Barrington, Bristol and
Warren, Rhode Island

WATER SUPPLY SYSTEM MANAGEMENT PLAN

EXECUTIVE SUMMARY

Revised January 2022

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PREAMBLE

This Water Supply System Management Plan (WSSMP) Update has been prepared as required under Rhode Island General Laws 46-15.3, as amended and titled "The Water Supply System Management Planning Act" (Act). The legislative authority to effectuate the goals and policies of this Act has been conferred to the Rhode Island Water Resources Board (RIWRB). To this end, the RIWRB has promulgated the Rules and Regulations for Water Supply System Management Planning (Rules), last revised in October 2002, as amended to implement the provisions of this Act. The WSSMP has been prepared to be consistent with the goals of these Rules as well as the strategies and goals articulated in the RIWRB's 2012 Strategic Plan. It is also consistent with the goals of State Guide Plan Element No. 721 – RI Water 2030 and the goals stipulated in the Comprehensive Plans for the Towns of Bristol, Warren, and Barrington.

The Bristol County Water Authority (BCWA), as a water purveyor supplying over 50 million gallons (MG) of water a year, is responsible for updating its WSSMP every five years. The BCWA prepared an update to the WSSMP in December 2010 and has made periodic updates to the plan in the time since then to clarify and address comments made by regulatory agencies following their review of the plan. The last significant WSSMP update was done in 2015. During the last five years, however, significant changes have occurred in the way the BCWA manages their supply sources now and how they look to do so in the future. Since 2011, the BCWA has used wholesale water purchased from Providence Water through the East Bay Pipeline as the sole source of supply to the system. Prior to this, the BCWA used wholesale water purchased from Providence Water in addition to water withdrawn from their own source reservoirs that was treated at the Child Street Water Treatment Plant. The treatment plant and reservoirs are maintained by the BCWA and are available in the event of an emergency, but they are not actively used to supply the system.

Previous versions of the WSSMP recommended that upgrades be made to the Child Street WTP and that transmission infrastructure be rehabilitated in order to improve the capacity, redundancy, and dependability of the BCWA's own supply sources. However, the BCWA does not consider the use of its own source water a sustainable approach for system supply in the future. Therefore, the BCWA believes that the best path forward is to partner with neighboring water systems to develop new supply interconnections and eventually altogether discontinue the use of their own sources and treatment plant. This approach is as follows:

- Continue to purchase wholesale water from Providence Water from the existing East Bay Pipeline interconnection, which has a supply capacity of 7.5 MGD that exceeds current and anticipated future daily demands.

- Develop an alternate wholesale connection from a second water supplier, Pawtucket Water Supply Board, for an additional +/-7.5 MGD in transmission capacity. This would meet current and anticipated future average day demands but will also provide overall supply redundancy from a source entirely separate from Providence Water and the Scituate Reservoir.
- Constructed a 4.0 MGD emergency interconnection with the City of East Providence.
- Continue to maintain the current emergency interconnections with East Providence with supply capacity totaling approximately 1.0 MGD.
- Connected with the Swansea Water District in Swansea, MA for up to 1.0 MGD in supply capacity during emergencies.

The BCWA has been working with the RI Water Resources Board, RI Department of Environmental Management, and other State agencies to pursue changes in legislation which has resulted in legislative changes as detailed in Appendix J and Appendix K.

INTRODUCTION

The BCWA was formed in February 1984 for the purpose of:

- Purchasing the private Bristol County Water Company and operating the water system;
- Rehabilitating and upgrading the distribution system; and
- Building and operating a connection to the Providence Water supply system.

The three goals established for the BCWA are all within the overall goal of providing a sufficient supply of potable water to meet the needs of the residents of Bristol County.

In order to supply the citizens of Bristol County with sufficient supplies of potable water to meet their needs, the BCWA prioritizes the following activities:

- Complying with all applicable laws and regulations;
- Providing service to all locations within the service area;
- Conforming to the overall goals of the Act; and
- Implementing the Bristol County Water Supply Act.

The Bristol County Water Supply Act (RIGL 46-15.5) declared that:

1. The citizens of Bristol County lack an adequate and secure supply of potable water;

2. Heretofore acting through the Bristol County water authority, the citizens of Bristol County have presented a proposal for the construction to bring water from the Scituate Reservoir to Bristol County;

3. The state and its citizens would be better served and the environment enhanced by the construction of an additional connection connecting Bristol County to the Scituate Reservoir;

4. The need for water in Bristol County is critical and requires immediate and prompt action on the part of the state, its agencies, boards and commissions;

5. Bristol County will require an alternate source of supply in order to construct the improvements to its existing system of reservoirs, wells, and treatment plants;

6. The alternatives authorized by this chapter will be less expensive than the East Providence connection, so-called.

7. Reliance by citizens of East Providence and Bristol County on a single connection would create a hazard to the health, safety, and welfare of the citizens of East Providence and Bristol County, and, therefore, the construction of an emergency connection which shall permit water to flow in either direction is a public necessity; and

8. The state is mandated to upgrade the current Bristol County water system of reservoirs, wells, treatment plant, and transmission lines, with the priority being given to the construction of a new raw water transmission line.

Actions taken by the BCWA to comply with the Bristol County Water Supply Act include:

- Constructing and maintaining the East Bay Pipeline, a second cross-bay connection between Providence Water and the East Bay (East Providence has a separate connection with Providence Water);
- Maintaining emergency interconnections with the City of East Providence and Town of Swansea;
- Maintaining the distribution system of pipes, storage tanks, and pump stations in a good, sound, and safe condition.

WATER SUPPLY SYSTEM DESCRIPTION

Organization and Legal Structure

The BCWA is a public corporation created by an Act of the Rhode Island Legislature, Chapter 102 of the Public Laws of 1981 as amended. The Act required authorization by the Towns of Barrington, Warren, and Bristol, which was completed by referendum in each town in November 1983. The referendum was approved by greater than 80% of the voters in each town.

The enabling legislation also called for each of the Town Councils to appoint three members to the Authority's Board of Directors, which was done in early 1984. The Board of Directors establishes policies and budgets. Each town continues to be represented by three board members.

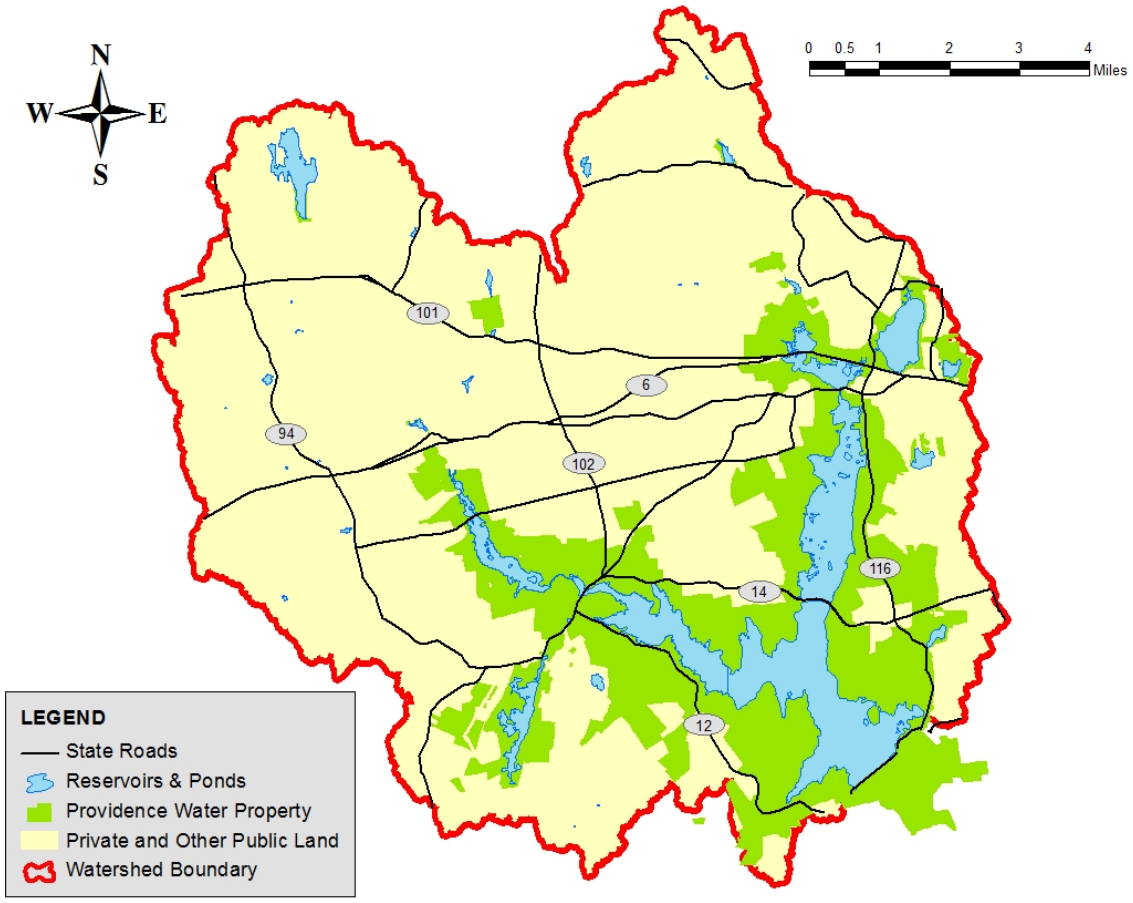
The owners of the BCWA are the customers that reside in Bristol County. Control of operations is vested in the Executive Director/Chief Engineer. All employees of the BCWA are subject to the direction of the Executive Director/Chief Engineer. The BCWA currently has 34 employees, ten (10) staff and 24 union employees.

