

SCITUATE WATER RESOURCES COMMISSION CONSERVATION PLAN



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with assistance from

The Scituate Water Resources Commission

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This plan is submitted by the Scituate Water Resources Commission to the community of Scituate for consideration and adoption as a long range vision for water conservation, and recommended strategies to achieve such conservation.

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The Water Resources Commission would like to thank Caroline Keefe for her research and effort in compiling this document, as well as others who commented and offered contributions.

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Formed in 2006, the Scituate Water Resource Committee was created by the Board of Selectmen. On all matters related to water resource management in Scituate the Committee coordinates with various other boards and committees in the community, as well as the Department of Public Works (including the water and sewer division). We provide guidance to the Board of Selectmen who also serve as Scituate's Water Commissioners. The Committee also collaborates with local watershed groups taking steps to protect environmental health and engage in citizen education regarding responsible water use practices.

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Section 1: Introduction

1.1 Background

The Town of Scituate is located in the South Coastal Watershed. The South Coastal Watershed consists of 14 coastal river watersheds with a total drainage area of approximately 240.7 square miles that span over all or part of 19 municipalities. The major coastal watersheds include the North and South Rivers (combined drainage area 105 square miles), the Jones River (30 square miles), and the Gulf/Bound Brook (16 square miles). It is also one of eleven watersheds in eastern Massachusetts that discharge directly to the ocean. The South Coastal Watershed contains numerous wetlands, many of which are used to cultivate cranberries. There are also many small coastal plain lakes and ponds scattered throughout the basin, numbering more than 350,056 of which cover at least ten acres. Silver Lake, in Plympton, Kingston, and Pembroke, is 640 acres.

The South Coastal Basin includes all or part of 18 towns. Seasonal peak water demands have been one of many contributing factors affecting low-flow and no-flow conditions in the South Coastal basin that have altered and damaged aquatic and bird habitat, as well as species distributions in the basin. The ecological needs for water conservation have been well documented by several groups in the area.

In Massachusetts water withdrawals of over 100,000 gallons per day are regulated by the Department of Environmental Protection under the Water Management Act of 1988. Scituate has a total authorized volume of 1.85 million gallons per day (mgd). In 2013, daily average water use was 1.41 mgd, and maximum daily usage exceeded 2.8 mgd (21 July).

While most communities rely on either surface water sources or groundwater wells, Scituate's water supply is a combination of both. 71% of the water supplied is from a network of 6 groundwater wells and 21% is from one surface water supply - a reservoir

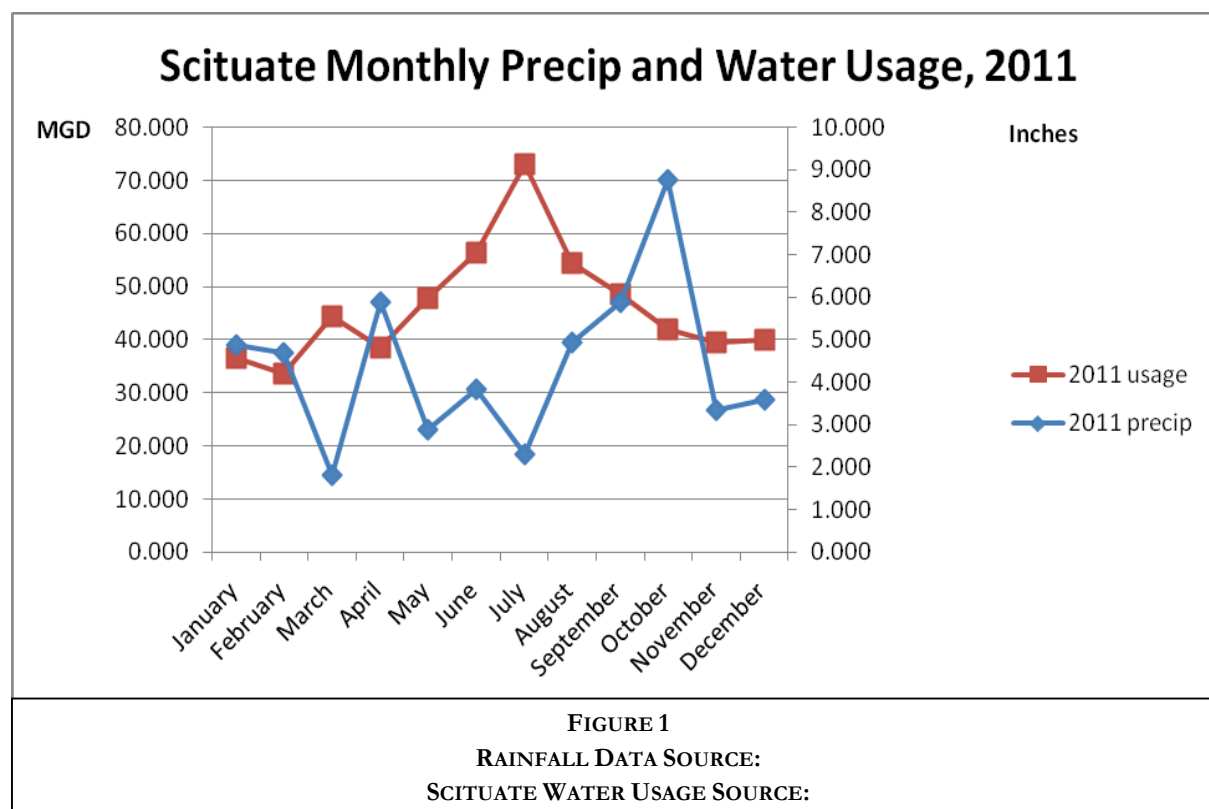
created by an impoundment built in the mid-1960s expanding the Tack Factory Pond, fed primarily by the First Herring Brook. One village of the community, Humarock, is served by the neighboring Marshfield Water Department, accounting for 8% of supplies from purchased groundwater sources.

With 123 miles of pipe throughout the town, the Scituate Water Department provides service to 18,696 customers year round. Due to this coastal community's popularity as a summer destination, that population expands to 19,146 during the summer months. The water department has a full time staff of 12 and reports to the Director of Public Works.



**EACH AUTUMN, FALL COLORS CIRCLE THE
SCITUATE RESERVOIR**

Both because of the influx of new population as well as the local practices of outdoor water use during the warmer months, water usage rises sharply in June and July, a time when rainfall is also lower. 2011 water usage compared to rainfall is shown in Figure 1.



1.2 Introduction and Rationale for Scituate Water Conservation Plan: The purpose of the Scituate Water Conservation Plan is to focus on the needs of Scituate in the context of its location and water use within the South Coastal watershed, as well as to the overall benefits of water conservation to the town.

