

STONE BRIDGE FIRE DISTRICT
WATER SUPPLY SYSTEM MANAGEMENT PLAN

PWS ID# 1615619

DISTRICT OFFICE
1761 MAIN ROAD
TIVERTON, RI 02878

WATER TREATMENT FACILITY
94 QUINTAL DRIVE
TIVERTON, RI 02878

EXECUTIVE SUMMARY

August, 2020

Updated June, 2022

EXECUTIVE SUMMARY

INTRODUCTION

The Stone Bridge Fire District (SBFD or District) has completed the Water Supply System Management Plan (WSSMP) in accordance with Rhode Island General Laws 46-15.3, as amended and titled “*The Water Supply System Management Planning Act*”. Under this legislation the Stone Bridge Fire District, as a water purveyor supplying greater than 50 million gallons of water per year, is responsible for the preparation, adoption and periodic update, of a WSSMP.

This purpose of this WSSMP is to define the objectives of the SBFD and serve as a guideline for District operations, management and decision-making processes. The over-arching goals of this WSSMP shall also be consistent with SGP 724, “*Water 2030*”. This WSSMP presents a detailed description of the water supply, treatment, storage and distribution system, including the policies and procedures for the general operation and management of the system. Additionally, the Emergency Management portion of the plan includes a vulnerability assessment of the system to be used for emergency planning.

WATER SYSTEM DESCRIPTION

The Stone Bridge Fire District (SBFD) is an independent water district that was created in June 1940 by a Rhode Island Legislative Act (Chapter 974 of the Public Laws of 1940), and was later amended in 1963 and in 1988.

SBFD distributes water to approximately 1,039 service connections within the Town of Tiverton, RI with a connected population census of 2,714. The District boundaries include approximately two and one-half (2.5) square miles in a L-shaped configuration extending from Stafford Pond along Bulgarmarsh Road and Main Road to the connection with North Tiverton Fire District at Carey Lane. This is generally known as the Stone Bridge section of Tiverton and is in the north central and north-west portion of the Town immediately south of the North Tiverton section of the Town.

SBFD obtains 100% of its water from Stafford Pond, a surface water supply owned by the City of Fall River. Following treatment, the finished water is distributed through a 24-mile pipeline system consisting principally of transite (asbestos-cement) pipe material, which was installed in the late 1940’s and 1950’s. The system has one pressure zone. Water is also supplied to one wholesale customer; North Tiverton Fire District, which as of June 2004, includes the former Tiverton Water Authority.

Water Supply Sources

The SBFD entered into an Agreement with the City of Fall River acting through the Watuppa Water Company for the withdrawal of water from Stafford Pond, located in the northeast section of the Town of Tiverton. The Agreement, renewed in September 2019, allows for SBFD to draw up to 1.9 million gallons per day from the pond and requires Fall River to maintain the water level of the pond such that this amount of water is available to SBFD. The District obtains 100% of its water supply from Stafford Pond.

The water withdrawals from Stafford Pond have been fairly consistent over the past decade, with an average annual withdrawal of 246.64 million gallons (MG), minimum withdrawal of 211.51 MG, and maximum withdrawal of 267.82 MG.

Stone Bridge Fire District Water Source – Stafford Pond	
Location	Tiverton, RI
DOH PWS ID#	1615619
Surface Area	487 acres
Intake Size	2 @ 8 in
Intake Elevation (MSL Datum)(Spillway)	196.8
Total Storage Capacity	16,000 MG
Usable Storage Capacity	NA
Watershed Size	1344 Acres
Legally Imposed Discharge	NA
Existing Discharge	None. (Outfall 001 – WTP Clearwell Overflow can discharge to Stafford Pond under emergency conditions only)
Proposed Discharge	None
Reservoir Function	Storage
Status	Active

Water Treatment Facility

Treatment of the raw water is provided by a 1.25 MGD purification plant located on the western shore of Stafford Pond. Treatment consists of coagulation, sedimentation, filtration, disinfection, taste and odor control and corrosion control.

