquakes are the old masonry buildings and large structures such as those in the Historic Districts.

History

No major earthquakes have happened in Tiverton but the resulting damage it could produce makes it a threat.

Table 18: Historic Seismic Activity in/near Rhode Island[43]

Date	Epicenter	Epicenter Magnitude	Mercalli Intensity Level
10/16/1963	Coastal MA	4.5	Caused some cracked plaster (MMI V) at Chepachet, Rhode Island.
6/14/1973	Western Maine	unknown	The intensities in Rhode Island were IV at Charlestown and I-III at Bristol, East Providence, Harmony, and Providence.
3/11/1976	Near Newport, RI	3.5	Intensity level VI shock effects felt throughout Southern New England. This earthquake has the

[43] United States Geologic Survey http//neic.usgs.gov/neis/states/rhode_island/rhode_island_history.html and Earthquake Hazards Program "*Did You Feel It"* Archives.

Date	Epicenter	Epicenter Magnitude	Mercalli Intensity Level
			distinction of being the largest earthquake to originate in Rhode Island.
4/20/2002	Plattsburgh, NY	5.2	Intensity level II to III shock effects felt throughout Rhode Island.
03/11/2008	Central Connecticut	2.9	No data reported for Rhode Island
6/23/2010	Ontario-Quebec	5.0	Felt throughout Rhode Island.
2011	Rhode Island	0.9	Felt locally
2012	Rhode Island	1	Felt locally
2013	Kingston, RI	Unknown	Felt locally
1/12/2015	Wauregan, CT	3.3	Intensity level II to III shock effects felt in Tiverton
7/22/2015	East Providence, RI	2.3	Intensity level II to III shock effects felt in Tiverton

3.1.11 Dam Failure

Description

Dam failures can result from natural events, human-induced events, or a combination of the two (2). Failures due to natural events such as prolonged periods of rainfall and flooding can result in overtopping, which is the most common cause of dam failure. Overtopping occurs when a dam's spillway capacity is exceeded and portions of the dam which are not designed to convey flow begin to pass water, erode away, and ultimately fail.[44]

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

- High Hazard – means a dam where failure or mis-operation will result in a probable loss of human life.
- Significant Hazard – means a dam where failure or mis-operation results in no probable loss of human life but can cause major economic loss, disruption of lifeline facilities, or impact other concerns detrimental to the public's health, safety, or welfare.
- Low Hazard – means a dam where failure or mis-operation results in no probable loss of human life and low economic losses. Intense storms may produce a flood in a few hours or even minutes for upstream locations. Flash floods occur within six (6) hours of the beginning of heavy rainfall, and dam failure may occur within hours of the first signs of breaching. Other failures and breaches can take much longer to occur, from days to weeks, as a result of debris jams or the accumulation of melting snow.

Probability of Future Occurrence

Possible.

[44] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update

Location

There are four dams throughout the Town of Tiverton listed on the Rhode Island 2015 Dam Safety Report (Dam Inventory).

Table 19: Tiverton Dams

Dam Name	Hazard Type	Ownership	Location
Creamer	High	Private	Developed area of town south of Route 24, 0.4 miles from the Sakonnet River
Eagleville Dam	Low	City of Fall River, MA	North central region of town
Mill Pond	Significant	Private	Less developed area in the southeast corner of town
Nonquit Pond	Significant	City of Newport, RI	Southwest corner of Tiverton

Extent

All three dam hazard classifications are represented in Tiverton. The extent of a failure would vary. Nonquit Pond, the largest dammed waterbody in Tiverton has a maximum storage capacity of 1,950 acre-feet (6.3 billion gallons). The main purpose of the dam is water supply for the City of Newport. The inundation area and flooding impacts are expected to be confined to the immediate vicinity of the tidal estuary. The residential areas downstream are well above the flood elevation area.[45]

Impact

The Tiverton Hazard Mitigation Planning Committee recognizes that a dam failure is not a natural hazard but several of the hazards listed in our hazard list could cause a dam failure upon the Town of Tiverton. Severe winter storms, flooding, and a hurricane could all bring enough rain and or snowfall to cause a dam failure. The age of these dams also pose a risk to the structural integrity of these dams. A failure of the Creamer Dam could cause considerable loss to lives, property and economy.

History

There have been no known dam failures in the Town of Tiverton.

See Appendix E for a list of Tiverton dams as identified by the Rhode Island Department of Environmental Management.

3.1.12 Flooding (Riverine)

The Tiverton HMC chose to differentiate between coastal floods (discussed above) and riverine floods in this hazard mitigation plan. Although the western part of town is technically located on a river, it is tidal and creates a hazard similar to other coastal water bodies. This section on riverine floods focuses on the inland streams and rivers which are less of a hazard because they are located in less developed areas.

[45] Town report: "396 Nonquit Pond Dam"

Description

Flooding typically results from a large weather systems generating prolonged rainfall or on-shore winds. Other causes of flooding include locally intense thunderstorms, snowmelt, ice jams, and dam failures. The excessive rainfall accumulates within a body of water and overflows onto the adjacent lands. The land adjacent to a water body is referred to as a floodplain. Flash floods are characterized by rapid on-set and high velocity waters, carry large amounts of debris. Floods are capable of undermining buildings and bridges, eroding shorelines and riverbanks, tearing out trees, washing out access routes, and causing loss of life and injuries (FEMA's Multi-Hazard Identification and Risk Assessment 1997, Chapter/Section Number: Subpart C. Natural Hazards: Hydrologic Hazards, pg. 138).

The streams in Tiverton generally run in a north/south direction through undeveloped or lightly developed areas. Fortunately, the swamps and vegetated areas on either side of most of the streams are able to absorb any floodwaters, preventing water from moving towards the developed areas. Unlike the coastal area along the Sakonnet River, there isn't much infrastructure that is impacted by the flooded streams. Therefore, the THMC gave riverine flooding a low risk value.

Probability of Future Occurrence

Unlikely. Floodwaters will overtop the stream banks but is it expected to be absorbed by the adjacent floodplain.

Location

Borden Brook: South of Route 117/Bulgarmarsh Rd., runs through Weetamoo Woods into Nonquit Pond in the southwest corner of town

Adamsville Brook: South of Route 117/Bulgarmarsh Rd., runs through Great Swamp to the southeast corner of town.

Quaker Creek: South end of Nannaquaket Pond, runs through Weetamoo Woods, parallel to Route 77/Main Road before joining Borden Brook in the Four Corners area of town (179/Route 77)

Extent

Localized flooding can be expected to occur on an annual basis. The flood event which occurred in March, 2010 was a 250 year +/- event. Tiverton received about 8 inches of rain from 3/29/10 to 3/30/10.[46] Immediate concerns during the storm were the overtopping of Creamer Pond dam, household basement flooding, and property damage.

Impact

The flooding along these rivers is common during heavy rain events as the ponds fill up and the watersheds drain. The surrounding marsh, woods, and undeveloped areas protect the built environment from rising riverine floodwaters. Maintaining these important natural areas not only provides specific habitat for plants and animals, but also provides water storage, lowers flood heights and reduces erosion.

History

The remarkable flood events that have occurred in Tiverton have mainly been urban flooding during heavy rain events, or coastal flooding.

[46] Weatherdb.com https://daily-weather.weatherdb.com/d/a/Tiverton%2C-RI Accessed 4/7/17

3.1.13 Tornadoes

Description

A tornado is a violent windstorm with a twisting, funnel-shaped cloud. They are often spawned by thunderstorms or hurricanes. Tornadoes are produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado season is generally March through August, although tornadoes can occur at any time of year. Over 80 percent of all tornadoes strike between noon and midnight.[47]


Tornado in Springfield, MA 2011

Probability of Future Occurrence

Unlikely. Tornadoes rarely occur in this region.

Location

The entire town is susceptible to tornadoes. The THMC recognizes that the risk of tornadoes is low for the State of Rhode Island and Town of Tiverton but with the recent changing weather patterns and touchdowns of tornadoes, the Town has decided to consider them a possible hazard.

Extent

Tornadoes are categorized according to the damage they produce using the Fujita Scale (F-scale). Below is the Enhanced Fujita (EF) Scale and the Old Fujita (F) Scale. An F0 tornado causes the least amount of damage, while an F5 tornado causes the most amount of damage. Relatively speaking, the size of a tornado is not necessarily an indication of its intensity. On August, 7th, 1986, a rare outbreak of seven tornadoes occurred in New England. One such tornado, rated F2 on the Fujita Scale, carved its way through Cranston, RI, and Providence, RI, causing twenty injuries and $2,500,000 in damages. Table 17 highlights more tornado events that have affected, Rhode Island.

Table 20: Fujita Scale

Fujita Scale			Enhanced Fujita Scale		Damage Scale
F Number	Fastest ¼ mile (MPH)	3 Second Gust (MPH)	EF Number	3 Second Gust (MPH)	
0	40-72	45-78	0	65-85	**Light damage**. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
1	73-112	79-117	1	86-110	**Moderate damage**. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
2	113-157	118-161	2	111-135	**Considerable damage**. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or

[47] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update

Fujita Scale			Enhanced Fujita Scale		Damage Scale
F Number	Fastest ¼ mile (MPH)	3 Second Gust (MPH)	EF Number	3 Second Gust (MPH)	
					uprooted; light-object missiles generated; cars lifted off ground.
3	158-207	162-209	3	136-165	**Severe damage**. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown
4	208-260	210-261	4	166-200	**Devastating damage**. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
5	261-318	262-317	5	Over 200	**Incredible damage**. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

During an average year, about 1,000 tornadoes are reported across the United States, resulting in 80 deaths and over 1,500 injuries. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one-mile-wide and 50 miles long.[48]

Small weak tornado-like formations or waterspouts have been spotted off the coast of Tiverton but have not transpired into land-based cyclones.

Impact

Tornadoes could cause significant damage to structures, trees and utility lines. Flying debris could be cause injuries to residents. Mobile homes are generally more vulnerable to damage than steel framed structures. The Town has 270 mobile or manufactured homes within its borders, these properties are more susceptible to the threat of a tornado.

History

Table 21: Recent Tornado Events in Rhode Island[49]

Date	F-Scale	Injuries	Damage	Location
8/16/2000	-	0	$0	Providence County
8/7/2004	-	0	$0	Kent County
7/23/2008	1	0	$47,987	Bristol County
8/10/2012	-	0	$50,000	Washington County

[48] National Weather Service, http://www.erh.noaa.gov/box/hurricane/hurricaneBob.shtml

[49] Rhode Island Emergency Management Agency (RIEMA), Rhode Island 2014 Hazard Mitigation Plan Update. There have been no reported tornadoes in Tiverton.

3.2 Summary of Likelihood of Future Events

In developing a mitigation plan it is also important to gauge the future likelihood and potential impact of natural hazard occurrences. To do this each member of the Committee ranked the events based upon the probability of the event occurring and its impacts. The scores were then averaged and represented below. The resulting events where then classified as having various incremental probabilities of occurring in Tiverton (see Table 18).

Highly Likely: Will occur every 1-5 years

Likely: Will occur every 5-10 years

Not Very Likely: Will occur every 10-50 years

Unlikely: In intervals greater than 50 years

Table 22: Likelihood of Future Events

Hazard	Future Probability
Flooding (Coastal)	Highly Likely
Hurricane/Nor'easter	Highly Likely
Winter Weather	Highly Likely
High Winds	Highly Likely
Extreme Heat and Cold	Highly Likely
Brushfire	Highly Likely
Lightning	Likely
Hail	Possible
Drought	Likely
Earthquake	Unlikely
Dam Failure	Possible
Flood (Riverine)	Possible
Tornado	Unlikely

Chapter 4: Risk Assessment

This chapter presents the natural hazard risk assessment performed for the Town by the Committee. The purpose of the assessment is to identify facilities and population at risk from natural hazards, to overview the particular concerns, to gauge the potential level of impact on people and property, and to assess the level of risk posed within the Town.

The Assessment has six primary components that culminate in the Risk Assessment Matrix (3.8). The primary components include a: Facilities Inventory (Section 4.1), Hazard Mitigation Mapping (Section 4.2), Fiscal Impact Analysis (section 4.3), Built Environment (Section 4.4), Population Impact Analysis (Section 4.5), Natural Environment (Section 4.6) and Vulnerability of Future Structures (section 4.7).

4.1 Facilities Inventory

The first step in the assessment process was to create the inventory of facilities of special concern to the Town. The THMC identified the following as community assets:

- Flood Prone Drainage Systems
- Bridges
- Wastewater facilities
- Water facilities
- Electrical facilities
- Dams
- Critical municipal hazard response facilities
- Populations
- Businesses
- Schools
- Recreational Facilities
- Historic resources

These inventories can either be found depicted on the map presented in Section 4.8, in the Community Assets Matrix.

4.2 Hazard Mitigation Mapping

The Town's GIS database, including parcel data, orthophotography and FEMA flood zone information, were utilized to complete the assessment. The use of this system allowed the THMC to estimate potential fiscal and population impacts for individual parcels (see sections 4.3 and 4.4 for results) but enabled them to analyze spatial relations between variables.

The final output of this exercise is the Town of Tiverton Resources map later in this section. The focus of the maps is not to duplicate all of the spatial information generated through the inventorying process but rather to present the location of the identified risks as they relate to the Town's response facilities.

4.3 Fiscal Impact Analysis

The Town of Tiverton's parcel data and FEMA's 1% annual chance floodplain data were utilized to generate estimates of potential fiscal impacts from natural hazard events such as flooding. The information utilized from the tax assessor's database and GIS included the improvement values, land usage, and unit counts. The analysis showed that Tiverton is comprised of 23,232 acres of land, with 1,352 acres (<6%) in the regulatory floodplain. These 1,352 acres are mainly located on the western shore of town.

HAZUS-MH was used to further understand the potential risk from a large hurricane[50]. HAZUS-MH is a software tool that contains models for estimating potential losses from earthquakes, floods, and hurricanes. For the purpose of this plan, a scenarios was run that capture the town's risk from hurricane damage. The table below summarizes some of the potential damages. The hurricane scenario model uses the same path as the hurricane which tracked west of Tiverton.

In 1954 Hurricane Carol (peak gusts at 89 mph) tore through Southern New England, causing extensive damage throughout Rhode Island. If this same storm were to strike again today, it would cause over $10.7 million dollars in total economic losses (property damage and business interruption loss).[51] Only 27 buildings are expected to be at least moderately damaged, one of which would be total destroyed.

HAZUS Qualitative Damage Description
No Damage or Very Minor Damage Little or no visible damage from the outside. No broken windows, or failed roof deck. Minimal loss of roof over, with no or very limited water penetration.
Minor Damage Maximum of one broken window, door or garage door. Moderate roof cover loss that can be covered to prevent additional water entering the building. Marks or dents on walls requiring painting or patching for repair.
Moderate Damage Major roof cover damage, moderate window breakage. Minor roof sheathing failure. Some resulting damage to interior of building from water
Severe Damage Major window damage or roof sheathing loss. Major roof cover loss. Extensive damage to interior from water.
Destruction Complete roof failure and/or, failure of wall frame. Loss of more than 50% of roof sheathing.

Table 23: HAZUS-MH Scenarios for Tiverton, RI

1954 Hurricane Carol Scenario

DAMAGE	AMOUNT
Debris generated	8,708 tons
Buildings destroyed	1
Buildings at least moderately damaged	27
Displaced households	0
Essential Facility Damage (fire, police, schools)	<1 day loss
Residential Property (capital stock)	$10 million
Business interruptions	$666,170

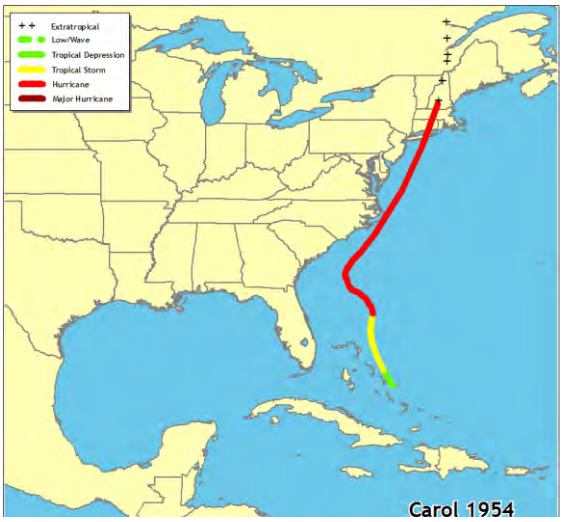


Figure 4: Hurricane Carol Path

[50] HAZUS modeling conducted by CDR Maguire on 6/23/2015 using HAZUS-MH 2.2
[51] HAZUS-MH: Hurricane Event Report, run 4/12/2016.

Table 24 displays potential damage estimates of property values of parcels that are located wholly or partially within the Town's Special Flood Hazard Area (SFHA, or regulatory floodplain). The parcel information, using the best available data, provides the number of parcels in the SFHA, and values of the buildings on each property. Land value was not considered for this exercise. The values provided are an estimate considering some properties are located in more than one sub-watershed. This percentage was calculated in order to assist with identifying which areas are at greater risk. According to Table 24, the town wide total potential building damages for these floodplain areas are over $42,000,000. The watershed with the most parcels in the SFHA is the Quequechan River. Of the 1,588 parcels in that region, 253 have buildings in the SFHA.

The most expensive property in the SFHA belongs to Inland Fuel, estimated building value of $1,913,000. (Note: the storage tanks themselves are not in the Special Flood Hazard Zone). The most valued private structure is a residential structure in the southwestern corner of town valued at over $1.4 million.

Approximately 80% of Tiverton's revenue is generated from property tax.[52] Should any of the properties forming the tax base be destroyed by a hazardous event, a causal effect would be those property owners whose parcels remain intact would carry and increased financial burden with regards to property taxes. It is an important course of action for the Town to protect both lives and property from natural disasters. However, as Tiverton's population grows, the burden of protecting lives and property grows.

Using data from the RI Geographic Information System (RIGIS) and information from the Tiverton Tax Assessor, the following table summarizes the value of the properties that are located within the Special Flood Hazard Areas.

Table 24: Assessment of Building Values within the Floodplain[53]

Watershed	# Parcels in SFHA w buildings	Residential	Commercial	Agriculture	Industrial	TOTAL
Mount Hope Bay	22	$ 2,539,700.00	$ 2,402,700.00	$ -		**$ 4,942,400.00**
Quequechan River	253	$ 32,089,400.00	$ 5,579,000.00	$ 687,100.00	$ 38,600.00	**$ 38,394,100.00**
Sakonnet River	0					**$ -**
Westport River	0					**$ -**
Sakonnet Point	0					**$ -**
TOTAL	**275**	**$ 34,629,100.00**	**$ 7,981,700.00**	**$ 687,100.00**	**$ 38,600.00**	**$ 43,336,500.00**

[52] As per the Tiverton Tax Assessor on 5/2/2016

[53] Tiverton 2015 Parcel Data

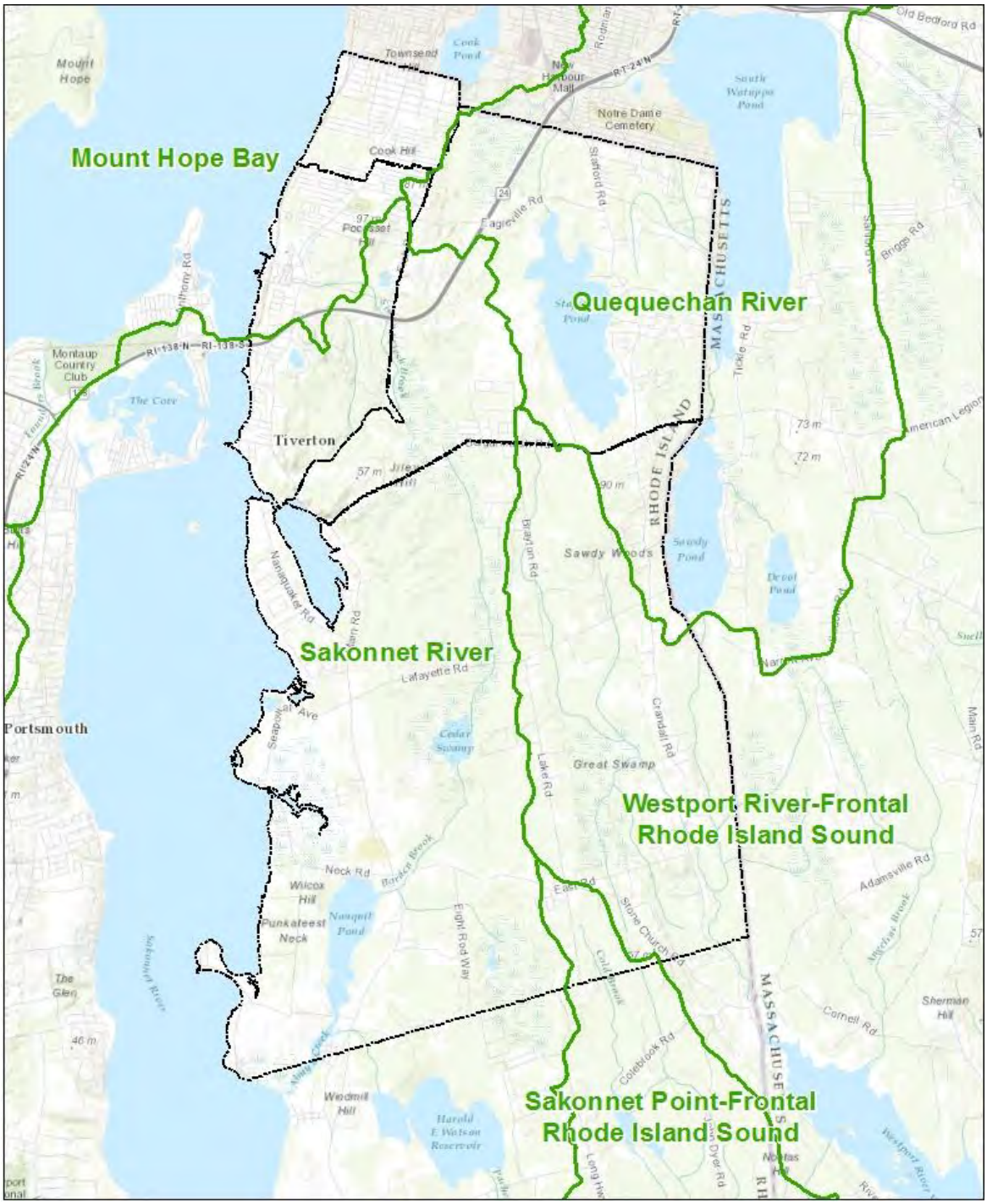


Figure 5: Map of Sub-basin Watersheds[54]

[54] RIGIS Watershed Boundary Dataset, *HUC12_RI_09*, 2009

4.4 Built Environment

According to HAZUS-MH, Tiverton has 7,165 buildings with a total replacement value (excluding contents) of $1.8 billion. Approximately 81% of which are associated with residential housing.

The THMC has identified critical infrastructure listed in the Community Asset Matrix (Table 19). The list includes: flood prone drainage systems (23), Bridges (4), Wastewater Facilities (6), Drinking Water Facilities (5), Electrical Facilities (5), Dams (4), Critical Municipal Hazard Response Facilities (13), Special Populations (8), Businesses (2), Schools (7), Recreational Facilities (11), and Historic Resources (33). All of these important community resources have the potential to be affected by a natural or manmade hazard. The magnitude of the losses would be dependent upon the type, location, and extent of each unique hazard.

The town's zoning laws help dictate future development while maintaining Tiverton's rural character. Continued enforcement of Rhode Island State building codes and new regulations as required will lessen potential damage caused by a natural hazard event. The codes adopted by the Town of Tiverton range from building codes and design standards, to zoning regulations.

Some of the developed parts of Tiverton are particularly susceptible to flooding. The base flood is an event that has a 1% chance of occurring annually and is the storm event used to identify the flood zones which impact zoning and building requirements throughout the Town. In Tiverton, the THMC is most concerned about the coastal area along the tidally influenced Sakonnet River where many homes and businesses are located in the flood zone or even perched above the water. Fortunately, there are fewer structures around the streams that traverse the Town.

4.5 Population Impact Analysis

Of primary concern during a hazard event is protecting the health and safety of Tiverton residents. In addition to knowing the total population, it's also important to estimate how many people would be impacted by loss of service or need to evacuate. According to the 2014 US Census, there are 7,443 housing units in Tiverton supporting a population estimate of 15,805. The population is not spread evenly throughout the town.

Using the 2014 Tax Assessor's Database, the Rhode Island GIS e911 structure file, and the Town's GIS, it was determined that there are total of 315 structures within Town's base flood zones (37 are commercial, 1 is public, and 273 are residential buildings).

In addition to private wells, which serve most of the population, there is public water service in the northern part of town.