The BCWA maintains its offices at 450 Child Street, Warren, RI 02885. The main telephone number is 401-245-2022.

Water Supply Sources

The BCWA purchases all of its supply from the Providence Water Supply Board, which provides treated water from the Scituate Reservoir and its feeder reservoirs. Information on the Scituate Reservoir from Providence Water's website follows.

Scituate Reservoir Watershed



The largest fresh waterbody in Rhode Island, the Scituate Reservoir is the source of Providence Water's supply. The Y-shaped reservoir is nearly 6 miles long and has a storage capacity of nearly 37 billion gallons at the Gainer Dam spillway elevation. Its average depth is about 32 feet, while it reaches a depth of 90 feet just upstream of the dam.

Water flows into the Scituate Reservoir from five smaller tributary reservoirs (Barden, Moswansicut, Ponaganset, Regulating, and Westconnaug) and an extensive network of rivers and smaller streams. In total, Providence Water owns surface reservoirs covering about 5,000 acres and another 13,000 acres of surrounding forestland.

Providence Water works to conserve the entire Scituate Reservoir watershed, or area of land that water flows across or under on its way to the main reservoir. The watershed is located primarily within the rural towns of Scituate, Foster, and Glocester, and includes parts of western Cranston and Johnston. The total drainage area covers 93 square miles or nearly 60,000 acres.

Land use influences the water quality in the reservoir and private wells within the watershed. Maintaining forest cover and practicing and promoting wise stewardship help ensure cleaner water

entering the reservoirs. Since Providence Water only owns about one third of the land in the watershed, it relies on local municipalities and private landowners as stewardship partners.

Protecting the source of the water supply saves ratepayers' money by reducing treatment costs, while providing many other benefits.

The BCWA constructed the East Bay Pipeline in 1998 to connect to Providence Water. The Pipeline runs 160 feet beneath Narragansett Bay to East Providence, then runs south to Barrington to supply the entire BCWA distribution system. See the section on *Transmission.*

The BCWA used to source water from the below mentioned reservoirs but they are no longer in use as water is totally sourced from Providence Water: Kickemuit Reservoir, located in Warren, RI, Swansea Reservoir, located in Swansea, MA, Shad Factory Reservoir, located in Rehoboth, MA, Anawan Reservoir, located in Rehoboth, MA.

Dams

The Anawan Reservoir is impounded by an earth filled dam that is 750 feet long, with a 55-foot gravity type concrete spillway. It was constructed in 1912 with steel plate wickets being added in 1945. The spillway was reconstructed by the BCWA in 2002. The dam is classified as a Class II, Significant Hazard. The dam and reservoir are owned by the Anawan Club, but the BCWA (and RIWRB under the Bristol County Water Supply Act) are responsible for maintenance and upgrades. An inspection in 2011 identified that the dam is in "fair" condition and listed a number of items that needed to be addressed. Construction for the upgrades and repairs necessary to bring it into compliance with MA regulations was completed in 2015 for approximately $500,000. BCWA will look to cancel the contract with the Anawan Club and discontinue responsibility for the dam as BCWA purchases wholesale water from Providence Water.

The Shad Factory Dam was listed in "satisfactory" condition in its last inspection. The dam, constructed in 1912, is earth embankment, 10 feet wide at the top by 400 feet long, with a concrete spillway and outlet at each end. A fish ladder was constructed in 2002. There are no known issues at this time. The BCWA owns the dam and will continue to maintain it until a means of divestment is determined.

The Swansea Dam is an 1883 earth embankment dam that no longer meets standards and may need to be replaced or removed, if feasible. The dam section is approximately 1,100 feet long and has an

average height of 9 feet. The spillway is a simple concrete crested weir, 124 feet long with a rubble wing wall. The dam is presently classified as Low Hazard. The BCWA owns it and is presently investigating the feasibility of removing it or transferring ownership.

The Warren Reservoir (Kickemuit) Upper Dam is a dike built to prevent salt water from moving up the Kickemuit Reservoir in a storm. The last full inspection listed it in "good" condition. The BCWA is investigating the removal of the dam and is working with the Fish & Wildlife Department of the RIDEM as it would provide fish access to the upper waters.

The Warren Reservoir Lower Dam was also listed in "good" condition on its last full inspection, classified as a Potential Hazard. The BCWA owns the dam and some property on the reservoir. The lower Kickemuit dam will continue to be maintained by the BCWA and the Town of Warren has no interest in taking responsibility for the dam. BCWA is exploring options to divest ownership of all dams.

Treatment, Storage, and Transmission Facilities

Historically, the BCWA effectively operated two separate but interconnected water systems. The part of the system primarily serving Warren and Bristol was supplied by the BCWA's surface water sources that were treated at the Child Street WTP. The part of the system primarily serving Barrington was supplied from a groundwater source at the Nayatt Road well field, which was treated at the Nayatt Road Treatment Plant and distributed into the system by a pump station at that site. During drought or high demand conditions, these sources would be supplemented with up to 1.0 MGD of wholesale water purchased from East Providence through two 8-inch emergency interconnections between the two water supply systems, which was still not sufficient to meet daily demand. This practice was discontinued in 1998 when the East Bay Pipeline was completed, allowing BCWA to supplement their supply with wholesale water from Providence Water. Currently, the entire system is supplied through the East Bay Pipeline. The Barrington wells and treatment plant are no longer in use.

The part of the system serving Warren and Bristol operates at a hydraulic grade line (HGL) established by the elevation of the Bay View Storage Tank (approximately 176 feet) in Bristol, while the part of the system serving Barrington operates at an HGL established by the Fountain Avenue Standpipe (approximately 150 feet) in Barrington, 26 feet lower than the Warren/Bristol service area.

The two parts of the system are interconnected as follows:

- Through one 12-inch water main crossing the Palmer River between Warren and Barrington; and
- Through the 24-inch East Bay Pipeline, crossing the Warren River from Barrington, to Water Street in Warren, to a 12-inch water main on Main Street in Warren.

A small portion of the Warren/Bristol service area is served by a higher HGL of approximately 265 feet. This service infrastructure includes the Metacom Avenue Tank, Metacom Avenue Pump Station, and future Hope Street Pump Station. This area consists primarily of residential units in the higher elevations of Bristol, east of Metacom Avenue. The area is served from the Metacom Avenue elevated storage tank located in Bristol, which receives its water from the Barrington Booster Pump Station on Nayatt Road.

Treatment

The BCWA historically treated raw water from the surface water reservoirs at the Child Street WTP, located in Warren adjacent to the Kickemuit Reservoir. The plant was built in 1908 with additions constructed in 1921 and 1947. It underwent a rehabilitation effort from December 2001 to December 2005 as part of a Phase I Improvement Project.

The Phase I Improvements were completed at a cost of approximately $1.7 million, of which $1.2 million was funded by the State under the Bristol County Water Act. These improvements were necessary to meet EPA Standards Stage I Disinfection and Disinfection By-Product Rule and the Interim Enhanced Surface Water Treatment Rule, which became effective on January 1, 2002.

The Child Street WTP has a design capacity of 4.0 MGD but was limited to operating at an average rate of approximately 1.5 MGD, due to its limited chemical treatment capacity in meeting current EPA Stage 2 Disinfection and Disinfection By-Product Rule standards. Production above this level results in water quality deterioration. The operation of the treatment plant was discontinued in July 2011.

Storage Facilities

There are five storage facilities in the distribution system, as follows:

- Hope Street Standpipe, in Bristol, was built in 1908 and has a capacity of 0.5 MG;
- Bay View Storage Tank, in Bristol, was built in 1928 and has a capacity of 2 MG;
- Fountain Avenue Standpipe, in Barrington, was built in 1952 and has a capacity of 846,000 gallons;
- Metacom Avenue Tank, in Bristol, was built in 1970 and has a capacity of 0.25 MG; and
- Ferry Road Storage Tank, located in Bristol, also known as the Roger Williams Elevated Steel Tank, was built in 2010 and has a capacity of 300,000 gallons.

The total distribution system storage is 3.9 MG, which exceeds the estimated average daily water use in the system, allowing a small reserve for fire flow and/or peak flow. The BCWA has performed a number of improvements and maintenance projects on the tanks in recent years and they all are generally in good condition.