Formed in 2006, the Scituate Water Resource Committee serves as an advisory group to the Board of Selectmen who are also designated as Water Commissioners by the Town Charter. On all matters related to water resource management in Scituate, the Committee coordinates with various other boards and committees in the community, as well as the Department of Public Works (including the water and sewer division). The Committee also collaborates with local watershed groups taking steps to protect environmental health and engage in citizen education regarding responsible water use practices. This document draws upon accepted Best Management Practices (BMPs) in both the water supply and ecological management fields, the Executive Office of Energy and Environmental Affairs (EEA) Water Conservation Standards (May 2006, updated June 2012¹), and the Massachusetts Department of Environmental Protection Water Management Act Permit for Scituate.

¹ See <http://www.mass.gov/eea/docs/eea/wrc/water-conservation-standards-rev-june-2012.pdf>

In preparing this Plan, the Scituate Water Resources Commission establishes goals that are consistent with the current practices and standards as cited above. The goals are intended to promote conservation practices that recognize water as a limited precious resource, needed for current and future generations of residents for health and safety needs as well as economic development, while protecting the ecological health of the South Shore.

The goals are as follows:

- To integrate water conservation and efficiency measures into all aspects of water supply planning and management;
- To maximize the efficiency of public water supply system operations;
- To ensure adherence to the Massachusetts Water Conservation Standards, including:
 - Limit residential usage to an average of 65 gallons per person per day or less
 - Limit Unaccounted For Water to 10% or less
 - Have a drought/emergency management plan;
 - Have a written program to comply current Best Management Practices;
 - Make written policies and recommendations available to municipal personnel and the public.
- To reduce peak demand use, especially during the summer months when rainfall is low;
- To improve flows to the First Herring Brook, managing supplies, conservation, and downstream releases to help achieve that goal;
- To promote public awareness of the long-term economic and environmental benefits of water conservation.

Key elements of water supply planning, management and water use include the following topics:

- Integrated Planning;
- Metering;
- Financial Management and Pricing;
- Residential Use;
- Public Sector Use;
- Industrial, Commercial and Institutional Use (ICI);

- Agricultural Use;
- Public Education and Outreach.

Each of these topics, including relevant BMPs and standards are presented in Section 2 of this document, including those actions Scituate is taking to meet them. Section 3 contains a number of appendices, including Appendix A which summarizes the Committee's recommendations. Other appendices offer supporting literature and research used in compiling this document.

Section 2: Water Conservation Program

2.1 Overview Scituate's conservation efforts are described in this section. The Town's Withdrawal Permit from DEP also creates objectives that must be met and are noted in this section as well.

2.2 Integrated Planning

2.2.1 Standards: An integrated approach is key to effective water use planning - factoring in drinking water withdrawals, wastewater and stormwater - to address and mitigate alterations to the natural water cycle's balance. The Town plans to meet all the standards, including:

- Have a drought/emergency management plan;
- Have a written program to comply current Best Management Practices;
- Make written policies and recommendations available to municipal personnel and the public.

2.2.2 Actions Taken This Water Conservation Plan constitutes the community's "written program" and is available to municipal personnel and the public. Also available to the public is an online resource called **Greenscapes** that has lawn care and irrigation water conservation techniques². An important element of the Town's conservation program that is relevant to integrated planning is its drought management program, which includes strategies to reduce peak daily and seasonal peak demand. The Code of General ByLaws adopted by Town Meeting in April 2013 authorizes the Board of Selectmen to take measures to conserve and manage the Town's public water supply³. They may order mandatory restrictions on water use which may include, but are not limited to, restrictions on outdoor water usage, filling of swimming pools and use of automatic and other hose mounted sprinklers.

While focused more on issues of quality rather than quantity, the Town also unanimously approved a revised Water Protection Overlay District (WRPD) during the April 2014 Town Meeting. The WRPD Bylaw draws upon knowledge about water supply protection and exceeds the current state regulations. The revised WRPD Bylaw helps ensure that toxic and hazardous materials use and storage is limited and that nonconforming businesses that could potentially impact the water supply

² See <http://greenscapes.org/>

³ <http://www.scituatema.gov/sites/scituatema/files/file/file/general-bylaws-2013.pdf>

are phased out. Helping to promote recharge of local water sources, the WRPD establishes limitations on impervious cover (with provisions for recharge if needed) for both Zone A (Surface Water Supplies) and Zone II (Groundwater Supplies). A map of the revised Water Resource Protection District is found in Appendix B.

Scituate's Water Department communication with residents and local officials includes an annual report on water consumption and supply, water quality, ongoing or planned capital projects, billing, rates and conservation initiatives. The Town's Water Department web site features links to the drinking water quality report, drinking water notices, lawn irrigation information, water restriction notices, and frequently asked questions regarding town water⁴.

2.2.3 Recommendations Recommendations pertaining to integrated planning address the need to include water supply, wastewater and stormwater in infrastructure planning. Scituate supports these recommendations but it must be noted that about one third of the community is served by the municipal sewer system and the remaining two thirds of the community relies on private septic systems.

In 1996 the Town filed a Stormwater Management Plan with the Massachusetts Department of Environmental Protection and the United States Environmental Protection Agency. The plan was approved and the Town now has a National Pollutant Discharge Elimination System (NPDES) permit to operate its stormwater collection system. The plan outlines the steps the Town takes to reduce water pollution by improving the quality of its stormwater and to reduce the amount generated. The Stormwater Management Plan includes provisions for public education and outreach, infrastructure mapping, regulation review, illicit discharge elimination, and pollution prevention. This Stormwater Management Plan should be updated by the Scituate Department of Public Works to reflect current best practices and ensure the Commonwealth's Water Conservation goal of "keeping water local" is followed, ensuring that stormwater is both properly treated and discharged in a manner that supports natural systems through effective recharge practices.

2.2.4 Standards for New Developments and Buildings

- Install water efficient plumbing fixtures, meeting the standards set forth in the 1992 Federal Energy Policy Act and the Massachusetts Plumbing Code;
- The use of water conservation Best Available Technologies (BAT) for new buildings and renovations and establish water-wise lawn and landscape requirements for any building undergoing site plan review;
- Strictly apply plumbing codes and incorporate conservation measures in new and renovated buildings.

⁴ See <http://www.scituatema.gov/departments-of-public-works>

2.2.5 Actions Taken for New Developments and Buildings

The Town does have stormwater bylaws⁵ and the Planning Board enforces stormwater and erosion control regulations when reviewing subdivision plans. The subdivision regulations create permit filing thresholds for land alterations/disturbances and use the DEP Stormwater Management Standards for both wetland resource and upland resource areas. The Town's Stormwater policies can be found at <http://www.scituatema.gov/planning-board/pages/stormwater-management>

Scituate's building code provisions recognize the most current Massachusetts Planning Code and, as a Massachusetts Green Community, the town has adopted the Board of Building Regulations and Standards (BBRS) Stretch Code.