Tiverton Middle School located on Quintal Drive is the primary Red Cross shelter for the Town. In the event an emergency shelter is needed, Ranger Elementary School on Brayton Road can be used as a backup shelter. Maintaining access to both facilities during a hazard event is crucial. Neither

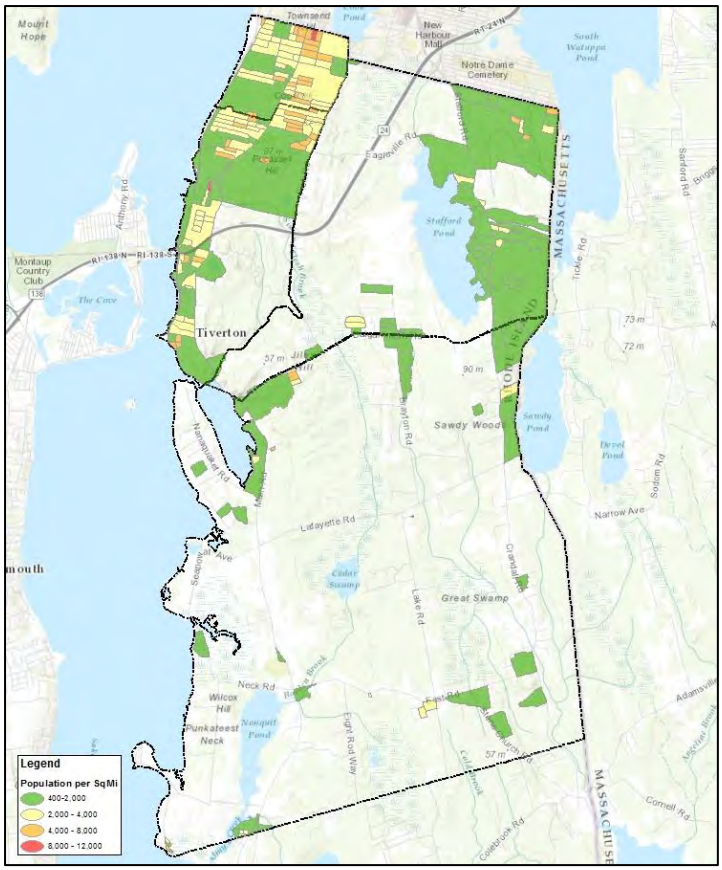


Figure 6: Population Density

building is in a SFHA but roads leading to the shelters are crossed by streams that may cut off access. On average, the primary shelter is opened twice a year as a heating or cooling center.

Due to their non-residential nature, at-risk population estimates could not be developed for historic resources, critical municipal hazard response facilities, and recreational facilities.

4.6 Natural Environment

According to the Comprehensive Plan, "farms, broad open spaces, forests and miles of scenic roadways in the south, and the rich ethnic and architectural heritage in the north give the town its fascinating diversity. Along the west side lies the beauty of an unspoiled coastline, treed neighborhoods, while low lying heather, bogs and swamps alternate with farms and crossroads hamlets in the eastern portion of the town. These are all precious qualities of small town New England that are rapidly disappearing, and qualities that townspeople fear will be lost in Tiverton's future".

"Extensive wetlands are protected by state and federal wetlands regulations, while many other areas are not suitable for development because of poor soil conditions for residential septic systems. With the town's Building Official, Planning Board and Conservation Commission monitoring construction activities and state regulatory efforts, development cannot occur in many areas of the town".[55]

Fresh water resources in Tiverton include Stafford Pond (primary source of the drinking water supply), Nonquit Pond (part of the City of Newport's water system), and groundwater. Efforts between the Rhode Island Department of Environmental Management and the Town of Tiverton have enacted regulations within the watersheds that protect these critical resources.

"Wetlands form a significant component of the land area of the town and are a major natural feature. Coastal wetlands comprise over 528 acres. These include large areas at Seapowet and Fogland Marshes. Inland wetlands comprise nearly 4,500 acres throughout the town. Major areas include Great Swamp and Cedar Swamp in south Tiverton, and Basket Swamp and Pocasset Cedar Swamp in the northern section of town".[56]

Weetamoo Woods (541 acres) in the central part of town is the largest area of contiguous forest. Combined with nearby Pardon Gray Preserve (230 acres), the area is a unique oak/holly forest community and habitat for fire state listed rare species.

4.7 Vulnerability of Future Structures

Since the 2005 hazard mitigation plan, Tiverton has experienced slow growth. In addition to a marginal population growth, the area along Route 24/Fish Road is now more developed. The coastal areas continue to experience the growth pressures. There are more houses at risk of being isolated should storm surge overtop 3 Rod Way. The structures themselves, are being built to the latest building codes which are enforced by the Town.

There is enough land available to meet Tiverton's near-future development needs for both residential and non-residential structures. An estimated 21% of the town is zoned for residential uses. A build out analysis conducted in 2006 projected that an additional 3,681 dwelling units could be developed based on current land available and zoning in place. Future growth will likely be centered along expansions of water and sewer services areas in the central part of the town.

Tiverton's vulnerability to natural hazards is not expected to change dramatically over the next five years due to increased development. Enforcement of current building codes will ensure that development will be stronger and more resilient than some of the older structures in Tiverton.

[55] Tiverton Comprehensive Community Plan 2009
[56] Tiverton Comprehensive Community Plan 2009

4.8 Risk Assessment Matrix

The matrix (Table 25): Critical Infrastructure/Community Assets) represents the culmination of the risk assessment process and is the final product. Its purpose is to gather all the pertinent results in one place for ease of presentation and to serve as a starting point for discussion of specific mitigation actions. It not only lists the specific areas of concern, but provides detailed location information, summarizes the applicable hazard, problem, and mitigation benefits.

Table 25: Critical Infrastructure/Community Assets

AT RISK	LOCATION	HAZARD	PROBLEM	MITIGATION BENEFITS	PROPOSED ACTIONS
Flood Prone Drainage Systems	A. Fogland Beach/3 Rod Way B. Riverside Drive C. Souza Rd @ Main Rd/Villages at Mount Hope D. Main Road @ Creamer Pond E. Fish Road @ Birch St. F. Fish Road @ Louis Dr. G. Fish Road @ Trout Pond (south of Souza Rd.) H. Fish Road @ Bulgarmarsh I. Mill Street @ Hooper J. 433 Main Rd. Area K. Main Rd. @ Mt. Hope Ave. L. Main Rod. @ Lawrence Court M. Lee Way @ Hancock St. N. Eagleville Rd.@ New England Hardwood O. Old Colony Terrace Area P. Seapowet Ave. north of bridge Q. Bulgarmarsh/Lucy/Main Rd. Area R. Evans Ave. @ Riverside Drive S. Stone Bridge Area T. Furey Ave. @ Brayton Rd. U. Stafford Rd. @ Frazier Lane V. Fairwood Drive @ Devin Way W. Crandall Rd. @ Blueberry Lane	Flooding	Flooding of local roads limit access and may strand residents and hinder rescue or evacuation efforts	Drainage, road access, reducing infrastructure loss.	<u>Actions #1-5</u> Drainage Study Sewer Outfall Inspection Elevate Roadways NFIP Substantial Improvement Compliance Waterfront Construction Class
Bridges	A. Pond Bridge Road Bridge- town owned B. Route 24/138 C. Nannaquaket Road Bridge- State owned D. Seapowet Bridge- DEM owned	Flooding Terrorism/vandalism	Bridge closures limit access and may strand residents and hinder rescue or evacuation efforts	Fewer bridge closures, protecting infrastructure safety, maintain emergency response time	<u>Actions #6-8</u> Bridge Upgrade Bridge Replacement Bridge Repair
Wastewater	A. Tiverton Wastewater District (pumps to Fall River for treatment) B. 5 Pump Stations • Schooner Drive (in a flood zone but elevated) • Blackbird Court (Countryview Estates) • Hurst Lane (for Countryview Estates) • 50 Industrial Way (DPW & Police Station) • Mill Street @ Canonicus (Bourne Mill) C. Wastewater district	Drought Flooding Hazardous Material Release	Aging infrastructure within wastewater district. 200 feet of wastewater infrastructure along the coast washed out during 2010 floods.	Public health and safety	Not an immediate focus for this 2017 plan.

AT RISK	LOCATION	HAZARD	PROBLEM	MITIGATION BENEFITS	PROPOSED ACTIONS
Water	A. Interconnection w. Stone Bridge Water, North Tiverton Fire, and Fall River B. Dry Hydrants at Pond Bridge, Old Nonquit School, and Sandra Lee @ Crandall C. Water Tank @ Pocasset Ave., North Brayton Road, and Quintal Drive	Drought Flooding	Contamination of water in the water towers could leave (% pop) without potable water. Destruction of water towers could cause widespread flooding Infrastructure used to carry water for fire suppression as well as municipal drinking water. Failure of the systems could increase risk of widespread wildfire, and affect human health. Aging infrastructure within the water district.	Safe and abundant drinking water.	<u>Actions #9a-9c</u> Improve communication with distributors.
Electrical Facilities & Communication Equipment	A. National Grid Substation @ Canonicus St. B. Power Plant @ Progress Way (Tiverton Power) C. Overhead telephone lines- antiquated lines owned by Verizon D. Cell phone towers (Landfill, DPW) E. Communication Towers (Police Station, Crandall Road, Hambley Road)	Drought Severe Winter Weather Thunderstorms Hurricane/Nor'easter Tornado Terrorism/vandalism	Drought (low water) at Stafford Pond or a compromised gas pipeline would affect the power plant. Downed high tension wires could create an electrocution hazard. Verizon has no intention of replacing antiquated lines. Failed Internet and phone switches could affect town wide communication. Security of towers from terrorism or vandalism activities (based on previous experience).	Provision of essential utility service, reduction in cleanup and repair costs, and the promotion of public health, safety, and welfare.	<u>Action #10</u> Physical security of communication towers
Dams	A. Creamer Pond (high hazard). Dam Emergency Action Plan in Place. Owned by Daniel T. Church Homeowners Assoc. B. Eagleville Pond (low hazard). Dam Emergency Action Plan in Place. Owned by Fall River, MA. C. Mill Pond (significant hazard). Dam Emergency Action Plan in Place. Owned by Dennis O'Keefe Trust D. Nonquit Pond (significant hazard). Dam Emergency Action Plan not signed by DEM. Owned by the City of Newport, RI.	Flooding Earthquake Terrorism/vandalism	Dam failure could lead to damaged roads, flooded homes and businesses, and economic loss.	Structural preservation preventing catastrophic flooding, reducing property loss and protecting public health, safety, and welfare.	<u>Actions #11a-12</u> Improve residents' knowledge of dam failure evacuation
Critical Municipal Hazard Response Facilities	A. Fire Station 2 (85 Main Road) B. Fire Station 3 (45 Crandall Road) C. Fire Station 4 (287 East Road) D. Police Department (20 Industrial Way) E. Town Hall (343 Highland Road) F. Public Works Garage (50 Industrial Way) G. Tiverton Wastewater District H. Stone Bridge Water District I. North Tiverton Fire Dist. J. Radio Tower (800 MHZ) on Pocasset Ave. -Water Tower K. Library- Warming and Cooling Center L. Tiverton Middle School- Red Cross Shelter M. Senior Center- Warming and Cooling Center	All hazards	Depended upon for responding to all natural hazard events Potential loss of physical access, power supply and critical systems, thus hindering the governmental and emergency response to natural hazard events. Aging infrastructure within the water and wastewater districts.	Protection of essential public services, records, evacuation routes, and the general livelihood of Tiverton's residents and their property.	<u>Actions #13-14</u> Implement CERT program Secondary emergency access road for police and DOT

AT RISK	LOCATION	HAZARD	PROBLEM	MITIGATION BENEFITS	PROPOSED ACTIONS
Populations	A. 207 Canonicus St., Senior Center (Town owned) B. 1215 Main Rd.,Brookdale Sakonnet Bay (Assisted Living-Private) C. 40 Alicia Circle Stafford Point (Low Income Units-Private) D. 99 Hancock Street (Low Income Units-Private) E. 213 Hurst Lane, Countryview Estates (55+ community of manufactured homes- Private) F. 73 Jiley Hill Rd, Life Inc. (Group Home- State) G. 340 King Road, Looking Upwards (Disability Programs-State) H. 35 Highland Court (Group Home- private)	All hazards	Special needs populations that may need assistance during hazard events. Ambulatory needs for remote areas.	Care facilities for welfare improvement of special needs populations.	<u>Action #15</u> Promote heating and cooling centers
Businesses	A. Inland Fuel @ 25 State Ave. B. Algonquin (Spectra Energy) gas transmission pipelines throughout the town.	Terrorism/vandalism Hazardous Material Release	Possible terrorism targets. Transportation of fuel in and out of Inland Fuel via truck. Storage of fuel in tanks along the coast at the Massachusetts border. Rupture of gas transmission lines. Water contamination, public health and safety.	Protection of nearby natural resources Improved infrastructure safety Improve protection of public health and safety	<u>Actions #16-17</u> Review mitigation plan for Inland Fuel Educate coastal business owners
Schools	A. Future Scholars Preschool B. Sakonnet Early Learning Center C. Fort Barton School (near Town Hall) D. Ranger Elementary School (Brayton Rd) E. Pocasset School F. Tiverton Middle School (Red Cross Shelter) G. Tiverton High School	Severe Winter Weather Thunderstorms Hurricane/Nor'easter	Potential loss of physical access, power supply and structural integrity thus compromising sheltering abilities.	Protecting a Red Cross Shelter Improved structural integrity, allowing for faster recovery.	<u>Actions #18-20</u> Improve access Upsize generator at Middle School (Red Cross Shelter) Generator at Ranger Elementary School
Recreational Facilities	A. Weetamoo Woods B. Fort Barton (more developed) C. Bulgarmarsh Recreation Area D. Town Farm Recreation Area E. Bayview Playground F. Fogland Beach cabana G. Pocasset Field H. South Field I. Florence St. Area J. Grinnell's Beach K. Harbors	Winter Storm Thunderstorm Hurricane/Nor'easter Drought Brushfire	These facilities provide residents of Tiverton places to go for recreational and leisure activity. The occurrence of a natural hazard event creates a threat of property damage and natural systems.	Preservation of recreational facilities and reducing risk to residents.	<u>Actions #2, 21, and 22</u> ATV for rescue Weetamoo Woods site improvements Sanitary facilities at Fogland Beach

AT RISK	LOCATION	HAZARD	PROBLEM	MITIGATION BENEFITS	PROPOSED ACTIONS
Historic Resources (none in VE zone)	A. Almy Farm B. Almy House C. Amicable Congregational Church Parsonage D. Andrew White Store E. Arnold Smith House F. Barker House G. Benjamin F. Seabury House H. Joseph Hicks House I. Barker House J. Capt. Abel Manchester House K. Capt. Henry F. King House @ 137 Seapowet Ave. **(AE zone)** L. Chace-Cory House M. Col. D. Durfee House/Old Durfee Farm N. Cook-Bateman Farm O. Cory-Hicks-Borden-Gardner-Stevens House P. Edward Bennett House/James Otis Hambly House Q. Homelands at 575 Nanaquaket Rd. (**AE zone)** R. Job Gray House S. Judge Joseph Osborn House T. King Cottage U. Nathaniel Briggs-Manchester House V. Old Durfee Farm W. Osborne House X. Capt. Thomas Osborne House Y. Pardon Cory House Z. Samuel Wilcox House/The Brick Front AA. Soule-Seabury House BB. Stone Grist Mill CC. Thomas-Grey-Durfee Farm DD. W.M. Durfee Farm EE. White Homestead FF. William Batemna/Preserved Tripp's Wheelwright Stop GG. William Whitridge House	Flooding Severe Winter Weather Lightning Hurricane/Nor'easter	These historic resources, susceptible to property damage, contribute to Tiverton's culture, heritage, and general character.	Protecting irreplaceable property that contributes to Tiverton's culture, heritage, and general character.	<u>Action #23</u> Involve local historian in hazard mitigation activities where applicable

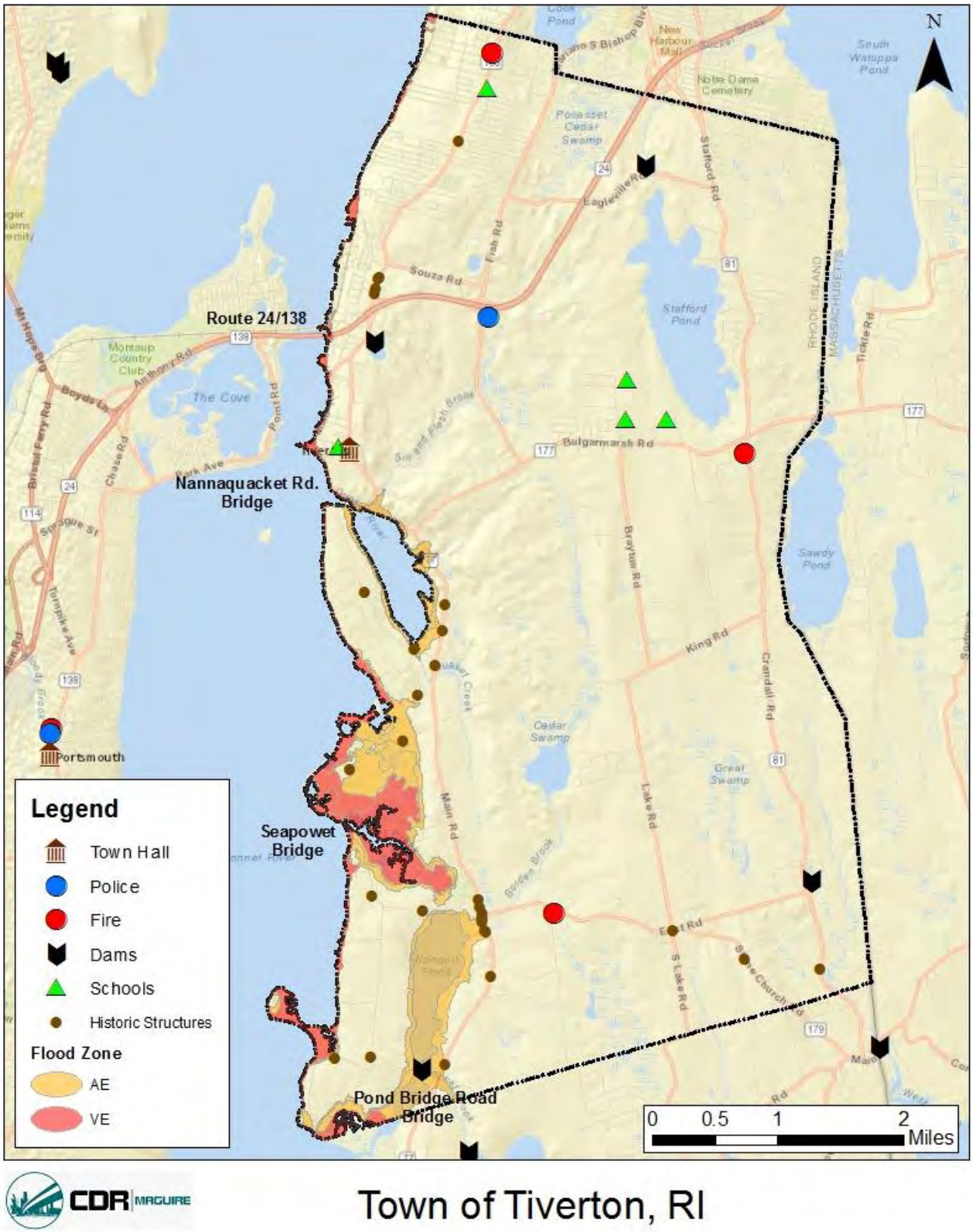


Figure 7: Resource Map

Chapter 5: Programmatic Capability Assessment

5.1 Purpose

This capability assessment examines the existing studies, plans, programs, and policies that have incorporated hazard mitigation and other pro-active tools into the Town system. The purpose of the capability assessment is to highlight successes, identify shortcomings, and to lay the groundwork for possible improvement. Tiverton recognizes that the inclusion of mitigation initiatives not only benefits the community by reducing human suffering, damages and the costs of recovery, but also helps build and maintain the sustainability and economic health of the Town. Section 5.2 details the Town's existing relevant plans, programs, and policies that were reviewed during the drafting of this plan.

5.2 Primary Plans, Regulations, and Departments

Tiverton Comprehensive Plan

In 1987 the town developed its first comprehensive plan. The current 2009 plan outlines actions that can be taken to address increased development pressures, economic stability, open space and recreation issues, and public infrastructure and facilities. The comprehensive plan also outlines goals, policies, issues, and actions to provide a framework for everyday operations within the town. The town recognized that incorporating mitigation initiatives (both pre-disaster and post-disaster) into the comprehensive plan would not only benefit the community by reducing human suffering, damages and the cost of recovery, but would also assist in building and maintaining the economic health of the town. (As of the date this hazard mitigation plan is being submitted for review, the 2017 Comprehensive Plan is still in draft form.)

Land Development and Subdivision Regulations

Chapter 23/Appendix B of the Code of the Town of Tiverton has the Tiverton Land Development and Subdivision Regulations. These regulations promote the protection of the existing natural and built environment and the mitigation of all significant negative impacts. In addition to providing procedures for plan review, the regulations also promote land development designs that are consistent with the Comprehensive Plan.

Zoning Ordinance

Tiverton's Zoning Ordinance, adopted in 1994, manages growth and land use. Article XI Special Flood Hazard Area of the Zoning Ordinance was created to minimize property damage, protect watercourses from encroachment, and preserve the ability of floodplains to retain and carry off floodwaters. There is also a watershed protection overlay district (Article VIII) to protect the quality and quantity of surface water and drinking water supplies.

Emergency Operations Plan (EOP)

Tiverton revised its Emergency Operations Plan in 2010. The plan details the Town's responsibilities and actions in the event of an extraordinary emergency situation associated with natural, man-made and technological disasters. Tiverton's EOP offers pre- and post-disaster strategies and measures designed to utilize emergency response organizations for protection of Tiverton's population and infrastructure, thus reducing the loss of life and limiting damage to private and public property.

National Flood Insurance Program

The Town of Tiverton is an active and compliant member of the NFIP since May 2, 1977. As such, Tiverton residents are able to purchase flood insurance to protect their property against flood losses. The following measures represent actions that have been conducted to remain compliant:

- The Town has designated the Building Official as the Local Floodplain Administrator to manage the program.

- The Town of Tiverton has adopted the most recent (September 2013) Flood Insurance Rate Maps (FIRM) and Flood Insurance Study (FIS).
- The Tiverton Zoning Ordinance includes "Article XI Special Flood Hazard Areas" to regulate development in the Special Flood Hazard Area.
- The Town also maintains a section of their website that is dedicated to floodplains and flood insurance.

The Town will continue improve public outreach through direct mailings, the municipal website and social media regarding flood hazard risk, flood insurance, and mitigation.

Harbor Management Plan

The Tiverton Harbor and Coastal Waters Management Commission has a harbor management plan designed to help protect water quality for conservation and fishing areas, biological habitats, swimming, windsurfing, and aquaculture, as well as for safe navigation within the waters. The plan provides guidance for the management and safety of existing and future activities on and in the coastal waters. Further, the plan provides recommendations concerning shoreside activities compatible with the activities occurring in and on the waters. Potential coastal mitigation measures may be influenced or supported by the Harbor Management Plan.

Forest Fire Management Assessment

Weetamoo Woods is a 650 acre "middle-aged" forest in central Tiverton. One of the biggest threats to the area is wildfire, especially since many areas within the reserve are not accessible by vehicle. Working with the Rhode Island Department of Environmental Management (RIDEM) and Tiverton's Conservation Commission, Tiverton's Emergency Management department created a Weetamoo Woods Preplan/Hazard Assessment. The purpose of this effort was to identify general areas of high risk (high level of usage) and areas of high hazard (concentrated fuel areas, fuels of concern, landscape concerns) within Weetamoo Woods. Recommendations from this study are incorporated into the mitigation actions proposed in this plan. The Emergency Management department continues to work with the Conservation Commission on maintaining trail access for fire suppression.

DEPARTMENTS

Emergency Management

The Town maintains an Emergency Management Director (Fire Chief) and a Deputy Director. The Emergency Management Director will continue to lead the efforts concerning future hazard mitigation plan updates as per regular duties assigned to the position. These are volunteer positions. The Town Council President is responsible for declaring emergencies and is the final authority for all emergency management decisions.

Planning Department

The Department of Planning carries out all the planning functions related to land use, environmental protection, and economic development required by the Town Charter, the ordinances of the Town, and the laws of the State of Rhode Island. Actions as outlined in this hazard mitigation plan will help prioritize the growth and resiliency goals of the community. This department also manages the GIS data and mapping requirements.

Code Enforcement

Code Enforcement is responsible for administration and enforcement of the state building code, the zoning ordinance, and the Housing Maintenance and Occupancy Code, and floodplain administration. The Code Enforcement Department aims to promote safety, health, and well-being of the people of Tiverton. The elevation certificates are maintained by this department.

Public Works

The Public Works Department (DPW) has a staff of 11. It is charged with maintaining the town owned roads including snow removal, street sweeping, roadside mowing, catch basin cleaning and sign maintenance, as well as the town landfill operation, and the repair and maintenance of town buildings other than those used by the School Department. The DPW has three dump trucks and two backhoes that can be used to move debris, and chainsaws and tools to clear debris from roads. Large scale disasters would require the Town to hire extra trucks and equipment to clear debris. There is adequate storage space for debris at the Tiverton landfill located in Main Road but the Town would need to hire a large tub grinder to process all the collected debris material in the event of a large disaster. Elements of this hazard mitigation plan will help the public works department prioritize projects and facilitate grant applications for funding. This department is out in the Town every day and offers firsthand experience on vulnerable systems, and infrastructure needs.

Tiverton coordinates snow removal efforts with the State DOT, to clear the state roads in town during snow emergencies. DPW maintains nine (9) plows and, seasonally, hires up to 20 contract employees.

Tree Warden

Tiverton has a Tree Warden who periodically surveys the streets for potential overgrown or dead trees. The DPW works in conjunction with the Tree Warden to remove or trim high risk trees. In addition to the Tree Warden's surveys, National Grid has a program to remove trees and limbs which present a threat to utility lines. This tree maintenance has proven to be very helpful by reducing dead trees and overgrown branches that might otherwise impact power lines during a wind storm. This practice represents an ongoing maintenance action.

Police and Fire

Police and Fire Departments in Tiverton ensure the safety and wellbeing of town citizens. Updated internal communication system and adding additional repeaters to improve radio communications. Upon request, the Tiverton Fire Department provides training for citizens in the use and handling of portable fire extinguishers. Fire department personnel offer a C.P.R. class for citizens on a regular basis. The town currently has 20 people trained in American Red Cross (ARC) Emergency shelter operations. As part of the hazard mitigation planning committee, members of the police and fire department can suggest actions that can improve disaster response. They can also use this plan as guidance when applying for grant funding.