Pump Stations

The following pump stations are part of the BCWA system:

- Barrington Booster Pump Station
- Metacom Avenue Pump Station
- East Providence Emergency Pump Station (to be turned over to City of East Providence)
- Hope Street Pump Station (will be active in 2022)
- Nayatt Road Well Pump Station (Inactive)
- Child Street WTP Pump Station (Inactive)
- Rehoboth (Shad Factory) Pump Station (Discontinued)

The Barrington Booster Pump Station, on the East Bay Pipeline, is located at Nayatt Road in Barrington, and raises the hydraulic grade line (HGL) from Providence Water to the HGL (182 feet) of the BCWA distribution system. This pump station has two pumps, each rated for 5,200 gallons per minute (gpm) or 7.5 MGD. It supplies the Hope Street Standpipe, Bay View Storage Tank, the Ferry Road Elevated Tank and the Fountain Avenue Standpipe. Water is supplied to the Fountain Ave Tank in Barrington at a HGL of 156 feet through the Nayatt Road control valve (electrically actuated

butterfly valve) located after the pump station, and the Middle Highway pressure reducing valve located before the pump station.

The Metacom Avenue Pump Station has two 600-gpm pumps that transfer water from the Bay View Storage Tank to the Metacom Avenue Elevated Spheroid, which serves the High Service Area of Bristol (263 ft HGL).

The Child St. Treatment Plant and Pump Station are not in use and are slated for demolition.

The East Providence Emergency Pump Station is located on Pawtucket Avenue in East Providence. It has two 4,510 gpm pumps and a 200-kW emergency generator. It has been fully tested and the BCWA is ready to transfer ownership to City of East Providence, pending an operation contract with City of East Providence.

The Nayatt Road Well Pump Station is located at Nayatt Road in Barrington and is inactive.

The Rehoboth (Shad Factory) Pump Station, located in Rehoboth, MA, is no longer used by BCWA as water is purchased from Providence Water.

Transmission

The East Bay Pipeline represents the most significant transmission main in the water system. It is a 50,000 linear foot water main consisting of mainly 24-inch epoxy coated steel pipe (under the Bay) and 30-inch diameter ductile iron pipe that was put into service in December 1998. It connects to the Providence Water supply system with a 30-inch diameter pipe at Virginia Avenue. The pipeline reduces to 24-inch steel pipe and crosses under the Providence River, then increases to a 30-inch diameter DI pipe and enters the Pawtucket Avenue Meter Vault/Pump Station. At this meter vault, an emergency connection and pumping station is connected to the East Providence system to supply water to East Providence. There is no existing connection that allows East Providence to supply the BCWA at this location. The 24-inch epoxy coated steel pipe was slip lined with 18-inch fused PVC pipe.

Following the Pawtucket Avenue Pumping Station, the 30-inch DI pipe continues to the Barrington Booster Pumping Station at Nayatt Road. After the Barrington Booster Pumping Station, the pipe reduces to a 24-inch DI pipe to the Warren River. At the Warren River Crossing, the pipeline enlarges to a 28-inch diameter high density polyethylene (HDPE) pipeline. After the Warren River,

the pipeline reduces to a 24-inch ductile iron pipe and connects to the BCWA system at its terminus at Main Street in Warren.

The Shad Factory Pipeline was another significant transmission main when the WTP was in operation. Raw water was transported from BCWA's surface water reservoirs to the Child Street WTP through this pipeline as well as in natural waterways in the watershed. The capacity of this pipeline, which originally had a design capacity of 3 MGD, has been limited by its age (more than 100 years old) and its poor condition. As indicated elsewhere in this Executive Summary, the BCWA is no longer pursuing replacement of this transmission main.

The 20-inch diameter 4,300-foot Kickemuit transmission main, installed in 1957, pumps water from north of the Upper Warren Reservoir to the Child Street WTP in case of salt water incursion to the lower reservoir, but it, too, is not currently in use.

Major finished water transmission mains include 12-inch pipelines in Barrington that extend from the Nayatt Road site in a northwesterly direction toward the Fountain Avenue Storage Tank. Major 12-inch and 16-inch transmission mains in the Bristol-Warren part of the system extend from the Child Street WTP south in Metacom Avenue and Hope Street to south Bristol. Although these mains were constructed before 1935, they have been cleaned and lined with cement and are considered to be in good condition.

Distribution

The water distribution system includes approximately 230 miles of water mains ranging in size from 1-inch to 30-inch, with the majority of pipes being between 2-inch and 8-inch in diameter. Pipes are primarily ductile iron and either unlined or cement lined cast iron, though asbestos cement pipe is present in some parts of the system.

Several improvements have been made to the water system since the formation of the BCWA and over 60 miles of pipeline has been repaired, replaced, or rehabilitated since the late 1980s. Recently, the BCWA performed cleaning and lining of several sections of pipe in Barrington and Bristol in 2014 and replaced pipe and tied in dead ends in all three towns in 2015. Also completed was the installation of approximately 6,700 linear feet of new DI and HDPE water main in the Poppasquash section of Bristol to improve fire flow in this part of the system.

Major projects initiated and completed in FY 2015 include:

- Cleaning and cement lining of water pipes in the Maple Avenue Area, Barrington
- Rehabilitate asbestos cement water mains in Melrose Avenue, Barrington and Hopeworth Avenue and Willow Lane, Bristol
- During this period, BCWA completed the second phase of the project which brought more water flow to Poppasquash area of the distribution system. This included installation of 4,500 feet of 10-inch HDPE water main which replaced the existing 6-inch cast iron water main.
- A new automatic chlorine monitoring and injection system was installed at the main connection to the East Bay Pipeline to optimize chlorine filtration and control by-products associated with disinfection.
- BCWA purchased 4G tablets with GIS for all of their employees to be integrated with the new customer service and work order software system to enable real-time data to trouble shoot issues and proactively service the infrastructure.

Major projects initiated and completed in FY 2016 include:

- Installation of a new connection to increase water flow to the Maple Avenue area to connect dead-ends and improve firefighting.
- During FY 2015, BCWA implemented plans to eliminate “dead end” sections of water mains throughout the distribution system as they can lead to bacterial growth, poor taste, discoloration, or increased disinfection by-products. BCWA replaced all the dead-ends with new water mains to provide better quality water to its customers. As part of this initiative, new pipes were installed to connect a lot of dead ends in the high-pressure zone area near Metacom Avenue. Also, BCWA improved the flow to the east Child Street area to the Swansea, AM state line which also helped improving reliability and safety.
- Two pumps at the Metacom Pump Station were re-built and one motor was replaced to service the high-pressure zone in Bristol.
- A new SCADA system was implemented to efficiently monitor and control system operations such as pumping, treatment and pressure levels. An original system was developed in the 1990s but had become obsolete due to technological changes.
- Also, BCWA instituted a comprehensive leak detection program and purchased a set of data logging leak correlators to be used with ground microphone survey to aggressively eliminate water lost through leakage.
- Other major initiatives to digitize information to enable better services, BCWA undertook GIS mapping the entire distribution system and also an asset management tracking system.

Major projects initiated and completed in FY 2017 include:

- Emergency Water Connections are critical to ensuring the viability of BCWA and meet the needs of customers. With this in mind, a 24-inch emergency interconnection was made with East Providence's 16-inch water main (served by Providence Water).
- As part of the same effort, the water main on Schoolhouse Road in Warren was extended to enable hydrant to hydrant connection to the Swansea Water District supply system.
- These two connections will allow for an emergency water supply totaling 5 MGD with 4 MGD from East Providence and 1 MGD from Swansea.
- To aid the high-pressure delivery zone in Bristol, the existing 8-inch water main on Metacom Avenue was replaced with a 12-inch water main.
- Secondary power generators were installed at BCWA's administration and operation facilities.
- Technology initiatives continued as security measures were implemented in the SCADA system to restrict operational access.

Major projects initiated and completed in FY 2018 include:

- Construction of the Metacom Avenue Pump Station commenced which will help expand the high-pressure zone, increasing water flow, fire flow and the number of connections serving the high service zone.
- Construction was completed to modernize the Nayatt Road pump station with renovations which include installation of new control valves, monitoring and control systems, upgrades to electrical and instrumentation systems, a pump by-pass for gravity supply, and replacement of the station's electric heating system with a gas system.
- Cast iron water mains were cleaned and cement lined on Gibson Road, Beach Road, and a section of Ridge Road in Bristol.
- Water mains along Cutler Street and Mulberry Street along with Main Street and Water street were replaced.
- Installation of new water meter systems commenced and will continue to extend into the next three years. This is an effort to modernize data collection, provide customers with more timely information, and increase the overall effectiveness and efficiency of the water services. Work was begun in Warren which will be followed by Bristol and Barrington.

Major projects initiated and completed in FY 2019:

- One of the emergency projects that became a priority during this year was fixing the leak in the East Bay Pipeline. On April 10, 2019, a leak was discovered in the Easy Bay Pipeline, which provides water from the Providence Water Supply Board. This was unexpected as the

line is only 20 years old. This leak caused a loss of approximately 10 percent of the average daily water flow (approximately 288,000 gallons per day). Water use restrictions were put in place and as of now the leak has been fixed.