2.2.6 Recommendations for New Developments and Buildings

In new and renovated buildings, it is important that designs comply with plumbing codes, use Best Available Technology (BAT) for water conservation and allow for the reuse of treated wastewater within the facility whenever feasible.

Recommendations for water efficient fixtures and equipment are shown in Table 1 below. Adherence to these flow rates helps ensure water resources are maximized in their use and not wasted.

Table 1 Recommendations for Water Efficient Plumbing Fixtures and Equipment	
Toilets	EPA Water Sense or < 1.28 gpf
Urinals	EPA Water Sense or < 0.5 gpf
Restroom Faucets	EPA Water Sense or < 1.5 gpm Touchless, sensor faucets
Kitchen Faucets	EPA Water Sense or < 1.5 gpm Foot pedal faucets
Showerheads	EPA Water Sense or < 2 gpm
Commercial Pre Rinse Spray Valves	EPA Water Sense or < 1.28 gpm
Commercial Food Service Equipment: Ice Machines, Dish Machines, Steamers, Combination Ovens	Energy Star or Consortium for Energy Efficiency (CEE) Tier 2
Metering	Multi-family/multi-tenant units should have individual meters rather than shared meters.

Gpf = gallons per flush; Gpm = gallons per minute

⁵ Bylaws Section 32050 - Stormwater can be found at <http://www.scituatema.gov/sites/scituatema/files/file/general-bylaws-2013.pdf>

Further resource protection can be achieved by wastewater recycling (reclaimed water) for buildings seeking an occupancy permit for more than 25 individuals. The use of reclaimed water, especially for irrigation purposes, would help reduce peak use during periods of low rainfall and save finished water for health and safety needs.

Water banking: A water banking program helps to ensure an adequate supply of water for competing uses – i.e., water supply, economic development, recreation, instream flow, and wetlands protection. Such a program must be considered as new development moves us to the capacity of our sustainable water resources. Water banking can mitigate, or offset, the impacts of water withdrawals, balance the water budget, assist in the restoration and protection of instream flow, promote water conservation, and, most importantly, help ensure an adequate supply of potable water. Massachusetts' communities are beginning to use this tool to accommodate future growth, while ensuring the sustainability of their water resources. As Scituate's concerns about its ability to meet projected water demand water banking, successfully implemented in other Massachusetts communities including Weymouth, warrants serious consideration for integration into its subdivision by laws and building permit requirements for property rehabilitation. Water banking is a strategy used to help promote conservation. For example, should new demands be made upon the water system a developer would be asked to offset that new demand through the support of water conservation strategies elsewhere.

The Water Resource Commission should review sample bylaws directed at water banking and consider their appropriateness for Scituate. In addition to Weymouth, other area communities such as Hingham and Stoughton both have water conservation mitigation programs. This review should be completed by June of 2016.

The town should also establish a policy which includes a threshold "trigger" for requiring rehabilitated properties to improve their use of water conservation devices. Whenever a property rehabilitation cost is more than 50% of the current property value, the design plans must reflect water conservation practices such as the use of water saving devices as shown in Table 1, including individual metering (discussed in greater detail below). This would encourage conservation at the property by property/unit by unit scale, not just in new developments. Further, these measures would ensure that up to date plumbing codes are followed. Such a threshold may also be employed when considering a water banking program.

2.3 Metering

2.3.1 Standards

- 100 per cent of all sources, building and end-users, including public buildings and schools, should be metered to ensure full registering of water flow;
- The metering program should include on-going inspection and a repair/replacement program;
- All meter systems should be sealed against tampering and inspected periodically;
- Any meter used to record quantity shall be calibrated according to type and specification;

- Conduct an annual water audit;
- Perform a leak detection survey based on reported water loss and in accordance with American Water Works Association and MassDEP guidance.

2.3.2 Action Taken Scituate meets these standards. It meters 100 per cent of the water distribution system, including public buildings. The Town regularly tests, replaces, and calibrates its meters and budgets approximately \$35,000 annually for meter replacement. All meters are sealed against tampering. To ease with the collection of water information for billing, the town has upgraded on site water meters with radio meters. Radio meters save the water department the expense of making periodic trips to each physical location to read individual meters. Further, billing is based on actual consumption rather than on estimates based on predicted consumption

The Water Department conducts an annual audit of its entire distribution system as well as bi-annual leak detection surveys. Scituate has been required since 2004 under its Withdrawal Permit to limit unaccounted for water (UAW) to less than 10% of overall water use. Unaccounted for water use is defined by the Massachusetts Water Resources Commission as the difference between the amount of water pumped or purchased and water that is metered or confidently estimated. Unaccounted for water includes water that cannot be accounted for due to meter problems, unauthorized hydrant openings, unavoidable leakage, recoverable leakage, illegal connections, stand pipe overflows and fire protection.

Year	UAW
2009	13.2 %
2010	8.8 %
2011	0.8 %*
2012	19.5 %
2013	15.4 %
*This figure is under review by the MassDEP	
Table 2: Reported Unaccounted for Water	

Scituate has struggled with UAW, as summarized in Table 2. Based on the information provided by the Water Department as part of its Annual Statistical Report filing to the DEP, UAW has been high in recent years, primarily due to a high number of water line breaks. Because of tuberculation build up in the water lines and a subsequent “brown water” problem drawing numerous complaints by residents and businesses alike, the town has embarked on an aggressive schedule of replacing old water lines from the 1930’s with new cement lined ductile pipe. Between the spring of 2014 through the fall of 2017, close to 25% of the town’s 123 miles of pipe will be replaced at a cost of close to \$24 million. This is not only expected to improve water quality, but has the added benefit of improving the resilience of the delivery system overall and cutting down on water line breaks – thereby reducing unaccounted for water losses.

2.3.3 Recommendations While Scituate is complying with current best practices for metering, further efforts to minimize UAW are needed. The current pipe replacement effort will help, but that is targeted at the oldest 25% of the town’s distribution system. Continued efforts to refurbish the entire system will be needed to reduce line breaks and leakages. Ongoing water audits of the community may also identify areas where smaller leaks are present or unmetered water use may be ongoing.

Earlier this plan recommended a threshold regarding property rehabilitation (see page 11). If a multiple unit residential property is being built, or an existing multiple unit dwelling undergoing renovation which would involve repairs which triggered the 50% value threshold, the Committee recommends that individual meters for each unit must be a requirement of the local building code.

When metered water is a shared responsibility individual unit owners may not be fully aware of their water use habits and those who do conserve are forced to pay the price of water use by those who do not conserve. Individual meters help promote conservation by developing an understanding of and sense of responsibility for water use unit by unit.