Tiverton Wastewater District (TWWD)

The TWWD aims to safeguard public health by protecting and improving ground and surface water resources. Implement efficient and effective wastewater management and disposal within the Tiverton water District. TWWD manages the wastewater collection system which covers about one third of the Town.

Tiverton School Department

The School Department has a system in place to ensure the timely and safe removal of snow from school roofs and access areas, thus preventing structural damage and protecting human safety.

As of April 2016, the Rhode Island Department of Education has planned to conduct a full structural assessment of the schools in Tiverton as part of a larger project funded by a $15.4 million dollar bond. The outcome of this assessment will help prioritize future mitigation actions. Currently, the Middle School has a failing roof and an undersized generator.

Mutual Aid & Coordination with Fall River

The Town of Tiverton has a fire service mutual aid agreement with the Towns of Bristol, Jamestown, Little Compton, Newport, , Middletown, Warren and the Newport Naval Station - collectively known as East Bay Control. This collaborative effort aids in emergency response as well as coordinated evacuations.

Tiverton has joined the interstate Emergency Management Assistance Compact (EMAC) and are co-signers of the Southern New England Fire Emergency Assistance Plan established to cover the firefighting and emergency responding

needs of communities. There are a few residential areas of Fall River adjacent to the eastern border of Tiverton that are separated from the rest of Massachusetts by water. Because of their geographic location, either department may be called. If Tiverton emergency responders receive the call and are the first on the scene, they notify Fall River.

In 1746, Tiverton, Massachusetts was annexed to Rhode Island as part a boundary dispute settlement. Littoral rights and ownership of Stafford Pond are still in question. This creates a unique water rights agreement between Fall River and Tiverton.

Town Council

The Tiverton Town Council is comprised of seven (7) members, elected from the town at-large to serve for a term of two years. These elected members are the governing body by which new plans and policies but be adopted. They take a holistic view of the Town's operations when formulating policies and exercising town powers. Educating the Town Council members about the importance of hazard mitigation is not only beneficial for the Town's resiliency but also facilitates plan adoption.

Tiverton Hazard Mitigation Committee

This group of invited local Stakeholders and decision makers is brought together as needed to update the hazard mitigation plan and during the annual review process. The intent is that this hazard mitigation effort will drive mitigation projects within the Town. This group will continue to be led by the Emergency Management Director.

Conservation Commission

An advisory body to the Tiverton Town Council on the following topics: protection of surface water and groundwater including the watersheds of Stafford and Nonquit Ponds; compliance with the RI Freshwater Wetlands Act; monitoring of storm water runoff and other nonpoint source pollution; compliance with soil erosion and sedimentation control regulations; monitoring of RI and Town wastewater management regulations; monitoring of underground storage tanks; monitoring the environmental impact of the Town landfill and solid waste management; compliance with regulations that protect coastal areas including salt marshes, bogs and ponds; protection of other environmentally sensitive or unique areas, protection of agricultural resources, protection of air quality, protection of the rural integrity and scenic character of the Town including tree and woodland preservation.

Economic Development Commission

The Tiverton Economic Commission acts to promote and facilitate business development in accordance with the Town's Comprehensive Plan, ordinances and regulations while preserving and enhancing the town's character. Managing development can improve hazard resiliency and protect valuable natural resources.

Sheltering

The Tiverton Middle School is the Town's designated Red Cross approved emergency mass care facility. The school has food storage, a backup emergency generator, and is equipped with a full kitchen capable of providing mass quantities of food. The ARC requires 40 square feet of usable space per person in each mass care facility. FEMA estimates that in the event of a natural disaster that requires mass care, 20 percent of an evacuated population will seek public mass care. The Middle School is free of flood risk and the total mass care capacity is 136 people. In the event of overcrowding at the Middle School, Tiverton will also open other schools, public buildings and churches.

Tiverton Harbor and Coastal Waters Management Commission (THCWMC)

In 2012, the THCWMC conducted a visual inventory of the coastline from the Sakonnet River. Having this video on record is a valuable tool to monitor future sea level rise and changes in development. There are no current plans to conduct this survey regularly but may be done after a storm or other significant change in the shoreline to assess damage.

Storm Ready Community

Tiverton is a StormReady community, having demonstrated necessary communication and safety procedures needed to save lives and property before and during a storm event. There is an existing notification network and every municipal building has lightning protection. The Town has adopted Standard Operating Procedures to provide guidance in preparing for and dealing with the effects of hazardous weather conditions. If the Tiverton EMA Director is unable to be reached, responders are encouraged to call the National Weather Service to get storm updates.

STATE PROGRAMS

Rhode Island State Building Code

All municipalities within the State of Rhode Island share a single building code (RIGL 23-27.3-100 et. al.). The Code itself (which incorporates the International Building Code) was last amended in 2012 and provides comprehensive construction requirements designed to mitigate the impacts from natural hazards, such as high wind events. The Code is enforced by the Tiverton Building Department and provides an additional layer of regulatory control to those discussed above.

Rhode Island State Fire Code Regulations

Tiverton has adopted the RI Fire Safety Codes to safeguard life and property from the hazards of fire and explosives in accordance with safe practice. The Code is enforced by the Tiverton Fire Department and provides reasonable minimum requirements for fore prevention and protection.

Rhode Island State Dam Safety Program

It is in the best interest of the Town and its citizens to maintain safe dam infrastructure. The Town of Tiverton participates in the State Dam Safety Program because the Creamer dam (owned by Daniel T. Church Homeowners Assoc.) is classified as 1 of 28 high hazard dams within the State. Mill Pond dam (owned by Dennis O'Keefe trust) and the Nonquit Pond dam (owned by the City of Newport) are classified as significant hazard dams. The State Dam Safety Program was created to facilitate the enforcement of the primary dam inspection law (RIGL 46-19, Inspection of Dams and Reservoirs). RIGL 46-19 states that dam owners are responsible for the safe operation, maintenance, repair, and rehabilitation of a dam, which are the essential elements in preventing dam failure; furthermore, dam owners are liable for the consequences of accidents or failures of their dams. All owners of high hazard and significant hazard dams are required to keep their dams and associated structures in a safe condition. As such, the Tiverton DPW Director has been reaching out to the local dam owners to encourage their participation by creating a dam safety plan. To date, these efforts have not been successful.

Rhode Island DEM Wetland Regulations

The Rhode Island Department of Environmental Management is responsible for regulating alterations of the freshwater wetlands throughout the State. Since many floodplains are also wetlands, appropriately managing these resources help maintain proper floodplain function. These regulations ensure that actions in this plan which will alter the physical landscape will not do so at the expense of wetlands.

Rhode Island Coastal Resources Management Council (CRMC)

The CRMC manages and implements the policies to preserve, protect, develop, and where possible restore the coastal resources of the state through comprehensive and coordinated long range planning and management designed to produce the maximum benefit for society from these coastal resources; and that preservation and restoration of ecological systems shall be the primary guiding principle upon which environmental alteration of coastal resources will be measured, judged, and regulated (CRMC RedBook).

Rhode Island Department of Education (RIDE) School Building Authority (SBA)

In June 2015, the SBA was created within the RIDE to assist local applications to the Fast Track Repair Program and Major Projects Program. These programs provide funds to provide safe, healthy, and educationally appropriate school facilities for its students. The Governor has recently approved $19,347,079 to be invested in structural improvements to school buildings in 18 communities. In Tiverton, the School Department expects funds to be used for replacing the boilers at and fixing the roof at both the Middle School and High School. The roof repairs will greatly improve the facility's resilience to snow, rain, and wind. As of early 2017, the bond has gone out to bid to secure contractors.

Chapter 6: Identification of Mitigation Actions

Whereas the two preceding Chapters identify risks from natural hazards and programmatic capabilities, this chapter defines a broad mission for the Town in mitigating these risks, and establish a series of hazard mitigation goals and specific implementation actions.

6.1 Mission Statement

It is the mission of the Town and the THMC to protect and enhance the quality of life, property and resources by identifying areas at risk from natural hazards and implementing hazard mitigation actions to protect the Town's residents; infrastructure; economy and its historical, natural and cultural resources.

6.2 Mitigation Goal

The mitigation goals are to implement actions which protect citizens; private property; public critical facilities and infrastructures; and the cultural, historical, natural, and economic resources. To achieve this, the THMC identified objectives which were used to focus mitigation efforts and provide a framework for discussion of specific actions. These objectives include: upgrading infrastructure and protecting property, strengthening municipal capabilities, and improving emergency response effectiveness.

6.3 Identified Actions and Objectives

The tables below summarize mitigation actions that have been deleted or completed since the 2005 Plan.

The 2017mitigation actions and objectives were developed by the THMC with review and opportunity for input from each of the prospective project leads. They are organized by vulnerable areas and in relation to of the three mitigation goals discussed above. The text following the table below summarizes the specific problem and proposed possible solution, details the primary tasks to be undertaken, identifies an appropriate lead and anticipates financing options. Each action was given a priority ranking of low, medium, or high as determined by the THMC.

Since it has been over 10 years since Tiverton's last hazard mitigation plan, there are necessary planning elements that need to be completed before additional mitigation actions can be considered. The Committee has identified a comprehensive range of actions below, some of which are planning. However, there is a mitigation action identified for each vulnerable area where applicable.

Priority Level

High: Reduces the greatest risks, is important to accomplish first
Medium: May need other actions to be completed first
Low: Less of an impact on safety and property

Time Frame (from date of plan adoption)

Short Term: within 1-3 years
Medium Term: within 3-5 years
Long Term: greater than 5 years

Table 26: Deleted Actions from 2005 Plan

Old Number	2005 Plan Action	Action Type	Vulnerable Area Addressed	Benefit	Lead	Status	Reason for Deletion
6	Request RIDOT assistance withreplacement of Pond (Nonquit) Bridge Road Bridge	Planning	Bridges	Protection of infrastructure, public safety and evacuation routes.	DPW	No longer relevant	Bridge is not a federal or state structure and cannot be funded through TIP funds.
12	Voluntary Citizens Fire Brigade	Public Outreach	Critical Facilities	The Fire Department would have trained citizens available to help support them in the event of a crisis in the town.	Fire Department	No longer relevant	Department has been focusing on strong permanent recruitment efforts.
17	Obtain and review the mitigation plan for Algonquin Gas/Spectra Energies	Prepared ness	Businesses	Protection of residents and the environment	Fire Department	No longer relevant as written	As of 5/2016 Spectra Energies does not have a mitigation plan for their pipeline. All emergency response outcomes or actions are done on a case by case basis. Their response plan is proprietary- they will not share it with the Town.

Since the 2005 Hazard Mitigation Plan adoption, the Town of Tiverton has completed 10 action items. The most critical actions were the replacement of the Sakonnet Bridge and Main Road Bridge. Some actions that were proposed in the 2005 plan are now part of the Town's regular preparedness efforts. These ongoing efforts have also been noted in Chapter 5: Programmatic Capability Assessment.

Table 27: Completed or Ongoing Actions from 2005 Plan

Old Number	2005 Plan Action	Action Type	Vulnerability Addressed	Benefit	Lead	Status	Comments
2	Identify alternate evacuation routes	Planning	Flood Prone Areas	Increased public safety in the event of road closures due to flooding.	DPW and Fire Departments	Completed	Emergency Exit Routes are currently posted. Currently directing evacuees to higher ground and emergency shelter locations. Which route police will direct citizens to utilize will depend on the type of storm, time and direction of an approaching event. Police will work in conjunction with RIDOT, State Police, Local DPW and Fire Department directing evacuation over and closing roadways and bridges where needed.
3	Replace Sakonnet Bridge	Property Protection, Structural Projects	Bridges	Protection of critical infrastructure, public safety and evacuation routes.	RIDOT	Completed	The Sakonnet River Bridge has been replaced with a new structure. The old bridge has yet to be demolished and removed.
4	Replace Main Road Bridge	Property Protection, Structural Projects	Bridges	Protection of critical infrastructure, public safety and evacuation routes.	RIDOT	Completed	The Main Road Bridge over Route 24 has been replaced with a new structure.
5	Monitor RIDOT bridge reports	Planning	Bridges	Protection of infrastructure, public safety and evacuation routes.	DPW	Ongoing	RIDOT bridge inspection reports are monitored and reviewed by the DPW Director for the Pond Bridge Road and Seapowet Bridges.

Old Number	2005 Plan Action	Action Type	Vulnerability Addressed	Benefit	Lead	Status	Comments
7	Identify alternate routes in the event of dam failure	Planning	Dams	Protection of infrastructure, public safety and evacuation routes.	DPW and Fire Department	Completed	Evacuation routes are noted in each Dam Emergency Action Plan.
8	Notify dam owners of their dam responsibility	Planning	Dams	Raise dam owners' awareness of their responsibilities. Protection of property, public safety and evacuation routes.	Town Administrator	Completed	Nothing came of this effort. Action re-written for 2017.
11	Continue annual tree trimming program	Property Protection	Utilities	Reduce damage to power and communications lines and public and private property. Minimize traffic disruption on roadways.	DPW, National Grid	Ongoing Capability	None
13	Maintain existing snow removal program	Property Protection	Critical Facilities	Cleared roads for public safety and emergency vehicles.	DPW	Ongoing Capability	None
14	Purchase a new front end loader	Property Protection	Critical Facilities	Acquisition of equipment necessary for snow removal, maintenance, and repair.	Town Administrator	Completed	Purchased new front end loader in 2006. Purchased new backhoe in 2015.
16	Perform ARC mass care facility inventory of stored supplies	Protection of Essential Services	Critical Facilities	The mass care facility has fresh supplies	Emergency Management Director	Completed	Updated October 2015.

Table 28: Current Action Items

Actions In 2017 Plan		Vulnerability Addressed	Priority Level	Time Frame	Status
1	Conduct a drainage study in the northern end of town	Flood Prone Areas	Medium	Medium	New
2	Purchase an ATV for sewer line inspections, trail maintenance, and rescue	Flood Prone Areas, Recreational Facilities	Medium	Medium	New
3	Elevate a portion of 3 Rod Way	Flood Prone Areas	Medium	Medium	New
4	Purchase building permit software	Flood Prone Areas	Medium	Short	New
5	Conduct a waterfront construction class	Flood Prone Areas	Medium	Short	New
6	Repair and fortify Old Stone Bridge structure	Bridges	High	Long	Scheduled
7	Replace Pond Bridge Road Bridge	Bridges	Low	Long	New
8	Repair Nannaquacket Road Bridge	Bridges	Medium	Long	New
9a	Map North Tiverton Water District and Stone Bridge Water District water systems	Water	High	Short	New
9b	Obtain and review peak usage and capacity data for water districts	Water	High	Short	New
9c	Create Town oversight of water districts	Water	High	Short	New
10	Install security cameras at the communication towers	Utilities	High	Short	New
11a	Identify alternate routes in the event of failure of Mill Pond Dam	Dams	High	Medium	New
11b	Distribute via direct mailing, evacuation route information to households downstream of the Mill Pond Dam.	Dams	High	Medium	New
12	Get dam action plans on file with RIDEM through another round of public education and outreach to dam owners	Dams	Medium	Medium	New
13	Implement a CERT program	Critical Facilities	High	Medium	Continued from 2005 Plan
14	Build a secondary emergency access road for the police department and DOT facilities	Critical Facilities	Medium	Medium	New

Actions In 2017 Plan		Vulnerability Addressed	Priority Level	Time Frame	Status
15	Promote heating and cooling centers	Populations	Medium	Short	New
16	Obtain and review mitigation plan for Inland Fuel Terminal.	Businesses	Medium	Short	Continued from 2005 Plan
17	Conduct a meeting for coastal property owners	Businesses	Medium	Short	New
18	Improve footpath between middle and high schools	Schools	Medium	Short	New
19	Upsize generator and improve transfer switch at middle school (ARC Shelter)	Schools	Medium	Short	New
20	Purchase and install generator and transfer switch at Ranger Elementary School	Schools	Medium	Long	New
21	Site improvement at Weetamoo Woods	Recreational Facilities	Medium	Long	New
22	Improve sanitation facilities at Grinnell's Beach and Fogland Beach	Recreational Facilities	Medium	Medium	New
23	Invite local historians to annual and 5-year plan review	Historic resources	Medium	Short	New

* Items with the "Continued from 2005 Plan" are carryover actions and retained their Priority Level from the previous plan.

Flood Prone Areas

Action 1 - Review Robert Gray drainage plan written in 2002. If necessary, hire an engineering firm to conduct a drainage study in the northern end of town, especially along Riverside Drive which is prone to coastal flooding during moon tides. The drainage systems need to be better designed to handle the wet weather flows in this low-lying, developed part of town. A study will help the Town identify and prioritize future mitigation actions.

Action Type – Planning and Regulations
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – DPW
Supporting – DPW and Fire Department
Financing Options – Town/operating budget
Cost Estimate – $15,000
Time Frame – Medium term
Benefit – Further understand the flooding problem and help set priorities for increased public safety.

Action 2- Purchase an ATV to aid in the bi-annual inspection of the sewer lines especially in the Village at Mount Hope Bay neighborhood where the sewer outfall is in a heavily vegetated area. Also needed or accessing deeper parts of the woods for firefighting/fire prevention maintenance, and rescue.

Mitigation Action Type – Prevention
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead –Town DPW
Supporting – Tiverton Wastewater District
Financing Options – Town DPW budget
Cost Estimate – $4,000-$10,000
Time Frame – Medium term
Benefit – Improve emergency access and preserve structural integrity of the road

Action 3- Elevate the road along Three Rod Way which runs along Fogland beach, connecting about 18 houses to the mainland. The houses are not threatened by flooding, but when the road is flooded, emergency response and general access is restricted.

Mitigation Action Type – Property Protection and Structural
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – DPW
Supporting – none
Financing Options – Town DPW budget, FEMA HMGP
Cost Estimate – Roughly ¼ million dollars per mile, $250,000
Time Frame – Medium term
Benefit – Improve emergency access and preserve structural integrity of the road

Action 4- Purchase updated building permit software that tracks cumulative cost of improvements to a property which may trigger the Substantial Improvement regulation.

Mitigation Action Type – Prevention
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – Building Official
Supporting – Code Enforcement
Financing Options – Town/operating budget
Cost Estimate – $10,000
Time Frame – Short term, but dependent upon implementation of Statewide permitting and tracking system.
Benefit – Increasing NFIP compliant buildings in the floodplain will reduce losses and make the Town more resilient.

Action 5- Conduct an annual ½ day waterfront construction class for area contractors using FEMA's Coastal Construction Manual as a guide. Integrate the 1 hour Coastal Construction Manual online course, and the Rhode Island Coastal Property Guide.

Mitigation Action Type – Public Education and Awareness
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – Code Enforcement
Supporting – Emergency Management
Financing Options – Town/operating budget. Coordinate with the State and/or FEMA.

Cost Estimate – $1,500
Time Frame – Short term
Benefit – More NFIP compliant buildings in the floodplain will reduce losses and make the Town more resilient.

Bridges

Action 6 – Repair and upgrade the Old Stone Bridge structure. The structure serves as a storm surge protector and energy dissipater for properties located north of it. It is currently crumbling from previous hurricane damage. Federal funds are being used for engineering consultant services to study the structure and develop a design for temporary repairs and overall upgrade. The upgrade will include the addition of additional riprap to improve the function of the structure.

Mitigation Action Type – Property Protection (including acquisition and elevation), Structural Projects
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Town Administrator
Supporting – DPW
Financing Options – Staff time, FEMA
Cost Estimate – $1.3 M
Time Frame – Long term
Benefit – Protect Main Road (an evacuation road), Riverside Drive and businesses and residences north of the structure from storm surge.

SCHEDULED. Construction expected in 2018.

Action 7–Replacement of the town-owned Nonquit Pond Bridge/Pond Bridge Road Bridge. The current bridge is structurally deficient. Alternate routes and current structural redundancies keep the bridge usable for now.

Mitigation Action Type – Property Protection, Structural Project
Pre or Post Disaster – Pre Disaster
Priority – Low
Lead – DPW
Supporting – Newport Water Authority
Financing Options – Town budget
Cost Estimate – $700,000
Time Frame – Long term
Benefit – Protection of infrastructure, public safety and evacuation routes.

Action 8–Repair of the state-owned Nannaquaket Road Bridge. Widen by 4 feet, raise by 2 feet.

Mitigation Action Type – Property Protection, Structural Project
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – State DOT
Supporting – Tiverton DPW
Financing Options –State highway funds
Cost Estimate – $750,000
Time Frame – Long term
Benefit – Protection of infrastructure, public safety and evacuation routes.

Wastewater

Much of the Town's wastewater infrastructure is tied into Fall River and not within Town control. All the wastewater facilities are in working order and are not an immediate focus of the THMC.

Water

Action 9- In order to better prepare for water distribution during a drought, the THMC recognizes a need to better understand the private distribution structure of the Town's drinking water. Currently the Town is required to approve future developments if they meet the building and zoning regulations but are approved without promise that there will be sufficient water to service them. There needs to be a better understanding of the system capacities so that the Town can manage development.

Action 9a- Map the North Tiverton Water District and Stone Bridge Water District water systems.

Action Type – Planning
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Fire Department oversight
Supporting – Water Districts
Financing Options – Town budget for the water districts
Cost Estimate – Staff time
Time Frame – Short Term
Benefit – Promote safe and abundant drinking water; improve the fire department's knowledge of the system used for firefighting.

Action 9b- Obtain and review peak usage and capacity data for water districts.

Action Type – Planning
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Fire Department
Supporting – Planning Board, Water Districts
Financing Options –Town budget
Cost Estimate – Staff time
Time Frame – Short Term
Benefit – Promote safe and abundant drinking water, smarter future development planning by the Town

Action 9c- Create Town oversight of water districts.

Action Type – Planning
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Town Administrator
Supporting – Water Districts
Financing Options –Town operating budget
Cost Estimate – Staff time
Time Frame – Short Term
Benefit – Promote safe and abundant drinking water, encourage smarter future development planning by the Town. **Obstacles-** unsure of how successful this will be considering it will require a legislative action.

Electrical Facilities and Communication Equipment

The current electrical and communication equipment is operational, and currently protected from floods, lightning, and power failure. After exploring a range of potential natural mitigation actions, the THMC does not propose any new actions at this time.

Action 10- Install security cameras at the communication towers which have previously been compromised by vandals.

Mitigation Action Type – Prevention
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Police Department
Supporting – Tiverton EMA
Financing Options – Annual Police Department Budget
Cost Estimate – $8,000 per unit
Time Frame – Short Term
Benefit – Physical security of communication towners used for cell phones and town-wide radio communication.

Dams

Action 11a- Identify alternate routes in the event of the failure of Mill Pond Dam (off Crandall Road) Failure of this significant hazard dam could result in the flooding of Adamsville in Little Compton which is downstream.

Action Type – Planning
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Police
Supporting – DPW and Fire Department
Financing Options – Town/operating budget
Cost Estimate – Staff time
Time Frame – Medium term
Benefit – Protection of property, public safety and evacuation routes

Action 11b- Distribute via direct mailing, evacuation route information to properties downstream of the Mill Pond Dam.

Mitigation Action Type – Public Education and Awareness
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Police
Supporting – DPW and Fire Department
Financing Options – Town/operating budget
Cost Estimate – Staff time
Time Frame – Medium term
Benefit – Protection of property, public safety and evacuation routes

Action 12- Send dam owners, via certified mail, an information packet that include the RIDEM dam safety requirements, a copy of the RI General Law 46-19-9, and instructions on how to complete a Dam Emergency Action plan.[57]There are no Dam Emergency Action Plans on file with RIDEM despite the Town's previous outreach to private dam owners. Currently Creamer Pond dam (high hazard), Mill Pond (significant hazard), and Nonquit Pond (significant hazard) require Dam Emergency Action Plans.

Action Type – Planning
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – DPW
Supporting – RIDEM
Financing Options – Town budget
Cost Estimate – $4,000
Time Frame – Medium term
Benefit – Identifies the areas, structures, facilities and roads that could be affected by dam failures, establishes a monitoring system which can activate the plan, identifies the corresponding official(s) along with their responsibilities in regards to implementing the plan.

Critical Municipal Hazard Response Facilities and Services

Action 13 – Implement a Community Emergency Response Training (CERT) program. There are currently three (3) Tiverton residents that have received CERT training from another town.

Action Type –Preparedness,
Pre or Post Disaster – Pre Disaster
Priority – High
Lead – Fire Department
Supporting – FEMA/RIEMA
Financing Options – FEMA
Cost Estimate – $1,000
Time Frame – Medium term
Benefit – The town would have citizens trained in community emergency response.

Action 14- Build a secondary, emergency access road for the police department and DOT facilities on Industrial Way.

Mitigation Action Type – Protection of Essential Services
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – Tiverton DPW
Supporting – Tiverton Police
Financing Options –Town Budget
Cost Estimate – $15,000 to $20,000 if utilized for emergencies only, and construction done by Town DPW workers.
Time Frame – Medium term
Benefit – Having a second point of entry/exit can provide additional level of safety during an event.

[57] See http://www.dem.ri.gov/programs/benviron/compinsp/pdf/dameaps.pdf

Populations

Action 15- Promote heating and cooling centers, and Special Needs registry at quarterly emergency management seminars at the Senior Center. Quarterly outreach message to also be posted in local newspaper, on social media, and disseminated to Meals on Wheels recipients.

Mitigation Action Type – Public Education
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – EMA Deputy
Supporting – Director of Tiverton Senior Center
Financing Options –Town Budget, volunteer time
Cost Estimate – $1,000
Time Frame – Medium term
Benefit – Ensure that vulnerable populations are adequately protected from the impacts of extreme temperatures.