Stone Bridge Fire District Water Treatment Facility ID – 1615619	
Location	TF1
Source(s) Treated	Stafford Pond
Design Flow	1.25 MGD
Maximum Flow	1.4 MGD
Standby Power	Yes
KW Demand of Facility	144 KW
KW of Standby Generators	150 KW
Chemical Feed Equipment	Yes

Water Storage Facilities

The system is served by two (2), water storage standpipe tanks, including a 1 MG standpipe on Quintal Drive, constructed in 1987, and a 0.5 MG standpipe on Bulgarmarsh Road, constructed in 1948. Both tanks were recently inspected and found to be in fair to good condition. Additional storage is provided in the water treatment plant finished water clearwell (90,000 gallons).

Stone Bridge Fire District Water Storage Facilities			
Location	Bulgarmarsh Rd (SF2)	Quintal Dr. (SF1) ¹	Treatment Plant
Storage Facility Type	Standpipe	Standpipe	Clearwell
Total Storage Volume	500,000 gal	1 million gal	90,000 gal
Usable Storage Volume	500,000 gal	1 million gal	90,000 gal
Facility Age	Built in 1948	Built in 1987	Built in 1948
Facility Condition	Fair	Good	Good
Last Date of Inspection	2015	2016	2018
Construction Material	Steel	Steel	Concrete
Interior Paint Coating or Lining	Epoxy Coating	Coating	No
Cathodic Protection	No	No	No

Note 1: Tank SF1 (1.0 MG) is owned by the Tiverton Water Authority, which was dissolved and incorporated into North Tiverton Fire District (NTFD).

Pumping Stations

The system has two (2) pumping stations, both located at the water treatment facility. A quadriplex (4 pumps) pumping system draws water from Stafford Pond, pumping it into the treatment facility. A triplex (3 pumps) finished water pumping system discharges the finished water into the distribution system.

Stone Bridge Fire District Water Pumping Stations		
	Stafford Pond Raw Water	Water Treatment Plant Finished Water
Location	Treatment Plant	Treatment Plant
Type of Pump Station	Raw Water Intake	To distribution
Number of Pumps in Station	4	3
Pump #1	Centrifugal 300 gpm	Centrifugal 375 gpm
Pump #2	Centrifugal 300 gpm	Centrifugal 375 gpm
Pump #3	Centrifugal 300 gpm	Centrifugal 375 gpm
Pump #4	Centrifugal 300 gpm	-----
KW Demand of Facility-Nearest KW	15 KW	70 KW
Emergency Power Y/N	Yes	Yes
Generator Power Rating-Nearest KW	150 KW for entire Treatment Plant and pumps	

Water Transmission & Distribution System Infrastructure

The finished (treated) water is distributed through a 19-mile pipeline system consisting of 6” (approx. 27,000 ft.), 8” (approx. 53,000 ft.) and 12” (approx. 19,000 ft.) mains, principally of transite (asbestos-cement), cast-iron and ductile iron pipe. The transite pipe installed 1940’s includes both 12” and 8” piping, as noted in the table below.

Transmission Line ID and Line Start-End Points	Material	Age of Line	Diameter	Total Length	General Condition
Quintal Dr-From WTP to Bulgarmarsh Road (T1)	AC	Inst 1946	12 in	1,500 ft.	Fair
Bulgarmarsh Road-From Quintal Dr to Main Road (T2)	AC	Inst 1946	12 in	12,400 ft.	Poor
Main Road-From Bulgarmarsh Rd to Bridgeport Rd (T3)	AC	Inst 1946	12 in	2,400 ft.	Poor
Highland Rd/Main Rd-From Bridgeport Rd to North Tiverton connection (T4)	AC	Inst 1946	8 in	11,300 ft.	Fair
Main Rd/Riverside Dr-From Bridgeport Rd to end of Riverside Dr (T5)	AC	Inst 1946	8 in	12,200 ft.	Fair

Interconnections

The Stone Bridge Fire District has four (4) interconnections with North Tiverton Fire District (which now includes Tiverton Water Authority) and one (1) interconnection with Portsmouth Water and Fire District. Water can be received from either interconnected system in an emergency situation. North Tiverton purchases its water on a wholesale basis from SBFD and the City of Fall River, MA. Fall River’s drinking water is sourced from North Watuppa Pond and the Copicut Reservoir. Portsmouth purchases its water on a wholesale basis from the City of Newport. One of Newport’s water treatment plants, the Lawton Valley Treatment Plant, is located on West Main Road in Portsmouth. The raw water comes from St. Mary’s Pond and Sisson Pond in Portsmouth, Nonquit Pond in Tiverton, and Watson Pond in Little Compton.