2.4 Financial Management and Pricing

2.4.1 *Standards* Best management practices for pricing indicate that:

- Consumers should be charged the full cost of water and that water suppliers should implement full cost pricing. That includes the entire cost of operating the water supply system, including operations, maintenance, capital costs (infrastructure rehabilitation and replacement costs as well as long term debt service) and indirect costs;
- Ongoing water audits and leak repairs should be included in the water department budget;
- Water department funds should be segregated from the General Fund by use of an enterprise accounting system;

Use	Rate <i>per 100 cubic feet</i> 100 cubic feet = 748.1 gallons
Residential	
0 – 1200 cubic feet	\$0.97
1201 – 3000 cubic feet	\$4.22
Over 3,000 cubic feet	\$6.85
Commercial	
All use	\$4.50
Table 3: Water Rates as of 25 June 2014 Plus Water Service Charge – based on water line diameter	

- Price structures should encourage conservation, either a seasonal or increasing block rate pricing system.

2.4.2 *Actions Taken* The Water Department uses enterprise account funding as recommended, established through Town Meeting vote. The cost of the audits and leak repairs are included in the Water Department's annual budget, as required under the DEP Water Withdrawal Permit. Water prices signal value to consumers and help determine whether consumers use water efficiently. Scituate bills for its water using an increasing block rate structure. Increasing block rates or tiered pricing strives to reduce water use by increasing

the per-unit charges for water as the amount used increases. The first block is charged at one rate, the next block is charged at a higher rate, and so forth⁶.

⁶ http://water.epa.gov/infrastructure/sustain/pricing_structures.cfm

Eighty-three per cent of Scituate's water use is for residential use⁷. Water rates are set annually by the Board of Water Commissioners. Peak demand is driven predominantly by residential customers so the Town chose to charge higher rates for higher usage. Although commercial customers are charged more for water initially, their rates increase by less as they use more water. This structure allows the Town to target the outdoor, non-essential water demands within the system and rewards those who use less water. Based on rates in effects in June of 2014, water consumption consistent with Massachusetts' water conservation policies in a four person household would be 4171 cubic feet at a cost of \$254.51.

Customers are billed on a quarterly basis using actual, not estimated data. As discussed above, an automatic or radio-read meter system has been in place since 2006 and most of the town is now covered by these up to date meters. During the 2014 Town Meeting, an additional \$162,000 was voted to continue with the meter replacement program⁸. In a further effort to keep the water consumer educated about their water use practices, the water bills show a comparison between water use for the billing period and water use for the previous period, as well as a comparison between water use for the current period and water use for the same period during the previous year. Each bill also shows the gallons of water used, not just the traditional cubic foot measurement taken by meters.

2.4.3 Recommendations While Scituate follows many of the best management practices such as increasing block rate structures, use of an enterprise account, and informative quarterly billing, the overall budget of the department must better address the infrastructure rehabilitation and replacement needs of the system. Maintaining an up to date and efficient system reduces the water losses due to treatment practices in the plant, and especially losses due to water line breaks throughout the delivery system.

System Reinvestment: Discussions with industry experts (financial managers, design and construction engineers, and public utility rate regulators) recommend a capital reinvestment rate of 2 percent of the total system value be made each year-to-year. With a water system valued at approximately \$49.71 million, this would equate to an annual reinvestment cost of \$990,000 per year. In recent years, the annual budget for the entire water system, including operations and maintenance, chemical costs and labor, has been approximately \$2.7 million with system reinvestment of approximately \$370,000.

As a result of underfunding replacement and rehabilitation expenses, many of the water mains in the community are now 70 or more years old. The impact of the practice of continually deferring maintenance has resulted in the need for a substantial commitment to water main replacement. The April 2014 Town Meeting authorized up to \$22 million in capital spending to address this problem. Water rates will rise to fund the long term debt (principal and interest) needed to fund these costs. By building infrastructure rehabilitation and replacement costs into the annual budget, the "sticker shock" of large scale upgrade projects could be averted, as well as the wide spread disruption of the community (road reconstruction, traffic, temporary water systems) during the construction process.

⁷ Town of Scituate Annual Statistical Report, filed annually with MassDEP

⁸ Annual and Special Town Meeting Report and Recommendations, Town of Scituate Advisory Committee, p 21.

Municipal Water Infrastructure Investment Fund: Chapter 259 of the Acts of 2014⁹ was signed into law in August of 2014. Section 26 authorizes communities to establish a Municipal Water Infrastructure Investment Fund. Any municipality which accepts this section may impose a water infrastructure surcharge on real property at a rate up to, but not exceeding, 3 per cent of the real estate tax levy against real property, as determined annually by the board of assessors. Had such a fund been in place and utilized in the past, the sticker shock mentioned above may have been avoided while a dedicated fund was used to finance a more methodical and periodic replacement of water system lines and equipment.

If Scituate adopts a Municipal Water Infrastructure Investment Fund, up to \$1,485,000 could be raised (based on FY 2015 property tax levies). In addition to providing a dedicated fund for replacement and rehabilitation expenses, it would provide the taxpayer the added benefit of deductibility against state and federal income, a feature not available to water rate costs.

This investment strategy should be a long range strategy, to be pursued after the current water pipe replacement program has been completed.

Community Preservation: Scituate adopted the Community Preservation Act (CPA) locally in 2002. CPA is a smart growth tool that helps communities preserve open space and historic sites, create affordable housing, and develop outdoor recreational facilities. Ensuring better collaboration between the CPA committee and the Water Resources Commission, helping to identify and advance open space purchases critical to current and future water supply needs, must be a priority. The Board of Selectmen should direct the CPA Committee to solicit the Water Resources Commission on any potential purchase to ensure that vital water resources are protected yet available to meet community demand in light of future growth.

2.5 Residential Water Use

2.5.1 Standards

- Meet efficiency goals for residential water use, meeting average water use targets of 65 residential gallons per capita per day.
- The adoption of a restriction to regulate the use of town water in favor of private wells or rain barrels for irrigation;

2.5.2 *Actions Taken* Water conservation efforts, including extensive public education efforts, have resulted in residential use meeting state water conservation goals. As Table 4 shows, residential use¹⁰, has trended downward steadily since 2009, as

Year	RGPCD
2009	68
2010	65
2011	63
2012	63
2013	60
Table 4: Residential Water Use	

⁹ <https://malegislature.gov/Laws/SessionLaws/Acts/2014/Chapter259>

¹⁰ RESIDENTIAL GALLONS PER CAPITA DAY (RGPCD): a performance standard for public water suppliers serving municipalities. RGPCD is a measure of the average amount of water a resident uses each day during the reporting period (commonly one calendar year).

reported in the water department's Annual Statistical Reports filed with the DEP. A number of measures have been taken to achieve these goals, including the limitation of water use for non-essential purposes and ongoing public education.

DEP's most recent five-year update of the Town's Withdrawal Permit includes both calendar as well as streamflow triggers for instituting outdoor water use restrictions. The permit requires Scituate to facilitate partnerships with the North and South River Watershed Association in restoring herring passage to the First Herring Brook, which serves the town reservoir while recognizing the need to ensure sufficient supplies in the reservoir itself. The Watershed Association, working in collaboration with the MassBays program and the Water Department, has conducted extensive research regarding the capacity of the reservoir and its ability to serve the community under a variety of conditions.