Businesses

Action 16 – Obtain and review the mitigation plan for Inland Fuel Terminal, Inc. The facility is located in a VE Zone in the northern section of Tiverton near Mount Hope Bay and subject to inundation during a flood event

Action Type – Planning and Preparedness
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – Fire Department
Financing Options – Town budget
Cost Estimate – Staff time
Time Frame – Short term
Benefit – Protection of residents and the environment. If the company has a mitigation plan in place, the Town will be more confident that Tiverton's residents and surrounding environment are safe in the event of an incident.

Action 17- Conduct an annual evening meeting for coastal business owners to educate them on the risks associated with having property in the flood zone. Specifically address reducing their damage potential by elevating/retrofitting electrical equipment, pump stations, and storage tanks. Damage to these items can also cause harm to the surrounding natural and manmade environment.

Mitigation Action Type – Public Education and Awareness
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – Tiverton NFIP Coordinator
Supporting – Tiverton EMA, Building Official, Harbor & Coastal Waters Management Commission
Financing Options – Town Budget (Code Enforcement)
Cost Estimate – Staff time
Time Frame – Short term
Benefit – Reduce damages from hurricane force waves and coastal flooding

Schools

Action 18- Improve the condition of the 1/4 mile footpath from the Tiverton Middle School to the High School. The THMC would like to make this path usable for vehicular traffic in the event of an emergency evacuation to safely transport large groups of people to a safer location. Currently Quintal Drive (a dead end) is the only way in or out of the school. The secondary emergency evacuation route is especially important considering the high pressure Algonquin natural gas pipeline that runs through the middle school property.

Mitigation Action Type – Structural Project
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – School Department
Supporting- Tiverton DPW
Financing Options – School budget, Emergency Management budget
Cost Estimate – Staff time
Time Frame – Short
Benefit – Safeguard children and staff during an emergency.

Action 19- Upsize generator and improve transfer switch at the Tiverton Middle School, an American Red Cross shelter). The current generator is not sufficient to supply the shelter with enough power to function in the event of a power failure.

Mitigation Action Type – Emergency Service Protection
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – Emergency Management Director
Financing Options – School budget, Emergency Management budget, FEMA HMGP
Cost Estimate – $80,000
Time Frame – Short term
Benefit – Public safety for shelter clients.

Action 20- Purchase and install a generator and transfer switch at the Walter E. Ranger Elementary School to power the whole school which acts as a secondary Town shelter. Engineering will need to be done prior to installation.

Mitigation Action Type – Emergency Service Protection
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – EMA Director
Financing Options – Town Emergency Management budget, FEMA HMGP grant
Cost Estimate – $80,000
Time Frame – Long term
Benefit – Public safety for shelter clients.

Recreation Facilities

Action 21- Implement site improvement recommendations for mitigation hazards as outlined in the Weetamoo Woods Preplan/Hazard Assessment (see Annex 1). Specific focus will be on making the following routes more passable in a pick-up truck:

- Lafayette Road, and
- Yellow trail to blue trail, or
- Red trail to gas line

Mitigation Action Type – Natural Resource Protection
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – EMA Director
Supporting- RI Department of Environmental Management Forestry Division
Financing Options – Town Emergency Management budget
Cost Estimate – staff time
Time Frame – Long term
Benefit – Public safety

Action 22- Improve sanitation facilities at Fogland Beach to withstand flooding and protect surrounding natural resources along the Sakonnet River.

Mitigation Action Type – Property Protection
Pre or Post Disaster – Pre Disaster
Priority – Medium
Lead – DPW (or designee)
Supporting- Recreation Department
Financing Options – Town recreational budget
Cost Estimate – $40,000
Time Frame – Medium term
Benefit – Public health and safety. During heavy rain or high water events, an improved sanitation facility will prevent saw sewage from entering the Sakonnet River.

Historic Resources

Action 23- Invite a representative from the Tiverton Historic Preservation Advisory Board, and RIDOT's Principal Historic Preservation Specialist to the annual and five year plan review. There are no known immediate vulnerabilities to the identified structures but it will be helpful for the committee to include local experts to discuss preparing historic resources for disasters (see FEMA 386-6, Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning).

Action Type – Planning
Pre or Post Disaster – Pre Disaster and Post-Disaster
Priority – Medium
Lead – EMA Deputy
Supporting- Tiverton Historic Preservation Advisory Board
Financing Options – Staff time
Cost Estimate – staff time
Time Frame – Medium term
Benefit – Historic preservation

Chapter 7: Public Input

7.1 Summary

This hazard mitigation plan benefits from various distinct types of public input strategies that were utilized by the THMC during the drafting process and prior to its adoption by the Town Council. Public input for the Tiverton hazard mitigation plan was primarily collected through a public survey, public meetings and an invitation to comment.

Early on in the planning process, the THMC distributed a "Hazard Perceptions" survey both online and at Town Hall. The purpose of the anonymous survey was to hear from residents the hazards and neighborhoods they are most concerns about. Over 90 individuals participated in the survey. Not surprisingly, most were concerned about hurricanes, blizzards, and ice storms. The survey also provided the THMC with a list of problematic areas that are susceptible to flooding. The THMC used the input from the survey to focus their mitigation planning efforts.

Prior to public release of the 2017 HMP, the THMC drafted the plan through a series of committee meetings. While these meetings did not rise to the level of public hearings and were not advertised, they were open to the public.

The 2017 THMC included town residents. The THMC's roles focused on reviewing the content of the risk assessment matrix to ensure proper classification of problems and estimates of potential impacts; formulation of mitigation actions and sequencing of primary tasks; and identification of feasible implementation methods and schedules. Their comments were incorporated into the final 2017 HMP.

The second public input strategy was geared toward the general public as opposed to specific stakeholders. . During the draft review portion of the plan development, an electronic copy of the draft 2017 HMP was posted to the Town's website. The public was informed of both the webpage posting and the public hearing. See Appendix B. They were encouraged to review the document, comment on the HMP and attend the meeting. Notice of the public hearing was also posted as an agenda item on the Town's website in accordance with state law. On January 23, 2017, the Town Council held a discussion on the HMP as part of their regular public meeting. At the Town Council meeting, there were a few suggested edits proposed by Council Members. These were subsequently incorporated into the plan. There was no further comments from the general public. The school locations were corrected on the map and further clarification was added as to why Nonquit Pond/Pond Bridge Road Bridge was labeled as a low priority. At the meeting the newly hired Town DPW Director was updated on the progress of the plan.

Review and comments from the Federal Emergency Management Agency and the Rhode Island Emergency Management Agency were also incorporated prior to adoption by the Town Council.

Before the THMC began meeting regularly, the Town was working on updating their Comprehensive Plan which includes discussions on floodplains, resource protection districts, and development trends. The public participation program of the Tiverton Comprehensive Plan Update is currently underway as of January 2017. Members of the THMC are involved in the Comprehensive Plan update and will be incorporating elements of this document into the other plan.

Chapter 8: Implementation and Adoption

8.1 Prioritization of Mitigation Actions

Having identified appropriate mitigation actions the Tiverton Hazard Mitigation Committee set about prioritizing them for implementation. After the mitigation actions were identified and drafted, the THMC had an informed discussion about the prioritization of each action. They ranked each as "high", "medium", and "low". It is understood that these ranks may change and will be re-considered when the plan is updated.
The following were considered when ranking the actions:

- Protecting human health and safety
- Reducing damages
- Economic feasibility
- Political climate
- Environmental impact

High Priority: Greatest beneficial impact
Medium Priority: May need other actions to be completed first
Low Priority: Less of an impact on safety and property

Table 29: Activity Prioritization

High	Repair and upgrade the Old Stone Bridge structure
	Map North Tiverton Water District and Stone Bridge Water District systems
	Obtain peak usage and capacity data for water districts
	Create Town oversight of water districts
	Install security cameras at the communication towers
	Identify alternate routes in the event of the failure of Mill Pond Dam
	File dam action plans with RIDEM
	Implement a CERT program
Medium	Drainage study in the northern end of Town
	ATV for sewer line inspection, forest rescue, trail maintenance, and firefighting
	Elevate road along 3 Rod Way (Fogland Beach)
	Utilize updated building permit software
	Conduct an annual ½ day waterfront construction class for area contractors
	Widen Nannaquaket Road Bridge
	Build a secondary emergency access road for Police Dept. and DOT facilities
	Promote heating and cooling centers
	Review mitigation plan for Inland Fuel
	Conduct an annual evening meeting for coastal business owners
	Improve the condition of the footpath from Tiverton Middle School to the High School
	Upsize generator and improve transfer switch at Middle School/shelter
	Purchase and install a generator and transfer switch at Ranger Elem. School
	Site improvement recommendations per Weetamoo Woods Preplan/Hazard Assessment
	Improve sanitary facilities at Grinnell's Beach and Fogland Beach
	Invite local historians to HMP review in a year.
Low	Replace Nonquit Pond Bridge/Pond Bridge Road Bridge

8.2 Implementing the Plan

The Town of Tiverton and the THMC realize that successful hazard mitigation is an ongoing process that requires implementation, evaluation, and updates to this plan. The Town also understands the importance of integrating appropriate sections of the plan into the Town's Comprehensive Plan, Emergency Operations Plan, and site plan review process. It is intended that this plan and the ongoing efforts of the THMC will preserve and enhance the quality of life, property, and resources for the Town of Tiverton.

Adoption of this mitigation strategy increases Tiverton's eligibility for federal hazard mitigation grants. These grants originate from FEMA's Pre-Disaster Flood Mitigation Assistance (FMA), Pre-Disaster Mitigation (PDM) and post-disaster Hazard Mitigation Grant Program (HMGP). (Refer to Appendix B for further information.)

8.3 Monitoring

The THMC, under the leadership of the Town's Emergency Management Director, will meet annually (or more frequently if necessary), to monitor and evaluate the actions contained in the plan. At each meeting, the committee members will discuss the actions assigned to them to ensure continual progress with mitigation efforts. The status of each mitigation action will be documented and minutes recorded for the record. The THMC will also continue to re-evaluate membership on the committee to ensure effective engagement of the appropriate parties. New members may be invited to serve on the THMC as priorities shift.

8.4 Evaluation

At the annual meetings, the THMC will evaluate both the actions and the planning process. The THMC will base its evaluation on whether or not the actions have met the following criteria: increased public awareness/education, reduction in hazard damage, actions being implemented in the designated time frames, and actions staying within the cost estimate. The committee will document and report its findings to the Planning Board and Town Council. The THMC will involve the public in the action evaluation process by holding an annual advertised public meeting in order to review the evaluation and solicit input.

During the annual evaluation process, the plan will be promoted online, in the local library, at Town Hall, and the Community Center for public review. Comments and suggests can be sent directly to the Emergency Management Director or brought up at the advertised public meeting.

8.5 Revisions

Recognizing that this is a living document, the THMC will make changes to it after each annual revision or a disaster, as conditions warrant. These revisions will also reflect changes to priorities and funding strategies that may have been implemented.

A full revision of the plan will commence a year in advance of the current plan expiration date in order to ensure the Town always has an approved plan. The update will be completed every five years and will incorporate a formalized process for prioritizing actions and weighing the cost/benefit of such actions. All updates or revisions to the plan will be submitted to the RIEMA. The Town Council will involve the public in the plan revision process by holding an annual advertised public meeting to present recommended revisions and solicit input. Revised plans will also be sent to the neighboring communities for comment.

All future meetings will again be open to the public and it is the hope of the THMC that once the public education and outreach actions begin, public involvement in the Plan will increase and will be reflected in future revisions. The THMC will involve the public in the annual meeting by posting it on the website, in the local library, and in the local newspaper to encourage involvement.

8.6 Adoption

Every five years, the Tiverton hazard mitigation plan will be presented to and adopted by the Town Council after the document receives an Approvable Pending Adoption notice from FEMA. An Approvable Pending Adoption notice will be issued to the Town once all of the plan requirements outlined in the Local Hazard Mitigation Plan Review Guide are sufficiently met. The associated resolution documentation will be kept as part of this plan.

APPENDICES

Appendix A- Resources

Technical and Financial Assistance for Mitigation
State Resources

Coastal Resources Center
University of Rhode Island
Narragansett Bay Campus
Narragansett, RI 02882
(401) 874-6224

Coastal Resources Management Council
Stedman Government Center
4808 Tower Hill Road
Wakefield, RI 02879
(401) 222-2476

Department of Administration/Division of Planning
One Capitol Hill
Providence, RI 02908
(401) 222-6478

Department of Environmental Management
235 Promenade Street
Providence, RI 02908
(401) 222-6800

Rhode Island Banking Commission/Associate Director
233 Richmond Street
Providence, RI 02903
(401) 222-2405

Rhode Island Builders Association
Terry Lane
Gloucester, RI 02814
(401) 568-8006

Rhode Island Department of Business Regulations
233 Richmond Street
Providence, RI 02903
(401) 222-2246

Rhode Island Emergency Management Agency
645 New London Avenue
Cranston, RI 02920
(401) 946-9996

Public Utilities Commission
100 Orange Street
Providence, RI 02903
(401) 222-3500 Ext. 153

State Fire Marshal's Office
272 West Exchange Street
Providence, RI 02903
(401) 222-2335

State of Rhode Island Building Committee Office
Building Commissioner's Office
One Capitol Hill
Providence, RI 02903
(401) 222-3529

Technical and Financial Assistance for Mitigation
Federal Resources

Economic Development Administration
Philadelphia Regional Office
The Curtis Center
601 Walnut Street, Suite 140 South
Philadelphia, PA 19106-3323
(215) 597-8822

Federal Emergency Management Agency
Mitigation Division
Mitigation Division
Region I Office
99 High Street
Boston, MA
(617) 223-9561

Small Business Administration
10 Causeway Street
Room 265
Boston, MA 02222
(617) 565-5590

U.S. Department of Agriculture
Natural Resources Conservation Service
451 West Street
Amherst, MA 01002
(413) 253-4362

U.S. Department of Commerce
National Weather Service Forecast Office
445 Myles Standish Boulevard
Taunton, MA 02780 (508) 823-2262

U.S. Department of Housing and Urban Development
Community Development Block Grants
Region I – O'Neill Federal Building
10 Causeway Street
Boston, MA 02222
(617) 565-5354

U.S. Department of the Interior
National Park Service
Rivers and Trails Conservation Program
Regional Office
15 State Street
Boston, MA 02109
(617) 223-5203

U.S. Environmental Protection Agency
Region I Offices
5 Post Office Square - Suite 100
Boston, MA 02109-3912
(617) 565 3400

U.S. Fish and Wildlife Service
Northeast Regional Office
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9587
(413) 253-8200

Other Resources

The Association of State Floodplain Managers (ASFPM):

The ASFPM is a professional association with a membership of almost 1,000 state employees that assists communities with the NFIP. ASFPM has developed a series of technical and topical research papers and a series of proceedings from their annual conferences. Many mitigation "success stories" have been documented through these resources and provide a good starting point for planning.

Floodplain Management Resources Center:

The Floodplain Management Resources Center is a free library and referral service of the ASFPM for floodplain management publications. Co-located with the Natural Hazards Center at the University of Colorado in Boulder, staff can use keywords to identify useful publications from the more than 900 flood-related documents in the library.

Institute for Business and Home Safety (IBHS):

The IBHS is an insurance industry sponsored nonprofit organization dedicated to reducing deaths, injuries and property damage resulting from natural hazards. IBHS efforts are directed at five specific hazards: flood, windstorm, hail, earthquake and wildfire. Through its public education efforts and information center, IBHS communicates the results of its research and statistical gathering, as well as mitigation information, to a broad audience.

Volunteer Organizations:

There are a number of volunteer organizations such as the American Red Cross, the Salvation Army, Habitat for Humanity, Interfaith and the Mennonite Disaster Service, that are often available to help after disasters. Service organization, such as the Lions, Elks and VFW are also available. These organizations have helped others with food, shelter, clothing, money, etc. Habitat for Humanity and the Mennonite Disaster Service provide skilled labor to help rebuild damaged buildings incorporating mitigation or flood proofing concepts. The offices of individual organizations can be contacted directly or the FEMA Regional office may be able to assist.

Flood Relief Funds:

After a disaster, local businesses, residents and out-of-town groups often donate money to local relief funds. They may be managed by the local government, one or more local churches or an ad hoc committee. No government disaster declaration is needed. Local officials should recommend that the funds be held until an applicant exhausts all sources of public disaster assistance. Doing so allows the funds to be used for mitigation and other projects that cannot be funded elsewhere.

New England States Emergency Consortium (NESEC):

NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Brochures and videotapes are available on such topics as earthquake preparedness, mitigation and hurricane safety tips. NESEC maintains a web site that is accessible at http://www.serve.com/NESEC.

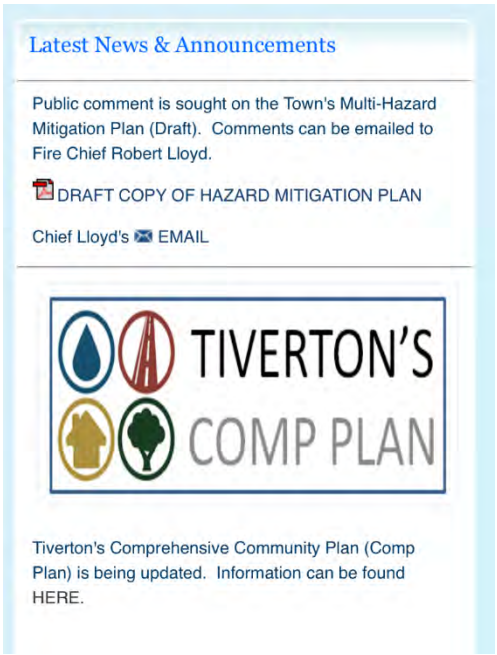
The Rhode Island Flood Mitigation Association (RIFMA):

The goal of the organization is to form a network of associates who could bring their ideas and experiences to a forum for people to share and learn from. The result of the Association is a network of floodplain managers who can improve the effectiveness and efficiency of all aspects of floodplain management in the State of Rhode Island. RIFMA regularly provides training opportunities and an annual floodplain conference.

Appendix B- Public Notices

Facebook

Twitter



Town Website

Town Council Agenda Posted January 20, 2017 with the Rhode Island Secretary of State.

http://sos.ri.gov/openmeetings/?page=meeting&id=210500

ANNEXES

WEETAMOO WOODS PREPLAN/ HAZARD ASSESSMENT

Purpose:

Identify general areas of high risk (high level of usage) and areas of high hazard (areas of concentrated fuels, fuels of concern, landscape concerns). This is a summary of a brief visual survey and not a comprehensive hazard assessment. This survey done to help derive a possible plan of action for mitigating risks related to emergency response in the Weetamoo Woods block. The challenge is to match the incident with the resources responding, before it occurs.

Types of emergency response

- Medical/ SAR- Life safety
- Wildfire- property/ environment safety

FINDINGS

Areas of Concern

-Fuel loading
-Areas of High frequency with fall risk
-Areas of high frequency with Ignition risk
-Access
-Environmental concerns

Fuel Loading

Fuel conditions currently are a major concern. Largely an oak, beech over story with a moderate shrub layer in greater than 50 percent of forest. This shrub layer consists of fuels with vertical and horizontal continuity of 1 to 6 feet in height. A large portion of this shrub layer is comprised of mountain laurel, blueberry and green briar. Numerous wind events and succession have also left large quantities of cured woody debris on forest floor. This is mostly in the 100 hour fuel category. Presently a thick duff layer can be found over nearly 100% of forest. Also areas of environmental significance are noted with a scattered holly component in the southern end of forest and in pockets elsewhere. It is unclear what management goals and methods are at this time. Note: Due to the thin bark, holly trees are extremely susceptible to fire damage.

Areas of high frequency with fall injury and/or ignition risk

Multiple rock outcroppings lend themselves to be attractive areas of activity. Signs of multiple campfires may be found on any number of these areas as well as unmarked trails frequented by mountain bikers, off road vehicles and equestrians. These areas have increased risk associated with them due to slippery rocks, sudden/ steep/ high drop offs, voids/ tripping hazards in rocks. Woodlands north of Lafayette risk of incident is most likely to be on the exterior of woods where the majority human interaction occurs.

Access

Current condition of access is poor. Yellow trail is passable by small, light equipment only to the area of the red and blue trail intersections. Lafayette road from the west is blocked by stones near the spur trail intersection. Access from the lake road side appears to be too narrow to accommodate emergency vehicles. Green trail, orange trail and portions of the red, blue, and yellow trails are too narrow and mostly single track trails. Trail markings are inconsistent. Aluminum tags while partially reflective are small and maybe difficult to see at night. Also side trails to areas of interest are not marked or mapped.

RECOMMENDATIONS FOR MITIGATING HAZARDS

Prevention
-Start a Fire Wise prevention program focusing on surrounding properties
-Patrolling during high usage, drought, holidays
-Posting of fines for negligent and criminal ignition
-Establishing of trail logs
-Public outreach in times of increased fire danger

Training
-Rural water supply and tanker shuttles
-Lookouts, Communications, Escape Routes, and Safety Zone training
-Preplanning drills- Focus on realistic specific scenarios
-Wilderness medical response training for personnel (Solo has a good program)
-Wildfire behavior, handline construction
-Engine operations in the urban interface
-Urban interface structure triage and protection
-Minimum Impact Suppression Techniques (M.I.S.T.)

Tactical
-ATV/UTVs- advance them on run cards, seek funding to purchase one
-During summer drought and deep burning fire conditions, contain and monitor maybe best tactical approach due to limited water and resources
-Utilize other local resources; make them known during preplan- farm equipment/ helicopters

Site Improvements
-Lafayette Rd should be made passable by at least a pick up as it is a primary point of access and egress
-yellow trail to blue or red trail to gas line should be made accessible for pick up
-Trails should be further evaluated to determine which would be most beneficial as control lines and improved as such.
-meadow should be assessed to determine usage as medical helicopter landing zone for prolonged patient transport

-Stone bridges should be evaluated by an engineer to determine safe working load
-other access should be assessed
-Trail markings should be clear and consistent along the length of the trails
-unique location identifiers should be placed at major intersections to allow for clear location communication
-unmapped trails should be mapped and encouraged or hidden and eradicated to control the flow of people
-Abandoned WELLS MUST BE FILLED or made safe. Filling with sand allows for future use if needed
-Identify areas that are of significant environmental, cultural importance and plan for their protection
-Fuel reduction program is recommended but may not be possible for management objectives or practical
-Explore creating Community Wildfire Protection Plan. May not be necessary for this community

Town of Tiverton,
Rhode Island

STORM READY Standard Operating Procedures

Americans live in the most severe weather-prone country on Earth. Each year, Americans cope with an average of 10,000 thunderstorms, 2,500 floods, 1,000 tornadoes, as well as an average of 6 deadly hurricanes. Potentially deadly weather impacts every American. Communities can now rely on the National Weather Service's StormReady program to help them guard against the ravages of Mother Nature.

Some 90% of all presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly $14 billion in damage. StormReady, a program started in 1999 in Tulsa, OK, helps arm America's communities with the communication and safety skills needed to save lives and property– before and during the event. StormReady helps community leaders and emergency managers strengthen local safety programs.

StormReady communities are better prepared to save lives from the onslaught of severe weather through better planning, education, and awareness. No community is storm proof, but StormReady can help communities save lives. StormReady makes a difference!

This purpose of this SOP is to provide guidance to the town of Tiverton in preparing for and dealing with the effects of hazardous weather conditions. NOAA's National Weather Service urges residents to keep abreast of local forecasts and warnings and familiarize themselves with key weather terminology.

Warning Notification: A warning for severe weather will be received from one or more of the following systems:
NATIONAL WEATHER SERVICE (NWS) RECEIVER/Specific Area Message Encoding (SAME) Radio
EMERGENCY ALERT SYSTEM (EAS)
CABLE and BROADCAST RADIO and TELEVISION

Station Name	Station Call Sign	Cox Cable Channel	Broadcast Channel
NWS Weather			162.40 Mhz
ABC 6	WLNE	6	6
NBC 10	WJAR	10	10
CBS 12	WPRI	12	12
The Weather Channel		51	51

Station Name	**Station Call Sign**	**Cox Cable Channel**	**Broadcast Channel**
WPRI Continuous Weather		106	106
1540 WADK	WADK		AM 1540
630 WPRO	WRPO		AM 630
Echolink	WX1BOX	(New Eng) group	Node
RI SkyWarn	Cranston	146.76, -600hz	No PL
RI ARES	Cranston	146.70, -600hz	No PL

Rhode Island Law Enforcement Teletype (RILETS)
INTERNET: WeatherBug, Interactive Weather Information Network (IWIN), Weather Underground

SAME Weather Radio Receivers have been installed in the following locations: School Administration office, Tiverton Police dispatch office, Tiverton Fire Dept, Tiverton Public Works Dept, Town Hall Personnel office, Community Center

Activation Procedures for Dispatchers

When you receive a weather "Warning" your Specific Area Message Encoding (SAME) receiver will sound a warning tone for eight seconds followed by the voice broadcast of the National Weather Service. The type of alert will be indicated by the lights on the front panel of the display and the type of alert will also scroll across the text window on the front panel of the receiver. This alert notification procedure will only be activated for weather "WARNINGS" that present an immediate threat to life, Such as a severe thunderstorm or tornado.

