South Shore
Site Readiness Study

Final Report

September 28, 2021

Acknowledgments

South Shore Site Readiness Study partners:

SOUTH SHORE CHAMBER OF COMMERCE

South Shore Economic Development Corporation, a subsidiary corporation of the South Shore Chamber of Commerce

MassDevelopment

MAPC

Weston & Sampson

Funding generously provided by:

- MassDevelopment Site Readiness Program
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1 Introduction

1.1 Study Overview

Throughout the Greater Boston region, proactive planning for growth and investment is critical to encourage compact, sustainable, and well managed patterns of settlement that complement the existing assets of a municipality and strengthen the community. Water and wastewater systems are foundational infrastructure elements to support the type of settlement patterns that are most sustainable. The water and wastewater infrastructure already in place in the region requires regular maintenance and investment to meet existing needs. And, it is even more critical to proactively plan in locations where water and wastewater infrastructure needs and constraints may be present. In the South Shore, water and wastewater capacity is one of the leading factors that limit development and growth potential. These improvements and investments could be supported, in part, through closely coordinated development investments. This study is a first step to better understand the specific constraints and opportunities presented by the water and wastewater infrastructure in the South Shore, with broader applicability throughout the region.

The origin of this study came from the South Shore Economic Development Corporation. It identified a corridor along Route 3 that has seen development in the past, but may be a location that could support future development. The corridor passes through the five municipalities that became the focus of this study (Weymouth, Hingham, Norwell, Rockland, and Hanover). Each municipality may be constrained by the different water and wastewater infrastructure that is currently present. This corridor runs roughly between Route 53 in Hanover in the south and Weymouth in the north and generally bordered by Route 53 on the east side of Route 3 and over to Union Point on the west side. In order to analyze properties in this corridor, the study had to evaluate total water and wastewater services available for each of the five municipalities. The findings or recommendations may prove valuable to this specific area and to other communities exploring water and wastewater solutions.

In order to explore and analyze the water and wastewater constraints and opportunities, this study identified six example properties in the towns of Hanover, Hingham, Norwell, Rockland and Weymouth. The six example properties were analyzed with hypothetical build-out scenarios to provide a foundation for the water and wastewater analysis and recommendations. The evolution of the Union Point development planning and its future impact on water and wastewater considerations in the region was also considered as part of this study. This report identifies approaches to water and wastewater solutions that would help to address future infrastructure needs and create future development opportunities for key properties in the South Shore. The recommendations focus on the actions that are necessary to encourage investments and potential partnerships that will help to address infrastructure and future growth.

Study Goals

The goals of this study were as follows:

- Explore the water and wastewater infrastructure in the South Shore municipalities of Hanover, Hingham, Norwell, Rockland and Weymouth,
- Define the characteristics of the most appropriate areas for smart growth development and redevelopment based on example properties in these municipalities,
- Provide an analysis of the opportunities and constraints related to water supply and wastewater capacity in the participating municipalities.

Partners

The study partners include the South Shore Economic Development Corporation, South Shore Chamber of Commerce, MassDevelopment, Metropolitan Area Planning Council (MAPC), and Weston & Sampson. This project team advanced the work and engaged with project stakeholders including planning staff and leadership in the municipalities of Hanover, Hingham, Norwell, Rockland, and Weymouth, as well as property owners and developers associated with the selected example properties in these municipalities.

Funding Sources

The study was generously funded by the South Shore Economic Development Corporation, a subsidiary corporation of the South Shore Chamber of Commerce, MassDevelopment's Site Readiness Program, and technical assistance funding from the Metropolitan Area Planning Council.

1.2 Study Process

The study process was unique in that it was focused on the technical aspects of both infrastructure and development centered on water and wastewater constraints in the South Shore. The process involved stakeholders planning for the future of infrastructure in the region and the potential development of example properties. The process was not focused on engaging the broader community in this high level planning for potential future infrastructure needs. The process did build upon previous community processes that have occurred in each of the five participating municipalities through the identification of example properties based on previous planning efforts. The results of this study will be used to inform future community discussions around the infrastructure, growth, and development in the South Shore. The process involved close coordination with the following core team members and partners.

Core Team Engagement

The Core Team for the study led the analysis and worked in close coordination throughout the study process. The Core Team included the South Shore Chamber of Commerce, MassDevelopment, MAPC, Weston & Sampson, and two Chamber members from the development community. The Core Team met monthly through the duration of the study and provided guidance as the work was advanced. The principal components of the analysis and process were led by two members of the Core Team, MAPC and Weston & Sampson. The individual members of the Core Team are included below with their affiliations:

- Peter Forman, President & CEO, South Shore Chamber of Commerce
- Amanda Gregoire, VP Real Estate Services, MassDevelopment
- Betsy Cowan Neptune, Former Chief of Economic Development, MAPC
- Martin Pillsbury, Director of Environmental Planning, MAPC
- Josh Fiala AICP AIA LEED AP, Principal Planner, MAPC
- Tara McManus PE, Team Leader, Weston & Sampson
- Laurie Toscano, Team Leader, Weston & Sampson
- Gabe Crocker, Crocker Design Group
- Thomas Berkley, Senior VP Development and Operations, Union Point Development Company

Partner Engagement

The study process involved close coordination between the project partners throughout a series of study phases. The first phase of the process was the selection of example properties, followed by the calculation of hypothetical build-out scenarios for the example properties, then calculation of the water demands and wastewater capacity and needs of the example properties, and finally extrapolation of issues and recommendations based on this analysis and process. The partner meetings involved staff from the five municipalities involved in the study including Hanover, Hingham, Norwell, Rockland, and Weymouth. These meetings helped to guide the analysis and communicate initial findings and recommendations. Additional coordination occurred between the owners or developers of the six example properties that were selected for the specific analyses included in this study. An initial coordination discussion with each property owner occurred, followed by a discussion of the study process and initial conclusions.

1.3 Study Area

Municipalities

The study area targeted the five municipalities who agreed to partner in this effort. All of the analysis and the selection of example properties occurred within Hanover, Hingham, Norwell, Rockland, and Weymouth. The water and wastewater concerns explored in this study are not

unique to the targeted municipalities. These conditions are relevant to the entire South Shore and apply to other subregions of the Boston metropolitan region as well. Limitations to development in the five municipalities subject to this study include difficulties identifying adequate water supply and wastewater disposal capacities. The South Shore Site Readiness Study has been undertaken to look at specific example properties for potential future development for the purpose of examining these infrastructure limitations and defining potential solutions. The study does not seek to suggest a certain level of development or uses for particular properties, but aims to identify the water and wastewater challenges at the sites as a tool to better understand the long term needs of the region. Additionally, water resource boundaries are not the same as municipal boundaries so there are often regional opportunities that may be identified when studying these broader systems. The conclusions and recommendations of the study have broader applicability beyond these municipalities, but the analysis is grounded in the specific context of these municipalities and the example properties selected within them.

Example Properties

Example properties for this study were identified within this subarea of the South Shore. The identification of example properties was performed by MAPC through the review of previous planning documents in Weymouth, Rockland, Norwell, Hingham, and Hanover combined with conversations with municipal leadership and planning staff. The potential opportunity properties identified through this process defined six areas within the municipalities that each had a cluster of properties that provided a potential development and infrastructure investment opportunity. A map of these clusters is included in Section 2 of the report, the six clusters include:

- Properties in the vicinity of Route 53/Route 139 in Hanover
- Route 3 near Exit 13 and the Hanover Mall vicinity in Hanover and Norwell
- The vicinity of Commerce Road in Hingham and Rockland
- The vicinity of Route 3 around Exit 14 and Accord Park Drive in Norwell and Rockland
- Bristol Brothers properties near Old Derby Street in Weymouth and Hingham
- South Weymouth Naval Air Station properties in Weymouth and Rockland.

1.4 Site Readiness Program Context

The Site Readiness Program, administered by MassDevelopment, aims to increase the Commonwealth's inventory of large, well-located, project-ready sites; to accelerate private-sector investment in development projects; and to support the conversion of abandoned sites and obsolete facilities into clean, actively-used, tax-generating properties. In its first four years, the program has awarded approximately $10.4 million to 48 projects in almost every region of the Commonwealth. This program is now part of the Community One Stop for Growth, a single application portal and collaborative review process for community and economic development

grant programs that make targeted investments based on a Development Continuum. This process streamlines the experience for the applicant and better coordinates programs and staff on engagement and grant making. It will also reorients the State from a passive reviewer of funding requests to an active partner in economic development strategy, priorities, and investment.

In this case the Site Readiness Program is being leveraged to study an infrastructure readiness issue that impacts investment in the South Shore. Solutions for the water and wastewater capacity would increase the inventory of large, well-located, project-ready sites.

Current Studies and Initiatives

Current and recent studies and initiatives of the five municipalities involved in this study were reviewed in order to better understand the context of water and wastewater infrastructure and potential development opportunities.