Reservoir level (feet)	Millions of gallons in Reservoir*	Reservoir % full	Estimated supply remaining (days)**
40	155	100%	158
39	134	87%	137
38	114	73%	116
37	95	61%	96
36	76	49%	77
35	60	39%	61
34	44	28%	45
33	31	20%	31
32	18	11%	18
31	10	6%	10
30	2	1%	1
29	1	1%	1
28	0.5	0%	0
27	0	0%	0
*Rounded to whole numbers Based on June-August pumping of 1.85 mgd			
Table 5: Reservoir Capacity advising Demand Management			

Based upon this research, a revised policy was adopted in May 2015. In sum, the policy states that watering bans will be based off the Scituate's reservoir water elevation. When the elevation of the water in the Scituate reservoir reaches 36 feet (+/- 49% full) a watering ban will be implemented immediately by the Scituate Water Department.

This ban includes all non-essential use. As defined by the Massachusetts Department of Environmental Protection, "non-essential water use" means uses that are not required: a) for health and safety reasons; b) by regulation; c) for the production of food and fiber; d) for the maintenance of livestock. Examples of non-essential use include: the irrigation of lawns or landscaping, washing vehicles, parking lots, driveways and/or sidewalks, etc. This revised policy is designed to ensure sufficient water supply for health and safety, and helps Scituate meet its commitments to protect water flows in the Herring Brook as directed by our Water Management Act permit.

Irrigation Restrictions: With technical assistance provided by the MassBays program¹¹, extensive research and analysis of water meter reading unveiled key characteristics of water use in the community. While the top 25 percent of water users accounted for a 7 percent increase overall during the summer months, the top 5 percent of water users year round increased their water usage an average of 25 percent - a significant increase over others in the community and a significant impact on the town water supplies, using over 300,000 gallons per day¹² when restorative rainfall is commonly at its lowest levels. Based on that research, the use of in-ground sprinklers were restricted to one day per week, organized by precinct, between Memorial Day and Labor Day. A street by street schedule is available on the Scituate Water Division website¹³

As a result of the conservation measures instituted, usage dropped from a peak of 245 million gallons during the summer of 2005 to 170 million gallons during the summer of 2011 – a decrease of over 30%¹⁴!

But while Scituate faces a healthy development future, the Water Resources Commission and the Water Department are both concerned about the use of treated "finished" water continually diverted for outdoor non-essential uses. In order to ensure a sufficient water supply for years to come, Scituate has followed in the steps of other area communities such as Hanson, Kingston, and Pembroke by placing a ban on new hook-ups of in-ground sprinklers to the municipal water supply network. This preserves finished water for its intended purpose of ensuring safe drinking water and sufficient water pressure throughout the community to meet health and safety priorities. In-ground irrigation systems will still be permitted, but must rely on roof catchment systems¹⁵. Fines may be levied on both the property owner as well as the installer who connects the system to the municipal network as an economic disincentive. As mentioned above (*See 2.2.6*), increased use of recycled

¹¹ <http://www.mass.gov/eea/agencies/mass-bays-program/>

¹² Dr. Sara Grady, Report to Scituate Water Resources Commission, March 2011

¹³ <http://www.scituatema.gov/sites/scituatema/files/file/file/irrigation-day-by-street.pdf>

¹⁴ Dr. Sara Grady, Report to Selectmen, April 2012

¹⁵ See <http://www.cbf.org/Document.Doc?id=30> and <http://www.mass.gov/eea/agencies/massdep/water/drinking/private-wells-frequently-asked-questions.html> for more information

water would also reduce daily demand on water supplies, and has the added benefit of helping to promote local recharge.

2.5.3 Recommendations While annual average use is consistent with water conservation policy goals of 65 RGPCD, additional effort must be made to reduce maximum daily usage. At 2.328 million gallons per day¹⁶, this rate of use is 126 percent of our authorized daily volume as established by the DEP water withdrawal permit. Further, our current average daily use of 1.51 million gallons per day means that we are already using 82 percent of our permit authorization, leaving little room for additional development or economic growth.

Property owners with existing inground systems should receive information on the benefits of roof catchment systems versus use of finished water as well. Targeted mail pieces in the water bills of high users, as well as inclusion with fine notifications of those who violate of the town's inground water restriction would provide the best avenue of outreach. The WRC will create a recommended letter by the fall of 2016 and increase outreach through public education sessions regarding water conservation, including the more efficient use of water irrigation systems.

At the time this plan is being finalized, the Scituate Board of Health is developing local regulations regarding private wells. Should the onsite well be developed for lawn irrigation purposes, the Board of Health regulations should require the use of water sensors (inground moisture detection units) and use of that system should also be limited to one day a week just as those existing systems on the public water supply. Further, as water commissioners, the Board of Selectmen should require all existing inground irrigation systems to install a water sensor. While a reasonable grace period should be offered, this goal should be achieved by the spring of 2017.

Because of the recent emphasis of maintain streamflows evaluation to recent revision of the Water Management Act regulations, the Water Resource Committee's concern over the cumulative impact of many private wells may have an impact on the town's ability to provide water through the public water system is heightened. That is why we recommend non-agricultural inground irrigation system use, regardless of source, be limited to a consistent one day per week town-wide.

Guidance: The Water Resources Commission needs to improve collaboration with Building Inspector, providing helpful information on water efficiency to be given with each plumbing permit and building permit outlining Best Available Technologies (BAT). Information based on the EPA WaterSense program¹⁷ will help promote water conservation in both new construction and rehabilitation projects. Committee members will establish a semi-annual meeting schedule, working through our Board of Selectmen liaison, to achieve this goal. These meetings should begin in calendar year 2016.

Water Banking: As discussed above (See 2.2.6 *Recommendations for New Developments and Buildings*), incorporating water saving mitigation efforts into subdivision and property rehabilitation designs. For example, Weymouth developed a successful water banking program that has enabled it to stay within its authorized withdrawal volume. The bank saved the city 1.2 mgd (million gallons a day) and has helped the town to accommodate new growth and meet water demand needs. Potential

¹⁶ Town of Scituate Annual Statistical Report, 2013

¹⁷ http://www.epa.gov/watersense/about_us/index.html

mitigation efforts may include rebates for water efficient fixture retro-fits, improved stormwater recharge, and reuse of grey water – to name a few.

Again, as introduced on page 11, the Water Resource Commission should review sample bylaws directed at water banking and consider their appropriateness for Scituate. This review should be completed by June of 2016.