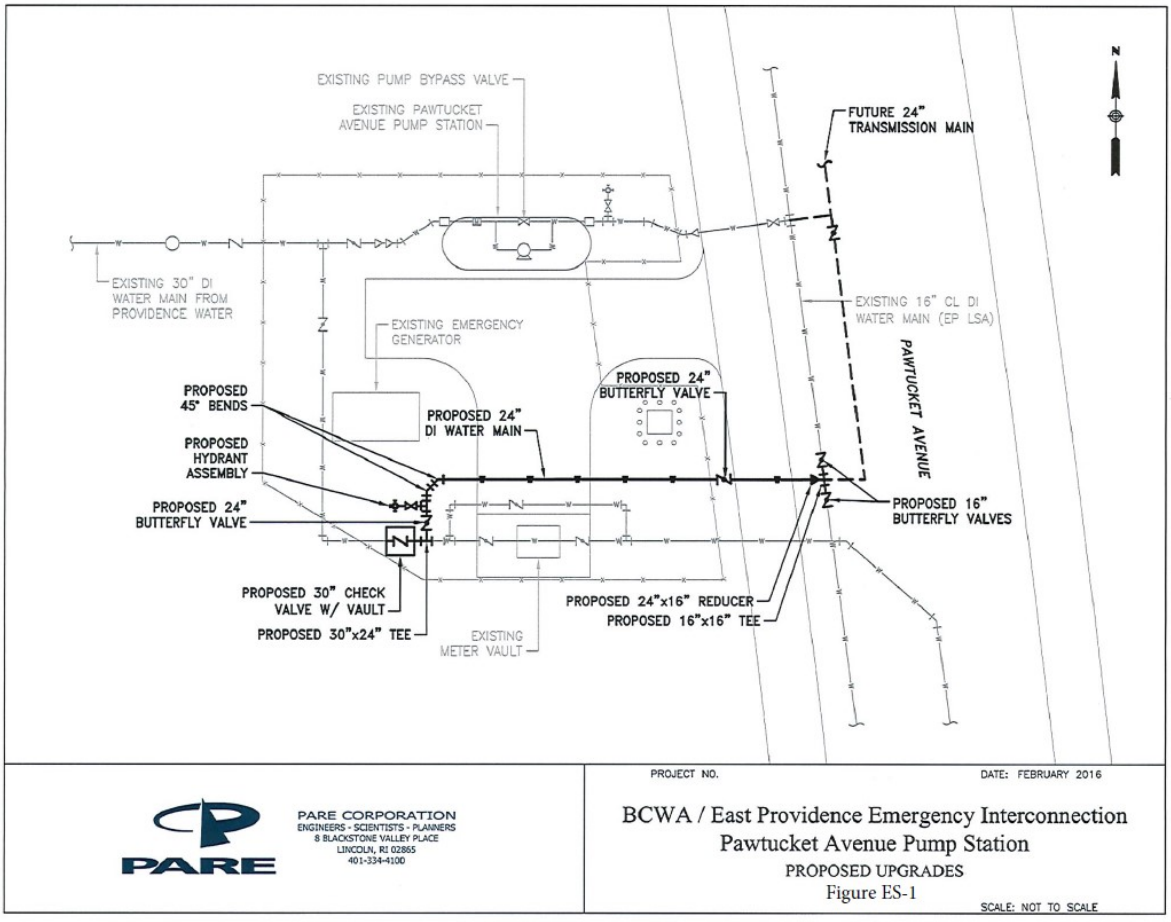
- Child Street Pipeline was replaced from an existing 8-inch with a 12-inch HDPE pipe.
- Mains in Barrington were replaced along these areas: Townsend Street and Crown Avenue, Lantern Lane and Salisbury Road
- Mains in Warren were replaced along these areas: Fatima Drive, Ridgeway Drive
- Mains in Bristol were replaced along these areas: Ferry Road and Fairview Drive, San Jose Drive, San Miguel Drive, Hopeworth Drive.
- Construction of Metacom Avenue Pump Station continued to progress.

Interconnections

The BCWA has three emergency interconnections with the City of East Providence water system. These are 8-inch connections near the East Providence/Barrington town line. One connection was completed in July 1987 and the second connection was completed in August 1987. The interconnections are controlled jointly by East Providence and BCWA and their use must be justified by an emergency situation without creating adverse effects on either system. The total available supply from these connections was approximately 1.0 MGD. Historically, water has been withdrawn from these connections to supplement supply for various reasons during the early and mid-1990's. Since the completion of the East Bay Pipeline in 1998, there has been no need or use of the interconnections. The interconnections are maintained in the event they are needed in an emergency.

The BCWA has completed new emergency interconnections with East Providence and Swansea Water District. This interconnection between the existing East Providence 16" main and the existing BCWA 24" main will provide 4 MGD (depending on pressure in East Providence). Two more interconnections with City of East Providence on Richmond Avenue and another one on Metropolitan Park Drive will provide 0.5 MGD each. Another interconnection between BCWA and Town of Swansea on Long Lane (hydrant to hydrant) was also completed in the last five years which will provide an additional 1 MGD during emergencies. BCWA is currently developing the design work completed for Phase 1 of the Pawtucket pipeline, the interconnection between the East Providence tank and the BCWA 24" East Bay pipeline. This 24", 1.4-mile pipeline would provide a full, direct interconnection between the East Bay and Cross Bay pipelines, allowing either system to shut down their respective supply for maintenance or in an emergency. These interconnections are shown schematically on Figure ES-1 on the following page.

The East Providence Emergency Pump Station, also referred to as the Pawtucket Avenue Pump Station, is an interconnection that provides an emergency supply to East Providence directly from the BCWA East Bay Pipeline. The East Providence system is supplied from the East Providence Emergency Pumping Station through a 16-inch cast iron water main in Pawtucket Avenue.


EXISTING PUMP BYPASS VALVE
EXISTING PAWTUCKET AVENUE PUMP STATION
FUTURE 24" TRANSMISSION MAIN
N
EXISTING 30" DI WATER MAIN FROM PROVIDENCE WATER
EXISTING EMERGENCY GENERATOR
EXISTING 16" CL DI WATER MAIN (EP LSA)
PAWTUCKET AVENUE
PROPOSED 24" BUTTERFLY VALVE
PROPOSED 45° BENDS
PROPOSED 24" DI WATER MAIN
PROPOSED HYDRANT ASSEMBLY
PROPOSED 24" BUTTERFLY VALVE
PROPOSED 16" BUTTERFLY VALVES
PROPOSED 30" CHECK VALVE W/ VAULT
PROPOSED 30"x24" TEE
EXISTING METER VAULT
PROPOSED 24"x16" REDUCER
PROPOSED 16"x16" TEE
PROJECT NO.
DATE: FEBRUARY 2016
PARE
PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100
BCWA / East Providence Emergency Interconnection
Pawtucket Avenue Pump Station
PROPOSED UPGRADES
Figure ES-1
SCALE: NOT TO SCALE

Service Area

The BCWA's service area consists of substantially all of Bristol County, 24.9 square miles in area. The population of Bristol County is approximately 49,875 residents, per the 2010 US Census. This represents a decrease in the population from 2000, which was approximately 50,648. While previous studies predicted population increases in upcoming years, the current trend shows a net migration away from Bristol County (as well as the State as a whole).

The BCWA serves virtually the entire population of the County, approximately 49,875 people with 450 residents being part of the Touisset Community Water System. Service is provided through 17,213 residential, commercial and industrial connections. The only areas in the County not served by the BCWA is the area served by the Touisset Community Water system and a portion of the area commonly referred to as the Poppasquash section of Bristol, which is served by individual wells.

Source and Distribution Metering

Master meters are located in several locations in the system one on the East Bay Pipeline connection to Providence Water at the Columbia Park site in Providence, one at East Bay pipeline connection at Pawtucket Avenue in East Providence, and one at the Barrington Booster Station (also referred to as the Nayatt Road pump station). Reference meters for the Town of Barrington supply are located at the Middle Highway connection on the 30" transmission main and one to be placed at the Nayatt Road Pump Station. Water flows to the Town of Barrington are also metered at the American Tourister Building by means of an electromagnetic flow meter.

BCWA no longer withdraws water from surface water sources and requires no metering. In the coming years, BCWA will work with State of Rhode Island, State of Massachusetts, and the local towns to transfer ownership of the dams and reservoirs. BCWA continues to supply the system entirely with wholesale water purchases.

All users of the BCWA system are currently metered. The BCWA currently reads meters and bills large commercial and industrial users on a quarterly basis while all other users are metered and billed quarterly.