From Hanover's recent studies the following documents were reviewed:

- Hanover Open Space Residential Cluster Design Bylaw (2019)
- Hanover Master Plan (2018)
- Hanover Hazard Mitigation Plan (2016)
- Hanover Open Space and Recreation Plan, 2008-2012 (2008)
- Town of Hanover "Build-out Base Map" (2006)

From Hingham's recent studies the following documents were reviewed:

- Town of Hingham Hazard Mitigation Plan (2016)
- Hingham Master Plan Update (2014)
- Town of Hingham Open Space and Recreation Plan, 2009-2016 (2009)

From Norwell's recent studies the following documents were reviewed:

- Norwell Hazard Mitigation Plan (2020)
- Town of Norwell Housing Production Plan (2019)
- Norwell Economic Growth Plan (2018)
- Norwell Open Space and Recreation Plan, 2012-2019 (2012)
- Norwell Open Space and Recreation Plan 2005-2010 Appendices (2005)

From Rockland's recent studies the following documents were reviewed:

- Town of Rockland Community Resilience Building Workshop Summary of Findings (2019)
- Town of Rockland Open Space and Recreation Plan 2018 Update (2018)
- Rockland Housing Production Plan (2016)

From Weymouth's recent studies the following documents were reviewed:

- Open Space and Recreation Plan (2020)
- Town of Weymouth Housing Production Plan (2018)
- Town Master Plan (2001)

Other non-municipal documents and recent studies were also reviewed including:

- South Shore 2030 Housing Initiative Year in Review (2019)
- South Shore 2030 Housing Report (2017)
- South Shore 2030 Infrastructure Report (2017)
- The importance of housing supply to the South Shore (2017)
- South Shore 2030: Choosing Our Future (2016)

1.5 Water Infrastructure Context

Existing Water Supply Conditions

To adequately document the existing conditions related to water supply and distribution in the study area, the Core Team reviewed information available through the Massachusetts Department of Environmental Protection (MassDEP) including Water Management Act (WMA) permitted, and registered source information, and Annual Statistical Reports on water use trends in each municipality. Some supplemental information was also obtained from each of the individual municipalities regarding specific distribution system information and/or town policies. The following summaries provide a snapshot of the water infrastructure, capacity, and demand in each of the five study municipalities. One of the immediate observations is how decentralized the water infrastructure and management is in most of these municipalities.

Town of Hanover

The Town of Hanover Water Division provides drinking water to approximately 15,000 people through three groundwater treatment plants. Each water treatment plant (WTP) is located in the South Coastal Watershed. The combined Water Management Act (WMA) authorized daily annual average withdrawal volume from these three plants is 1.38 million gallons per day (MGD). Historically, Hanover has withdrawn water above their authorized volume, although they have been focused on reducing their water losses and in 2019 reported withdrawing 1.25 MGD. For proposed new developments, once water demand projections are provided by the developers, the Water Division can evaluate its ability to provide additional water based on potential source and treatment plant limitations, WMA authorized withdrawal volumes, and potential prior commitments to provide water to approved development projects. The condition of the existing water mains will also need to be evaluated in order to determine if the mains have the integrity and capacity to meet the fire flow and domestic water needs of the proposed development.

Town of Hingham

The Town of Hingham now owns the Weir River Water System (WRWS) which provides drinking water to approximately 30,500 people in the winter and 41,000 in the summer in Hingham, Hull, and North Cohasset. The various groundwater and surface water sources are all located in the Boston Harbor Watershed and piped to a single water treatment plant located in Hingham.

The combined WMA authorized daily annual average withdrawal volume for these sources is 3.51 MGD. Over the past five years, the water system has withdrawn an average of 3.24 MGD and in 2019 reported withdrawing 3.16 MGD. For proposed new developments, once water demand projections are provided by the developer, the WRWS can evaluate its ability to provide additional water based on potential source and treatment plant limitations, WMA authorized withdrawal volumes, and potential prior commitments to provide water to approved development projects. The condition of the existing water mains will also need to be evaluated in order to determine if the mains have the integrity and capacity to meet the fire flow and domestic water needs of the proposed development.

Town of Norwell

The Town of Norwell Water Department provides drinking water to approximately 11,500 people through two groundwater treatment plants. The Washington Street WTP is located in the South Coastal Watershed and the Grove Street WTP is located in the Boston Harbor Watershed. The combined WMA authorized daily annual average withdrawal volume from these two plants is 1.14 MGD with the potential to increase up to 1.21 MGD if additional WMA permit requirements are met. Over the past five years, the water system has withdrawn an average of 0.942 MGD and in 2019 reported withdrawing 0.923 MGD. For proposed new developments, once water demand projections are provided by the developer, the Water Department can evaluate its ability to provide additional water based on potential source and treatment plant limitations, WMA authorized withdrawal volumes, and potential prior commitments to provide water to approved development projects. The condition of the existing water mains will also need to be evaluated in order to determine if the mains have the integrity and capacity to meet the fire flow and domestic water needs of the proposed development.

Town of Rockland

The Abington & Rockland Joint Water Works provides drinking water to approximately 34,000 people in the Towns of Abington and Rockland through two surface water treatment plants located in the South Coastal Watershed and one groundwater treatment plant in the Taunton Watershed. The combined WMA authorized daily annual average withdrawal volume from these three plants is currently 3.11 MGD with the potential to increase up to 3.36 MGD if additional WMA permit requirements are met. Over the past five years, the water system has withdrawn an average of 2.742 MGD and in 2019 reported withdrawing 2.719 MGD. For proposed new developments, once water demand projections are provided by the developer, the Joint Water Works can evaluate its ability to provide additional water based on potential source and treatment plant limitations, WMA authorized withdrawal volumes, and potential prior commitments to provide water to approved development projects. The condition of the existing water mains will also need to be evaluated in order to determine if the mains have the integrity and capacity to meet the fire flow and domestic water needs of the proposed development.

Town of Weymouth

The Town of Weymouth Water Department provides drinking water to approximately 54,000 people through two water treatment plants from a combination of groundwater and surface water sources all located in the Boston Harbor Watershed. The combined WMA authorized daily annual average withdrawal volume from these two plants is 5.00 MGD. Over the past five years, the water system has withdrawn an average of 4.516 MGD and in 2019 reported withdrawing 4.501 MGD. For proposed new developments, once water demand projections are provided by the developer, the Water Department can evaluate its ability to provide additional water based on potential source and treatment plant limitations, WMA authorized withdrawal volumes, and potential prior commitments to provide water to approved development projects. For decades, Weymouth has considered the Massachusetts Water Resources Authority (MWRA) as a potential source for the water needed to redevelop the former South Weymouth Naval Air Station. Plans in the past have studied MWRA water for only that portion of the Town. However, within the past year Weymouth Mayor Bob Hedlund began the process to evaluate whether Weymouth should consider joining the MWRA to provide water to the entire town for a variety of environmental, water quality, and recreational benefits. The condition of the existing water mains will also need to be evaluated in order to determine if the mains have the integrity and capacity to meet the fire flow and domestic water needs of the proposed development.

1.6 Wastewater Infrastructure Context

Existing Wastewater Management Conditions

To adequately document the existing conditions related to wastewater management and available treatment and discharge capacity in the study area, information available through the United States Environmental Protection Agency (US EPA) was reviewed for wastewater treatment facilities (WWTF's) with a National Pollutant Discharge Elimination System (NPDES) surface water discharge permit and through MassDEP for WWTF's with a Groundwater Discharge Permit. Where available, recent discharge monitoring reports were reviewed to estimate potential remaining capacity. Some supplemental information was also obtained from each of the individual communities regarding specific collection system information and town policies for their sewer system, where applicable. The following summaries provide a snapshot of the wastewater infrastructure in each municipality

Town of Hanover

The Town of Hanover does not currently have a centralized wastewater management system (sewer). Existing development in Hanover relies predominantly on septic systems located on each property for wastewater treatment and disposal. Several larger developments and commercial properties have privately owned and operated wastewater treatment facilities of varying size with permitted groundwater discharges for the treated effluent. While in the past the Town has examined the option of creating a centralized sewer system and municipal wastewater treatment facility to serve the Route 53 corridor, there are no current plans to proceed with implementation phases, and wastewater management continues to rely on individual property owners.

Town of Hingham

The Town of Hingham does currently have two separate centralized wastewater management systems (sewer districts). The North Sewer District serves approximately 2,500 businesses and residences in northern Hingham along the coast and flows directly to the Massachusetts Water Resources Authority (MWRA) system for treatment and discharge. The Weir River Sewer District serves approximately 275 residences in the northwest section of town. Flow from this area, combined with approximately 300 residences in Cohasset is transmitted to the Town of Hull WWTF.

Town of Norwell

Similar to Hanover, the Town of Norwell does not currently have a centralized wastewater management system (sewer). Existing development in Norwell relies predominantly on septic systems located on each property for wastewater treatment and disposal. One larger development in Norwell has a privately owned and operated WWTF with a permitted groundwater discharge for the treated effluent. Wildcat Hill WWTF, located on Highfield Lane, treats approximately 24,000 gallons per day (gpd) of flow from this limited residential area.