2.6 Public Sector Water Use

2.6.1 Standards

- Municipal buildings should conduct indoor and outdoor water use audits; focus on water consuming equipment in buildings; practice good lawn and landscape water use techniques;
- Estimate and meter water used by contractors using fire hydrants for pipe flushing; and

2.6.2 Actions Taken While Scituate has adopted many of these best practices, many of our public buildings are quite old and therefore do not have water conserving “low-flow” fixtures. Town practices comply with the irrigation of public and recreational fields in accordance with the in-ground irrigation limitations of one day per week. Scituate employs water-wise landscaping practices on municipal properties by not over-watering lawns, not cutting grass too short, choosing native plants for landscaping, and mulching around shrubs and trees to retain moisture. Town road crews monitor the use of hydrants by contractors. Water Department regulations state that no water may be taken from a hydrant without permission from the Water Department.

2.6.3 Recommendations Scituate is currently engage in a number of building projects for the next decade, including a new Middle School, new Public Safety Complex, and expanded Library.

As plans are finalized for these projects, it is imperative that water efficient fixtures as well as water-wise landscaping be incorporated into the final designs, installed, and properly maintained. All design and build specifications must require WaterSense labeled plumbing fixtures be used. Flow rates of fixtures, as discussed above (See Table 1 – page 10), should be cited as well. Architects considered for work on any capital project involving vertical construction with water as a utility must demonstrate their familiarity with water conservation efforts in offering comparative recent designs when citing their qualifications, and construction contractors must also demonstrate their familiarity with the installation of water efficient products and strategies when considered for any contract award.

The Committee has been actively engaged with the public review process through the Planning Board, offering comments on the design plans for the proposed Middle School and the Public Safety Complex. This engagement shall continue as other capital projects are proposed to meet community needs.

2.7 Industrial, Commercial and Institutional Water Use

2.7.1 Standards

- All users in this category should do a water audit and implement water conservation techniques;
- All users should develop and implement a water saving strategy.

2.7.2 Actions Taken Scituate has 224 commercial or industrial metered service connections out of a total of 7641 connections¹⁸. Commercial and industrial water uses accounts for 6.9 percent of the Town's annual use. None of the commercial or industrial connections are significant users at present. Because of this low volume and because 83 percent of users are residential, the DEP Withdrawal Permit directs it to focus its efforts on reducing seasonal water use and residential gallons per capita per day use.

2.7.3 Recommendations While a majority of attention has been placed on residential use, more attention can be place on commercial use through outreach efforts and monitoring of development proposals.

The Water Resources Commission developed a good working relationship with the Planning Board and Planning Department during the recent revisions to the Water Resource Protection Overlay District. This cooperative effort can continue to ensure water conservation practices in all development proposals, particularly water efficient fixtures and water-wise landscaping practices. This includes office buildings, restaurants and nursing homes. Specific measures include the use of faucet aerators in hand washing and food preparation sinks, efficient pre-rinse spray valves, energy efficient ice machines, and touchless sensor faucets.

Promotion of the use of reclaimed water (gray water)¹⁹ for commercial properties which meet certain criteria (for example, size of development; anticipated number of people served) should be considered for non-potable water use, including outside landscape irrigation.

While measures to prohibit new connections of irrigation systems to the municipal water supply will also affect new commercial development, large scale withdrawals via individually owned private wells for irrigation also tap the same water table thereby negating many of the desired impacts of conservation. This is why efforts to promote reclaimed water, especially for commercial development, is needed.

The Committee will investigate the Best Management Practices (BMPs) for ornamental plantings in New England including watering practices. One key resource to reference should be the WaterSense program. The Committee recommendations should be readied and available to the public by the end of calendar 2017.

¹⁸ See 2011 Scituate ASR

¹⁹ Use of reclaimed water is regulated by MassDEP
<http://www.mass.gov/eea/agencies/massdep/water/wastewater/wastewater-reclaimed-water.html>

2.8 Agricultural Water Use

2.8.1 Standards Conservation practices recommend adopting an approach through which water is used in a planned and efficient manner with appropriate amounts and frequency to meet needs without excessive water loss.

2.8.2 Actions Taken Agricultural water use is minimal at this time in Scituate. There are several small, self-supplied farms and a few garden centers in town, yet they are not significant water users. The Town does allow for agricultural uses in all of its current zoning districts.

2.8.3 Recommendations Research subsurface, drip (SDI) irrigation and similar techniques to see if which is the most practical water saving alternative for the types of agriculture in Scituate. Conduct outreach with the local agricultural operations as well as the local conservation district director and collaborate on efforts to develop a water conservation approach that meets the irrigation needs of local agricultural enterprises.

This effort should be rolled into the ornamental planting BMPs mentioned above, and also readied by the end of calendar year 2017.

2.9 Public Education and Outreach:

2.9.1 Standards

- Develop and implement an education plan for its water consumers; and
- Address why it's important for self-supplied users to conserve as well.

2.9.2 Actions Taken Scituate has been proactive in creating a strong public education plan that includes the following components:

- Publicize outdoor water restrictions in local newspapers, on the town website, by mail and email;
- Engage in community outreach by offering to speak on water conservation to community service and church groups;
- Send out a letter to all residents informing them of the importance of water conservation.

When the restrictions on inground irrigation were first announced, a brochure sent to each household (See Appendix E), mailed separately from the water bills. Water bills, sent each quarter, contain a reinforcement message about water conservation.

The Water Department's Annual Water Quality Report makes the link between conserving water and increasing water quality for homeowners and the Department plans to add it to its Conservation web page.

Each year the Scituate Water Resources Commission collaborates with the Water Department and the North and South River Watershed Association in celebrating National Drinking Water Week. Water Week events are publicized through local media including area newspapers, community

television, and radio interviews. Activities include outreach presentations to local community groups and schools, presentations before the Board of Selectmen (and broadcast on local cable television) on water as a limited and precious resource, and a Family Fun Day at the Water Treatment Center.

At the Family Fun Day parents and children are invited to take tours of the Water Treatment Plant, are offered presentations on future water use projections, learn about watershed protection, visit the recently restored fish ladder, and play games designed to teach conservation. The Water Department also provides free water conservation retrofit kits include faucet aerators, two low-flow showerheads, toilet tank leak detectors, and a toilet dam. School students who have prepared water related presentations for the school system's annual science fair are also invited to display their work.



**WATER RESOURCES COMMISSION MEMBER MARTHA COOK
INSTRUCTS FAMILY ON RETROFIT INSTALLATION DURING
FAMILY FUN DAY AT THE WATER TREATMENT CENTER**

Along with National Drinking Water Week, Scituate further encourages community engagement through a community survey. The reduction in residential water use is discussed in detail in Item 2.5. After the first year irrigation restrictions were in place, the Board of Selectmen asked the Water Department for an update on the results of the effort. The results were very impressive! As a result of the conservation measures instituted, water use town wide dropped from a peak of 245 million gallons during the summer of 2005 to 170 million gallons during the summer of 2011 – a decrease of over 30%²⁰!