Stone Bridge Fire District Interconnections					
Interconnections	Int. #1	Int. #2	Int. #3	Int. #4	Int. #5
Location	Bulgarmarsh Rd @ Quintal Dr.	Brayton Rd	Riverside Dr.	Carey Lane	W. Ridge Dr.
Connected To	N. Tiverton	N. Tiverton	Portsmouth	N. Tiverton	N. Tiverton
Pipeline Ø	12”	12”	10”	8”	8”
Capacity (gpm)	150	500 – 700	300 – 500	300	500
Interconnection Valve Location:					
Valve #1	Meter pit	Meter pit	Meter pit – pump house	Main Rd	No meter pit – 1 valve only
Valve #2	Meter pit	Meter pit	Meter pit	Surge control valve – Carey La.	Emergency only Manual
Interconnection Valve Ownership:					
Valve #1	Stone Bridge	Stone Bridge	Stone Bridge	N. Tiverton	Stonebridge
Valve #2	Stone Bridge	Stone Bridge	Portsmouth	N. Tiverton	-----
Flow Direction	Normal Delivering, Emergency-Receiving	Delivering	Emergency-Receiving, Normally Closed ¹	Delivering ²	Emergency-Receiving

Note 1: Supply capacity is limited due to pressure differential with standpipe tanks. Currently can supply only western portion of SBFD service area.

Note 2 : Capacity is limited to capacity of N. Tiverton pumping station.

Water Supply and Distribution Metering

Stone Bridge has installed and maintains water supply and distribution master meters at the water treatment facility. Master meters are also installed at the connection points for each of the three wholesale customers. The meters are read daily by telemeter at the water treatment plant and physically read monthly. Master meters are calibrated annually.

The majority of the finished water produced by the water treatment facility is delivered to wholesale customers whose meters are read monthly. The retail customers are 100% metered. The District tests and maintains the water meters frequently to assure that meter readings are accurate. The District is aggressive in repairing any leaks as rapidly as possible after identification of the leak. These operating practices have resulted in a non-account water level (6.32%) that varies from year to year but is still significantly below the statewide goal of 10% on a long-term basis.

SERVICE AREA

Geographic Area

The District service boundaries were established by the 1940 Act, including approximately two and one-half (2.5) square miles in an L-shaped configuration from Stafford Pond along Bulgarmarsh Road and Main Road to the connection with North Tiverton at Carey Lane. This area is referred to as the Stone Bridge section of Tiverton.

Population and Projections

The SBFD service area includes only a fraction of the Town of Tiverton. The population served by the District was obtained from the 2010 census information and the Comprehensive Town Plan which presents the census for the entire Town of Tiverton. This information was adjusted for high population density service connections and the local knowledge of the District Superintendent to adjust the service population from the assumed to be 2.4 people per service connection, resulting in a calculated SBFD service population of 2,714 people. For comparison, the 2000 population in the area of the District retail distribution system was estimated to be 2,388.

Calculation of Stone Bridge Fire District Per Capita Water Use		
Total Retail Water Consumption (gal.)	111,106,000	
Retail Water Volume Deducts:		
Boat House & Club House (gal.)	(4,490,000)	
Brookdale Sakonnet Sr. Living (gal.)	(4,780,000)	
Tiverton HS (gal.)	(1,329,000)	
Tiverton MS (gal.)	(579,000)	
Ft. Barton ES (gal.)	(239,000)	
Net Retail Water Consumption (gal.):		99,689,000
Total Service Connections (2019)	1,039	
Service Connection Count Adjustment:		
6 Major Users ¹	(9)	
Dadson Mobile Estates (102 – 1 = 101) ²	101	
Adjusted Total Connections		1,131
Unit Population Count per Connection	2.4 ³	
Connected Service Population	2,714	
Per Capita Water Use		100.6 gpcd

Note 1: Includes: Brookdale, Boat House, Village Club House, Tiverton HS, Tiverton MS, & Ft. Barton ES – total of 9 service connections.