Town of Rockland

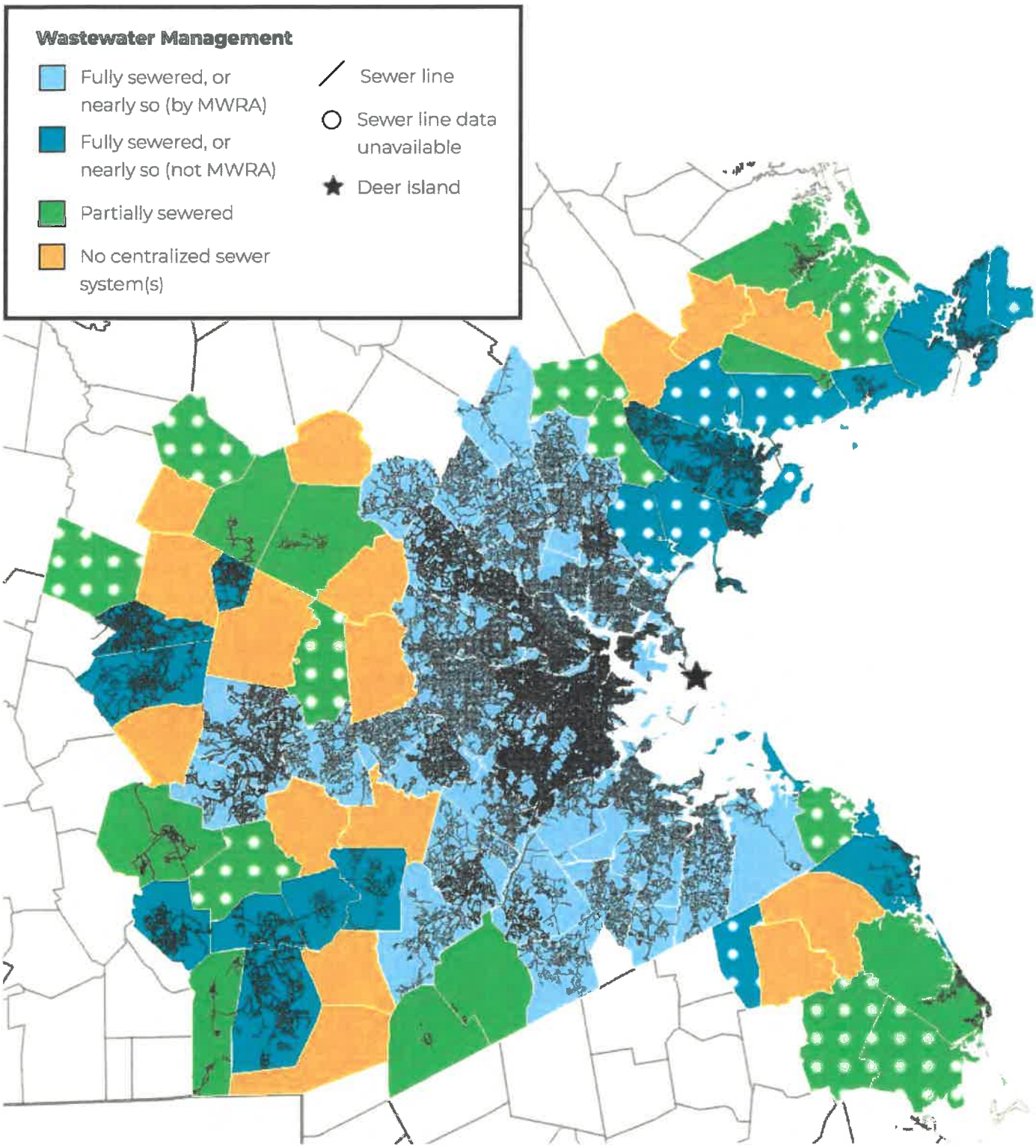
The Town of Rockland does currently have a centralized wastewater management system (sewer). The Rockland municipal sewer system currently serves approximately 5,000 businesses and residences throughout the Town and transmits flow to the Rockland WWTF (located on Concord Street) for treatment and surface water discharge. The current permitted capacity for the Rockland WWTF is 2.5 million gallons per day (mgd), however the sewer system experiences significant inflow & infiltration, which taxes the existing facility and requires high-flow management actions to mitigate impacts. The Rockland WWTF also receives flow (up to 110,000 gpd) from the adjacent Town of Abington. In late 2019, the Town of Rockland contracted to have a Comprehensive Wastewater Treatment Plant Assessment and Evaluation performed. The findings of that effort are not yet finalized, but will likely include recommendations to improve the facility and restore capacity.

Town of Weymouth

The Town of Weymouth is an MWRA municipality and all wastewater is transmitted to the MWRA system through multiple connections throughout the City. Weymouth currently contributes approximately 8.48 mgd to the MWRA.

Regional Wastewater Management

On the following page, these five municipalities are placed within the regional context. MAPC built on work previously conducted by MassGIS to define a basic data standard and compile data from municipalities, the U.S. Geological Survey, and the MWRA to depict wastewater management across the 101 municipalities that comprise the region. As can be seen on the map, wastewater infrastructure limitations are not only present in the South Shore, but also occur on the North Shore, and the southwest and northwest quadrants of the region. Most municipalities in the fully sewered category are served by the Massachusetts Water Resources Authority (MWRA), which sends wastewater to the Deer Island Wastewater Treatment Facility for processing.


Wastewater Management
Fully sewered, or nearly so (by MWRA)
Fully sewered, or nearly so (not MWRA)
Partially sewered
No centralized sewer system(s)
Sewer line
Sewer line data unavailable
Deer Island

2 Summary of the Analysis

2.1 Overview and Purpose

Six properties in the South Shore were selected as examples of potential development opportunities to explore through this study. The selection of specific properties enabled the exploration of potential hypothetical build-out scenarios for each example property and the analysis of water and wastewater constraints and opportunities based on these examples. The identification of example properties was performed by MAPC through review of previous planning documents in Weymouth, Rockland, Norwell, Hingham, and Hanover combined with conversations with municipal leadership and planning staff. Through this process 25 potential example properties were identified and then narrowed to six example properties that would be analyzed as part of the study. The 25 potential example properties form six clusters of properties that are geographically grouped together. In order to identify examples that were representative of larger opportunities, one example property was selected from each of these six clusters. The conclusions that are drawn from these six examples could be reasonably assumed to apply to other similar properties that are located nearby.

The following process and analysis was performed for each example property to investigate water and wastewater constraints and opportunities in the South Shore. Once the example property was identified the property information was explored through previous studies, available GIS data, and interviews with the property owners. Two hypothetical build-out scenarios were created for each example property based on the current zoning limitations and an additional hypothetical build-out scenario that explored development potential beyond current zoning. The build-out scenarios were then used to project water and wastewater needs and identify solutions. The findings and recommendations of this study are generalized from the more specific exploration of these example properties. The analysis of the example properties was conceptual in nature and developed to better understand the infrastructure limitations. This study does not represent specific planning or potential outcomes for any of the example properties.

2.2 Selection of Example Properties and Adjacent Clusters

The following map on page 14 shows all of the properties identified through the review of previous planning documents and conversations with municipal leadership and planning staff. Twenty-five potential example properties were identified across the five municipalities.

Through the mapping of these potential example properties across the five municipalities, six clusters of properties were identified and assisted in the identification of appropriate examples for this study. The six clusters of properties are evident on the following map and include:

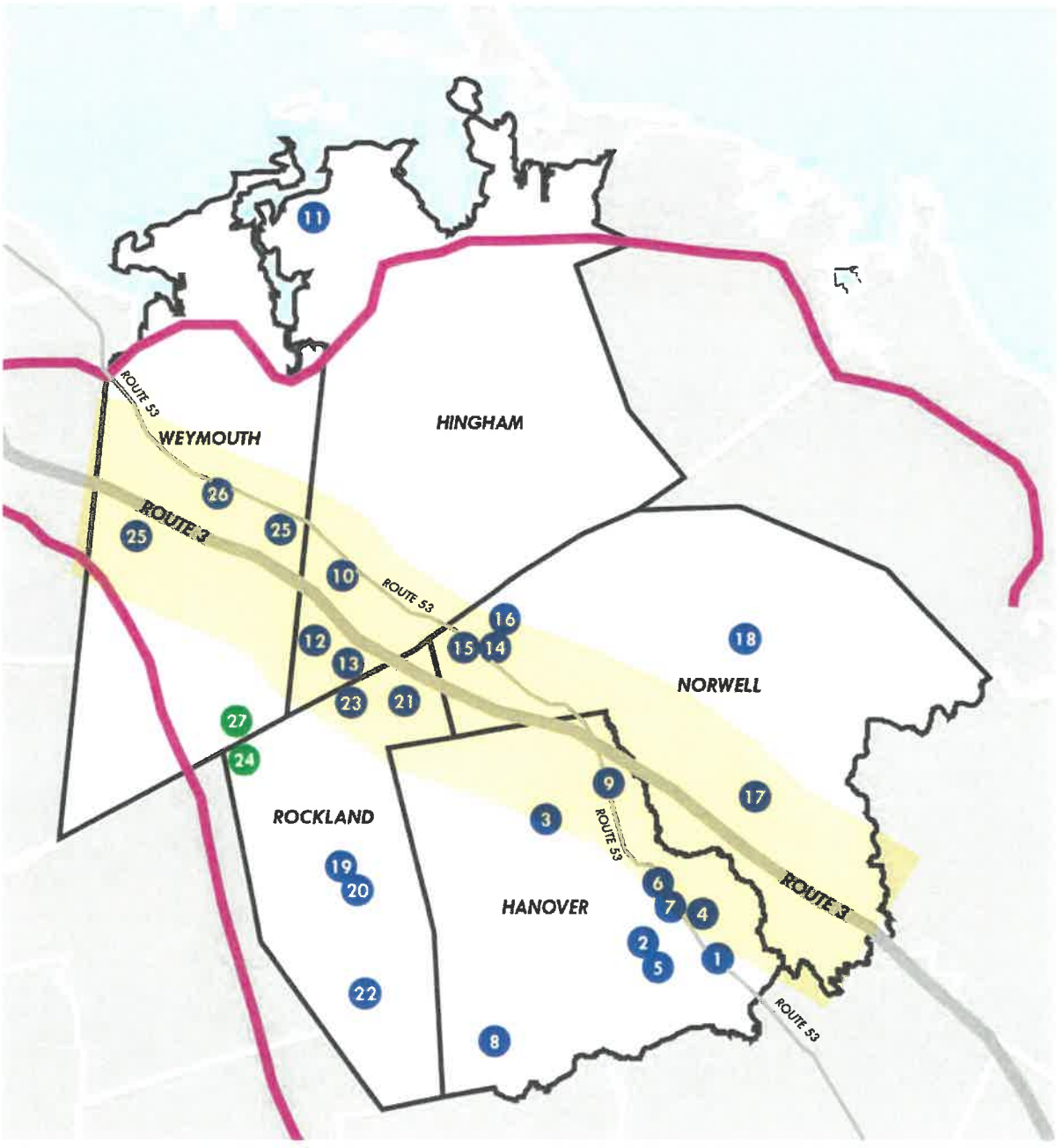
1. Route 53/Route 139 vicinity properties (Hanover)
2. Route 3 Exit 13/Hanover Mall vicinity properties (Hanover and Norwell)
3. Commerce Road vicinity properties (Hingham and Rockland)
4. Route 3 Exit 14 Accord Park Drive Vicinity properties (Norwell and Rockland)
5. Bristol Brothers properties near Old Derby Street vicinity (Hingham and Weymouth)
6. South Weymouth Naval Air Station properties (Rockland and Weymouth)

Within these clusters, the property characteristics of potential example properties were reviewed relative to property selection criteria that were identified further narrowed the properties. The property selection criteria included the following and were intended to select a variety of example development opportunities and circumstances based on the following:

- Current zoning
- Existing uses
- Past property/area uses
- Availability of water supply and wastewater treatment and discharge
- Surrounding context
- Representative of typologies
- Roadway access/transit
- Properties that leverage other opportunities around them
- Provide good examples that reinforce the South Shore Chamber's 2030 Housing Plan

Additional review for each property was performed relative to the following considerations, including the willingness of property owner to participate in this study and the MassDevelopment Site Readiness program criteria suggesting properties should include some industrial and commercial uses, with some suitable for high-tech manufacturing. Other encumbrances were reviewed at a high level based upon available GIS data for each property including a review of the presence of rare species, physical development constraints, environmental contamination, wetland features, topography, or other encumbrances.

Six example properties were selected based on the review of this information for the identified property clusters. The six properties are located within each of the five municipalities involved in the study and represent a variety of the property clusters shown on the preceding map. Each example property has been given a name based on its location for the purposes of this study. This name may not match the formal property name used by its owners. The six example properties include:


WEYMOUTH
HINGHAM
NORWELL
ROCKLAND
HANOVER
ROUTE 53
ROUTE 3
11
26
25
25
10
16
15
14
12
13
18
23
21
27
24
9
17
3
19
20
6
7
4
2
5
1
22
8

- Cardinal Cushing Rear Property, 405 Washington Street Rear, Hanover
- Unicorn Development Property, Blue Spruce Lane Rear, Hanover
- South Shore Park Property, 0 Southeast Expressway, Hingham
- Wildcat Lane Property, Pleasant Street, Norwell
- Land behind Home Depot, 0 Pond Street, Rockland
- Bristol Brothers Properties, 0 Pleasant Street, Weymouth

The example properties are representative of other properties in the Study Area that present both similar opportunities and similar infrastructure constraints that can be informed by the analysis that was performed. Additional information for each example property can be found in the Appendix. A summary of the analysis performed on each of the example properties follows.

2.3 Hypothetical Build-out Scenarios

Hypothetical build-out scenarios and projections were developed in order to analyze the constraints and opportunities associated with water and wastewater infrastructure on the example properties. The hypothetical build-out scenarios defined a range of potential outcomes that would need to be accommodated by water and wastewater solutions. No single property may develop as projected in these hypothetical scenarios, but the projections provide a potential range of the types of development opportunities for these example properties and indicate the type of development that may occur on other nearby properties of similar characteristics. It is important to reiterate that the development scenarios are hypothetical rather than prescriptive for these properties, with the goal of determining water demands and wastewater capacity needed to facilitate development. While these calculations result in concrete numbers for potential development yields, the yields themselves are not the focus of this work, the yields are a part of the process to examine the potential infrastructure needs and solutions. The calculations are specific enough to facilitate the assessment of infrastructure needs and have been prepared for that purpose. The detailed results of the build-out scenarios can be found in the Appendix.

The first step in examining water and wastewater infrastructure constraints was to define how much infrastructure is needed to serve hypothetical and projected development that could potentially occur. For each example property, two hypothetical build-out scenarios were developed to define potential water and wastewater infrastructure constraints and to analyze potential infrastructure solutions. The first scenario developed a hypothetical build-out projection that complies with the

current zoning constraints of the property. The second scenario developed a hypothetical build-out projection that goes beyond the constraints of the current zoning and is based on a more dense development with a development program that is derived from conceptual level discussions with the property owners or potential developers of the property. Other factors not considered as a part of this work may determine the development yields that are possible on any of the subject properties including the owner's plans for the property, the municipality's regulations, the community response to a development proposal, and the real estate market's absorption of the future development.

The method used for the current zoning built-out scenarios that were zoned residential was a mathematical approach to determine the number of single-family residential lots that could be defined on the study property as determined by the current zoning and property constraints. The method used for the other non-residentially zoned properties was a mathematical approach that derives total build-out based on a generalized effective floor area ratio (FAR) to calculate hypothetical potential commercial area. The variables used in the equation for these calculations vary depending on the zoning characteristics of each property. The build-outs were based on calculations and did not involve the creation of conceptual layouts. Conceptual layouts would help to further define the potential build-out and provide a check for the calculated ranges, but were not a part of the scope of this study.

The second development scenario for each example property went beyond the limitations of the current zoning characteristics. This is an important build-out yield to calculate as the build-out under current zoning may not represent a scenario that maximizes the use of these properties. To better assess the infrastructure needs, it is important to develop a build-out yield that is a closer approximation of a maximum build-out. The approach to this alternative set of development programs was generally framed by discussions with the property owners to reflect the scale and type of development that may be considered on the subject properties. In some cases, this scenario, unconstrained by current zoning, also reflects outcomes which may be more likely under a Chapter 40B comprehensive permit process. This approach to the calculations produced the greatest potential build-out yield and the difference in development program and yield is tracked in a summary table that compares current zoning build-out to the unconstrained build-out. Again, the focus of this study was not to determine the future development potential of any one property, but to derive build-out yields that are reasonably realistic to analyze water and wastewater infrastructure.

In addition to the two types of hypothetical build-out scenarios, each example property was calculated based on three distinct geographic areas. The first geographic area was the single primary property that was selected. The second geographic area was the combination of several abutting properties that were adjacent to the primary property and under the same ownership as the primary property. Not all example properties had an abutting property that could be assembled for a larger opportunity. The third geographic area was the compilation of potential hypothetical build-out of a similar character and density on the surrounding cluster of properties that were also identified as having development potential. The results of each of these hypothetical build-out scenario calculations are detailed in the Appendix.

Following up on the hypothetical build-out scenarios, potential projections for water demand and wastewater flows that would be generated from these types of example developments were estimated. As discussed above, while these projections seem very precise, they are based on hypothetical mixes of residential, commercial, and industrial development and have been provided only to better justify the various orders of magnitude for infrastructure limitations. In addition to the size of a potential development project, changes in types of use will also affect the amount of water demand that the project will require and thereby the amount of wastewater that will be generated. While these projections are specific only to the scenarios that have been run, the purpose was to provide specific examples of water and wastewater needs that could correspond to the broader development potential across each municipality and collectively in the South Shore.