(A "Weather Warning" is defined as: The type of weather event the warning is issued for is imminent, occurring, or likely to occur for the Newport county area. A weather "Watch" is defined as: conditions are favorable for the development of (weather event) in and close to a defined area. **A watch should increase your weather awareness, but will not activate this alert notification procedure.**

Actions: Tiverton Police Dept dispatcher: When you receive a Weather "**Warning**" you will:

1. Announce the warning on all fire and police channels. Include warning type, effective times and affected area. Notify Tiverton EMA for notification to NWS
2. Patrol Units: Upon receiving weather warning, or through observance of local conditions such as a severe thunderstorm or tornado, will proceed to the following local outdoor recreation areas to advise public to seek shelter: Town Farm Recreation Area, Grinnells and Fogland Beach, Pocasset Fields, Bulgamarsh Recreation Area. **For a Tornado Warning, every attempt will be made to notify the inhabitants of all local trailer parks of the imminent threat of a tornado and they should be strongly advised to seek safer shelter!**

3. Notify Tiverton School Administration. Include warning type, effective times and affected area (Only during school year)
4. Notify Tiverton Public Works. Include warning type, effective times and affected area
5. Notify Tiverton Fire and Water District. Include warning type, effective times and affected area
6. Notify Tiverton Public Library. Include warning type, effective times and affected area

. Continue down the list until all individuals have been contacted

Title	Name	Office	Cell	E-mail
Police Chief	Tom Blakey	[redacted]		tblakey@tivertonpoliceri.com
Fire Chief	Robert Lloyd	[redacted]		chief@tivertonfire.com
Emergency Manager	Bill Tavares		[redacted]	biltav@cox.net
Town Administrator	Matt Wojick	[redacted]		administrator@tiverton.ri.gov
Recreation Director	Gary Rose			gr@fwwebb.com
Public Works Director	Steve Berlucchi	[redacted]		dpw@tiverton.ri.gov

EOC Activation Criteria: The Tiverton EOC will be activated at the discretion of the Town Administrator, Emergency Manager, Fire Chief, or Chief of Police .The decision will be based upon:
1. The need for State or Federal assistance
2. The need for close coordination with local Town Council members
3. Anytime a shelter is open
4. During a technological or natural disaster..ie blizzard or severe thunderstorm

All Clear: All Clear will be transmitted by the same means as the initial warning

Additional Weather Reporting items:

Fire Dept; The following events should be reported to the Director of Emergency Management, Chief Robert Lloyd or Bill Tavares 401-924-1676: If the EMA Director is not available, you should contact the National Weather Service office in Taunton directly at (508) 823-2228. This is a private unlisted number for reporting significant weather by public safety officials ONLY and is not to be released to the general public.

-Tornadoes or funnel clouds
-Wall clouds, especially if they are rotating
-Hail
-Winds in excess of 40 MPH
-Rain, greater than 1" in one hour, or 2" or greater storm total
-Flooding: Streams and rivers, Coastal, Street (when more than the usual poor drainage puddles)

Winter Weather

-Precipitation type change (rain to sleet/snow) when change has taken hold
-Thunder, when accompanied by snow
-New snowfall:
- First 2"; every 2-3" thereafter

1 inch per hour or greater

Lightning Safety/Sheltering: If caught out in the open during a severe weather event, you should immediately seek shelter! All Recreation areas will have hand held lightening detectors on site. Notification by device in these areas will activate immediate response!

When a Safe Location is nearby

When a safe location is nearby, follow the **"30/30 Rule."**

- Seek safe shelter when you first hear thunder, see dark threatening clouds developing overhead or lightning. Count the seconds between the times you see lightning and hear the thunder. You should already be in a safe location if that time is less than 30 seconds.
- Stay inside until 30 minutes after you last hear thunder.

Plan Ahead! Your best source of up-to-date weather information is a NOAA Weather Radio (NWR). Portable weather radios are handy for outdoor activities. If you don't have NWR, stay up to date via internet, TV, local radio or cell phone. If you are in a group, make sure all leaders or members of the group have a lightning safety plan and are ready to use it.

Determine how far you are from a safe enclosed building or a safe vehicle. As soon as you hear thunder, see lightning or see dark threatening clouds, get to a safe location. Then wait 30 minutes after the last rumble of thunder before you leave the safe location. If you are part of a group, particularly a large one, you will need more time to get all group members to safety. NWS recommends having professional lightning detection equipment so your group can be alerted from significant distances from the event site.

When groups are involved, the time needed to get to safety increases. So you need to start leaving sooner. Your entire group should already be in a safe location when the approaching storm reaches within 5 miles from your location.

When a Safe Location Is Not Nearby

The lightning safety community reminds you that there is NO safe place to be outside in a thunderstorm. If you absolutely can't get to safety, this section is designed to help you lessen the threat of being struck by lightning while outside.

Being stranded outdoors when lightning is striking nearby is a harrowing experience. Your first and only truly safe choice is to get to a safe building or vehicle. If are camping, climbing, on a motorcycle or bicycle, boating, scuba diving, or enjoying other outdoor activities and cannot get to a safe vehicle or shelter, follow these last resort tips.

- Do **NOT** seek shelter under tall isolated trees! The tree may help you stay dry but will significantly increase your risk of being struck by lightning. Rain will not kill you, but the lightning can!
- Do **NOT** seek shelter under partially enclosed buildings
- Stay away from tall, isolated objects. Lightning typically strikes the tallest object. That may be you in an open field or clearing.
- Know the weather patterns of the area. For example, in mountainous areas, thunderstorms typically develop in the early afternoon, so plan to hike early in the day and be down the mountain by noon.
- Know the weather forecast. If there is a high chance of thunderstorms, curtail your outdoor activities.
- Do not place your campsite in an open field on the top of a hill or on a ridge top. Keep your site away from tall isolated trees or other tall objects. If you are in a forest, stay near a lower stand of trees. If you are camping in an open area, set up camp in a valley, ravine, or other low area. A tent offers NO protection from lighting.
- Wet ropes can make excellent conductors. This is BAD news when it comes to lightning activity. If you are mountain climbing and see lightning, and can do so safely, remove unnecessary ropes extended or attached to you. If a rope is extended across a mountain face and lightning makes contact with it, the electrical current will likely travel along the rope, especially if it is wet.
- Stay away from metal objects, such as fences, poles and backpacks. Metal is an excellent conductor. The current from a lightning flash will easily travel for long distances

If lightning is in the immediate area, and there is no safe location nearby, get into the lightning desperation position. Crouch down but do NOT lie down. Bend your knees down while keeping your feet together (see Figure 2).

Figure 2: Lightning Desperation Position

Weather related terms:

SPRING AND SUMMER WEATHER TERMS

Coastal Flooding - Prolonged strong onshore flow of wind and/or high astronomical tides causing a rise in sea level that floods coastal areas.

Drizzle - Precipitation in the form of liquid drops. It's diameter is less than .5 millimeters. Drizzle falls at a much slower rate than rain does.

Dust Devils - A small but rapidly rotating column of wind of short duration that is made visible by dust, sand, and debris picked up from the ground. Diameter usually ranges from 10 to 100 feet and develop best on clear, dry, hot afternoons. Fairly uncommon in this part of the country.

Excessive Heat Warning - Issued within 12 hours of the onset of the heat conditions listed in the excessive heat watch.

Excessive Heat Watch - Issued for the potential of the following conditions within 12 to 36 hours: heat index of at least 105 degrees Fahrenheit for more than 3 hours per day for 2 consecutive days or heat index more than 115 degrees Fahrenheit for any period of time.

Flash Flood - A flood which is caused by heavy or excessive rainfall in a short period of time, generally under 6 hours, leading to water that rises and falls quite rapidly. The term may also be used to alert the public of non life threatening flooding of small streams, streets, storm drains, and low lying urban areas. A flash flood can also be caused by the failure of a dam or from ice jams on waterways.

Flash Flood Warning - Issued to inform the public, emergency management, and other cooperating agencies that flash flooding is in progress, imminent, or highly likely.

Flash Flood Watch - Issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain or imminent.

Flood - The condition that occurs when water overflows the artificial or natural boundaries of a stream, river, or other body of water. Also issued for the ponding of water at or near where the rain is falling or has fallen. The term may also be used to alert the public of non life threatening flooding of small streams, streets, storm drains and low lying urban areas. It may also be used if small streams in rural areas reach or exceed bank full.

Flood Crest - Maximum height of a flood wave as it passes a certain location.

Flood Stage - The level at which a stream, river or other body of water begins to or will begin to leave its banks.

Flood Warning - Issued to inform the public, emergency management, and other cooperating agencies that flooding is in progress, imminent, or highly likely.

Fujita Tornado Damage Scale - A scale correlating the damage from a tornado with wind speed of the tornado.

Funnel Cloud - A rapidly rotating column of air extending from a cumulonimbus cloud with a circulation that does not reach the ground. once a funnel cloud reaches the ground it is then called a tornado.

Hail - Precipitation in the form of transparent or partially opaque balls or irregular lumps of concentric ice. Hail is normally defined as having a diameter of 5 millimeters or more and is produced by thunderstorms.

Heat Advisory - Issued within 12 hours of the onset of the following conditions: heat index of at least 105 degrees but less than 115 degrees for less than 3 hours per day. Nighttime lows remain above 80 degrees for 2 consecutive days.

Rain - Precipitation in the form of liquid drops the diameter of which must be .5 millimeters or greater. Implies a steady precipitation that might last for several hours.

Severe Thunderstorm - A thunderstorm with winds of 58 mph or greater and/or with hail 1 inch diameter or larger.

Severe Thunderstorm Warning - Issued to warn the public, emergency management and other cooperating agencies when a severe thunderstorm is forecast to occur or is occurring. The warning will include where the storm was occurring, its direction of movement and the primary threat from the storm.

Severe Thunderstorm Watch - Issued when conditions are favorable for the development of severe thunderstorms in and close to a defined area.

Shower - Intermittent rainfall of short duration that falls from a cumulus cloud. Heavy precipitation is possible. Implies more of a scattered rainfall.

Squall Line - A line of solid or nearly solid thunderstorms or strong winds that might extend for several hundred miles.

Supercell - A severe thunderstorm whose updrafts and downdrafts are in near balance allowing the storm to maintain itself for several hours. Supercells often produce large hail and tornados.

Tornado - A rapidly rotating column of air extending from a cumulonimbus cloud with a circulation that reaches the ground. However, the visible portion might not extend all the way to the ground.

Tornado Warning - Issued to warn the public, emergency management and other cooperating agencies when a tornado is forecast to occur or is occurring. The warning will include where the storm was occurring and its direction of movement.

Tornado Watch - Issued when conditions are favorable for the development of severe thunderstorms and possible tornados in and close to a defined area.

Wall Cloud - An area of clouds that extends beneath a severe thunderstorm. If a wall cloud rotates, it might precede tornado development.

Waterspout - A rapidly rotating column of air extending from a cumulonimbus cloud with a circulation that reaches the surface of the water

Hurricane Season Weather Terms

SMALL CRAFT ADVISORY:
When winds 25 knots) or 5 foot wave conditions threaten a coastal area, small craft operators are advised to remain in port or to not venture into the sea.

GALE WARNING

Wind Speeds of 34 knots sustained

STORM WARNING

Winds of 47 knots or more sustained

TROPICAL DEPRESSION:
A disturbance with a clearly defined low pressure area; highest wind speed is thirty-eight (38) miles per hour.

TROPICAL STORM WATCH:
An announcement for specific areas that a tropical storm, (or the potential of a newly developing tropical storm) poses a threat to coastal areas, generally within 36 hours.

TROPICAL STORM WARNING:
A warning that tropical storm conditions, including possible sustained winds within the range of 39-73 miles per hour, are expected in specific coastal areas within 24 hours.

TROPICAL STORM:
A distinct low pressure area well defined by a rotating circulation, with winds of 39-73 miles per hour.

HURRICANE:
Once a tropical storm's constant wind speed reaches 74 miles per hour or greater, it is classified as a hurricane.

HURRICANE WATCH:
An announcement for specific areas that a hurricane or hurricane conditions pose a threat to coastal area, generally within 36 hours.

HURRICANE WARNING:
An alert that a hurricane is expected in a specified coastal area within 24 hours. When a hurricane warning is issued, all precautions should be completed immediately. If the hurricanes path is unusual or erratic, the warning may be issued only a few hours before the beginning of hurricane conditions.

HIGH WIND WATCH/ WARNING:
A warning will be issued for inland counties where hurricane force winds are anticipated.

HURRICANE HAZARDS:
A striking hurricane creates four major hazards; storm surge, high winds, tornadoes and heavy rains.

EVACUATION ORDER:
The most important instruction you will receive from local government officials, relayed over local radio and television stations. Once issued, an evacuation order is mandatory under law in the State of Rhode Island If you live in a mobile home or an area ordered to evacuate, gather your survival kit and leave immediately. If you live in a safe area, secure your home and be prepared to stay. Because of long evacuation times and the unpredictability of hurricanes, you may be ordered to leave before a hurricane watch or warning is issued. For hurricane information listen to NOAA Weather Radio 162.4 MHZ.

Evacuation routes are clearly marked by the following sign;

These signs will direct by the safest route to the Mass Care Shelter, located at the Middle School

WINTER WEATHER TERMS

Winter Storm Warning: Issued when hazardous winter weather in the form of heavy snow, heavy freezing rain, or heavy sleet is imminent or occurring. Winter Storm Warnings are usually issued 12 to 24 hours before the event is expected to begin.

Winter Storm Watch: Alerts the public to the possibility of a blizzard, heavy snow, heavy freezing rain, or heavy sleet. Winter Storm Watches are usually issued 12 to 48 hours before the beginning of a Winter Storm.

Winter Storm Outlook: Issued prior to a Winter Storm Watch. The Outlook is given when forecasters believe winter storm conditions are possible and are usually issued 3 to 5 days in advance of a winter storm.

Blizzard Warning: Issued for sustained or gusty winds of 35 mph or more, and falling or blowing snow creating visibilities at or below ¼ mile; these conditions should persist for at least three hours.

Lake Effect Snow Warning: Issued when heavy lake effect snow is imminent or occurring.

Lake Effect Snow Advisory: Issued when accumulation of lake effect snow will cause significant inconvenience.

Wind Chill Warning: Issued when wind chill temperatures are expected to be hazardous to life within several minutes of exposure.

Wind Chill Advisory: Issued when wind chill temperatures are expected to be a significant inconvenience to life with prolonged exposure, and, if caution is not exercised, could lead to hazardous exposure.

Winter Weather Advisories: Issued for accumulations of snow, freezing rain, freezing drizzle, and sleet which will cause significant inconveniences and, if caution is not exercised, could lead to life-threatening situations.

Dense Fog Advisory: Issued when fog will reduce visibility to ¼ mile or less over a widespread area.

Snow Flurries: Light snow falling for short durations. No accumulation or light dusting is all that is expected.

Snow Showers: Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

Snow Squalls: Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant. Snow squalls are best known in the Great Lakes region.

Blowing Snow: Wind-driven snow that reduces visibility and causes significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground picked up by the wind.

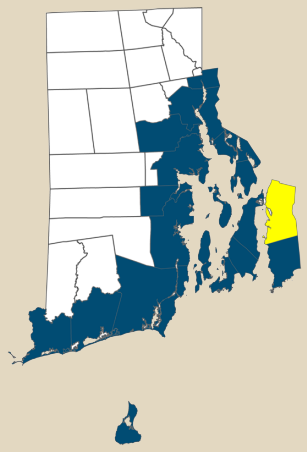
Sleet: Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects. However, it can accumulate like snow and cause a hazard to motorists.

Freezing Rain: Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Even small accumulations of ice can cause a significant hazard.

RHODE ISLAND DIVISION OF PLANNING

TIVERTON, RI

SOCIOECONOMICS OF SEA LEVEL RISE COASTAL FACTSHEET



PROJECT OVERVIEW

Rhode Island's municipalities are in the preliminary stages of integrating planning for sea level rise and climate change into their comprehensive planning process. To support these planning efforts of RI cities and towns, RISPP developed the Socioeconomics of Sea Level Rise project. The project aims to assist coastal municipalities in their long-term planning by attempting to identify population characteristics of **the people** located within sea level rise (SLR) inundation zones 1, 3, 5 and 7 FT. The data presented in this factsheet places a focus on Environmental Justice and Title VI populations.

METHODOLOGY

The RISPP utilized 2010 Decennial Census data and the latest American Community Survey (ACS) estimates to conduct an extensive data analysis. Staff also utilized CRMC's STORMTOOLS GIS shapefiles to identify the SLR inundation zones. In addition, RI Geographic Information Systems (RIGIS) e-911 data was utilized to identify single family, multi-family and mobile home residential points located within each SLR inundation zone. For more information on the methodology, please reference the **full report** on our website.

TIVERTON QUICK FACTS

15,780
2010 Census Population

46.2
2010 Census Median Age

$73,438
2014 ACS Median Household Income

TIVERTON'S OCCUPIED RESIDENTIAL UNITS & POPULATION ESTIMATES

Tiverton is one of Rhode Island's 21 coastal communities, located east of Portsmouth, and north of Little Compton, Rhode Island.

Tiverton has an average household size of 2.35 (2010 Census). The average household size and the percentage of occupied housing units were used to calculate a population estimate. Approximately 76-79% of the residential units located within each SLR inundation zone are occupied units. Residential units were identified in GIS using the e-911 shapefile. A combination of single family, multi-family and mobile home residential units were identified throughout the various SLR inundation zones. The majority of the units are single family. There is a significant change between the estimated population located in the 3 and 5 FT. inundation zone, with an additional 68 people estimated in the 5 FT. zone. The 7 FT. inundation zone has the greatest population and number of residential units, with 167 people estimated within the zone and 71 occupied residential units.

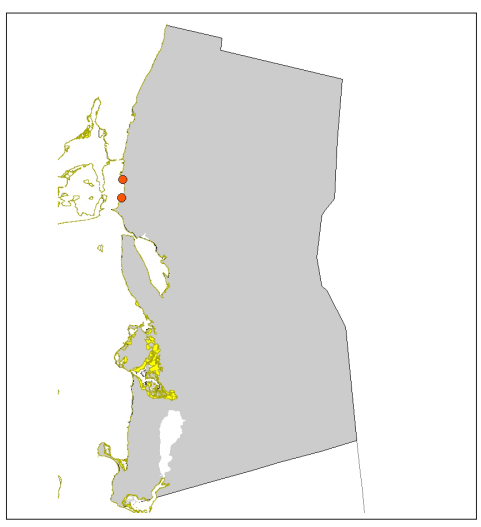
SLR Inundation zone	Residential Units	Occupied Unit calculation (Total Units (x) Occ. Housing Unit Rate in SLR zone)	Population calculation (Occupied Units (x) Tiverton Avg. HH Size)
1FT.	2 SF	**2** (76% occ. HU)	**5**
3FT.	19 SF, 6 Mobile	**19** (78% occ. HU)	**45**
5FT.	41 SF, 20 Mobile	**48** (79% occ. HU)	**113**
7FT.	67 SF, 1 MF, 21 Mobile	**71** (78% occ. HU)	**167**

Nanaquaket Pond, Tiverton, RI
Sept. 2015 King Tide, Photo Courtesy of Mycoast.org, submitted by Tricia Hilton.

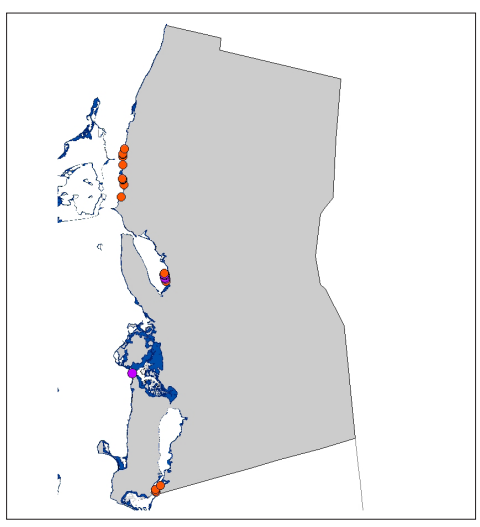
SLR INUNDATION ZONES

The maps above illustrate each of the SLR inundation zones. Single family units are represented by orange points in the SLR inundation zone maps, while multi-family units are represented by green points. Purple points signify mobile home units.

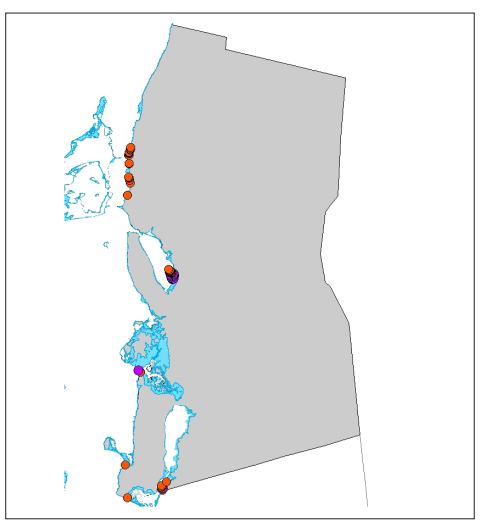
SLR 1 FT.



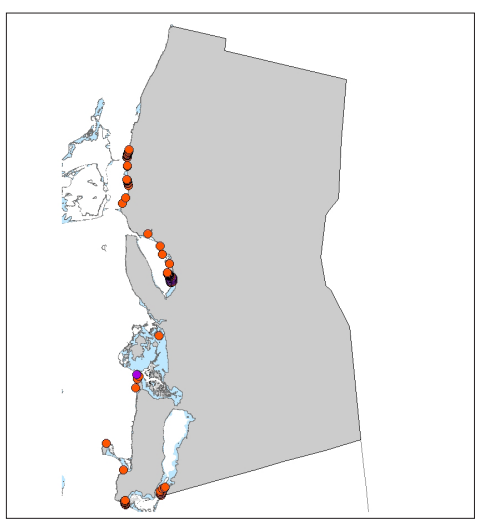
SLR 3 FT.



SLR 5 FT.



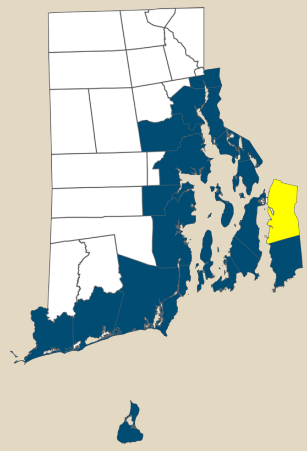
SLR 7 FT.