Note 2: Dadson Mobile Estates has 102 residential units served from 1 service connection. Increase service connection count by 101 to represent all units in subdivision.

Note 3: Assumed service population per connection is based upon estimates from the American Community Survey for the Town of Tiverton.

Note 4: Dadson Mobile Estates Service Population reduced from 245 to 150 ($\Delta = -95$).

The Dadson Mobile Estates includes 102 residential units supplied from a single 2” service connection, with an estimated population of 150. From a water supply management perspective, it would be beneficial to have each unit with an individual meter to enable tracking of usage and leaks. However, it is common for Home Owners Associations (HOAs) to manage the water supply with a single connection. If the HOA had individual meters, then it would become a Public Water Supply entity, and they HOA may not have sufficient funds for system improvement projects.

WATER USE

Water withdrawn from Stafford Pond is used internally in the water treatment plant, distributed to SBFD retail customers and sold wholesale for redistribution by the North Tiverton Fire District, which also includes Tiverton Water Authority. Although Stone Bridge has a connection to the Portsmouth Water and Fire District, Portsmouth stopped purchasing water wholesale from Stone Bridge in April 1999.

Within the area served by SBFD, the water use is mainly split between Stonebridge (retail) and North Tiverton (wholesale). The water use in Stonebridge has been gradually increasing over the decade, whereas in North Tiverton, the use has been declining during the same timeframe. The result is a fairly consistent total combined use averaging 208.32 MGY for the decade. Accordingly, the water withdrawals from Stafford Pond, the sole water source for SBFD, have been fairly consistent over the past decade, with an average annual withdrawal of 250.88 MGY ranging from a minimum of 237.98 MGY to a maximum withdrawal of 267.82 MG. During that period, there has been no clear upward or downward trend in water withdrawals from Stafford Pond. The population within SBFD has trended upward during the past decade, but water conservation programs put in place likely account for the consistent total water use. Based on population projections for the Town of Tiverton, the user water demands for SBFD were estimated for years 2025 (293.47 MG) and 2040 (319.15 MG).

SBFD Metered Water Sales			
Year	Retail	Wholesale	Total
	Stonebridge	N. Tiverton	
2019	111,106,000	96,809,000	207,915,000
2018	107,387,000	95,774,000	203,161,000
2017	100,230,000	101,027,000	201,257,000
2016	103,054,000	113,791,000	216,845,000
2015	59,686,000*	72,242,000*	131,928,000*
2014	81,824,000	124,366,000	206,190,000
2013	77,384,000	122,966,000	200,350,000
2012	75,826,000	134,674,000	210,500,000
2011	74,582,000	135,198,000	209,780,000
2010	80,226,000	138,605,000	218,831,000

* Missing data for July 2015 through October 2015 due to filter repairs, refurbishment and re-bedding.

SURFACE WATER SOURCE PROTECTION

As a surface water source, Stafford Pond is particularly susceptible to contamination from stormwater runoff over the surrounding developed land, and has a history of experiencing algal blooms, the result of excessive nutrient (often nitrogen and phosphorus) concentrations in the water. The eastern shore of the pond is almost entirely developed, primarily with moderate to high density residences, and the western side is mostly undeveloped. A study conducted in 1997 indicates that primary sources of contamination are high phosphorus loadings from a nearby dairy farm and nitrogen from residential septic systems. Findings of this report resulted in the listing on Stafford Pond on Rhode Island’s Impaired Waters List and a Total Maximum Daily Load (TMSL) was developed to establish limits on phosphorus loading to the pond (set at average of 0.025 mg/L).