2.4 Hypothetical Water Projections

The process undertaken to develop the water demand projections was conservative but tempered with some factors to account for Massachusetts-based water conservation measures. The very detailed analysis culminated in the creation of a spreadsheet that was used to consistently calculated values for the different build-out scenarios on the various example properties. The full calculation methodology and water demand and wastewater flow summary results are included in the Memorandum: Hypothetical Water and Wastewater Projections for Example Properties in the Appendix of this report. Design phase considerations outside the scope of this study such as fire protection flow requirements and system hydraulics (water supply, storage and pipeline volume and capacity) were not included in this preliminary analysis. Ranges of water demand for the five municipalities were compared to available permitted capacities in the existing water supply

systems to further identify potential future needs for drinking water with the hypothetical build-out scenarios.

All of the municipalities in this analysis have very comprehensive public water supply systems including two regional collaborations; the Abington and Rockland Joint Water Works which provides water to the towns of Abington and Rockland and the Weir River Water System (WRWS) which provides water to the towns of Hingham, Hull, and the northern portion of Cohasset. As discussed in earlier sections of this report, while the capacity of water supply varies between communities, each municipality has the ability, albeit minimal in some cases, to provide water for future development. The re-occurring theme of the comparison on the water supply side of available capacity was that there is a potential that some of the lower density scenarios of future build-out (under existing zoning) could be met. However, the higher intensity uses (build-out under future potential zoning revisions and expanded cluster build-out) would require increases in the available water supply or another alternative to meet the projected need. While source water may be available, the municipalities have expressed concern with providing water to any future development due to treatment plant limitations or limited water availability and/or water quality during times of drought. With respect to water infrastructure, each municipality has an existing water distribution pipeline network that abuts the majority of properties in town, including the six example properties. However, each municipality expressed a concern with the ability of their existing water system to treat and convey water to future development due to aging or limited capacity infrastructure. Overall, each town would need to review their existing water supply and infrastructure needs to determine their ability to provide water to existing customers as well as potential future development. The towns would also need to review water requests for proposed developments that are currently under review in greater detail and confirm upcoming and future development would not displace other allocated uses.

2.5 Hypothetical Wastewater Projections

A similar process was undertaken to estimate the wastewater flow projections based on the example properties' hypothetical build-out scenarios. Again, the estimates are conservative for this hypothetical planning, but do take into consideration consumptive uses (irrigation, etc.) from the water demand calculations that would not require treatment and discharge. Wastewater projections were added to the detailed spreadsheet that was used to consistently calculate the values for the different build-out scenarios on the various example properties. The full results are

included in the Memorandum: Hypothetical Water and Wastewater Projections in the Appendix to this report.

Unlike the water supply side, existing sewer systems are limited in this region. One of the municipalities in this analysis, the Town of Rockland, has an existing, centralized sewer system for wastewater treatment and disposal. Another municipality, the Town of Weymouth, transmits existing wastewater to the regional MWRA sewer system for treatment and disposal. The three additional municipalities, the towns of Hanover, Hingham, and Norwell, do not have any public or regional sewer in existence at this time. Several independent private sewer and treatment systems do exist in Hanover and Hingham. Ranges of wastewater estimated for the example properties were compared to available permitted capacities in the existing systems, where applicable, to further identify potential future needs for wastewater management with the hypothetical build-out scenarios.

The re-occurring theme of the comparison on the wastewater management side of available capacity was that more comprehensive sewer systems or an expansion of the regional system would be needed for most of the hypothetical build-out scenarios. There is a potential that some of the lower density scenarios of future build-out under existing zoning in Rockland and Weymouth could be met with extension of the existing sewer systems, however the towns would need to review this in greater detail and confirm it would not displace other allocated uses. The higher intensity uses (build-out under future potential zoning revisions and expanded cluster build-out) would require increases in available wastewater treatment and disposal or another alternative to meet projected need.

3 Observations and Conclusions

3.1 Smart Growth and Infrastructure

Although this study is specifically focused on water and wastewater infrastructure constraints and opportunities, the infrastructure should be viewed more broadly as enabling and supporting desirable land use patterns in the region. Water and wastewater infrastructure sets the foundation for the types of development patterns that can occur. The adequate capacity and management of resources through this infrastructure is necessary and ubiquitous. How these systems are designed and implemented can influence the economic prosperity, social equity, and environmental sustainability of a region. These systems are required to support a stronger, more sustainable South Shore.

Among, municipal master plans guiding future investments, the South Shore Chamber has developed the *South Shore 2030: Choosing Our Future* plan as a comprehensive approach to promote economic growth, job creation, and stronger communities with interesting, diverse, and attractive places to live, work, and enjoy a high quality of life. South Shore 2030 identified six strategies necessary for growing the economy. The six identified strategies include:

- Attract a younger workforce and be more welcoming to families
- Strengthen public and private sector collaboration to build stronger communities
- Strengthen and retain existing businesses in key target sectors
- Promote new business startups and entrepreneurship on the South Shore
- Recruit new businesses to the region
- Improve infrastructure capacity

Improving infrastructure capacity is highlighted specifically and is required to support most of the other identified strategies. Water and wastewater infrastructure is necessary to encourage more transit-oriented development in the South Shore and to leverage transit-oriented housing into broader commercial and economic activity. In addition to providing a basic foundation for investment, water and wastewater infrastructure also informs the type of development that is possible. The compact, walkable, vibrant, and active places that help to attract a younger workforce and be more welcoming to families may not be possible without the right water and wastewater infrastructure. Several specific features of growth and development patterns that are dependent on and related to the infrastructure are described below.

Encouraging Compact Mixed-use Development

South Shore 2030 envisions stronger centers of activity in most communities with smarter planning and management of available resources to support new housing and improved walkability, increased recreational opportunities closer to home or work, and much stronger employment opportunities in the area. The water and wastewater systems shape the feasibility of this vision. For example, the type of wastewater system employed on a property can place limitations on the amount of density, or compactness of the development. The density and compactness of the development patterns may reduce walkability and affect the mix of uses that is possible. Water and wastewater solutions designed for each individual property decrease the density of development and increase the distance between buildings and uses. The distance is required to properly space and buffer wellheads, water sources, and septic fields. In addition, water and wastewater facilities located on site occupy substantial portions of developable land and reduce the acreage that could be more productively devoted to the development program and limit the potential for compact, mixed-use developments.

As the South Shore 2030 vision acknowledges, the model of compactness for the South Shore is suburban. It is likely to be spread over a larger area than might be found in a city and will require some driving. However, the creation of more walkable, compact, and dense nodes of mixed activity would strengthen the quality of life and economic success of the South Shore. Encouraging these types of nodes of activity near transit has the potential to be transformative. Based on the analysis of the example properties, water supply and wastewater management capacity that is currently available in most communities would place limitations on both the density and the compactness of the development and reduce the likelihood that this vision could be implemented.

Zoning as Growth Management

In a municipality where water supply and wastewater management limitations exist, community members may feel that the infrastructure constraints protect the community from growth and the its perceived impacts. From this perspective, potential infrastructure investments and improvements may not be well supported as they can be viewed as an invitation to growth or that the constraint managing growth will be removed. However, the infrastructure constraints may be limiting the type of development and redevelopment investments that are desired by a community as well. The type of investments that will bring needed housing, job opportunities, and added amenities that will be attractive to the workforce and new residents. Instead of leaning on infrastructure constraints as the default growth management tool, a municipality's zoning code should be reviewed and updated as the most effective growth management tool. This zoning review and update should occur alongside infrastructure investments that may be needed to maintain and improve current systems.

Growth management anticipates and guides growth and development to align with the community vision and to achieve community priorities. A town-wide master plan is a critical tool of growth management that defines the community vision, priorities, and goals. Once a master plan process has documented and articulated the community preferences for the future, these preferences should then be integrated into the zoning districts and requirements of the town's bylaw. This type of approach aligns what is possible, in terms of growth and development, with how the community would like to see future investment and development patterns evolve. This alignment is independent from the water and wastewater systems and uncouples the infrastructure from growth management. Investments and improvements in infrastructure can then be explored and evaluated for their return on investment, sustainability, and environmental impact. This also allows infrastructure needs to be identified and resolved independent of growth and development concerns.

Mutual and Strategic Investments

In general terms, the status quo suburban development model for growth contributes to inefficient and unsustainable infrastructure use. The property value per unit of infrastructure is lower in suburban communities when compared to that of cities. In other words, a block of water main in the suburbs may serve far fewer buildings than in the city, but the pipe and the cost of its maintenance and operation would be similar. This disparity is a result of the comparative differences in the density of development and the availability and value of the land. In general, at urban densities infrastructure investments in sidewalks, sewers, and transit systems are more fiscally sustainable. At rural densities, it is easier to serve the needs of each property individually with an on-site private well and septic system. In between those two opposites, the most appropriate infrastructure solutions for the suburban context is less clear. A suburban development pattern that is low density and automobile dependent may not be dense enough to support city-like infrastructure, but may be too high of a density to properly isolate and separate on-site water and wastewater systems. A suburban system may also reach natural capacities associated with the available water resources. Additionally, all of these infrastructure systems, regardless of context, require maintenance and improvements to remain in good working order and in compliance with evolving regulations and safety standards.