RHODE ISLAND DIVISION OF PLANNING

TIVERTON, RI

SOCIOECONOMICS OF SEA LEVEL RISE COASTAL FACTSHEET



RACE & AGE

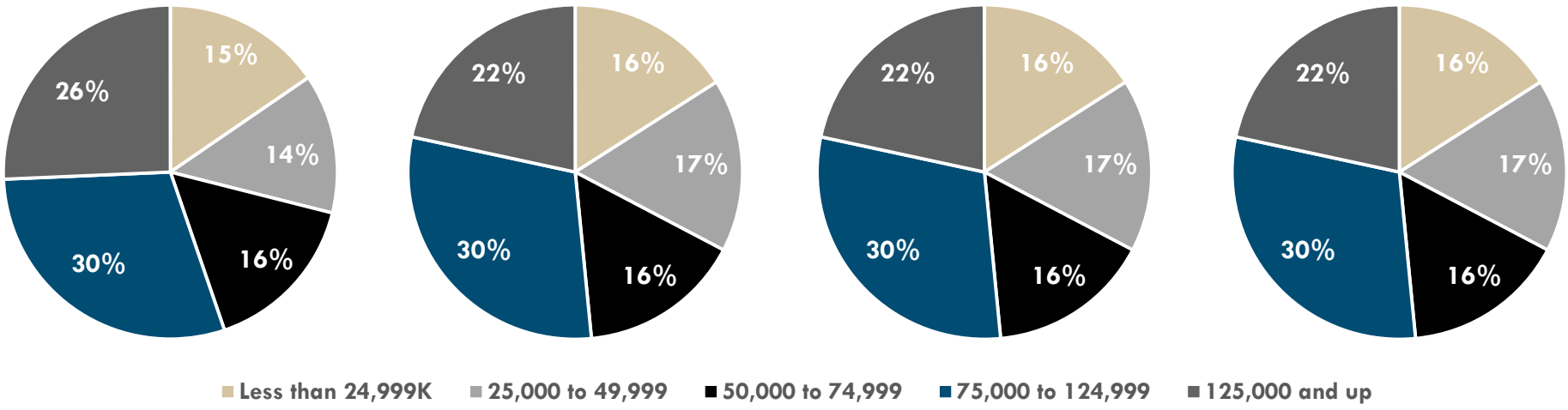
SLR 1	SLR 3	SLR 5	SLR 7
EST. POPULATION: 5 EST. OCCUPIED HOUSEHOLDS: 2	EST. POPULATION: 45 EST. OCCUPIED HOUSEHOLDS: 19	EST. POPULATION: 113 EST. OCCUPIED HOUSEHOLDS: 48	EST. POPULATION: 167 EST. OCCUPIED HOUSEHOLDS: 71
99% or 5 - White **0%** - Black **0%** - American Indian/ Alaska Native **0%** - Asian **1% or 0.04** - Hispanic **2% or 0.1** - Minority	**97% or 44** - White **1% or 0.2** - Black **0%** - American Indian/ Alaska Native **2% or 1** - Asian **1% or 0.3** - Hispanic **4% or 2** - Minority	**97% or 110** - White **0%** - Black **0%** - American Indian/ Alaska Native **1% or 2** - Asian **1% or 1** - Hispanic **3% or 4** - Minority	**97% or 162** - White **0.4% or 1** - Black **0%** - American Indian/ Alaska Native **1% or 2** - Asian **1% or 1** - Hispanic **3% or 6** - Minority
10% or 1 - *Age 75 or older*	**9%** or 4 - *Age 75 or older*	**9%** or 11 - *Age 75 or older*	**9%** or 16 - *Age 75 or older*

SOCIAL CHARACTERISTICS

10% or 0.2 are *Individuals with Disabilities*	**8% or 2** are *Individuals with Disabilities*	**8% or 5** are *Individuals with Disabilities*	**8% or 8** are *Individuals with Disabilities*
0% or are *Limited English Proficiency Households*	**1% or 0.1** are *Limited English Proficiency Households*	**1% or 0.3** are *Limited English Proficiency Households*	**1% or 0.4** are *Limited English Proficiency Households*
8% or 0.3 are *Unemployed*	**8% or 3** are *Unemployed*	**8% or 7** are *Unemployed*	**8% or 11** are Unemployed
6% or 0.3 are *Individuals Below Poverty Level*	**5% or 2** are *Individuals Below Poverty Level*	**5% or 6** are *Individuals Below Poverty Level*	**5% or 9** are Individuals Below Poverty Level
4% or 0.1 *Households receive SSI*	**3% or 1** *Households receive SSI*	**3% or 2** *Households receive SSI*	**3% or 2** Households receive SSI

HOUSEHOLD INCOME

- In Estimated Occupied Housing Units



HOUSEHOLD CHARACTERISTICS

- Percent of Population in Housing Type

16% Renter Occupied 21% Owned Outright	17% Renter Occupied 22% Owned Outright	17% Renter Occupied 22% Owned Outright	17% Renter Occupied 22% Owned Outright
63% Owned with Mortgage/Loan	**61%** Owned with Mortgage/Loan	**61%** Owned with Mortgage/Loan	**61%** Owned with Mortgage/Loan

TIVERTON

HOUSING UNITS & POPULATION

Variable Name	Sea Level Rise (SLR)				Count
e911 Housing Unit Total	**SLR 1**	**SLR 3**	**SLR 5**		**SLR 7**
Single Family (R1) Units	2	19	41		67
Multifamily (R2) Units with Calculation (*2)	0	0	0		**1*2=2**
Mobile Home (R3) Units	0	6	20		21
Total Units: Single Family (R1), Multifamily (R2), Mobile Home (R3)	**2**	**25**	**61**		**90**

Note: Multifamily unit totals are multiplied by 2 based on the presumption that there are a minimum of two units within each multifamily e911point

Variable Name	Sea Level Rise (SLR)						Count & Percentage	
e911 Occupied Housing Unit Calculation	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Units: Single Family (R1), Multifamily (R2), Mobile Home (R3)	**2**	**100%**	**25**	**100%**	**61**	**100%**	**90**	**100%**
Estimated Occupied Units - Count and Percentage	2	76%	19	78%	48	79%	71	78%
Population Calculation		**SLR 1**		**SLR 3**		**SLR 5**		**SLR 7**
Estimated Occupied Units	**2**	**100%**	**19**	**100%**	**48**	**100%**	**71**	**100%**
Population Estimate= Occupied Units (x) Municipal Avg. Household Size (2.35)		2*2.35=**5**		19*2.35=**45**		48*2.35=**113**		71*2.35=**167**

DEMOGRAPHIC
Block Level and Block Group^ Data

Race/Hispanic Ethnicity	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Population (in Occupied Housing Units)	**5**	**100%**	**45**	**100%**	**113**	**100%**	**167**	**100%**
White	5	99%	44	97%	110	97%	162	97%
Black or African American	0	0%	0.2	1%	0	0%	1	0.4%
American Indian and Alaska Native	0	0%	0	0%	0	0%	0	0%
Asian	0	0%	1	2%	2	1%	2	1%
Some Other Race	0	0%	0	0%	0	0%	0	0%
Hispanic	0.04	1%	0.3	1%	1	1%	1	1%
Non-Hispanic, White Population	5	98%	43	96%	109	97%	161	97%
Minority Population (Total Population minus Non-Hispanic, White Population)	0.1	2%	2	4%	4	3%	6	3%
Age	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Population (in Occupied Housing Units)	**5**	**100%**	**45**	**100%**	**113**	**100%**	**167**	**100%**
Young Children (<5)	0	3%	2	3%	4	4%	6	4%
School-Age Children (5-17)	1	14%	6	14%	16	14%	23	14%
Age 18-24	0	5%	2	5%	6	5%	8	5%
Age 25-44	1	17%	8	18%	20	18%	30	18%
Age 45-64	2	38%	17	39%	44	39%	65	39%
Age 65-74	1	13%	5	12%	13	11%	19	11%
Age ≥75	1	10%	4	9%	11	9%	16	9%
Population 16-64 (For Individuals with a disability variable)+	2	63%	28	63%	71	63%	104	63%
Population ≥25 (For educational attainment variable)	4	78%	35	77%	88	78%	130	78%
Population ≥16 (For employment variable)+	4	83%	37	83%	94	83%	139	83%
Population ≥65 (For age ≥65 in group quarters variable)+	1	23%	9.5	21%	23	21%	35	21%

SOCIAL
Block Group Data

Disability	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Population (in Occupied Housing Units, age 16-64)	**2**	**100%**	**28**	**100%**	**71**	**100%**	**104**	**100%**
Individuals with Disabilities	0.2	10%	2	8%	5	8%	8	8%
Limited English Proficiency (LEP)	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Estimated Occupied Housing Units	**2**	**100%**	**19**	**100%**	**48**	**100%**	**71**	**100%**
Limited English Proficiency Households	0	0%	0.1	1%	0.3	1%	0.4	1%
Educational Attainment	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Population (in Occupied Housing Units, age ≥25)	**4**	**100%**	**35**	**100%**	**88**	**100%**	**130**	**100%**
Less than a High School Diploma or Equivalent	0.4	9%	3	10%	9	10%	13	10%
High School Diploma or GED	1	28%	10	29%	25	29%	37	29%
Professional School	0.1	3%	1	2%	2	2%	3	2%
Associate's/Bachelor's	1	32%	11	32%	28	32%	41	32%
Master's/PhD	0.5	12%	4	11%	10	11%	14	11%
Other (Some College)	1	17%	6	17%	15	17%	22	17%

ECONOMIC
Block Group Data and Municipal Level Data‡

Employment	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Population (in Occupied Housing Units, age ≥16)	**4**	**100%**	**37**	**100%**	**94**	**100%**	**139**	**100%**
Employed	4	91%	34	92%	86	92%	128	92%
Unemployed	0.3	8%	3	8%	7	8%	11	8%
Job Industry ‡	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Population (age ≥16 and employed)	**4**	**100%**	**34**	**100%**	**86**	**100%**	**128**	**100%**
Agriculture, forestry, fishing & hunting, mining	0.1	1%	0.5	1%	1	1%	2	1%
Construction	0.3	7%	2	7%	6	7%	9	7%
Manufacturing	0.4	12%	4	12%	10	12%	15	12%
Wholesale trade	0.1	2%	1	2%	2	2%	3	2%
Retail trade	0.4	10%	3	10%	8	10%	12	10%
Transportation & warehousing, utilities	0.1	3%	1	3%	2	3%	3	3%
Information	0.0	1%	0.5	1%	1	1%	2	1%
Finance & insurance, real estate, rental & leasing	0.3	9%	3	9%	8	9%	11	9%
Professional, scientific, management, administrative, waste management services	0.3	9%	3	9%	8	9%	11	9%
Educational services, health care, social assistance	1	26%	9	26%	22	26%	33	26%
Arts, entertainment, recreation, accommodation & food services	0.4	9%	3	9%	8	9%	12	9%
Other services (except public administration)	0.2	6%	2	6%	5	6%	7	6%
Public administration	0.2	5%	2	5%	5	5%	7	5%
Income	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Estimated Occupied Housing Units	**2**	**100%**	**19**	**100%**	**48**	**100%**	**71**	**100%**
Less than $24,999K	0.3	15%	3	16%	8	16%	11	16%
$25,000 to 49,999	0.3	14%	3	17%	8	17%	12	17%
$50,000 to 74,999	0.3	16%	3	16%	8	16%	11	16%
$75,000 to 124,999	1	30%	6	30%	14	30%	21	30%
$125,000 and greater	1	26%	4	22%	10	22%	15	22%
Total Population (in Occupied Housing Units)	**5**	**100%**	**45**	**100%**	**113**	**100%**	**167**	**100%**
Income Below Poverty Level	0.3	6%	2	5%	6	5%	9	5%
Income Above Poverty Level	5	94%	43	95%	107	95%	158	95%
Estimated Occupied Housing Units	**2**	**100%**	**19**	**100%**	**48**	**100%**	**71**	**100%**
With Social Security Income (SSI) Households	0.1	4%	1	3%	2	3%	2	3%
Without Social Security Income (SSI) Households	2	96%	18	97%	46	97%	69	97%

HOUSING
Block Level and Block Group^ Data

Housing Occupancy	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Housing Units	**2**	**100%**	**25**	**100%**	**61**	**100%**	**90**	**100%**
Occupied Housing Units	2	76%	19	78%	48	79%	71	78%
Vacant Housing Units	0	24%	6	22%	13	21%	19	22%
Estimated Occupied Housing Units	**2**	**100%**	**19**	**100%**	**48**	**100%**	**71**	**100%**
Owner-Occupied Housing Units	1	87%	17	87%	41	85%	60	85%
Renter-Occupied Housing Units	0.2	13%	3	13%	7	15%	11	15%
Total Population (in Occupied Housing Units)	**5**	**100%**	**45**	**100%**	**113**	**100%**	**167**	**100%**
Population in Group Quarters	0	0%	0	0%	0	0%	0	0%
Total Population (age ≥65)	**1**	**100%**	**9**	**100%**	**23**	**100%**	**35**	**100%**
Age ≥65 in Group Quarters+	0.02	2%	0.1	1%	0.3	1%	0.4	1%
Housing Tenure+	**SLR 1**	**SLR 1 %**	**SLR 3**	**SLR 3 %**	**SLR 5**	**SLR 5 %**	**SLR 7**	**SLR 7 %**
Total Population (in Occupied Housing Units)	**5**	**100%**	**45**	**100%**	**113**	**100%**	**167**	**100%**
Population in Property Owned with mortgage or loan	3	63%	28	61%	69	61%	103	61%
Population in Property Owned free and clear	1	21%	10	22%	24	22%	36	22%
Population in Renter-Occupied Units	1	16%	8	17%	19	17%	28	17%

JOBS
Municipal Data‡ & e911 Data

Employment and Business Unit Data‡								**Count**
Average Employment - Municipality								**2623**
Number of Units (Business - Private and Government)								**354**
Average Number of Workers per Unit (Business - Private and Government)								**7**
Workers Per Commercial Unit			**SLR 3**		**SLR 5**		**SLR 7**	
e911 Commercial Unit Total			5		9		12	
Average Number of Workers/Jobs per Commercial Unit			37		67		89	

Tiverton, RI

COASTAL SEA LEVEL RISE AND STORM SURGE:
TRANSPORTATION FACT SHEET

RHODE ISLAND STATEWIDE PLANNING PROGRAM

PLANNING FOR SEA LEVEL RISE ON YOUR ROADS

This fact sheet aims to provide municipal leaders and practitioners with a survey of Tiverton's transportation infrastructure elements that may be affected by sea level rise and storm surge. In addition to explaining and presenting the data, this fact sheet will outline strategies that may help in adapting to these conditions, and point towards resources that will enable further investigation.

Relevance

The impacts of Sea Level Rise (SLR) are often perceived as distant, but the assets being built today will still be within their design life when future effects of sea level rise are felt. In addition, sea level rise will magnify the impacts of 100-year storm surge events by raising the water level. Though current federal guidelines only require federally funded assets be built to survive a 100-year storm event, what the impact of a 100-year storm event entails is likely to change during the design life of the assets currently under consideration around Rhode Island.

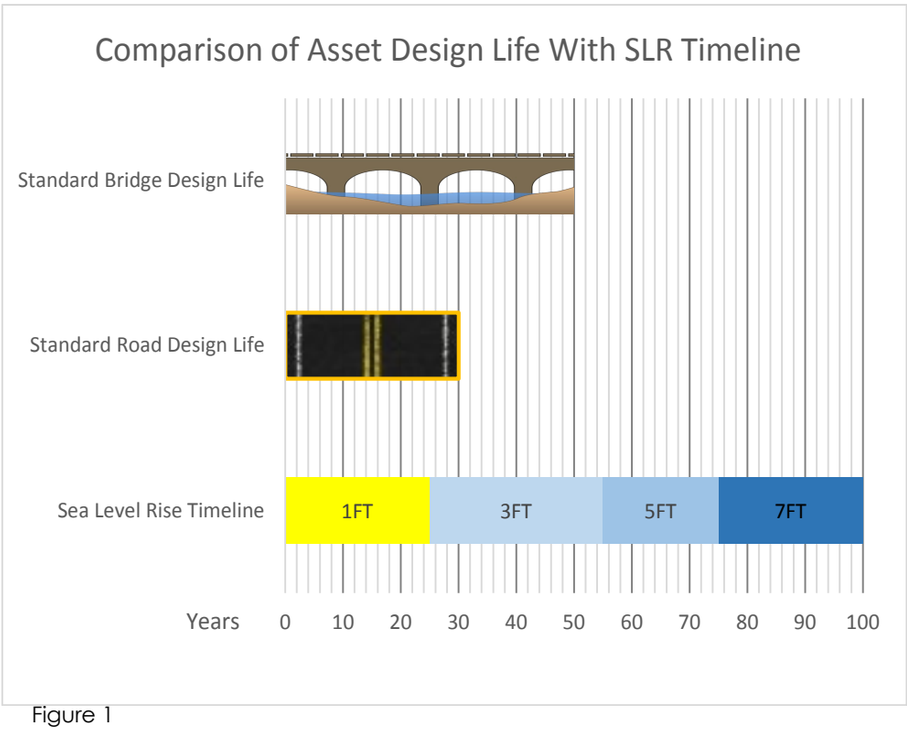


Figure 1

Data and Methodology

Figure 2: Flooding near Sauchest Point: June 2013

To help Rhode Island's cities and towns prepare for these changing conditions, the Statewide Planning Program (SPP) has engaged in an effort to analyze the potential impacts created by the sea level rise and storm surge. Using data developed under the name "STORMTOOLS" by the Coastal Resources Management Council and the University of Rhode Island, SPP identified the assets that could be impacted (exposure), and their vulnerability. As a result of this analysis, SPP identified the roads and bridges most likely to be impacted by Sea Level Rise, and scored their relative vulnerability based on the severity of the hazard they faced and the potential impact of asset damage on the transportation system as a whole.

Tiverton, RI

RHODE ISLAND STATEWIDE PLANNING PROGRAM

Tiverton Roads Exposed to Sea Level Rise

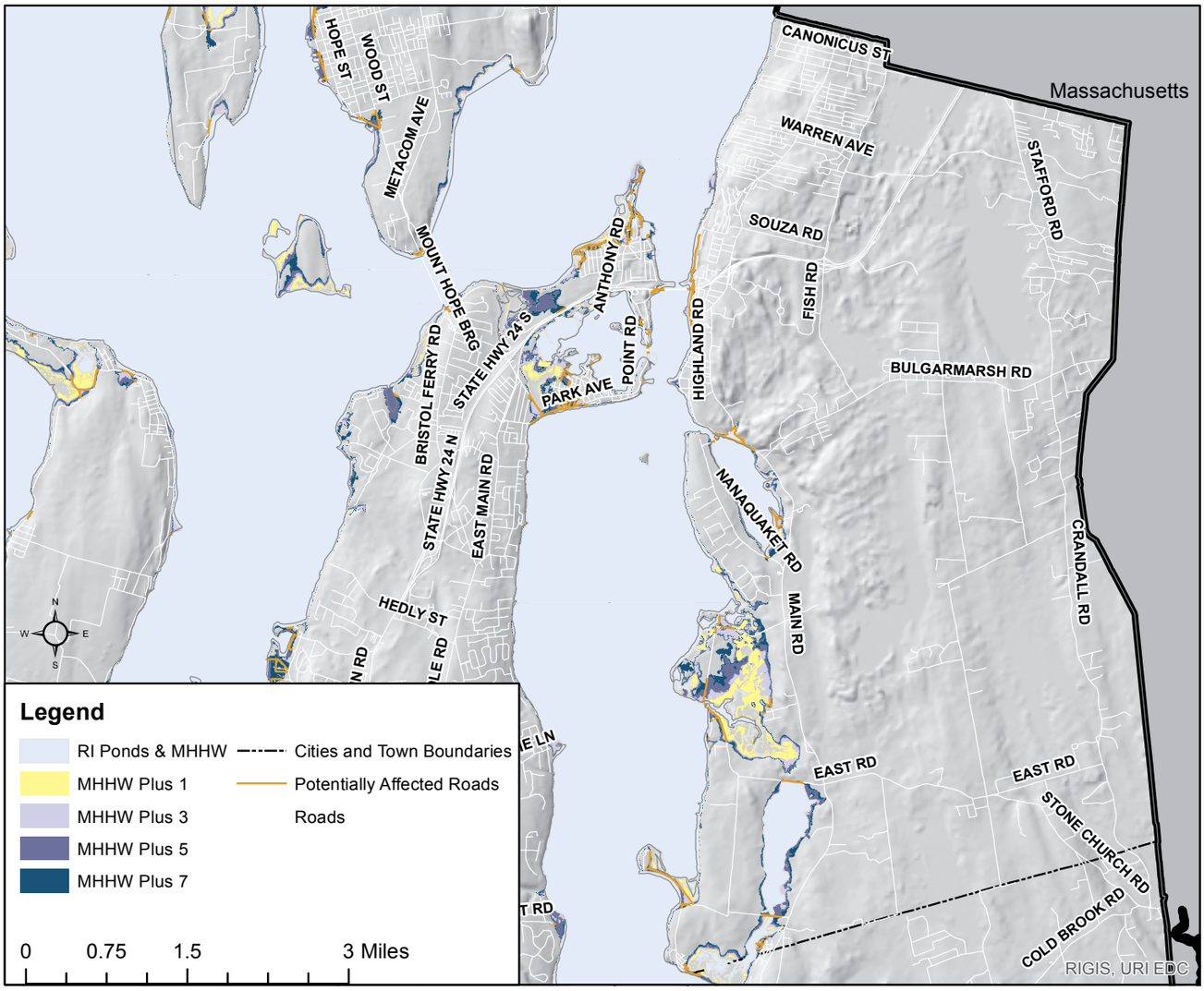


Figure 3

Given seven feet of sea level rise, a total of 156 miles of road in Rhode Island could be exposed to inundation, 70% of which would occur on local roads. For Tiverton five miles of roadway inundation can be expected. Of this, 78% (3.78 miles) are local. Tiverton's roads (state and local) are the 13th most vulnerable in the state of Rhode Island to sea level rise.

Figure 4

Top 10 Road Assets in Tiverton Vulnerable to Sea Level Rise (SLR)											
Mun. Rank	Road Name	1 Ft of SLR	3 Ft of SLR	5 Ft of SLR	7 Ft of SLR	Total Linear Feet	Evac. Route	Intermodal Facility	Functional Classification	Vuln. Score	State Rank
1	STATE HWY 24 S	308	217	138	20	683	No	Yes	Freeways	7.42	10
2	STATE HWY 24 N	279	233	168	10	690	No	Yes	Freeways	7.29	12
3	OLD MAIN RD	0	789	222	96	1,107	Yes	No	Major Coll.	5.13	92
4	RIVERSIDE DR	0	468	3,074	808	4,349	No	No	Local	4.79	126
5	THREE ROD WAY	0	1,368	1,685	487	3,540	No	No	Local	4.01	220
6	HIGHLAND RD	0	0	0	55	55	No	Yes	Major Coll.	3.70	283
7	MAIN RD	0	24	646	1,339	2,010	No	No	Minor Art.	3.66	291
8	BRIDGEPORT RD	0	0	158	363	521	No	Yes	Major Coll.	3.46	332
9	NANAQUAKET RD	5	13	84	181	283	No	Yes	Major Coll.	3.34	352
10	LAWRENCE CT	0	575	420	80	1,075	No	No	Local	3.17	392

Tiverton, RI

RHODE ISLAND STATEWIDE PLANNING PROGRAM

Tiverton Bridges Exposed to Sea Level Rise

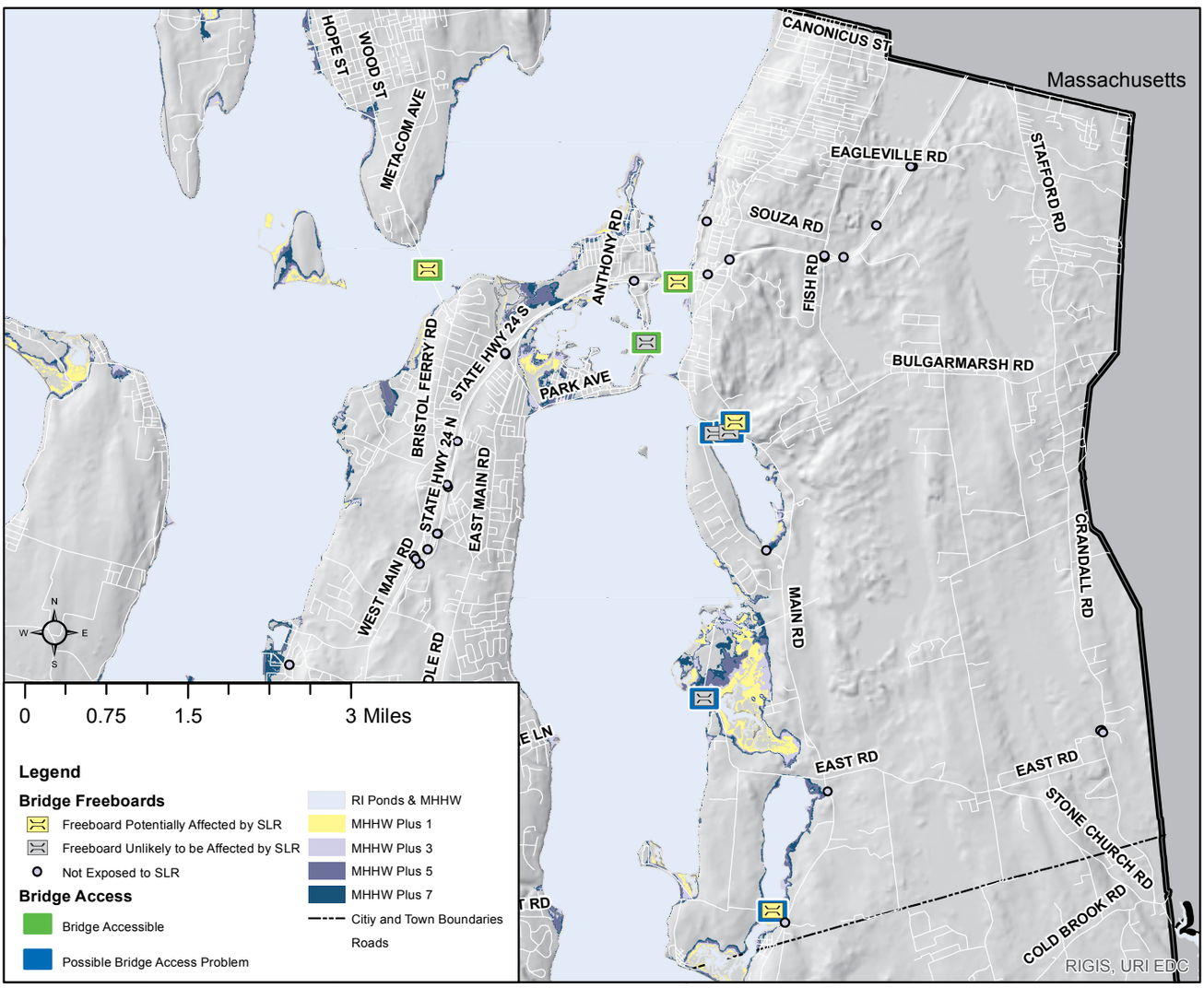


Figure 5

Given seven feet of sea level rise, a total of 90 bridges in Rhode Island cause concern either due to potential freeboard height or accessibility problems. In Tiverton there are four bridges of concern, two of which are small facilities that may not be eligable for federal aid. Tiverton's bridge infrastructure is the seventh most vulnerable in the state of Rhode Island to sea level rise. Please note: The Sakonnet River Bridge freeboard was not included in the data sets used, and so was flagged as having a freeboard height that required further investigation.