The BCWA has been actively modernizing its meter reading technology since 1998, when the first Trace Radio Read Meters were installed. In July 2007, the BCWA instituted a Three-Year Meter Modernization Plan to replace non radio-read meters remaining in the system and replaced 8,557 non-

radio read meters with Badger Orion Radio Read Meters. Overall, the BCWA has installed over 17,000 Orion and Trace Radio Read Meters from 1998 to the present. BCWA initiated another meter replacement program in 2016 with the installation of smart meters. Almost 90% of the meters have been replaced till now and the rest of the meter replacement will be complete by FY 2021. These new meters will provide more accurate utility and usage information at 15-minute intervals, quicker service response, streamlined billing and customer service, quicker identification of leaks. They will also help BCWA transition from quarterly billing to monthly billing, which will bring BCWA billing in line with other utilities.

The BCWA has an annual large meter program for the testing and/or replacement of all of the older meters larger than 3".

System Production Data & Water Use

The BCWA currently obtains all of its system supply from Providence Water through the East Bay Pipeline. Under the General Laws of Rhode Island, the BCWA is allowed to purchase up to a maximum of 7.5 MGD from Providence Water. Wholesale water purchases totaled 1,190 MG for State Fiscal Year 2020 with an Average Day Demand (ADD) of 3.28 MGD. The ADD is traditionally higher during the summer peak months and was estimated to be 3.38 MGD for the peak month of August 2019.

Based on a service area population of 49,875, total water use equates to approximately 41 gallons per capita per day (gpcd). Residential water use historically was between 60% and 65% of total water use. Residential use was 76.2% of the total demand in FY2020. The average annual residential water use in the BCWA system was estimated to be 41 gpcd for State Fiscal Year 2020. This is based on a total residential water sales during FY 2020 of 745,556,000 gallons and an estimated 49,875 residents. This is consistent with BCWA's calculations of residential average annual water use for other years and meets the State's goal of a maximum of 65 gpcd.

Past versions of the WSSMP estimated the Maximum Day Demand (MDD) in the system using a MDD to ADD multiplier of 2.36. Based on the ADD of 3.41 MGD for State Fiscal Year 2015, this would suggest that the MDD was 8.0 MGD. However, a review of the daily water meter readings from the Nayatt Road Pump Station, which measures wholesale water purchased from Providence Water, shows that the MDD is much lower than this. For the period of January 2016 through June 2020, the highest daily meter reading at the Nayatt Road Pump Station was 4.84 MGD for June 12, 2020. The highest daily meter reading in each of the other years reviewed ranged from 4.76 MGD

(June 25, 2016), 4.64 MGD (July 3, 2017), 4.68 MGD (July 4, 2018), to 4.52 MGD (July 16, 2019). These results suggest that the MDD is lower than originally thought and that the MDD to ADD multiplier has ranged from 1.5 to 1.8 in recent years. Going forward, the BCWA will use a MDD to ADD multiplier of 2.0 but will continue to monitor peak water use and will adjust the MDD to ADD for future use protections, as appropriate.

Major Users

The BCWA serves 10 major users. Roger Williams University is by far the largest user, with total water use of approximately 35 MG in Fiscal Year 2020.

Legal Obligation to Provide Water

The BCWA is authorized to provide water to the residents of Bristol County. The BCWA has no legal obligation to provide water outside of Bristol County and has no specific legal obligation within Bristol County beyond the implied contract with each service connection.

The BCWA has an existing contract with Providence Water that allows the BCWA to withdraw up to 7.5 MGD, which is the capacity of the East Bay Pipeline. The term of this agreement expires "thirty (30) years from and after the first day of delivery of water" through the pipeline, or "one year after the maturity of the last of any bonds, notes, or other instruments" used to finance design and construction of the pipeline, whichever comes sooner. It was the intent of both parties to amend this agreement with the actual expiration date shortly after the pipeline was put in service, but this has not occurred. The current contract has expired but Providence Water will continue to provide 7.5 MGD as required the State of Rhode Island statutes.

Non-Account Water Use

The BCWA has been active in implementing programs that are designed to reduce non-account water (i.e., leak detection, meter replacement, and distribution system rehabilitation). The BCWA had a full leak survey performed in 2013-2014. In 2014, leak detection correlators were purchased to perform leak detection in-house. All leaks that are found are promptly repaired. The BCWA intends to continue to have professional leak detection surveys of 50% of the system each year, supplemented with the in-house leak detection correlators.

These policies and actions have resulted in reducing previously high levels of non-account water to below the statewide goal of fifteen (15%) percent. Non-account water was approximately 10% in Fiscal Year 2020. Similarly, leakage was estimated to be 3.3% of total water in the system for Fiscal Year 2020, meeting the State's goal of 10%. BCWA has constantly upgraded the metering and leak detection systems to reduce the amount of leakage.

Water Conservation Program

The BCWA has also actively pursued water conservation programs to help minimize elevated maximum day demands to the degree possible. These programs, along with a water rate structure that is specifically designed to discourage inefficient uses of water, have resulted in some of the lowest per capita annual average residential water use in the State.

Informational flyers are distributed at the Administrative office. Area schools can also request an in-school presentation by BCWA personnel. The BCWA historically has conducted an annual calendar/poster contest and an annual essay contest that corresponds with National Drinking Water Week.

WATER QUALITY PROTECTION AND MANAGEMENT

The Bristol County water system was historically supplied by treated groundwater from the Nayatt Road well field in Barrington and surface water treated at the Child Street WTP in Warren. Now, the system is entirely supplied by wholesale water from Providence Water. The BCWA collects water quality protection charges and remits them to the RI Water Resources Board and Providence Water, as required, in accordance with the Public Drinking Water Protection Program (RIGL 46-15.3).

The BCWA no longer uses groundwater or surface water sources and the system is supplied with wholesale water purchased from Providence Water. The BCWA's five year strategy is to demolish the Child Street Water Treatment Plant, transfer ownership their surface water sources, and supply the system entirely with wholesale water, both with supply from Providence Water and eventually supply from the Pawtucket Water Supply Board (PWSB) water system. BCWA will construct another supply pipeline from PWSB as an alternate connection to Providence Water as the surface water supplies have been abandoned. This strategy is discussed in more detail in the "Supply Management" component.

SUPPLY MANAGEMENT

Supply sources currently available to the BCWA include the interconnection with Providence Water, which has a rated capacity of 7.5 MGD, and emergency interconnection with the Town of Swansea (1 MGD), and three interconnections with the City of East Providence (approximately 5 MGD).

The BCWA has determined that the overall limitations of the existing reservoirs and the costs required to upgrade the reservoirs and their dams, construct a new Shad Factory pipeline and pump station, replace the Child Street WTP, and maintain these components is economically unsustainable while not providing a reliable source of supply. Therefore, BCWA has discontinued the use of the reservoirs and the treatment plant. The BCWA has been working with the RI Water Resources Board, RI Department of Environmental Management, and other State agencies to pursue changes in legislation which has resulted in legislative changes as detailed in Appendix J and Appendix K.

A secondary source of supply must be established before the BCWA terminates the use of the Massachusetts supplies and infrastructure, as it would be imprudent to rely solely on the Providence Water connection. It has been determined that a connection to the PWSB can provide an alternate source of supply of high-quality water. The PWSB obtains its supply from the Diamond Hill Reservoir and the Arnold Mills Reservoir in northern Rhode Island. With a safe yield of 22 million gallons per day, the PWSB recently constructed a 25 MGD water treatment plant. They also constructed new transmission mains, storage, and renovated or replaced most of their transmission and distribution infrastructure. Their customer water use has dropped from 13.5 MGD to 8 MGD, leaving an excess supply of high-quality water.

An interconnection would require the construction of a transmission main from the PWSB system through East Providence with capacity of up to 7.5 MGD for the BCWA, matching the current operational capacity of Providence Water Supply. The City of East Providence has also expressed considerable interest in a connection to the PWSB, as it is adjacent to their system and would provide a redundant, alternate supply to their current connection to Providence Water.

Drawing from a feasibility study commissioned in 2013 by the State of Rhode Island Water Resource Board (WRB), the City of East Providence, and BCWA, designs for the project began in 2018. The East Providence Connection (Phase I) will be the construction of a 24" main from the BCWA Providence Water connection on Pawtucket Ave. to the vicinity of the East Providence water tank. This could supply BCWA with up to five million gallons of water per day from the East Providence system’s Cross Bay pipelines. This supply is also from Providence Water, and while it will secure an

alternative source of water should an issue arise with our primary connection to Providence, it will not serve as a fully redundant supply, nor will it provide the competitive or stability advantages mentioned previously. Phase I construction is scheduled to start in Spring 2021.

In Phase II, The Pawtucket Pipeline (Phase II) will be the construction of a water main from the East Providence water storage tank to the Pawtucket Water Supply. This will be the lengthier and more difficult of the two phases, as the probable route is already congested above ground with traffic and below ground with city service and utility infrastructures. This main will be 24” or 30" depending on participation from the City of East Providence. BCWA is currently working in partnership with East Providence, however, BCWA is wholly prepared to move forward and complete the project with or without East Providence’s participation. At the earliest, construction of the pipeline is scheduled to begin in 2022. This is depicted on Figure ES-1.