Building more at the traditional lower suburban densities will not help to address potential capacity, maintenance, or improvement needs. However, encouraging nodes of higher density, compact, mixed-use development may be a substantial enough development investment that it could contribute to infrastructure investments and solutions, rather than just connecting to current systems. Collectively, these types of shared public and private investments in infrastructure could be mutually beneficial and support strategic growth that helps to both address infrastructure needs and aligns development with the vision and growth parameters established by the community through comprehensive planning and zoning modifications.

The step diagrams that follow for Water Supply Management Alternatives and Wastewater Management Alternatives illustrate this relationship between scale, density, and infrastructure solutions. The least dense and most land intensive development models do not require innovative solutions that are strategic and mutually beneficial. These types of properties have been served adequately by conventional approaches for many years. The overall capacity in the water systems in particular may not be able to support endless growth based on this model of development, but these simple infrastructure solutions will continue to be adequate. The other infrastructure solutions available require a certain scale of development to be able to support the investment in water and wastewater solutions. For some of the solutions, the costs would be too high for a single development project, but the development project could be a partner and contributor to the costs associated with the solution. For example, for a regional public water supplier to be viable, several municipalities and large-scale development opportunities may need to partner to make the costs of the initial connections feasible. Private development could be a partner in advancing improved public infrastructure. These potential improvements in public infrastructure would not only benefit the private development partners, but would be beneficial to the provision of public infrastructure and services.

Development Review and Assessment of Infrastructure Systems

The initial investment and life-cycle costs of water and wastewater systems need to be considered during the process of development review. Ideally, the costs of all available infrastructure systems should be compared and evaluated, including costs that would be the responsibility of the developer or land owner and costs that would be the responsibility of the municipality or infrastructure provider. A few approaches could be used by both municipalities and developers to more proactively assess water and wastewater infrastructure options during the pre-development and approval processes. For municipalities, exploring alternative and shared water and wastewater solutions could be part of the requirements of a pre-development or approval checklist for large development projects. The threshold for a large development project may need to be determined by the municipality based on recent permit data. This checklist may ask developers and property owners to have an exploratory conversation with municipal staff to discuss infrastructure constraints and possible solutions for the property. This may help to communicate the solutions that fall under private or public ownership, and collaborative approaches that are outlined in the following section. Another approach for a municipality to initiate exploration of these solutions would be to create an overlay zoning district based on the community vision established through a comprehensive planning process. For example, a water and wastewater overlay district may require property owners to seek combined wastewater solutions that establish multi-property de-centralized wastewater treatment plants or that require additional water conservation features to reduce water supply capacity concerns.

3.2 Water and Wastewater Alternative Solutions

Most people do not spend much time thinking about water and/or wastewater, so before cost expenditures or rate increases are brought to a community conversation, it is important to communicate what alternatives can be considered to provide a firm foundation for solutions that are readily supported. This section of the report provides some general information on water and wastewater alternatives and compares them to one another. As described in more detail below, the example properties and their build-out scenarios are integrated into the alternative solutions to provide context and to add tangible application to the alternatives.

Plateau Diagrams

To better communicate with a range of audiences, a graphical representation was created for the various alternatives for water supply and wastewater treatment and disposal. These graphics are included in the sections below with a summary description of the information shown and a correlation to the various development scenarios used as examples in this study.

Description of Water Supply Management Alternatives Plateau Diagram

As can be seen in the diagram on page 26, there are four main alternatives available for water supply: Individual Wells, Public Water Supplier/Community or Non-Community, Public Water Supplier, and Regional Public Water Supplier. The teal bar across the top of the diagram shows the ranges of typical ownership for each water supply alternative and the text between this bar and the blocks provides additional details about requirements for the various build-out scenarios created as examples for this study. Based on the maximum development average daily flow rates, the hypothetical development scenarios for the study parcels are further collated with the various options in the corresponding-colored text below the blocks.

The majority of the example properties in each of the five towns are provided drinking water by municipally owned public water suppliers. The first block in the plateau graphic is designated for minimal build-out developments that would typically require less than 10,000 gallons per day (gpd) of water. Similar to the property in Norwell, these types of development would normally consist of single-family or small multi-family homes or commercial/industrial properties that have less than 15 service connections and serve less than 25 people with potable drinking water. If connection to the existing public water system is not an option, these smaller developments would normally construct individual drinking water wells to support the development. Other than the two Norwell scenarios, all of the other hypothetical build-out scenarios have projected water demands

greater than 10,000 gpd. Therefore, the individual wells alternative is not applicable for the other properties, so it is not considered a viable solution.

The second block represents parcel build-outs that would establish a public water system to provide water to a development that would typically require more than 10,000 gpd but less than 100,000 gpd. Types of water systems like this are broken out into Community and Non-community water systems. As defined by MassDEP, a Community water system serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. A Non-Community water system is further classified as either Non-transient or Transient. A Non-transient Non-community water system has at least 15 service connections or regularly serves at least 25 of the same individuals or more approximately four or more hours per day, four or more days per week, more than 6 months or 180 days/year; such as a workplace providing water to its employees. A Transient Non-community water system has at least 15 service connections or serves water to 25 different persons at least 60 days per year. Some examples of these types of systems are restaurants, motels, campgrounds, parks, golf courses, ski areas, and community centers. The water demand volume and mixed-use property options corresponded with several build-out scenarios for each of the four remaining towns. Establishing a public water supply for developments such as these would require an initial investigation to determine a favorable hydro-geologic and permittable location(s) for a new groundwater source. Once a new source is located, the potential source would then need to go through MassDEP's new source approval permitting process, land protection zones would need to be established, and other local town bylaw, planning and zoning, and/or conservation requirements would need to be adhered to. This option would likely start out as a private ownership option with the potential to develop into a private/public partnership or transition fully to a public water system.

The third block represents cluster build-outs or larger community development that would require water demands greater than 100,000 gpd. Similar to the second block, the cluster build-out alternative would require establishing a public water system, if a new groundwater source was identified. However, as many municipal public water suppliers completed town-wide water supply investigations when their water sources and distribution systems were being developed, it is highly unlikely that a groundwater source greater than 100,000 gpd would be identified in the five towns. For this alternative, it is estimated that connecting to the existing municipal water system is the only viable option. This would also likely require a private/public partnership component to help supplement the existing water system with additional water source, treatment, and/or distribution (storage tanks and water mains) improvements.

The final block represents an all build-out scenario in which one or more municipalities would create a regional water system either across localized municipal boundaries or, as a farther-reaching benefit for the South Shore, by connecting to the MWRA's water system. The MWRA's water comes from the Quabbin and Wachusett Reservoirs which are both considered well protected and high-quality water sources. This alternative would require review of water quality blending potential with the existing municipal system(s) as well as a cost-benefit analysis comparing the existing municipal water system(s) improvement needs versus the MWRA connection and required infrastructure pipeline fees. The closest connection to the MWRA's water system is located in Quincy, Massachusetts. While Quincy is adjacent to Weymouth, the existing MWRA pipeline infrastructure is distant from the other study area communities. Any connection to the MWRA system would also require transmission through adjacent communities. Another consideration for this alternative is Union Point and the potential for Union Point to connect to the MWRA water system in the near future, which would improve the viability of this alternative.

Water Supply Management Alternatives

Private Ownership | Private or Public Ownership | Public Ownership

MINIMAL BUILD-OUT

- Need to reserve an appropriate area to site individual wells on each property

INDIVIDUAL WELLS

- Typically, < 10,000 gpd
- Single Family or Multi Family Home
- Local control (BoH)
- Monitored & treated as needed by Owner

➢ Norwell Scenarios 1 & 4
➢ Assumed not applicable for others

PARCEL BUILD-OUT

- Need to reserve an appropriate area on parcel to site a well/wellfield
- New Source Approval Process (MA DEP)
- Typically, limited number of properties with limited commercial/industrial usage

PUBLIC WATER SUPPLIER / COMMUNITY OR NON-COMMUNITY

- ≥ 15 service connections or ≥ 25 people
- Typically > 10,000 and < 100,000 gpd
- Property use-specific
- State Approval & Control (MA DEP)
- Source-specific treatment likely required

➢ Hanover Cushing Scenarios 1, 2, 3 & 4
➢ Hanover Unicorn Scenario 2, 3 & 4
➢ Hingham Scenarios 1, 2 & 3
➢ Rockland Scenarios 1 & 4
➢ Weymouth Scenarios 1, 2 & 4

CLUSTER BUILD-OUT

- Connect to existing Public Water Supply is likely option – potentially supplement existing PWS source/treatment/piping
- Identifying a new source in the community > 100,000 gpd is very unlikely

PUBLIC WATER SUPPLIER

- Community-specific
- Existing PWS controlled and monitored by the State
- Local PWS connection fee
- Infrastructure improvements (treatment and/or distribution piping) likely required

➢ Hanover Cushing Scenario 5
➢ Hanover Unicorn Scenario 5 & 6
➢ Hingham Scenarios 4 & 5
➢ Weymouth Scenarios 3 & 5

ALL BUILD-OUT

- Connect to MWRA – potentially create a localized Regional Water Supply across several communities