Figure 6

Top 10 Tiverton Bridge Assets Vulnerable to Sea Level Rise											
Mun. Rank	Bridge Name	Facility Carried	Feature Intersected	Inches of Freeboard Relative to 7FtSLR	Terrain Crossed	Landing Access	Intermodal Facility	Evac. Route	AADT	Vuln. Score	State Rank
1	Sin & Flesh	OLD MAIN RD	SIN & FLESH BROOK	-24	Water	Problem	No	Yes	900	7.00	29
2	Nonquit Pond	POND BRIDGE RD	NONQUIT POND	-33	MHHW	Problem	No	No	500	6.50	38
3	Nannaquaket	NANNAQUAKET RD	NANNAQUAKET R	90	MHHW	Problem	Yes	No	822	5.50	64
4	Sapowet	SEAPOWET AV	TIDAL INLET	51	MHHW	Problem	Yes	No	480	5.50	65
5	Nannaquaket Pond	RI 77 MAIN RD	NANNAQUAKET POND	27	Water	Problem	No	No	6,868	5.40	67

Tiverton, RI

RHODE ISLAND STATEWIDE PLANNING PROGRAM

Tiverton Roads Exposed to 100-Year Storm Surge Events

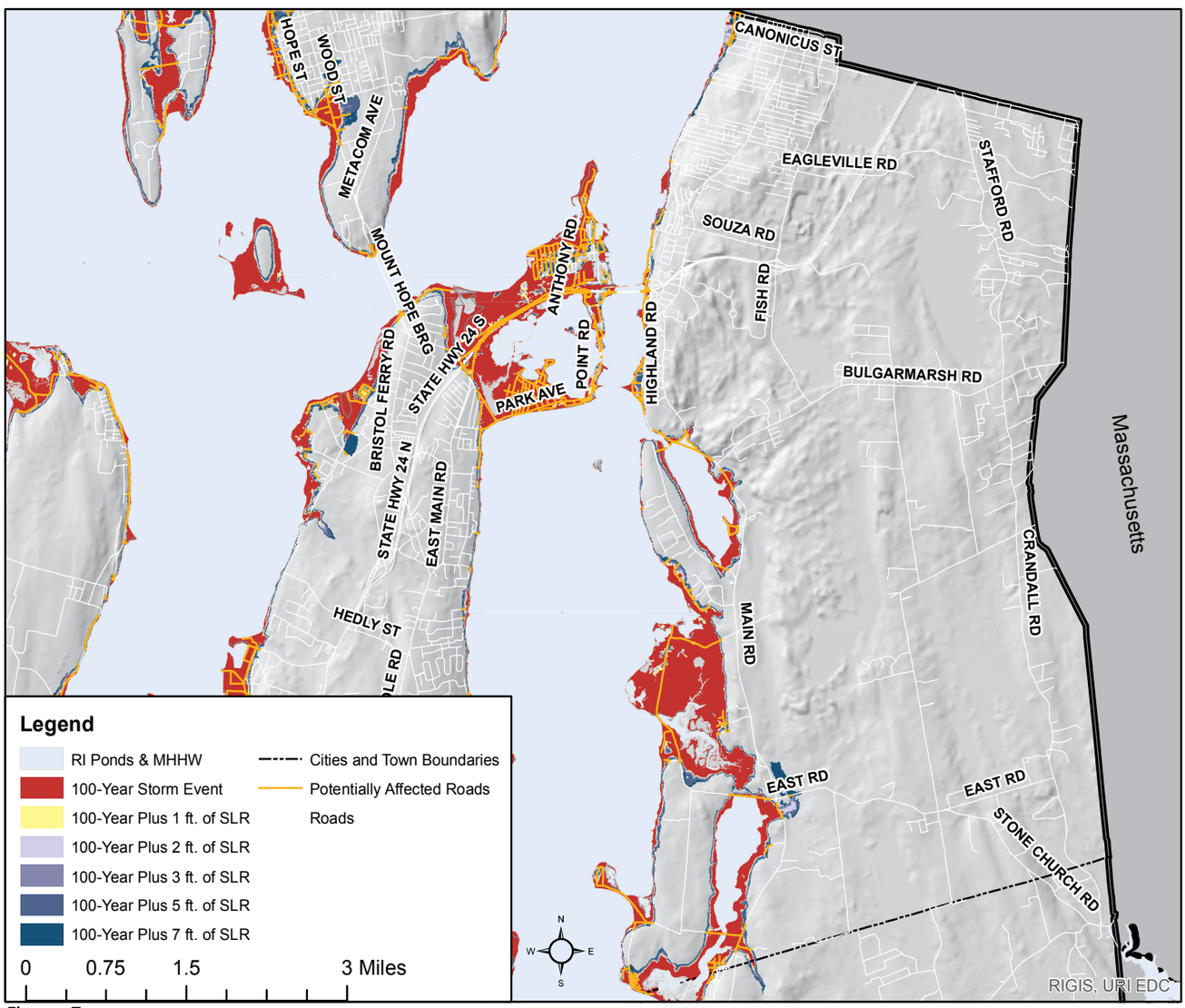


Figure 7

Given seven feet of sea level rise and a 100-year storm surge event, a total of 573 miles of road in Rhode Island will potentially be exposed to inundation, 73% of which will occur on local roads. For Tiverton, 13 miles of roadway inundation can be expected, 76% (~10 miles) of which are local. Tiverton's roads are the 14th most vulnerable in the state of Rhode Island to storm surge.

Figure 8

Top 10 Road Assets in Tiverton Vulnerable to 100-Year Surge Events												
Mun. Rank	NAME	No SLR	1 Foot of SLR	3 Feet of SLR	5 Feet of SLR	7 Feet of SLR	Total Linear Feet	Evac. Route	Intermodal Facility	Functional Classification	Vuln. Score	State Rank
1	STATE HWY 24 N	792	3	3	3	0	802	No	No	Freeways	7.66	40
2	STATE HWY 24 S	795	16	13	10	10	844	No	No	Freeways	7.53	47
3	HIGHLAND RD	1,364	13	27	27	20	1,452	Yes	No	Major Coll.	7.04	75
4	BRIDGEPORT RD	747	0	0	0	0	747	No	Yes	Major Coll.	7.03	77
5	HART ST	147	0	0	0	0	147	No	Yes	Local	6.60	113
6	THREE ROD WAY	3,602	0	0	0	0	3,602	No	Yes	Local	6.60	114
7	MAIN RD	6,007	662	1,305	1,052	936	9,962	No	No	Minor Art.	6.58	117
8	SEAPOWET AVE	7,791	316	646	222	169	9,144	No	Yes	Local	6.34	139
9	NANAQUAKET RD	1,143	71	137	133	153	1,638	No	Yes	Major Coll.	6.22	155
10	BARBARA ST	135	0	0	0	0	135	No	No	Local	5.60	752

Tiverton, RI

RHODE ISLAND STATEWIDE PLANNING PROGRAM

Tiverton Bridges Exposed to 100-Year Storm Surge Events

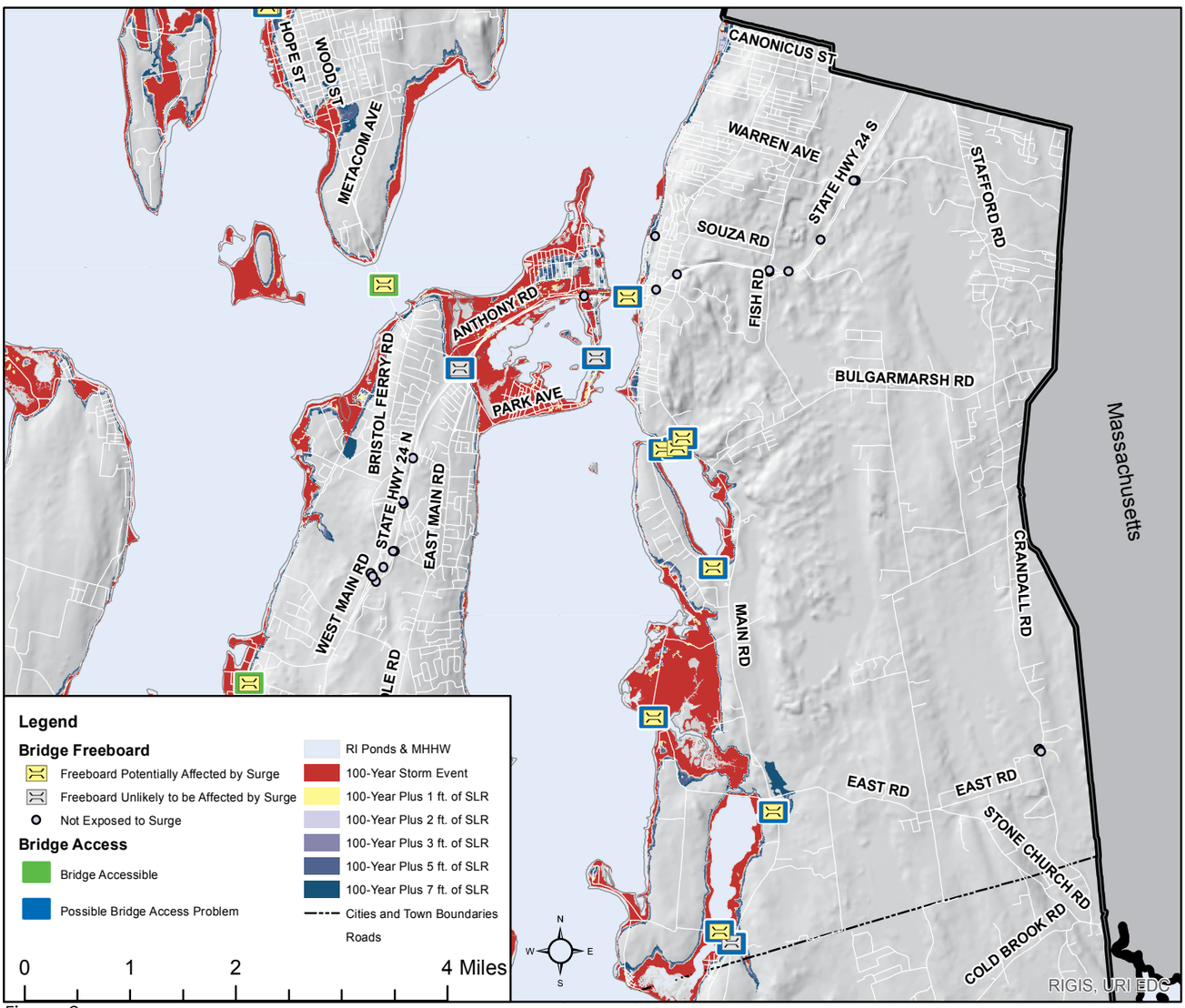


Figure 9

Given seven feet of sea level rise plus a 100-year storm surge event, a total of 148 bridges statewide cause concern either because of potential free-board height or accessibility problems. In Tiverton there are eight bridges of concern, two of which are smaller facilities that may not be eligable for federal aid. Tiverton's bridge infrastructure is the sixth most vulnerable to storm surge in the state of Rhode Island. Please note: The Sakonnet River Bridge freeboard was not included in the data sets used, and so the bridge was flagged as having a freeboard height that required further investigation.

Figure 10

Top 10 Tiverton Bridge Assets Vulnerable to Sea Level Rise Plus a 100-Year Storm Surge Event											
Mun. Rank	Bridge Name	Facility Carried	Feature Intersected	Inches of Freeboard Relative to 7FtSLR	Terrain Crossed	Landing Access	Intermodal Facility	Evac. Route	AADT	Vuln. Score	State Rank
1	Tiverton Four Corners	RI 77 WEST MAIN RD	BORDEN BROOK	-47	Water	Problem	No	Yes	6,300	7.30	34
2	Nannaquaket	NANNAQUAKET RD	NANNAQUAKET R	-54	MHHW	Problem	Yes	No	822	6.60	54
3	Sapowet	SEAPOWET AV	TIDAL INLET	-93	MHHW	Problem	Yes	No	480	6.60	55
4	Nannaquaket Pond	RI 77 MAIN RD	NANNAQUAKET POND	-127	Water	Problem	No	No	6,868	6.30	61
5	Beattie	NANNAQUAKET ROAD	BEATTIE BROOK	-90	Water	Problem	Yes	No	600	6.10	70
6	Sin & Flesh	OLD MAIN RD	SIN & FLESH BROOK	-210	Water	Problem	No	Yes	900	6.10	71
7	Pachet Brook	RI 77 WEST MAIN RD	PACHET BROOK	22	Water	Problem	No	Yes	3,600	5.70	87
8	Nonquit Pond	POND BRIDGE RD	NONQUIT POND	-177	MHHW	Problem	No	No	500	5.60	97

Tiverton, RI

RHODE ISLAND STATEWIDE PLANNING PROGRAM

Next Steps

Given the potential scale of the impacts of sea level rise and storm surge on local transportation infrastructure, local communities will need to find a way to prepare. A variety of approaches are available, and programs exist to help communities execute these strategies. Finding preparedness strategies will require undertaking further analysis, formulating a clear adaptation strategy, and then taking advantage of planning opportunities that may present themselves.

Further Analysis

The most important step is the pursuit of further analysis. The data contained in this factsheet serves as introduction to municipal level transportation issues associated with sea level rise and storm surge. The data contained here and in Technical Paper #167: Vulnerability of Municipal Transportation Assets to Sea Level Rise and Storm Surge (published by SPP and available at http://www.planning.ri.gov/geodeminfo/data/slr.php) should allow local decision makers to prioritize the assets that may require an engineering analysis. Decision makers would also be advised to consult The methodology for STORMTOOLS, a key source of data for this project, which is available on-line at http://www.beachsamp.org/the-science-behind-stormtools/.

Figure 11: Consideration of Sea Level Rise can be included in regular planning activities

Adaptation

Once the nature of the ongoing changes are understood, a policy should be developed to prepare for the changes holistically. The specific policies to be implemented will vary widely based on the community, the assets under threat, and the resources available. The policies can broadly be described as Protect, Accommodate, Retreat, and Do Nothing.

> **Protect**: Though often popular, this is the most financially expensive option. A municipality can seek to safeguard an asset by building sea walls, or take a slightly more green approach by attempting to artificially recreate the types of dune or wetland structures that naturally stabilize a shoreline. These approaches offer short term security if well designed and implemented, but their effectiveness in the long term may be limited by further changing conditions and the resources required for maintenance.

Figure 12

Tiverton, RI

RHODE ISLAND STATEWIDE PLANNING PROGRAM

Accommodate: Accommodation can imply a number of built solutions that take into account the new conditions. An engineering oriented solution would be to elevate the assets in question above the new waterline, while another option would be to rebuild the asset in a way that suits the new conditions better, for example by rebuilding a road using a new alignment on higher ground.

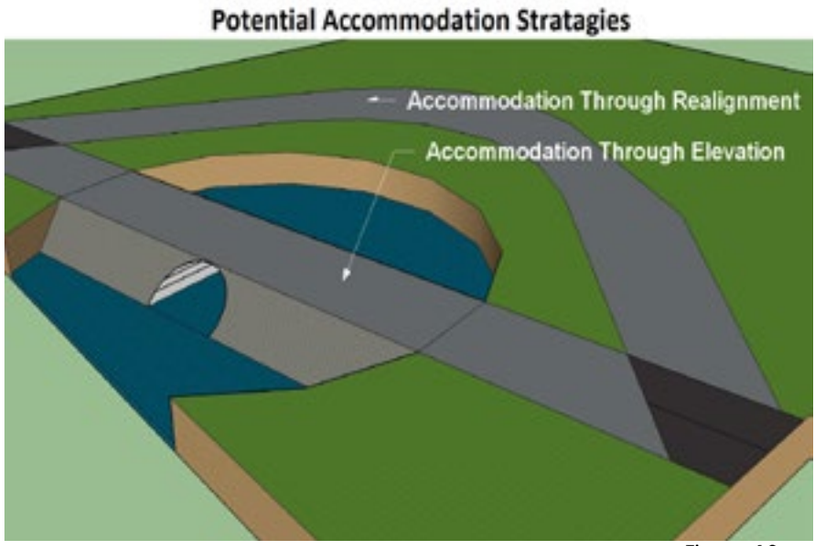


Figure 13

Retreat: If built solutions are infeasible, a community may decide to simply abandon the asset. Private stakeholders may take over responsibility for the asset, or the need for its maintenance may diminish as users of the asset leave the area. Though undoubtedly the most efficient solution from a fiscal perspective, there are complex legal issues involved that remain unresolved.

Do Nothing: Communities may choose to take no action in response to rising sea levels. In effect this would consist of maintaining the status quo infrastructure, regardless of risk and the increasingly common inundations. In practice this approach may closely resemble retreat, as assets are incapacitated with increasing regularity until all those served by the assets move away. The financial strain of repeated maintenance could have significant fiscal effects on communities.

Planning Opportunities

Once the subject of sea level rise and storm surge have been adequately researched, and an overall municipal adaptation strategy has been decided upon, decision makers should attempt to take advantage of planning opportunities that may allow the city or town to begin implementation of their planning goals. A key first step to this process will be building awareness amongst staff and constituents, either by direct outreach or simply through informal discussions.

As awareness grows, the community would be well served simply by keeping their readiness policy goals in mind when conducting their regular planning activities, such as comprehensive planning, or zoning compliance review. More concrete policies like overlay zones and rolling easements may become important tools for communities seeking a way to realize their policy goals.

Communities that are critically threatened by sea level rise and storm surge may seek to directly invest in readiness measures using municipal funds. Additional funding may be available to aid in this process from state and federal sources. Placing eligible projects for consideration in the State Transportation Improvement Plan, or other sources of Federal and State funding, is a good way to leverage local funding.

Figure 14

Water Supply System Management Plan

Executive Summary

North Tiverton Fire District

May 2012

(Updated October 2014)

Executive Summary

(1) Introduction

The North Tiverton Fire District (NTFD) is pleased to submit to the Water Resources Board (WRB) its Water Supply System Management Plan (WSSMP) in accordance with Rhode Island General Law 46-15.3-5.1, Public Drinking Water Supply System Protection. This Executive Summary contains the information pursuant to Rhode Island General Law 46-15.3-7.5 (c).

This WSSMP builds upon the last submittal by NTFD dated May 2007 and includes all pertinent data through 31 December 2011. The following components, and their sub-components, are addressed in the plan to the extent that they are relevant to NTFD: System Goals and Description, Supply Management, Demand Management, System Management, Emergency Management, Drought Management, and Financial Management. Highlights of the NTFD's accomplishments identified in WSSMP are listed below.

- Completed the last phase of a major capital improvement plan with the complete refurbishment of the State Avenue Pumping Station and the replacement of nearly three quarters of a mile of water main as part of the Hilton Street Area Water Main Replacement project. The earlier phase of the plan included the construction of the Stafford Road Pumping Station and the two-million gallon water tank on Pocasset Avenue. The emergency interconnection with the Stone Bridge Fire District along Fish Road to the Industrial Park was also constructed during the initial phase.
- Upgraded its entire computing and billing system, replaced its entire fleet of two service vehicles, and added a compressor to its inventory of major tools.
- Increased the volume of water sold from 143.2 million gallons per year in 2006 to 167.9 million gallons per year in 2011 (+17.2%).
- Maintained per capita Average Daily Demand in the district at 44.9 gallons for residential customers in 2011, well below the Water Resources Board's target of 65 gallons.
- Reduced non-account water to 5.1% and leakage to 0.04% of all purchased water in 2011.
- Determined sufficient water availability and capability to distribute for the 5-year and 20-year planning periods based upon projected population growth.
- Negotiated a new water supply contract with the City of Fall River, MA.
- Maintained the same water rates since FY09 through FY12 while its two suppliers, The City of Fall River and the Stone Bridge Fire District, have increased their price of water to NTFD by 17.5% and 25.9% respectively, over the same time period.
- Implemented electronic read meters to 63.3% of accounts in a continuing effort that is expected to be completed by the end of 2016.

- Maintained an overall balanced budget while steadily increasing funds in the stabilization and reserve accounts.
- Initiated improvements to its meter-read to bill-mail cycle in anticipation of the transition from a four-month to a quarterly billing cycle beginning in January of 2014.
- Included reporting data in the WSSMP in accordance the Water Resources Board's Water Use and Efficiency Act Rule which was adopted May 16, 2011.
- Moved its administrative office into a newly refurbished handicap-accessible building across the street from its old headquarters.

The October 2014 Update incorporates responses to comments resulting from review by the Water Resources Board of the May 2012 WSSMP submittal.

(2) Background

North Tiverton Fire District (NTFD) was established by legislation titled "An Act to Incorporate the North Tiverton Fire District and to Furnish a Supply of Water for the Town of Tiverton" which was signed into Rhode Island state law on April 24, 1926. The Act became effective on November 3, 1926 with its approval by the qualified electors of the town on November 2, 1926 and its approval by the Tiverton Town Council on the following day. The Act has been amended in each of the following years: 1927, 1940, 1947, 1948, 1951, 1956, 1975, 1982, 1993, 2002, 2003, and 2009. The 2003 amendment (H-6273) is the last to include the full text of the Act. The 2009 amendment delineates the exact boundaries of the district. The former Tiverton Water Authority (TWA) was dissolved and incorporated into the North Tiverton Fire District by legislative action in July of 2003 and took effect upon the transfer of assets in June of 2004.

NTFD is an independent quasi-municipal agency providing water for drinking and fire protection purposes within a designated service area in the Town of Tiverton, Rhode Island. Its owners are the qualified electors (members of the district) that own property within the boundaries of the district. In addition to taxing authority, NTFD has the powers generally incident to a corporation.

(3) General System Description

A general system description is contained in the following paragraphs.

(i) Water Supply Sources

NTFD purchases treated water from two suppliers, the City of Fall River and the Stone Bridge Fire District. NTFD has no surface water sources of its own. There are two primary metered

interconnections between NTFD and the City of Fall River, and three primary metered interconnections between NTFD and the Stone Bridge Fire District.

(ii) Water Treatment Facilities

Water purchased from the City of Fall River and the Stone Bridge Fire District meets the drinking water quality standards of State of Rhode Island's Department of Health. NTFD tests water quality as it enters into its distribution system from both sources at its three pumping stations. Chlorine, fluoride, and sodium hexametaphosphate are added, as required. There is no need for additional treatment facilities to maintain or improve water quality from NTFD's supply sources.

(iii) Storage Facilities

NTFD has three water storage facilities that form part of its distribution system: a one-million gallon ground-level reservoir on Hambly Road, a two-million gallon standpipe tank on Pocasset Avenue, and a one-million gallon standpipe tank on Quintal Drive.

The Pocasset Avenue tank receives water from the pumping stations at State Avenue and Carey Lane. This tank feeds the Hambly Road reservoir and also feeds directly into the distribution system. The Quintal Drive tank receives water pumped directly from the Stone Bridge Fire District's Treatment Plant.

(iv) Pumping Stations

NTFD has three pressure boosting pumping stations: one at State Avenue, one at Carey Lane, and one at Stafford Road. These three pumping stations are integrated into the two separate pressure zones of NTFD's water distribution system. The State Avenue and Carey Lane pumping stations feed the NT pressure zone and the Pocasset Avenue storage facility. The Stafford Road pumping station feeds the TWA pressure zone and the Quintal Drive storage facility.

(v) Raw Water and Finished Water Transmission Facilities

The NTFD distribution system consists of approximately 47.7 miles of transmission line pipe for finished water, and no transmission line pipes for raw water. The system was initially developed in the late 1920's with the majority of the piping installed between 1940 and 1980. Pipe lines are primarily unlined cast iron or cement lined ductile iron. NTFD has implemented an infrastructure rehabilitation program that has resulted in significant improvements to the system's operational efficiency. Portions of the distribution system pipe are replaced each year. NTFD maintains a database of pipe segments by street which contains

the following information: pipe size, pipe length, pipe material, and year pipe was installed. Pipe lines are categorized for replacement as Urgent, High, Medium, or Low priority based upon several factors. These factors include water quality, water volume, frequency of breaks, adequacy for fire protection, etc. There currently are no pipe lines classified as Urgent need of replacement.

There are two primary transmission lines in NTFD's water distribution system. The first primary transmission line delivers water from the State Avenue and Carey Lane pumping stations along Main Road, also called Route 138. The second primary transmission line delivers gravity fed water to Industrial Way through Fish Road to the Pocasset Avenue storage facility.

(vi) Distribution Facilities Including Low to High Service

This section is not applicable to North Tiverton Fire District.

(vii) Planned Extensions

There are no plans to extend the boundaries of the North Tiverton Fire District service areas. The NT service area is almost at maximum capacity for service connections with little room for expansion. Most of the TWA service area does not have access to water mains due to its rural environment. Residents and commercial enterprises obtain water primarily from private wells. Eligible areas for future service connections are those few individual locations that currently have access to an existing water main or an occasional new housing development that has one installed.

(viii) Interconnections

NTFD has five primary water interconnections, two with the City of Fall River and three with the Stone Bridge Fire District. The interconnections with the City of Fall River are at the State Avenue Pumping Station and the Stafford Road Pumping Station. The interconnections with the Stone Bridge Fire District are at the Carey Lane Pumping Station, North Brayton Road, and Quintal Drive. All five of these interconnections are metered.

(ix) Populations Served and Projections

According to the 2000 and 2010 United States Census, the Town of Tiverton's population increased from 15,260 to 15,780 over the last ten years. This is an increase of only 3.4%. The NT service area's estimated population increased from 6,078 to 6,135, of which 5,999 (97.8%) are provided water, and 136 are eligible to be served. The TWA service area's estimated population increased from 6,694 to 7,059, of which only 1,567 (22.2%) are provided water, and 5,492 are eligible to be served. The population

estimates were derived by mapping both 2000 and 2010 United States Census data to the service areas of the North Tiverton Fire District by census tract, block group, and block.

Based upon three different growth scenarios (Current Trend of 3.41%, Moderate Increase of 5.0%, and High Increase of 7.0%) over the next two decades, estimates of the town's projected population are shown in the table for the 5-year and 20-year planning periods. The Population Projection of 16,891 in 2030, based upon the Current Growth Trend, is within 50 (2.97%) people of the Town's Population projection of 16,841 as detailed in the Town of Tiverton's Comprehensive Community Plan, last revised in 2009.

Town of Tiverton Population Projections

Year	Current Trend 3.41% Growth	Moderate Increase 5.0% Growth	High Increase 7.0% Growth
2010 (Actual)	15,780	15,780	15,780
2015 (Projection)	16,051	16,178	16,340
2030 (Projection)	16,891	17,435	18,142

Based upon these projections, the projected NT and TWA service area residential populations with supplied drinking water are shown in the tables for the 5-year and 20-year planning periods. Using current data, the percentage of residential population supplied drinking water in the NT and TWA service areas is 98.8% and 20.4% respectively. These percentages are not expected to change in the future as nearly all of NT service area residential homes, in a mostly urban setting, have access to district water mains and approximately 20% of TWA service area residential homes, in a mostly rural setting, have access to district water mains. The estimates of population supplied with water are utilized later in this report to calculate total projected future water use.