Anticipated Future Demands

Water use projections for the 5-year and 20-year planning periods are summarized below. These estimates are based on current water use, the estimated per capita water use, and population projections for the next 20 years. Both Average Day Demand (ADD) and Maximum Day Demand (MDD) are presented.

	ADD	**MDD**
Current (2020)	3.28 MGD*	5.57 MGD*
5-Year (2025)	3.3 MGD	6.6 MGD
20-Year (2040)	3.3 MGD	6.6 MGD

* For comparison, ADD and MDD estimated to be 3.12 MGD and 5.3 MGD in 2015, respectively.

The MDD to ADD peaking factor has been estimated at approximately 2.36 by previous studies performed by Pare for the BCWA. However, a review of the daily water meter readings from the Nayatt Road Pump Station, which measures wholesale water purchased from Providence Water, suggests that the MDD to ADD multiplier is much lower than this. For the period of January 2010 through June 2015, the highest daily meter reading at the Nayatt Road Pump Station was 5.42 MGD for June 5, 2011. In 2013, the highest daily meter reading was 4.73 MGD on July 17, 2013. These results suggest that the MDD to ADD peaking factor has been in the range of 1.5 to 1.8 in recent years and that a peaking factor of 2.36 is an overestimate of the MDD. Therefore, the MDD for the 5-year and 20-year planning periods have been estimated using a peaking factor of 2.0.

The BCWA will continue to monitor demand and adjust their MDD to ADD peaking factor in the future, as appropriate. Proposed new developments and redevelopment of sites where water service will be requested are presented to the BCWA for review to ensure that adequate water service is available. The BCWA meets with each Town's Planning staff and the developer regarding proposed developments when they are seeking supply from the BCWA. This will continue to be done relative to future demand.

The BCWA serves virtually the entire population of the County, which had a population of 49,875 according to the 2010 US census. The service area population was estimated to be 49,425 residents. The county's population in 2010 decreased from the population reported in 2000, which was 50,648 residents. It is also less than the population that had been projected for 2010, which was 51,596 residents.

The BCWA estimates that current water use by Town is approximately 41% in Barrington, 18% in Warren, and 41% in Bristol. Population projections made by the Rhode Island Statewide Planning Program in 2013 for 2015 – 2040 predicted that the population in Bristol may increase slightly while projecting a fairly significant decrease in population is predicted in Warren. They also predict that the population in Barrington will decrease slightly. This differs from past projections made in 2004 that predicted steady increases in population throughout Bristol County over time. However, information provided in Barrington's Comprehensive Plan, as well as information provided by the Town Planner, suggests that Barrington's population will increase. Specific residential developments, including the former Zion Bible School site, have been identified by Barrington as reasons for the anticipated increase in population.

A June 2014 Census Bulletin published by the Rhode Island Statewide Planning Program shows that the population in Bristol declined from 2010 – 2013 and population in Barrington and Warren declined at slower rates than originally anticipated. Currently, the population is projected to decrease over the next twenty years.

It is likely that the recent decrease in population is due in part to the prolonged poor economic conditions in Bristol County and throughout the State as a whole. While population has migrated out of Bristol County, it has been coupled with relatively little new development. As the economy starts to recover, population may resume the upward trend that had once been predicted. For the purposes of water system planning, the BCWA is estimating that the population that had once been projected for 2010 (i.e., 51,596 residents) will be reached in the 5-year planning period (FY2018) of this WSSMP and the population projected for 2030 (i.e., 54,026 residents) will be reached in the 20-year

planning period (FY2033) despite RI Statewide Planning's estimates of declining population. This allows the BCWA to project and plan for reasonable increases in demand over time. These projections also assume that the BCWA will serve all eligible residents of Bristol County, which may or may not occur.

Available Water

The BCWA currently obtains all its water from the Providence Water connection, which is connected to the Nayatt Road Pump Station and is limited to its capacity of 7.5 MGD. Available water sources are sufficient to meet the current and anticipated future ADD and MDD of the system. Also, a 7.5 MGD connection to the PWSB being pursued by the BCWA, as an emergency connection. Each of these wholesale connections would individually have the capacity to meet the current and future anticipated ADD and the Providence Water and PWSB connections would collectively meet the anticipated MDD.

DEMAND MANAGEMENT

Demand Management consists of conservation measures which achieve long-term water savings by providing incentives and technical assistance to the customer base as a means of improving water use efficiency and reducing waste. The *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers* (Act), enacted in 2011, set a number of demand management goals, including the following:

1. Residential average annual water use of 65 gallons per capita per day (gpcd);
2. Efficient outdoor water use;
3. Efficient indoor water use;
4. A full accounting of non-billed water;
5. Leakage of no more than 10%; and
6. Accurate metering and billing.

In addition, the Act established required methodologies that must be employed in an effort to meet these goals, including:

- Initiating a program to accomplish 100% metering of all water delivered by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b);
- Initiating a program for the maintenance and replacement of meters by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b);
- Initiating a program for installing radio frequency reading systems by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b);
- Recording metered usage and bill quarterly or more frequently by December 31, 2013, as specified in R.I. General Laws §46-15.3-22(c);
- Educating customers in regards to efficient water use;
- Establishing rate structures that are adequate to fund all water supply costs, are equitable, sensitive to economic impacts, and encourage efficient water use, per R.I. General Laws §39-15.1-3 or §45-39.1.5 as applicable; and
- Implementing leak detection programs in accordance with AWWA standards and initiating a system-wide leak detection program if leakage is more than 10% of the water purchased.

The BCWA is generally in compliance with the Act. The average annual residential per capita water use has historically been below the required 65 gpcd and was estimated to be 43.6 gpcd for Fiscal Year 2015. Non-account water was estimated to be 13% in Fiscal Year 2015. The BCWA has been aggressive at performing leak detection surveys and repairing leaks when they are identified.

BCWA is currently undertaking a rate study, and after the study is concluded new rate structures and future rate recommendations shall be developed. BCWA's water rates currently do not differentiate between residential and non-residential uses. The rate structure is such that it adequately funds operation and maintenance of the system while encouraging conservation without deterring commercial and industrial growth.

The BCWA had also offered the direct installation of water conservation retrofits to all of the residences in the service area. The kits consisted of low-flow showerheads, faucet aerators, toilet dams or displacement bags, and dye tablets to identify leaks. Starting in 1993, the BCWA supplied approximately 2,000 retrofit kits to the residential customer base. The retrofit kits are no longer provided by the BCWA, and there does not appear to be a significant need for them given the amount historically given out, new plumbing codes that have gone into effect, and the overall reduction in water use observed in recent years.

The BCWA has had a long history of educational and informational water conservation programs. The WATERHOG program provided water conservation educational and informational programs in schools, for other agencies and organizations, and to the general public. The BCWA also developed and instituted a Major Users Technical Assistance Program (MUTAP) in January 2008 and provided guidance to the major users in the system. While the MUTAP is not an active program, there are relatively few major users in the system and the BCWA has observed a significant decrease in water use over the last several years.

SYSTEM MANAGEMENT

Water conservation practices involving system management initiatives are directed at improving the efficiency of, and reducing waste in, the production and distribution of water within a supply system. Such practices are necessary to ensure that the physical components of the water system are properly operated and maintained. Goals of system management include the following:

- Minimizing non-account water and endeavoring to limit it to below 15% of total system demand, in accordance with State Guide Plan Element No. 721;
- Maintaining leakage at a rate below 10% of system demand and instituting leak detection and repair programs, if required;
- Establishing a preventative maintenance program;
- Maintaining compliance with RIGL Chapter 46-13: *Public Drinking Water Supplies*; and
- Maintaining compliance with applicable requirements of the *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Supplier*s.

In general, the BCWA manages the water system to meet the charge of the Bristol County Water Supply Act (RIGL Chapter 46-15.5). The BCWA provides for the potable water needs of the residents of Bristol County and operates and maintains the system in accordance with all regulatory requirements and industry standards. In doing so, the general functions of the BCWA are to transmit and distribute the treated water from Providence to the customers, so that the water quality, at a minimum, meets all of the regulatory requirements of the Safe Drinking Water Act, while efficiently operating and maintaining the distribution system to safely provide the quantities demanded and fairly proportion the costs of operations to the users.

Meter Installation, Maintenance, and Replacement Plan

The BCWA meters 100% of the water delivered to the system, as well as the water that is used internally by the BCWA. Water used for firefighting and system maintenance, such as water main flushing, is not metered but the BCWA estimates this usage to the degree possible. There are currently 17,290 active metered accounts in the system as of FY 2020. Customer meters range in size from 5/8 inch to 6 inch and are all owned by the BCWA.