REGIONAL PUBLIC WATER SUPPLIER

- MWRA is an Existing Regional PWS
- MWRA connection fee & pipeline cost
- Region-specific (crossing community boundaries)
- State Approval & Control (MA DEP)
- Possibly create a localized Regional Water Supply of compatible water (quality and hydraulicly) systems
- MWRA is in compliance with MassDEP's current PFAS regulation

➢ Hanover Cushing Scenario 6
➢ Hingham Scenario 6
➢ Weymouth Scenario 6

Additional Assumptions

- Connection to an existing water system is preferred, if available.
- Assumes scenario's maximum development average daily flow unless N/A.
- Only new well/wellfields water sources are considered viable not surface water source
- Multi-family build-out refers to apartment style living (≥10 units/building therefore ≥25 people/building)
- Additional local town bylaws, planning & zoning ordinances, and/or conservation requirements may apply
- New source approval and land protection zone(s) required for Private PWS options; MEPA may be triggered depending on build-out/water use

Description of Wastewater Management Alternatives Plateau Diagram

As can be seen in the diagram on page 28, there are four main alternatives available for wastewater management: On-site Septic Systems, De-centralized Wastewater Treatment Plants (WWTP) with Groundwater Discharge, Centralized/Community Wastewater Treatment Facilities (WWTF), and Regional/Multi-community Wastewater Treatment Facilities. There are also other emerging technologies that may someday change the landscape of wastewater management, including evaporation of effluent, however, currently this is not a proven alternative for consideration. The teal bar across the top of the diagram shows the ranges of typical ownership for each wastewater management alternative and the text between this and the blocks provides additional details about requirements for the various build-out scenarios created as examples for this study. The hypothetical development scenarios for the study parcels are further collated with the various options in the corresponding-colored text below the blocks.

One of the five municipalities in the study area, the Town of Norwell, relies exclusively on on-site septic systems for current wastewater management. While these systems do a fine job at managing wastewater treatment and disposal for an individual home or a small development, but the maximum flow allowed for these systems is a limitation to its use. That, coupled with the fact that treatment is dependent on the soils in the leaching field filtering out pollutants and proper maintenance (consistent pumping, etc.) of tank solids place limitations on the application of these systems. If these systems are located in an area that contributes groundwater eventually to water supply wells, excessive nutrients may accumulate over time, requiring a future need for increased treatment at the water supply.

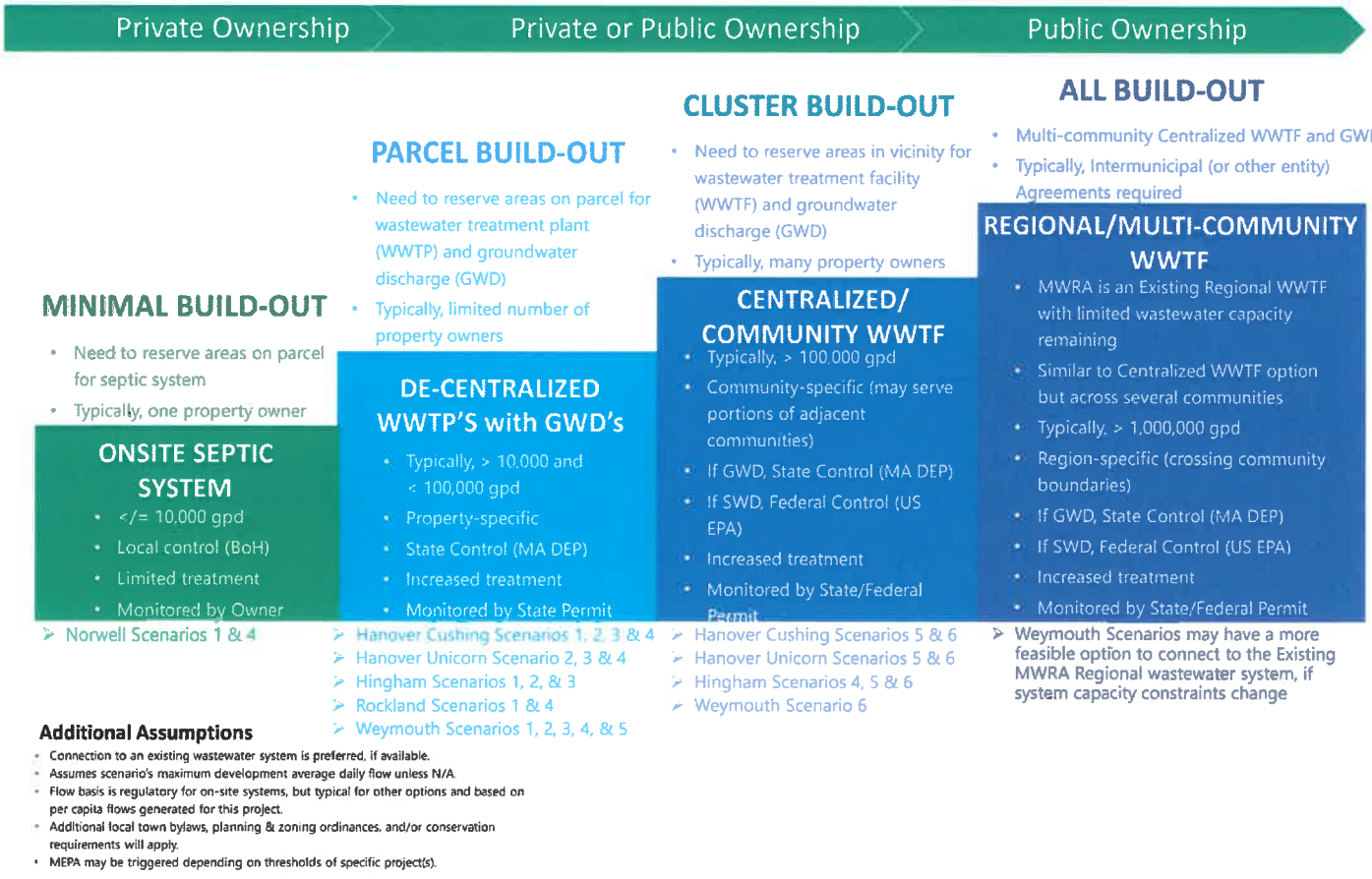
Two of the municipalities in the study area, Hanover and Hingham, have properties that use private, de-centralized WWTP's to treat the wastewater generated on their sites and discharge it back to the ground to recharge the groundwater. The remainder of development in these two communities relies on on-site systems. The decentralized facilities provide a much higher level of treatment to the wastewater than on-site septic systems, as they have processes that remove pollutants and excess nutrients resulting in a cleaner effluent. These facilities do discharge the effluent in a similar manner as septic systems, however, state permits and consistent monitoring and reporting are required. This results in improved public health and environmental protection in the vicinity of the decentralized systems.

One municipality in the study area, the Town of Rockland, has a centralized/community sewer system and WWTF to treat the wastewater generated on the properties in the Town and discharge it back to a receiving water to recharge the surface water body. This recharge method is different than recharging the groundwater, but similarly requires a high level of treatment with multiple processes that remove pollutants and excess nutrients resulting in a very clean effluent.

One longer term action item for the towns without a community or regional sewer system would be to consider if a public WWTF could be sited and constructed to promote or support managed growth, development and/or re-development, while increasing the future level of wastewater treatment in that (or those) area(s) of Town.

The final block of the wastewater plateau diagram describes the multi-community or regional option. Weymouth is currently a member of the MWRA (Massachusetts Water Resources Association) regional sewer system. Wastewater from this community and many other member communities is transmitted to Deer Island WWTF for treatment and surface water discharge of effluent. Other communities in the study area may in the future consider connection to the MWRA system, however, remaining sewer capacity is limited, and the existing system is distant from the other study area communities and would require transmission through adjacent communities. Another form of this option may be to create an additional, new, multi-community WWTF with groundwater discharge in the region that is more centralized to the study communities.

Wastewater Management Alternatives



3.3 Water and Wastewater Considerations

Cost Benefit

While the range of potential costs increases as you move from left to right in ascending blocks of the plateau diagrams, benefits to public health and environmental protection also increase with each level of investment. Existing infrastructure systems require consistent operation, maintenance, and repair. Costs to support existing infrastructure are typically borne by the utility's ratepayers. Additionally, capital improvements due to changing regulations or the need for modernization/improvement will add to that cost burden as the systems continue to age. Some Commissions are hesitant to raise utility rates, which can lead to capital projects being deferred as they are unaffordable. There are opportunities to implement capital projects with hybrid financing scenarios, portioning out some of the costs to the tax base (those that have a general benefit), some to the user rates and some to betterments. There also may be an opportunity for communities to explore a surcharge on property tax bills for water and wastewater projects that are for the public good. These opportunities should be further developed for specific projects.

Future funding applicability will require comprehensive planning. With infrastructure awareness at the forefront of current government spending, it may be beneficial for communities to jointly consider requesting that MA DEP fund a regional planning effort for interested South Shore municipalities to build on analysis in this study and continue collaboration for a shared solution. This future study could further analyze the needs of current systems and investments needed to provide baseline information for cost comparisons of infrastructure solutions including maintenance, new requirements and regulations, and other needs. Data on rate setting in the region could be compiled and provide a baseline comparable for a multi-community alternative. This information could also explore available incentives, such as increased allowed density, or requirements to encourage multiple property collaboration for combined water and wastewater solutions.