NT Population Projections (with Supplied Water)

Year	Current Trend 3.41% Growth	Moderate Increase 5.0% Growth	High Increase 7.0% Growth
2010 Calculated	6,135 (6,060)	6,135 (6,060)	6,135 (6,060)
2015 Projection	6,240 (6,164)	6,290 (6,213)	6,353 (6,275)
2030 Projection	6,567 (6,487)	6,779 (6,696)	7,053 (6,967)

TWA Population Projections (with Supplied Water)

Year	Current Trend 3.41% Growth	Moderate Increase 5.0% Growth	High Increase 7.0% Growth
2010 Calculated	7,059 (1,440)	7,059 (1,440)	7,059 (1,440)

2015 Projection	**7,180 (1,465)**	**7,237 (1,476)**	**7,310 (1,490)**
2030 Projection	**7,556 (1,541)**	**7,799 (1,591)**	**8,116 (1,656)**

(x) Major Users

NTFD's only one major water user is the Tiverton Power Authority (TPA) which produces electricity. It is classified as an Industrial user. Its average annual projected future water use is shown in the table. TPA's annual water usage for 2011 was 16.1 MG.

(xi) Metering

The NTFD has five master meters, two measuring water at the primary interconnections with the City of Fall River and three measuring water at the primary interconnections with the Stone Bridge Fire District.

100% of NTFD's over 3,000 accounts are metered. This includes all residential, commercial, government accounts, as well as its one industrial account. NTFD sells water to two commercial water companies that supply water for pools. These companies fill their trucks at local hydrants using temporary meters intended for this purpose.

NTFD has only one major user, the Tiverton Power Authority. Its two meters were installed in 2001 and the entire plant was officially incorporated into North Tiverton Fire District in 2006. Both meters are read monthly and checked annually.

NTFD began the conversion from manual read to electronic read meters on April 13, 2004. As of the end of 2011, 1,921 (63.3%) of NTFD's 3,036 meters have been converted. At the installation rate of between 200 and 250 meters per year, NTFD anticipates the conversion to be completed by the end of 2016. The meter conversion rate is almost entirely based upon available funding.

(xii) Legal agreements

NTFD has legal agreements with its two suppliers of water, the City of Fall Fiver and the Stone Bridge Fire District.

(xiii) Leakage

Non-account water is defined as the total of all purchased water minus all water sold within a given period of time, typically a year. All water purchased from the Stone Bridge Fire District and the City of Fall River is metered. Non-account water, or unmetered water, is therefore the total of all metered water purchases minus the total of all metered water sales. This includes water in the following categories: Fire

Fighting, Water Main Flushing, Water Quality Testing, Construction, Theft, Meter Error, Water Main or Service Breaks. The amount of NTFD's non-account or unmetered water for 2011 is 9.1MG, 5.1% of water purchased from all sources.

Leakage is defined as the total of all non-account or unmetered water for the year minus all non-account or unmetered water estimated by specific category, as identified above. NTFD's total leakage for 2011 is estimated to be 77.3 KG. 0.85% of all unmetered water or 0.04% of water purchased from all sources. NTFD has instituted a leak detection program , and is aggressive in repairing any leaks, either to water mains or service connections, as rapidly as possible upon identification.

(xiv) Demand Management

Based upon the Water Resources Board's 2010 Annual Report, NTFD has the second highest water rate in the state. The high rate is primarily due to the high price NTFD pays for water from its suppliers. The consequence of the high water rate is that it inherently promotes and encourages water conservation, a behavioral characteristic typically not well practiced in a suburban community with large lawns and numerous pools. NTFD's 44.9 gallons per capita Average Daily Demand (ADD) for 2011 is evidence of the general practice of water conservation by the water users of the district. This figure is well within the 65 gallon per capita ADD target established by the Water Resources Board.

Additional measures to promote conservation include the following: conservation message printed on all users' water bills, conservation pamphlets available to users, and conservation retrofit kits available to users. NTFD routinely donates to the Tiverton Conservation Commission for its work on the Stafford Pond Watershed Program, which teaches water preservation and conservation to all fourth graders at the Pocasset, Fort Barton and Ranger schools.

(xv) Supply Management

NTFD purchases treated water from two sources, the City of Fall River and the Stone Bridge Fire District.

The City of Fall River obtains its water from North Watuppa Pond, located to the east of the city. North Watuppa Pond, with a volume of about 8 billion gallons, has a watershed area of approximately 9.2 square miles and a safe daily yield reported to be between 8.5 and 9.0 MGD. North Watuppa Pond has been utilized as a potable water supply since the late 1870's. Copicut Reservoir, with a volume of about 3 billion gallons, was developed by the city as an additional source of supply in 1975. Water is pumped from Copicut Reservoir, which has a watershed area of about 5.8 square miles, on an as-needed basis to maintain the level in North Watuppa Pond. The safe daily yield of Copicut Reservoir is reported to be

between 6 and 6.5 MGD on average for the year. Water is treated in the city's own water treatment plant. There are seven storage tanks in the City of Fall River's distribution system. The total volume of the city's distributed storage, calculated based upon the height of each tank's overflow and the tank's diameter, is approximately 19.6 MG. Water from the city of Fall River enters the North Tiverton Fire District's distribution system through the district's State Avenue Pumping Station and Stafford Road Pumping Station.

The Stone Bridge Fire District obtains its water from Stafford Pond, located to the east of the district. Stafford Pond, with a volume of about 2.04 billion gallons, has a watershed area of approximately 1.48 square miles and a safe daily yield reported to be between 2.0 and 2.5 MGD. Stafford Pond has been utilized as a potable water supply since the mid-1940's. Water is treated in the Stone Bridge Fire District's own treatment plant. Water from the Stone Bridge Fire District enters the North Tiverton Fire District's distribution system through the district's Carey Lane Pumping Station, the Quintal Drive metered connection, and the North Brayton Road metered connection.

(xvi) Available Water

The comparison of available water from both the City of Fall River and the Stone Bridge Fire District against the projected average daily demand is shown in the table below. The daily projected average demand based upon the high population growth projection for the town over the next twenty years is less than 50% of the available water from both sources taken individually. The total water available combined from both sources is adequate to meet the maximum daily demand projected for the year 2030.

North Tiverton Fire District's capacity for pumping water into its distribution system also exceeds the available water from sources. The district intends to evaluate the potential need for increasing the pumping capacity at its Carey Lane Pumping Station as general upgrades are made over the next ten years and as the Stone Bridge Fire District implements upgrades to its water treatment plant over the next few years. The district will also evaluate the need for additional pumping capacity if it anticipates an abnormally high influx of development in the town's industrial park. As of the date of this WSSMP, no abnormally high commercial or industrial growth is projected for the town.

Projected Water Availability vs. Projected Water Demand

	Available Daily Water From Sources (KG)		NTFD Maximum Daily Pumping Capacity (KG)		NTFD Daily Projected Average Demand (KG)		
Year	**2015**	**2030**	**2015**	**2030**	**2010**	**2015**	**2030**

					(Actual)		
Fall River	600[1]	600[1]	1,600[3]	1,600[3]	509.3	541.4	608.4
Stone Bridge	700[2]	700[2]	750[4]	750[4]			
Total	1,300	1,300	2,350	2,350	509.3	541.4	608.4

Notes: 1. 600 KG is based upon contractual availability. The City of Fall River encourages NTFD to purchase all of the water it can.

2. 700 KG is based upon historical usage. Stone Bridge Fire District encourages NTFD to purchase all of the water it can.

3. 800 KG is for each of the State Avenue Pumping Station and the Stafford Road Pumping Station.

4. 350 KG is for Carey Lane Pumping Station, and 200 KG is for each of the Quintal Drive metered connection and the North Brayton Road metered connection.

(xvii) Safe Yield

North Watuppa Pond has a safe daily yield reported to be between 8.5 and 9.0 MGD. The safe daily yield of Copicut Reservoir is reported to be between 6 and 6.5 MGD. Stafford Pond is reported to have a safe daily yield between 2.0 and 2.5 MGD.

(xviii) Anticipated Future Demands

Other than the addition of the occasional house, business, or housing development, North Tiverton Fire District has no anticipated future demands on its water treatment or distribution systems. There is a potential for the addition for a large mixed-use plaza off of Souza Road. NTFD is currently working with the Town and the engineering company for the developers to ensure proper tie-in to the NTFD water systems. There is adequate water to supply the needs of this future demand.

(xix) Capital Improvement

North Tiverton Fire District is at the end of a seven-year capital improvement program that began with the acquisition of the Tiverton Water Authority in 2004. Since then, NTFD has put a new 2-million gallon water tank into operation, constructed the Stafford Road Pump Station, expanded into a newly acquired and renovated administrative office building, refurbished and upgraded the State Avenue Pump Station, replaced nearly three quarters of a mile of 90-year old water main in the north end of the district, upgraded it entire computer and billing system, and purchased two new replacement service vehicles. Over the next five years, NTFD anticipates the following improvements.

(1) Replacement of approximately one quarter of a mile of street water main per year.

(2) Upgrades to two pumps at the Carey Lane Pump Station.

(3) Replacement of nearly two miles of water main on Fish Road.

(4) Painting of Quintal Drive water tank.

(xx) Rate Structure

NTFD's water rate structure is a flat rate consumption charge based upon metered water usage, which includes a fixed charge for minimum usage. NTFD charges for initial water meters, service installations, applications, and inspections. Late fees are applied to water bills that are 45 days past due. The flat rate charged for water consumption is as follows.

Flat Rate Water Consumption Charge	$4.10 per CCF
Minimum Fee	$15 per Billing Period
Flat Rate Consumption Charge for Tiverton Power Authority	$10.80 per 1,000 gallons
(The Flat Rate for TPA includes all district taxes.)	

Based upon the Water Resources Board's 2010 Annual Report, NTFD has the second highest water rate in the state. The high rate is primarily due to the high price NTFD pays for water from its suppliers. The consequence of the high water rate is that it inherently promotes and encourages water conservation, and eliminates the need for a graduated or marginal water rate structure. NTFD's Average Daily Demand (ADD) for 2011 is 44.9 gallons per capita, well below the 65 gallon per capita ADD target established by the WRB.

NTFD's tax rate structure is based upon the Town of Tiverton's valuation of assessed property (land, building, and tangibles), which includes a minimum fixed charge for taxes. Exemptions are given to the elderly and to veterans based upon the Town of Tiverton's exemption process. Late fees are applied to tax bills that are 30 days past due.

Tax Rate	$0.78 per $1,000 of Assessed Value
Minimum Tax	$2.00 per Annual Billing

(xxi) Financial Management

NTFD is an independent quasi-municipal water agency structured as a public corporate entity under the laws of Rhode Island. NTFD is self-supporting through the revenue it receives from water user charges, fees, and taxes. The aggregate budget for NTFD is prepared to incorporate revenue from water charges, fees and tax revenue. Also included are the costs of all operating expenses, payments on bonds, and the

cost of improving the treatment and distribution systems of the district. Water and tax rates are established by the Administrative Board, and tax rates are subject to approval by the members of the North Tiverton Fire District at the Annual Meeting held every June. The primary objective is to keep the water and tax rates as low as practical, while continuing to maintain a balanced budget, continuing to provide a high quality water product to our customers, and continuing to implement incremental improvements to the treatment and distribution systems over time.

Excess funds from the operating budget are held in NTFD's reserve accounts. The reserve accounts are the source of funds for cash flow stability, major improvement projects, and in the event of emergencies. In recent years, NTFD has utilized its reserve accounts only for purposes of stabilizing cash flow between billing cycles. Outside agencies are the source of funds for major improvement projects that typically require large amounts of up-front capital. The external agencies that are a source of funds for NTFD are the United States Department of Agriculture Rural Development (USDA RD) which has provided low interest loans with up to 45% project grant funds to rural areas of 10,000 population or less, and the Rhode Island Clean Water Finance Agency (RICWFA) which has provided low interest loans.

As of fiscal year-end 2011, NTFD's total long-term debt is $3,523,667, spread over six loans, five with United States Department of Agriculture Rural Development (USDA RD) and one with Rhode Island Clean Water Finance Agency (RICWFA). Annual payments (interest and principle) over all six loans total to $231,500.

NTFD's financial statements are prepared by Aceto & Associates (CPA) and financial audits are conducted annually by Carlucci & Dugan (CPA) in accordance with *Government Auditing Standards* issued by the Comptroller General of the United States for submittal to the USDA.

(xxii) Emergency Management

Varying degrees of emergency response depend on the scope of the situation and type of disaster or crisis. North Tiverton Fire District has an up-to-date Vulnerability Assessment (VA) and Emergency Response Planning Guide (ERPG) for both the NT and TWA service areas. Section 3, *Events that Cause Emergencies*, of the ERPG contains an assessment of the risk of events that cause emergencies including hurricanes, ice storms, contamination & chemical spills, mechanical failures, and droughts. Section 6, *Response Actions for Specific Events*, of the ERPG contains steps to be taken related to six emergency situations, consistent with State Guide Element 721: Rhode Island Water 2030.

Water supply emergency responses during different emergency conditions will depend upon the nature of the disaster or crisis, as it impacts the water sources of the City of Fall River and the Stone Bridge Fire District. During a drought situation, the level of service will be impacted when North Watuppa Pond or Stafford Pond falls less than 30 inches below full pond.

(xxiii) Water Supply Source Protection

North Tiverton Fire District has no water surface or ground water supply sources of its own. It purchases all of its water from the City of Fall River and the Stone Bridge Fire District at the drinkable quality level in accordance with Rhode Island Department of Health standards.

Stone Bridge Fire District has completed a Water Quality Protection Plan (WQPP) in accordance with the Rhode Island Water Quality Protection Act of 1987, which has been approved by the Water Resources Board. Details related to source water quality protection are available in SBFD's Water Supply System Master Plan.

There are no known issues related to water protection on the Watuppa Pond in the City of Fall River. The source is completely fenced and used exclusively for water supply purposes.

(xxiv) General Policies shall be developed

NTFD has no additional policies other than those described in the Executive Summary and the text of the WSSMP.

1/14/08

STONE BRIDGE FIRE DISTRICT

WATER SUPPLY SYSTEM MANAGEMENT PLAN

EXECUTIVE SUMMARY

JANUARY 2008

Comprehensive Environmental Inc.
Rhode Island • Massachusetts • New Hampshire
Phone: (508)482-5557/Fax: (508)482-5445
www.ceiengineers.com

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STONE BRIDGE FIRE DISTRICT

WATER SUPPLY SYSTEM MANAGEMENT PLAN

GENERAL

In July of 2001, the Stone Bridge Fire District completed a Water Supply System Management Plan in accordance with the State of Rhode Island Water Resources Rules and Procedures for Water Supply System Management Planning. In accordance with the above referenced regulation, the Stonebridge Fire District is required to review its plan at least once every five years from the date of Board approval. This Executive Summary for the five year update of the Water Supply System Management Plan is developed to highlight the historical operations and future considerations of the Administrative Board of the Stone Bridge Fire District (District).

GOALS

The District is organized and operates to serve the water supply needs of the owners of the system; i.e. the citizens and businesses of the service area that generally consists of the section of the Town of Tiverton commonly described as Stone Bridge. As such the District complies with all laws, rules, regulations, and directives of appropriate legal authorities and operates the system in accordance with generally accepted standards for water systems.

SYSTEM OVERVIEW

The District operates a water system that obtains all of its water from Stafford Pond, a surface water supply owned by the City of Fall River, and distributes that water to approximately 1,079 service connections (Dec 2006) through a pipeline system consisting of approximately 24 miles of pipe (approximately 8 miles 8 in – 12 in transmission and approximately 16 miles of 6 in – 8 in distribution lines). Water from Stafford Pond is treated in a treatment plant using a pulsator-clarifier treatment process prior to distribution. The system was developed in the late 1940s with the majority of the piping installed in the late 1940s and 1950s. Pipelines are primarily transite (asbestos-cement) material. There is one pressure zone for the retail system. Water is also delivered to one wholesale customer; North Tiverton Fire District. There are two distribution storage reservoirs, a 500,000 gallon welded steel standpipe owned and operated by the Stonebridge Fire District and a one million gallon steel standpipe, owned by North Tiverton Fire District and operated by the Stonebridge Fire District.

SOURCE WATER QUALITY PROTECTION

The Stone Bridge Fire District has completed a Water Quality Protection Plan (WQPP) in accordance with the Rhode Island Water Quality Protection Act of 1987. The Plan was submitted to and approved by the Rhode Island Water Resources Board as required by the Water Quality Protection Act.

The WQPP along with a Limnological Study of Stafford Pond have identified the following ongoing programs for protection of the watershed and recharge areas:

- Management and maintenance of the land owned by the District
- Maintaining a liaison with enforcement agencies dealing with various aspects of control in watershed areas such as local police, planning, zoning and health boards, EPA and Rhode Island DEM
- Participation in public meetings regarding planning and zoning for all land in watershed areas
- Involvement with all federal and state agencies and the Town of Tiverton regarding any aspects of land use that may affect water quality.

The Administrative Board historically has had concerns about the continued gradual deterioration of the raw water quality in Stafford Pond. The Board's efforts since development of the WQPP and the Limnological Investigation include:

Specific Water Quality Protection Actions

Recommendations	Actions to Date
Begin Ecological Monitoring Program	The RI Department of Environmental Management provided a grant to complete a Limnological Investigation of Stafford Pond that was completed in 1997.
Acquiring Land or Development Rights in Watershed	The District has been active in acquiring control of activities on watershed land through purchase and other means of control including: - acquiring 15 acres from Town on Industrial Road - acquiring approximately 4 acres on pond and approximately 2 acres on land adjacent to District land in exchange for 12.5 acres near High School/Middle School complex - negotiating to acquire approximately 8 acres on pond abutting District property - cooperating with Town on use of 52 acres adjacent to Water Treatment Plant and 1500 feet along shoreline of pond
Creation of a Stafford pond advocacy group	The Stafford Pond Steering Committee consisting of : - Tiverton Conservation Commission - Stone Bridge Fire District - Stafford Pond Improvement Association - URI Cooperative Extension Water Quality Program - RI Department of Environmental Management - RI Bass Federation Was created to protect the pond for all uses

Development of interagency communication and cooperation	Through the Stafford Pond Steering Committee
Upgrading of substandard septic systems	The Town of Tiverton has in effect an Onsite Wastewater Management Program, established by Ordinance, which addresses the requirements for management, design, siting, installation, operation, maintenance, and inspection of septic systems. On July 17, 2006 the Town Council adopted an ordinance, establishing an Onsite Wastewater Management District consistent with the Tiverton Comprehensive Plan and the Tiverton Onsite Wastewater Management Plan. There are a total of 256 On-site Sewerage Disposal Systems (OSDS) in the Stafford Pond Watershed Protection overlay district. To date 88 have been inspected with the remainder to be inspected by July 1, 2008. All cesspools identified during the inspection will have to be upgraded by the July deadline.
Upgrading storm drainage systems	Storm drains have been rehabilitated and upgraded by state of Rhode Island to capture sediment and reduce leakage into watershed grounds

A watershed survey and update of potential pollution sources to the 1992 plan was performed as part of the 30-month update to the WSSMP performed in September of 2005.

The Stafford Pond Steering Committee has an active public information program that encourages citizens to be involved in the protection of the water quality in the pond.

HISTORIC USAGE

Table I describes the recent historic purchases and usage to serve the District.

Table I-Historic Water Use

DESCRIPTION	1997 MG	2001 MG	2004 MG	2006 MG
Withdrawn from Stafford Pond	416.23	225.67	230.15	238.62
Retail sales	61.28	72.48	85.12	85.4
Wholesale sales	278.0	105.82	107.94	111.9
Fire Fighting	1.23	1.57	1.61	1.62
System Use	23.44	20.28	17.04	29.77
Total Billed and Accounted for	363.95	200.15	211.71	228.18
% Accounted For Water	87.4	88.7	92.0	95.0

Notes: 1. Portsmouth Water and Fire District was a significant wholesale customer until April 1999; however, since that time Portsmouth only takes water on an emergency basis.

WATER CONSERVATION PROGRAMS

The District has distributed approximately 250 water conservation retrofit to its customers. The District is seeking a vendor who will supply the kits at a reasonable cost. Customers will be notified of the kits availability and water department personnel will provide information regarding the installation of the devices. The Superintendent makes presentations, which incorporate water conservation in the curriculum, to local middle school students. .

SYSTEM NEEDED IMPROVEMENTS

The District intends to develop a hydraulic model of the distribution system, which would aid in the evaluation of system weaknesses and improvements. The long and protracted replacement of the Sakonnet River Bridge has delayed development of this model because a final design of the bridge will have an impact on the configuration of the distribution mains. If the model is to be used as a tool to identify system weaknesses and identify future projects, then this analysis should be made with the most complete and up to date information, which will not be available until the bridge replacement design has been finalized. The District has identified improvements to the system associated with the elimination of dead ends to help improve water quality.

ANTICIPATED FUTURE NEEDS

The assumptions and calculations for the anticipated five (5) and twenty (20) year planning horizons are included in the main report. Table II is a summary of the anticipated demands.

Table II

Summary of Anticipated Water Demands

Year	Actual/Est	MGD	MGY
2001	Actual	0.618	225.67
2006	Actual	0.654	238.62
2011	Estimated	0.809	295.4
2026	Estimated	1.12	408.8

AVAILABLE WATER

The water available to the District is limited by agreement with the City of Fall River as the owner of the water rights to Stafford Pond. The City of Fall River has agreed to allow Stone Bridge to withdraw a maximum of 1.9 million gallons per day and further agrees to maintain the level in Stafford Pond such that the maximum amount is available for withdrawal. Consequently Stone Bridge determines its water availability to be 1.9 million gallons per day. Table III compares the 2006 available water to the 2006 water use. Table IV compares the anticipated future demand to the available water in the 5 and 20 year planning scenarios.

The District considers its agreement with Fall River to be sufficient for the five (5) and (20) year planning scenarios.

Table III.

Available Water vs Water Use – 2006

Available Water (MGD)	Actual Use (MGD)
1.90	0.654

Table IV

Available Water vs Anticipated Water Use

Planning Year	Estimated Available (MGD)	Estimated Demand (MGD)
2011 (5 yr)	1.90	0.809
2026 (20 yr)	1.90	1.12

NON-ACCOUNT WATER

The District maintains a policy (as identified in the Goals statements) of complying with all Federal and State regulations, policies, and guidelines. As such the District strives to maintain Non-Account Water below the 15% guideline identified in the State Guide plan Element 721. The District also has identified its long-term goal of reducing Non-Account Water to 10% as recommended by the Water Supply Management Plan regulations. Accordingly Table V provides a historical representation of Non-Account Water for the District. A three year calculation of non-account water is also provided since the meter readings may not be coincident within a year and the three year average is a better indicator of trends then a one year calculation.

Table V

Historical Non-Account Water

Calendar Year	% Non-Account Water (including 1.5% Fire Fighting Allowance)	
	Annual Basis	Three Year Trend
2006	5.0	7.0
2005	7.9	7.4
2004	8.0	8.7
2003	6.4	9.8
2002	11.7	13.4
2001	11.3	16.0
2000	17.1	17.3
1999	19.7	15.5
1998	15.8	13.1
1997	12.6	12.3
10 year average	13.8	NA

METERING

The District maintains a policy of metering 100% of the users of water and in fact has historically metered 100% of the users.

The District tests meters on a schedule such that each meter is replaced no less frequently than every fifteen (15) years.

The District has one Master Meter at each wholesale connection. Each master meter connection is owned and maintained by the wholesale customer. The connections are tested and calibrated at least annually.

EMERGENCY MANAGEMENT

The District has completed a Vulnerability Assessment and developed an Emergency Response Action Plan which is included as part of the main report. Table VI identifies the Critical Facility Components identified through the Vulnerability Analysis.

Table VI - Critical Facility Components

Stafford Pond Intake Structure
Stafford Pond Water Treatment Plant/Pump Station
All 12 inch and 12/8 inch transmission lines
500,000 gallon standpipe

IMPLEMENTATION SCHEDULE, RESPONSIBLE ENTITIES, AND PROJECTED COSTS

Table VII identifies the activities and responsibilities for implementation of the elements of this Plan.

Table VII
Implementation of Plan Elements

Plan Element	Scheduled Completion Date	Source of Funding	Responsibility for Completion
Implement Residential Retrofit/Major Users Technical Assistance Program	On-going	Annual Budget	Superintendent
Develop system hydraulic model	TBD	Annual Budget	Superintendent/Consultant
Purchase of Land/Development rights of parcels in Watershed	On-going	Annual Budget/Water Quality Protection Funds	Admin Board/Superintendent
Leak detection Survey/Repair	2008	Annual Budget	Superintendent
Valve Replacement	2008	Annual Budget	Superintendent
Central Ave/Evans Ave loop	TBD	Annual Budget	Admin Board/Superintendent
Main installation Susan St/Causeway	TBD	Annual Budget	Admin Board/Superintendent
Upgrade of cesspools in Stafford Pond watershed	2008	Property owners	Wastewater Collection Superintendent
Consideration of implementing a conservation oriented water rate structure	TBD	Annual Budget	Admin Board/Consultant

FINANCIAL MANAGEMENT

The District operates the water system in a financially sound manner, in fact the District has no sources of revenue other than those fees, rates, and charges levied against the customers of the water system. All costs of implementing the elements of this Plan will be paid for from the normal charges to the customers of the water system.

The District maintains a rate structure that includes a service charge based on the size of the meter and a consumption charge that is charged at a flat rate. Other charges to customers are based upon the actual cost of providing service; e.g. private fire protection, service installations, etc. This rate structure is fully in compliance with the State of Rhode Island policies.

Currently all customers are billed quarterly based upon two actual meter readings collected every six months, and two estimated reads generated three months after each actual read .

COORDINATION

This Plan was developed in coordination with the Town of Tiverton and using the 2006 Updated Town of Tiverton Comprehensive Plan information.

COMMENTS

The Administrative Board of the Stone Bridge Fire District takes pride in the developed system and is constantly concerned that the system is developed and operated for the benefit of the citizens and businesses of Stone Bridge and the Town of Tiverton while maintaining efficiency such that the rates and charges are appropriate to operate, maintain, and protect the integrity of the water system.