The BCWA maintains an active replacement program for all small meters on a 15-year cycle. The BCWA has been actively modernizing its meter reading technology since 1998, when the first Trace Radio Read Meters were installed. In the last few years, BCWA has implemented a new smart meter

replacement project and has replaced over 90% of the existing meters. The rest of the meter replacements shall be complete by 2021. The BCWA has the capability of testing residential meters in-house. For large meters (i.e., greater than two (2) inches), the BCWA hires a large meter testing firm. Because the BCWA reads water meters frequently (monthly or quarterly), tests are conducted when meter readings indicate a consumption rate substantially inconsistent with the consumption in previous periods. Residential meters are tested at a customer's request, or in the event of inconsistent water use that cannot be reconciled in any other way.

Leak Detection and Repair Plan

A professional leak detection survey was performed on the water system in 2013 and half of the system in the fall of 2015. When the entire distribution system was surveyed in 2013, a total of fifty-one (51) leak points were identified. A total of 15 leaks were discovered on water mains while 27 leaks were on services, 13 of which were the BCWA's responsibility to repair. All leaks discovered on BCWA mains and services were repaired immediately, while customer-owned service lines were allowed a limited period of time for repair. There were also 9 leaks discovered on hydrants and valves. For the 2015 survey, only 3 hydrant leaks have been found to date, with 90% of the program completed. The BCWA plans on continuing annual leak surveys, alternating between different parts of the system on a rotating basis.

The BCWA purchased new leak detection equipment in 2014 and are performing leak detection surveys with their own trained employees. Correlators are used between valves to detect noise signals that indicated a leak. When leaks are discovered, they are promptly repaired.

During April 2019, a leak was discovered in BCWA's East Bay pipeline, which provides our water from the Providence Water Supply Board. The leak was unexpected, as the pipeline is relatively new, completed in 1998. We took immediate investigative action and worked with local and state agencies to identify the point of leakage and to determine a plan of repair. Initially, the pipeline appeared to be leaking in an area approximately 10-14 feet below the Port of Providence parking lot on the Providence side of the Providence River. The leak caused a loss of approximately 10 percent of our average daily water flow (approximately 288,000 gallons per day).

After installing dewatering wells and water treatment systems, BCWA excavated the pipeline in the Port of Providence parking lot to access the suspected location of the leak. This required shutting down the East Bay pipeline and switching over to the emergency water supply from the City of East Providence's water utility. Water use restrictions were implemented for all BCWA customers, as the

maximum water supply from this connection is 3.5 million gallons per day (also the approximate daily usage by BCWA customers). The restrictions were an important factor in BCWA's ability to maintain water supply and pressure for fire flow protection. It was determined that the most likely repair method would be to slip-line the entire length of the 4,800-foot East Bay pipeline, essentially creating a pipe within a pipe.

An 18" PVC pipe was pulled through the 4500-foot length of the 24" East Bay Pipeline in a process called "slip-lining." This effectively sealed off the two identified leaks on welds which were located about 1/3 of the way from Providence under the river. No other leaks were found during the repair process, and the pipeline was determined to be in otherwise good condition. The repaired pipeline was then pressure-tested, flushed and disinfected. The repair was completed within our projected budget and timeline.

All water restrictions have been lifted. Water is now being supplied via the pipeline from Providence Water, and BCWA is no longer connected to our emergency supply with the City of East Providence. Water quality remains high and fire flow protection is ample.

The potential for leakage on the East Bay Pipeline is evaluated on a regular basis. There are meters at the Columbia Park, East Providence Emergency pump station, and Nayatt Road pump station locations. These meters are now on the SCADA system for continuous reading and graphically compared to identify any significant variance. To date, identified variances are within the acceptable range of meter accuracy and no leakage is suspected. They are also tested and calibrated on an annual basis.

Preventative Maintenance

The BCWA operates its facilities in accordance with industry standards. Maintenance and repair procedures, including preventative maintenance programs, are specifically identified for the purpose of interruption-free service to the system users to the extent possible. Redundancy and back-up facilities are designed into the systems to the extent it is cost-effective in order to minimize interruptions in service. Elements of the system that affect service and require repair (e.g., water mains that leak or break) are addressed expeditiously, regardless of time or weather, in order to minimize the period that any customer may be without water.

The BCWA conducts ongoing Preventative Maintenance programs in accordance with best management practices. Staff conducts regular inspections of all pump stations and storage facilities.

Equipment such as pumps, generators, and treatment systems are maintained in accordance with manufacturer's recommendations. Fire hydrants are inspected annually. The distribution system is flushed annually.

Inspections and repairs have been recorded via work orders and daily logbooks. The BCWA has recently implemented a sophisticated work order/asset management software package that allows the BCWA to more efficiently schedule and record preventative maintenance work.

EMERGENCY AND DROUGHT MANAGEMENT

The Emergency management section of the WSSMP establishes the general guidelines for responding to most probable emergencies based on a review of potential emergencies and risks. The procedures outlined are consistent with the goals of State Guide Plan Element 721 – Rhode Island Water 2030. The intent is to provide guidance to ensure that the primary aspects of recovery from an emergency are addressed in an organized manner to aid in an efficient response and in maintaining drinking water of a high quality and quantity. The BCWA Emergency Response Action Plan provides a full discussion with regard to potential emergencies and corresponding responses. Additionally, BCWA is currently developing an Emergency Response Plan to comply with the American Water Infrastructure Act of 2018 which will be completed and certified to the USEPA by June 2021.

The BCWA maintains an up-to-date inventory of critical spare parts and performs preventative maintenance/testing on all equipment at a minimum of twice yearly. The BCWA has a 24-hour, 7-day emergency telephone number (401-245-5071). BCWA personnel are also on call 24 hours a day, 7 days a week for emergencies and are required to respond within an hour of receiving an emergency call-out. The BCWA is a member of the Rhode Island Water/Wastewater Agency Response Network (RIWARN), which can provide emergency back-up if needed.

Both the Barrington Booster Station and the Metacom pump station have emergency generator back-up power supply. The BCWA has emergency power supply to the Administration facility and the Operations garage.

The BCWA has evaluated their critical infrastructure relative to mapped flood plains. The Nayatt Road Pump Station is within the 100-year flood plain but the Child Street WTP and the storage tanks are not. The BCWA has renovated the Nayatt Road Pump Station, which included raising equipment where possible in the event of a flood. The BCWA is continuously investigating other flood mitigation measures for the station as well. The Child Street WTP is not currently within a mapped floodplain, and BCWA is the process of demolishing the Child Street WTP.

Drought is one specific type of emergency that is treated separately, as it can impact the system over an extended period of time. The BCWA currently obtains all of its supply from Providence Water, with its own supplies actively maintained so that they are available in emergencies. However, in a drought situation, the Massachusetts supplies are not typically available and BCWA has emergency connections with East Providence and the Town of Swansea. Also, BCWA will be pursuing a new pipeline to tie into the Pawtucket Water System.

The BCWA works in conjunction with Providence Water to aid in drought management through demand management and system management activities.

The direct effects of drought on the BCWA system potentially include:

- Reduction of available wholesale water from Providence Water;
- Reduction of Providence Water's surface water levels which can adversely impact water quality in addition to water quantity;
- Reduction of operating income due to reduced delivery of water.

The five phases of drought consistent with the Drought Watch/Warning System of the National Weather Service are:

- Normal
- Advisory
- Watch
- Warning
- Emergency

Drought conditions are evaluated on a regional basis across the state and are assigned based on conditions represented by major hydrologic indices, including precipitation, groundwater levels, stream flow, and the Palmer Drought Index. The RIWRB and Drought Steering Committee evaluate the major hydrologic indices and adjust drought levels both statewide and on a regional basis, accordingly. The BCWA coordinates with each town in Bristol County when drought conditions impact the water system.

The BCWA has identified four water quantity tiers in its Emergency Response Action Plan. Water use reductions correspond to Tiers 2-4 water quantity conditions based on the severity of the drought or emergency, as follows:

1. Tier 1 – 3.6 MGD – Approximately the ADD of the BCWA water system;
2. Tier 2 – 2.5 MGD – A 30% reduction from Tier 1 water quantity, first stage of water use restrictions imposed under drought management;
3. Tier 3 – 1.8 MGD – A 50% reduction from Tier 1 water quantity, second stage of water use restrictions imposed under drought management; and

4. Tier 4 – 0.1 MGD – An extreme drought emergency in which water use is restricted to only basic health and sanitary needs (approximately 2 gallons per person per day).

The BCWA will take steps to restrict water use to these tiered conditions in the event of a drought or emergency, in accordance with the Emergency Response Action Plan.

IMPLEMENTATION PLAN

An Infrastructure & Capital Plan (ICP) was developed by the BCWA in October 2012 and updated in December 2015 for the purpose of identifying key infrastructure upgrades necessary to maintain water quality and pressure throughout the system. Major infrastructure upgrades can generally be characterized as the cleaning and lining or replacement of cast iron mains; tying-in dead ends for water quality and system redundancy, upgrades to storage tanks and improving water storage operations; upgrades to pump stations; installation of control and monitoring systems; institution of a unidirectional flushing program; and continuing current maintenance programs, such as leak detection and routine meter replacement.