Since the study was conducted, various actions have been taken to limit nutrient and stormwater contamination of this surface water body, including Tiverton’s Phase 2 Storm Water Management Plan which addresses storm water runoff best management practices, including at the dairy farms, storm water control projects, public education and outreach, and pollution prevention and good housekeeping in municipal operations. The RIDOT is under a Consent Decree due to storm water issues around Stafford Pond and is required to prepare a Storm Water Control Program, by 12/30/2025. Land conservation efforts including land acquisition and zoning also protect the water source. Tiverton has conducted phosphate stabilization in Stafford Pond utilizing alum treatment during 2019-2021. As an additional source protection measure, the Town instituted a power boat prohibition for Stafford Pond in 2015.

Most of the areas served by the Stone Bridge Fire District are not connected to sewer service. However, the existing sewer system in Tiverton is being extended from Robert Gray Avenue south to Riverside Drive, the latter of which does fall within the Stonebridge District. The expansion project involves the installation of approximately 8,350 linear ft. of 8-inch and 10-inch diameter gravity sewer which will convey wastewater to

the Fall River POTW. The project is expected to be completed in the Spring of 2022. Extension of the sewer service will improve water quality by removing existing septic systems from service within the Stafford Pond Watershed. In 2017, the Tiverton Wastewater District completed an Onsite Wastewater Treatment System (OWTS) assessment within the Stafford Pond Watershed. This effort led to replacement and/or upgrades of septic systems and implementation of the municipal wastewater collection and conveyance system to transfer sanitary wastewater from North Tiverton to Fall River.

SUPPLY AND DEMAND MANAGEMENT

Projected Future Demands

Anticipated future demands are developed based upon several factors including historic trends for water use, anticipated population changes, beneficial effects of conservation efforts and efficiency of water using facilities and equipment, municipal policies, and anticipated major water user and wholesale water user needs and considerations. The projected 5-year and 20-year anticipated demands are summarized below based on historical source water withdrawal records.

SBFD Previous & Projected Source Water Demands			
Year	Actual/Est	MGD	MGY
2010	Actual	0.734	267.8
2014	Actual	0.685	250.0
2019	Actual	0.684	249.7
2025	Estimated	0.701	256.0
2040	Estimated	0.763	278.4

Available Water and Alternatives

Stone Bridge Fire District currently has interconnections with the North Tiverton Fire District and Portsmouth that can be used for emergencies or to augment existing supplies. The District considers Stafford Pond to be a sufficient source of supply for the five (5) and twenty (20) year planning scenarios.

The District has sufficient supply and does not anticipate a need to identify supply augmentation except for emergency needs. Currently the District has connections with the North Tiverton Fire District that can provide an emergency supply from Fall River and with the Portsmouth Water & Fire District that could provide an emergency supply from Newport. Specifically, as reported in the 2008 RI Supplemental Water Studies Feasibility Report, a limited amount of emergency water could be provided by North Tiverton under its current contract with the City of Fall River through the North Brayton Road interconnection. (Note: Tiverton’s contract with Fall River allows for a maximum of 0.55 MGD to be purchased). Additionally, Portsmouth Water and Fire District can provide up to 1.20 MGD via the Riverside Drive interconnection. Evaluation of additional direct and indirect connections to Fall River are under consideration, which is reported to have a surplus of approximately 20.00 MGD.

Demand Management

Since 2002, the District has provided annual information by mail to each of the residential accounts (single family and multi-family residences) and to offer water conservation kits, at cost, to the residential property owners. The District maintenance staff will provide information regarding the installation of the devices. The District also used its Central Contractor Registration (CCR) as a reminder that conservation/retrofit devices are available.

The District has also relied on the water rate structure to encourage efficient water use through flat rate tariffs. As of July 2018, the flat user rate was \$5.25 per 1,000 gallons, which has since been increased to \$7.70 per 1,000 gallons. This rate is constant across all types of users (e.g. residential, commercial.). At the July 2022 Annual Meeting, the rate is expected to increase significantly.