To measure public attitudes regarding these conservation measures, a post card was inserted into the water bills to surveying customer opinions. This post card can be found in Appendix D. The

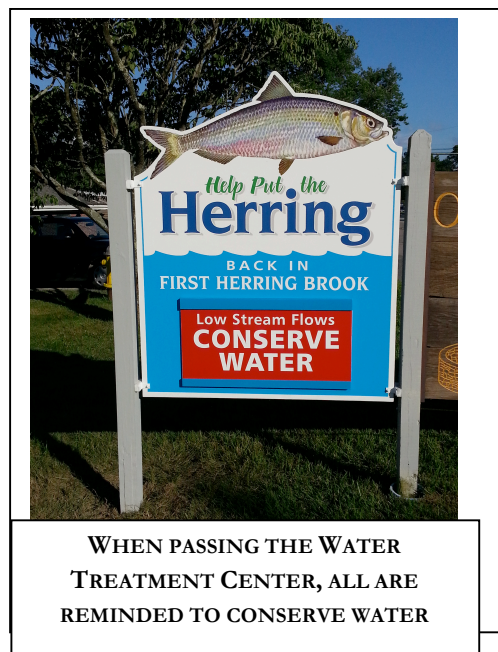
²⁰ Dr. Sara Grady, Report to Selectmen, April 2012

response was overwhelmingly in favor of the limitations. Because of these efforts, residential use has steadily declined over the past five years and is now within the 65 gallon per capita per day standard, as seen in Table 3.

In 2002 a joint All-Town Board meeting was held to discuss and set actions for water conservation actions in Scituate. Boards represented included Selectmen, Planning Board, Conservation Commission, Stormwater Management Committee, Board of Health, Water Commissioners, Water Department and Highway Department. One by product which grew out of that meeting was the establishment of the Water Resources Commission, charged with assisting the Water Commissioners (Board of Selectmen) and the DPW's Water Division in providing a safe supply of drinking water from surface to groundwater sources, through the delivery system, to meet the household, commercial, safety, ecological and other public needs. That committee was formed in 2006 and has worked with the Water Department on a number of projects, including this Water Conservation Plan.

Committee members attend and collaborate with other town committees, watershed groups, schools and residents to help protect and conserve water resources, and provide input on any development proposed within the Water Resource Protection District.

With the help of the North and South River Watershed Association, with funding provided by the Massachusetts Department of Ecological Restoration, the Water Department placed a sign by the Water Treatment Center in the spring of 2013. The full color sign, featuring a river herring, advises passersby on the need to conserve water when reservoir levels are low. Located on busy Route 3A, the sign is seen by hundreds of motorists from Scituate and Marshfield each day.



The Water Department also recently launched an updated web page that features water quality updates, water conservation tips, water regulations, web links to *Greenscapes*, as well as staff contacts. Similarly, the Water Resources Commission Website has links to the EPA WaterSense Program, Massachusetts' Sustainable Water Management Initiative, and the Water Infrastructure Finance Committee²¹.

2.9.3 Recommendations Ongoing efforts demonstrate that education and outreach has a positive impact and must be continued. The irrigation limitations have the support of a vast majority of residents. While enforcement to those few who prefer to ignore the rule is costly in staff time to the Water Department, the Department is committed to maintaining diligent administration of the Board of Water Commissioners' policy.

²¹ See <http://www.scituatema.gov/water-resources-committee>

Additional Outreach: While interaction with the schools has been attempted, efforts in this area have been met with limited success and must be redoubled. Additional focus on outreach to the community's business constituents is also recommended. While improved web information is helpful, just posting information alone does not produce results. Further outreach to make people aware of the resources and ideas available can lead to even more responsible actions by everyone. Other issues discussed in this Plan have been recommended for public discussion and education through outreach sessions at the Town Library or similar venue. This could be included in that outreach, as well as targeted efforts in reaching the business community through the local Chamber of Commerce and the Rotary Club. Establishing a more established calendar of outreach sessions with specific constituent groups should be made by the Committee by the Spring of 2016.

Water Conservation Coordinator: One other recommendation of the All-Town Board meeting was that the Town consider the creation of a Water Conservation Coordinator's position. It was recommended that a person be hired to help plan and hold water use workshops for the public and in schools, provide updated information on water-wise landscaping, lawn-care, retrofit and rebate programs, help educate the public on the link between water conservation and water quality, and educate self-supplied water users on BMPs for private well use and irrigation. The Committee should further investigate the feasibility of a Coordinator by the end of calendar 2016 including the development of job responsibilities and potential funding sources. While this could be a position within Scituate, it may be more efficient to develop a shared "circuit rider" position shared among a number of communities who rely upon watershed or sub-watershed resources with Scituate. The Committee will continue to work with the North and South River Watershed Association in making this a reality.

Concluding Remarks

While this Water Conservation Plan provides a beneficial compilation of objectives to be achieved and specific strategies to reach those objectives, public involvement would be best served by an annual review of progress published by the Water Resources Commission. Further, the Plan should be reviewed and rewritten every five years.

It is the goal of the Committee to have this Plan adopted by the end of March 2016, with milestones achieved on the individual conservation strategies within the periods recommended. Only with the continuing support of the townspeople can this become a reality. The Committee looks forward to working with the Board of Selectmen, other town boards, and the citizens of Scituate as we move forward.