Intermunicipal

This initial study has brought recognition to similarities between neighboring municipalities with regard to development and infrastructure limitations. Through the stakeholder participation process, the lines of communication have been established for continuing conversations regarding the need for increased water supply capacity and wastewater treatment and disposal capacity. The next steps will require collaboration to determine if communities in this study area can work together to resolve the capacity challenges to allow for managed growth.

Public/Private Partnerships

To achieve increased build-out potential, a public and private partnership would be beneficial for both water and wastewater considerations. On the water side, when considering the parcel

build-out alternative, in many cases the initial water source and infrastructure is completed by the private developer and then transitioned over to the public water system for ownership and/or operation and maintenance.

For the cluster and all build-out alternatives, the public water system will likely need assistance from the private developer(s) to upgrade their existing system or connect to the MWRA through Union Point, respectively. On the wastewater side, for future developments in areas where another area of a community could benefit from off-site wastewater management, there is an opportunity to partner and achieve multiple goals at once. One example of how partnerships have been successful in the past is having a developer make a significant portion of the capital investment and a community contributing by taking over future operation and maintenance of new infrastructure facilities. If appropriate land can be identified for GWD siting, oftentimes the community may consider participating in this component of the cost by using the power of eminent domain.

Private/Private Partnerships

Another option for future developments is a partnership between private parties. Since part of our audience for this study is developers (in addition to municipalities), this is an important opportunity to explore. Oftentimes there is some resistance to this because of potential competition or determining appropriate contractual and legal terms. However, if there is a situation where a potential water supply source is viable on one private developer's property, but they require land protections that cross over into another developer's land, an agreement for a shared water source may be the solution. On the wastewater side, this type of partnership may be formed if one property owner has a portion of their site that is conducive to effluent recharge and a partner property owner has a portion of their site that can be used to site a WWTP. In development, the less land that can be dedicated to infrastructure the more efficiently and profitably the remaining land can be used, so there is an opportunity for a balance to be found and mutual benefit achieved.

Regional Collaboration

The primary alternative reviewed for a regional water collaboration was a connection to MWRA's water system. This would require inter-municipal partnerships to convey the water through other towns and agreements with the MWRA for connection fees and associated infrastructure improvements. As previously mentioned, this alternative would be even more viable if Union Point connected to the MWRA water system. Organization of a multi-municipality conversation with MWRA to discuss potential future water connection would be beneficial to communicate in more detail the requirements and potential challenges associated with this alternative.

For decades, Weymouth has considered the MWRA as a potential source for the water needed to redevelop the former South Weymouth Naval Air Station. Plans in the past have studied MWRA water for only that portion of the Town, however. During the past year, Weymouth Mayor Bob

Hedlund began the process to evaluate whether Weymouth should consider joining the MWRA to provide water to the entire town. Under those circumstances, the change in water infrastructure would have other benefits, such as the Town's current drinking water sources could be converted to environmental and recreational resources. Herring could return to Great Pond, making Weymouth one of the largest herring spawning grounds on the East Coast of the United States. Swimming and boating could return to Whitman's Pond and Great Pond.

Weymouth residents would also benefit from the higher water quality of MWRA water, which has consistently been rated the highest quality of tap water in the United States. Additional water capacity from the MWRA would eliminate concerns over water use restrictions or bans, such as one Weymouth experienced in 2016.

"The concerns over water capacity are not new and only growing. The MWRA is the most accessible and abundant source of quality water. The Town, with the expertise of our DPW and engineering team, are working closely with the Southfield Redevelopment Authority (SRA) and the MWRA to help determine the Town's current and future capacity needs, including Union Point, and develop up to six alternatives for MWRA water supply. We will then analyze the costs and benefits for each alternative to determine which is the best solution for Weymouth and our residents.," said Mayor Hedlund. Weymouth officials continue to meet with state officials to further investigate the advantages of joining the MWRA as a town-wide water source.

4 Next Steps

4.1 Implementation Strategy

In many ways this study points to the beginning of a larger and long term process to improve waster and wastewater infrastructure in the South Shore. The observations and conclusions resulting from the analysis of the example properties point to meaningful next steps and actions that should be coordinated across partners, these partners include at minimum the leadership and staff of the municipalities, the property owners and developers looking toward future investments in the South Shore, and the Chamber of Commerce and other entities supporting economic development there. The implementation strategy resulting from this study is, at its most basic level, to keep the conversation going among these partners and to identify the shared milestones that could help drive coordinated and mutually beneficial activity. The driving motivation behind this conversation has been illustrated by the example property analyses in this study; more options are available through shared and collaborative approaches than compared to a go it alone approach.

4.2 Potential Municipal Actions

Based on the conversations with municipalities throughout this process, many actions may already be underway, but should be emphasized or given a renewed focus in the context of water and wastewater infrastructure.

The first is increased communication and coordination within town departments, commissions, and leadership. Water supply and wastewater infrastructure in many communities is managed by a separate commission or department that is not always in close coordination with other core town functions such as planning, community development, public health, and town administration. The current population needs, community priorities articulated through a comprehensive plan, projected growth, development goals, and infrastructure challenges should be the topic of regular and transparent discussion between Select Boards, Water Commissions, Sewer Commissions, Water Departments, Sewer Departments, Planning Departments, Public Health Departments, and Town Administrators.

The second is continued outreach and discussion with members of the community regarding the challenges facing the municipality with water and wastewater infrastructure. Unlike roads and bridges, water and wastewater infrastructure is largely "out of sight" and therefore often "out of mind" until there is a problem that needs to be addressed. The public is often not aware of the challenges and costs of maintaining existing water and/or wastewater services, let alone planning for needed future upgrades due to regulations, replacement of older facilities, and accommodating planned growth.

The third communication and coordination recommendation would be extend this conversation from within a municipality to an external conversation that includes multiple adjacent municipal neighbors. One model for this may be to establish an internal working group focused on advancing coordination and shared understanding on water and wastewater infrastructure issues. One member of this working group could join an inter-municipal working group to advance regional coordination, guidance, and best practices. Multiple municipality water and wastewater systems are not a new concept with shared systems in use such as the Abington-Rockland Joint Water Works, and the Weir River Water System serving customers in Hingham, Hull, and Cohasset. The hope is that structuring these conversations will identify actions and priorities that are clear from the multiple perspectives involved and shared across municipal boundaries. Through this collaboration, joint systems with the benefits of economy of scale that occur could potentially be expanded in the future. If viable options are identified, the municipalities may be able to pursue feasibility studies and more technical analysis through the State Revolving Fund or possibly the additional Federal Infrastructure funding expected this year. These conversations could also serve as a forum for coordinating with land owners and developers on potential public private partnerships and collaborations to address infrastructure needs.

Municipalities could also review the feasibility of implementing a surcharge to assist with funding identified water infrastructure improvements. This type of funding mechanism enabled by Massachusetts General Law Chapter 40 Section 39M.

4.3 Potential Property Owners Actions

As seen in the individual example property analyses, there is a large gap between the potential build-out under current zoning and what could be built on many properties in the South Shore. As has been approached through many previous development processes, the property owners and developers must approach the municipalities with their vision for the property and advocate for zoning modifications to enable the investment. Based on the analysis, the water and wastewater infrastructure constraints need to also be determined and solutions advocated for at this early stage of development exploration.

This may include advocating for infrastructure investments with the community by offering supportive testimony at Town Meeting votes or other occasions where support from property owners is an important component. Property owners may also provide data and feasibility analysis that make the case for infrastructure improvements and highlight the economic benefits to the community. Opportunities may also be identified to partner with municipalities and nearby property owners to explore collaborative approaches to water and wastewater solutions. This may include partnering with municipalities on upgrading existing facilities or jointly developing new shared facilities that would benefit both the town and the participating private sector partners.

4.4 Potential Chamber or Other Stakeholder Actions

The South Shore Chamber of Commerce excels as a convener in the subregion. This role is in many ways, the most needed for the advancement of water and wastewater improvements in the South Shore. Through this role the Chamber could convene municipal partners for coalition building and strengthening partnerships and bring them together to explore potential opportunities for public and private collaboration. The Chamber could also focus on convening for public education on water and wastewater infrastructure needs and challenges facing the South Shore, and potential solutions that would require collaboration and public support. Finally, the Chamber could convene leadership at the legislative and state level to help build support and advocate for funding and public investment in water and wastewater needs, and administration of those funds in a flexible manner to address the needs of the South Shore communities.

The Chamber could also support future study in this area that would benefit all partners. One such effort identified through this work that could be useful would be a comparative cost analysis of the long-term life cycle costs associated with more conventional individualized water and wastewater infrastructure systems compared to more centralized, multi-municipality collaborative systems. This analysis could include both financial comparison and comparison of potential environmental and resiliency risks, as well as, the potential to support additional private investment. This type of analysis could also be used to evaluate current rate setting practices to better understand if rates are appropriately anticipating future investment needs for current systems.