CAPITAL IMPROVEMENTS

The Clean Water Infrastructure Replacement Plan includes near-term improvement projects including the Riverside Drive pipeline replacement, the interconnection with North Tiverton (Silver Beech Rd.), North Brayton standpipe improvements, and the Hillside Drive pipeline replacement. Additionally, a long-term plan to improve the water treatment facility is also under consideration.

EMERGENCY RESPONSE

Since the last WSSMP for SBFD, the water treatment plant has undergone a number of system upgrades, some of which include updating meters and analyzers, pumping and control systems, and lighting, heating and electrical systems. The 2020 Clean Water Infrastructure Replacement Plan details additional upgrades to occur in the near future. The 2020 Emergency Response Plan, a stand-alone document details the possible threats to system infrastructure and the protocol for responding in the event of an emergency.

FINANCIAL MANAGEMENT

The Stone Bridge Fire District operates as an independent water district organized as a public corporate entity under the laws of Rhode Island. The District is self-supporting through user charges. The District also obtains a portion of its revenue by a tax levy on the ratable property in the District. Operations of the District are financed from water revenues in the form of user fees and in tax revenues. The budget for the District is prepared to incorporate all the costs of operating the District and the water rates are established so that the users pay for all of the activities of the District. User fees, charges and taxes levied by the District are established by the Board and are subject to approval by the voters of the Water District at an Annual Meeting.

The water use fee is reviewed annually and adjusted on the basis of need. Additionally, a uniform rate is charged for all customers regardless of whether residential, commercial, industrial or institutional. Furthermore, the flat-rate user fee, regardless of user volume, encourages water conservation. In July 2018, the rate was \$5.25 per 1,000 gallons used. Most recently, the user fee was increased to \$7.70 per 1,000

gallons. SBFD plans on increasing the rate at its Annual Meeting in July 2020 to \$9.00/1000 gallons, a 17% increase, to address factors such as staffing, inflation, and preparation for major projects.

The District also charges the North Tiverton Fire District a flat user fee (currently \$3.96 per 1,000 gallons) that is indexed to the Consumer Price Index. This fee increased 4.2% over the most recent fiscal year. Again, the use of a flat rate fee structure encourages water conservation. SBFD anticipates increasing this rate at the July 2022 meeting as well.

Stone Bridge Fire District also utilizes a property tax to finance capital improvements and maintenance projects. This tax rate is reviewed annually and approved each year at the annual meeting. During the most recent fiscal year the tax rate was increased from \$0.52 to \$0.66 per \$1,000 of assessed property valuation.

The District conducts invoicing for water service in conjunction with metering reading events. The wholesale and commercial/large customer account meters are read and invoiced monthly. All other residential/retail customer meters are read and invoiced quarterly. There are no planned changes in billing practices.

COORDINATION

Comprehensive Town Plan

The development of this Plan has been coordinated with the Comprehensive Town Plan for all aspects that affect either the District or the water supply in the Stone Bridge Fire District's service area. The District has worked with and provided information to the North Tiverton Fire District and the Portsmouth Water and Fire District for all aspects of water supply in the area. The Tiverton Comprehensive Town Plan contains recommended policy items regarding the coordination of the two water systems operating in Tiverton; i.e. North Tiverton Fire District (which now includes the Tiverton Water Authority) and Stone Bridge Fire District.

Sewer Service

Most of the areas served by the Stone Bridge Fire District are not connected to sewer service. However, the existing sewer system in Tiverton is being extended from Robert Gray Avenue south to Riverside Drive, the latter of which does fall within the Stonebridge District. The expansion project involves the installation of approximately 8,350 linear ft. of 8-inch and 10-inch diameter gravity sewer which will convey wastewater to the Fall River POTW. The project is expected to be completed in the Spring of 2022. Extension of the sewer service will improve water quality by removing existing septic systems from service within the Stafford Pond Watershed.

Other Water Systems

As a wholesale supplier to the North Tiverton Fire District and a former wholesale supplier to the Portsmouth Water and Fire District, the Stone Bridge Fire District is in frequent contact with these wholesale customers. Contact includes coordination of operations as well as technical assistance.