3. 0 Appendices

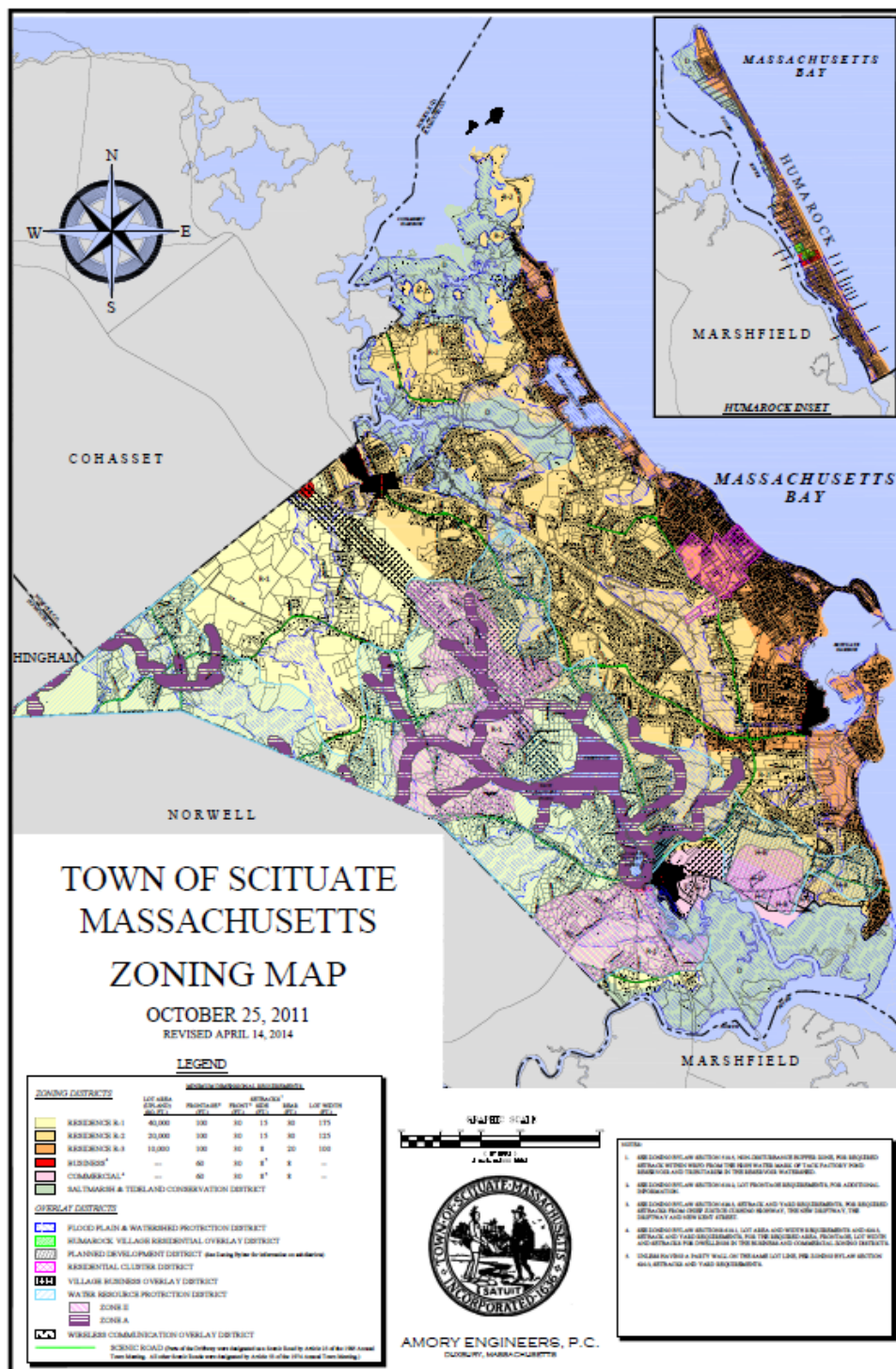
Appendix A	Summary of Recommendations
Appendix B	Map of Revised Water Resources Protection District
Appendix C	Scituate Water Conservation Questionnaire
Appendix D	Sample Post Card to Residents
Appendix E.....	Mailing to Residents on Water Conservation and Watering Restrictions

Appendix A: Summary of Recommendations

Topic	Recommendations	Timeline
1. Integrated Planning	<ul style="list-style-type: none"> □ Integrated Planning should address water supply, wastewater and stormwater management □ Ensure that stormwater management efforts support recharge and “keep water local” 	<p>Ongoing</p> <p>Ongoing</p>
2. Standard for New Developments and Buildings	<ul style="list-style-type: none"> □ Promote the use of Best Available Technology for water conservation □ Allow the reuse of treated wastewater with facilities where feasible □ Pursue water banking to help ensure a sustainable water supply 	<p>Ongoing</p> <p>Recommendations by June 2016</p> <p>Recommendations by June 2016</p>
3. Metering	<ul style="list-style-type: none"> □ Continue water audits 	Ongoing
4. Pricing	<ul style="list-style-type: none"> □ Improve system reinvestment □ Institute a Municipal Water Infrastructure Investment Fund □ Improve collaboration with the Community Preservation Committee to fund open space purchases critical to future water supply needs. 	<p>ASAP</p> <p>For consideration in 2018</p> <p>ASAP</p>
5. Residential Water Use	<ul style="list-style-type: none"> □ Maintain residential use at or below 65 gallons per person per day □ Reduce maximum daily use, currently 126% of authorized daily volume □ Prioritize finished water for health and safety uses □ Prohibit new connections of inground irrigation systems to municipal water supply □ Provide information on roof catchment systems to property owners with existing inground irrigation □ Provide guidance on water efficiency fixtures when issuing plumbing and building permits □ Pursue water banking to help ensure a sustainable water supply 	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>ASAP</p> <p>During 2016</p> <p>During 2016</p> <p>Recommendations by June 2016</p>
6. Public Sector Water Use	<ul style="list-style-type: none"> □ Be certain that water efficient fixtures and water wise landscaping be incorporated into the design of new and or refurbished public facilities □ Only hire architects and construction firms familiar with the proper selection and installation of water efficient fixtures and water wise landscaping 	<p>Ongoing</p> <p>Ongoing</p>
7. Industrial, Commercial, and Institutional Water Use	<ul style="list-style-type: none"> □ Be certain that water efficient fixtures and water wise landscaping be incorporated into the design of new and or refurbished properties 	Recommendations by December 2017
8. Agricultural Water Use	<ul style="list-style-type: none"> □ Research subsurface drip irrigation techniques and share findings with local commercial agricultural 	Recommendations by December

	entities where practical	2017
Topic	Recommendations	Timeline
9. Public Education and Outreach	<ul style="list-style-type: none"> <input type="checkbox"/> Improve collaboration with Scituate Schools on water education <input type="checkbox"/> Increase outreach to the business community <input type="checkbox"/> Improve outreach to residents on the tools and benefits available via the Water Department website <input type="checkbox"/> Consider teaming with area communities in sharing a regional Water Conservation Coordinator <input type="checkbox"/> Publish an annual review of progress on water conservation recommendations <input type="checkbox"/> Review and rewrite Water Conservation Plan every five years 	<p>Spring 2016</p> <p>Ongoing</p> <p>Ongoing</p> <p>Recommendations by December 2016</p> <p>Next Review to begin 2020</p>

²² adopted by Town Meeting April 14, 2014



Appendix C - Scituate Water Conservation Questionnaire

Appendix D - Customer Survey on Water Restrictions

WE WANT YOUR INPUT!

Last summer we implemented a water conservation policy that limited the use of in-ground lawn irrigation systems to one day per week from Memorial Day to Labor Day. The purpose of this was to conserve water and eliminate the need for a ban on all outdoor water uses.

We would like your feedback. Would you like to see this limitation on in-ground lawn irrigation systems be re-implemented next summer? Please tell us your preference by checking below and mailing this postage-free card back to us.

YES, continue to limit the use of in-ground grass irrigation systems _____

NO, do not limit the use of in-ground grass irrigation systems _____

Thank you for participating in this survey,
The Scituate Water Department

WATER DEPARTMENT

c/o Town Hall

600 Chief Justice Cushing Highway

Scituate, MA 02066

**Appendix E – Mailing to Residents on Water Conservation
and Watering Restrictions**