Two large scale capital improvement projects are anticipated by the BCWA and have been included in the 2015 update of the 20 year ICP. One of these projects is the construction of the Pawtucket pipeline interconnection to the PWSB, which has been estimated to cost $27 million, however including both Phases I and II, the total estimated cost will be close to $50 Million dollars. A study evaluating possible routes, anticipated costs, and treatment requirements for the new transmission main was completed by CDM-Smith in 2013, commissioned by the City of East Providence and the BCWA, with matching funds provided by the RIWRB. Recently, an amount of $7.5 Million has been approved for the construction of Phase I.

The following steps would be performing design and permitting, identifying funding sources, and proceeding to bidding and construction. However, funding was requested in the form of a bond for matching funds during the 2014 RI Legislative session and did not get approved. The City of East Providence, a major participant in the pipeline construction plan, did not support the bond request. The Town of Warren also did not support the request.

The BCWA, with the support of all three Towns, is requesting matching funds from the RIWRB to construct Phase 1 of the pipeline project, to connect the East Providence Cross-Bay pipelines to the BCWA East Bay Pipeline. The total cost of this project is estimated to be $4.8 million. Since this is of a benefit to the City of East Providence, the project was initially designed (CDM-Smith study) to provide EP supply from the East Providence Emergency Pump station to their tank, and a reverse supply to the BCWA near the Providence connection next to the EP emergency pump station. In which case, each system was to provide one quarter of the cost, with the state providing a matching fund for the remaining half of the project. However, since East Providence is not interested in participating at this time, the BCWA is requesting assistance from the RI Water Resources Board in identifying potential alternate funding sources to make up the difference in the total project cost.

As a short-term project, the BCWA has connected to the East Providence 16" main on Pawtucket Ave to the BCWA 24" main from Providence in 2016. This along with two other connections provides a total emergency supply to the BCWA of 5 MGD, dependent on the EP distribution system pressure. Also, BCWA has made an emergency connection with the Town of Swansea to supply another 1 MGD during emergencies. This would be a back-up to the Providence supply, but not an alternate supply should there be an issue with maintaining the Providence supply across the bay.

Demolition of the Child Street WTP would follow the completion of the Pawtucket pipeline at an estimated cost of $1.8 million.

The other major capital improvement project is the expansion of the high service area. A hydraulic evaluation performed in 2011 identified that low pressure and resulting fire flow issues in parts of the Main Service Area in Bristol and Warren that are at a relatively high ground elevation could be rectified through incorporating them into the High Service Area. Expansion of the system's high service area will require piping modifications, estimated to cost $7 million, and the construction of a new pump station to transfer water from the Hope Street standpipe to the Metacom Avenue storage tank. The pump station is estimated to cost $600,000.

The 20-year ICP follows this page.

Bristol County Water Authority 20 YEAR INFRASTRUCTURE & CAPITAL PLAN October 2012

Projects	5 YEAR IFR & CAPITAL PLAN					5 to 10 Year Plan				
Fiscal Year (March 1)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Computer Program/SCADA										
Computer system	$250,000	$200,000	$100,000	$80,000	$50,000	$50,000	$50,000	$50,000	$50,000	$200,000
GIS	$25,000						$20,000	$20,000		
License/maint fees		$80,000	$80,000	$80,000	$100,000	$80,000	$80,000	$80,000	$100,000	$100,000
SCADA/ Instrumentation	$50,000	$40,000	$20,000	$10,000	$50,000	$30,000	$10,000	$20,000	$10,000	$20,000
Sub total	$325,000	$320,000	$200,000	$170,000	$200,000	$160,000	$160,000	$170,000	$160,000	$320,000
FACILITIES					(Nyatt rd)					
Pump Station Rehab/ PRVs	$100,000	$100,000	$50,000	$50,000	$100,000	$10,000	$10,000	$10,000	$10,000	$30,000
Bristol HIP design/pump station			$90,000	$90,000	$90,000	$90,000	$500,000			
Distribution/garage/storage	$30,000	$200,000	$50,000	$20,000	$150,000	$50,000	$10,000	$20,000	$20,000	$100,000
WTP	$20,000	$20,000	$20,000	$20,000	$20,000	$50,000	$10,000	$10,000	$10,000	$20,000
Admin Facility			$20,000	$20,000	$10,000	$30,000	$20,000	$10,000	$10,000	$10,000
Generator/ elevator		$50,000	$60,000							
Renovation 2nd floor	$30,000	$30,000	$20,000	$10,000				$20,000		
Locker rooms - Basement			$25,000	$25,000						
Dam Repairs	$100,000	$100,000				$25,000	$25,000			
Inspections	$7,000				$3,500	$7,000				$3,500
Maintenance	$50,000	$50,000				$50,000	$50,000	$50,000		
Sub total	$337,000	$550,000	$335,000	$235,000	$373,500	$312,000	$625,000	$120,000	$50,000	$163,500
SUPPLY										
Pawtucket Pipeline (db serv >2017)	$60,000	$60,000	$60,000	$60,000	$5,000,000					
Treatment	$50,000	$50,000			$50,000					$50,000
Sub total	$110,000	$110,000	$60,000	$60,000	$5,050,000	$0	$0	$0	$0	$50,000
DISTRIBUTION										
Water Storage Tanks										
Install flow valves	$60,000	$60,000	$60,000							
Replace Barrington Tank										
Rehab					$100,000					$100,000
Water Main Rehab					$1,500,000	$1,000,000	$500,000	$500,000	$500,000	$2,000,000
Franklin St.										
Barrington 7980 ft		$1,037,400								
Market St. Warren			$1,137,500							
Bristol				$799,500		$1,000,000	$2,000,000	$2,000,000	$2,000,000	
Barrington				$930,900						
Service replacements	$65,000	$85,000	$85,000	$85,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Main Replacemts (in house	$100,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
co projects			$55,000	$145,000	$96,500	$43,000	$10,000	$60,000	$130,000	$0
Equipment (hydrants, valves, etc)	$100,000	$130,000	$150,000	$150,000	$200,000	$200,000	$200,000	$200,000	$200,000	$150,000
Paving	$100,000	$50,000	$50,000	$50,000	$50,000	$50,000	$150,000	$50,000	$50,000	$50,000
Sub total	$425,000	$1,562,400	$1,737,500	$2,360,400	$2,246,500	$2,593,000	$3,160,000	$3,110,000	$3,180,000	$2,600,000
Miscellaneous										
Meters & equipment	$50,000	$300,000	$300,000	$300,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Vehicles & equip (inc. dump & bh)	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$100,000	$100,000	$100,000
Office Equip	$20,000	$10,000	$20,000	$10,000	$20,000	$10,000	$20,000	$10,000	$20,000	$20,000
Inspection C-B & trans mains					$20,000	$20,000				$25,000
Leak detection (5yr req.)				$20,000				$20,000	$20,000	
Sub total	$150,000	$390,000	$400,000	$410,000	$320,000	$310,000	$300,000	$330,000	$340,000	$345,000
Total all Projects	$1,347,000	$2,932,400	$2,732,500	$3,235,400	$8,190,000	$3,375,000	$4,245,000	$3,730,000	$3,730,000	$3,478,500
IFR EXPENSE	$665,000	$2,232,400	$2,032,500	$2,535,400	$7,490,000	$2,675,000	$3,545,000	$3,030,000	$3,030,000	$2,780,000
OPERATIONS/CAPITAL EXPENSE	$682,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$698,500

Projects	10 to 15 Year Plan					15 to 20 Year Plan				
Fiscal Year (March 1)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Computer Program/SCADA										
Computer system	$200,000	$100,000	$50,000	$50,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000
GIS			$20,000	$20,000					$20,000	$20,000
License/maint fees	$80,000	$80,000	$80,000	$80,000	$100,000	$80,000	$80,000	$80,000	$100,000	$100,000
SCADA/ Instrumentation	$50,000	$10,000	$20,000	$10,000	$20,000	$30,000	$50,000	$20,000	$10,000	$10,000
Sub total	$330,000	$190,000	$170,000	$160,000	$200,000	$190,000	$210,000	$180,000	$210,000	$210,000
FACILITIES										
Pump Station Rehab/ PRVs	$30,000	$30,000	$30,000	$30,000	$30,000	$10,000	$100,000	$100,000	$100,000	$100,000
Bristol HIP design/pump station										
Distribution/garage/storage	$50,000	$10,000	$20,000	$20,000	$100,000	$50,000	$10,000	$20,000	$20,000	$20,000
WTP	$50,000	$10,000	$10,000	$10,000	$20,000	$50,000	$10,000	$10,000	$10,000	$10,000
Admin Facility	$30,000	$20,000	$10,000	$10,000	$10,000	$30,000	$20,000	$10,000	$10,000	$10,000
Generator/ elevator										
Renovation 2nd floor			$20,000					$20,000		
Locker rooms - Basement										
Dam Repairs										
Inspections	$7,000									
Maintenance										
Sub total	$167,000	$70,000	$90,000	$70,000	$160,000	$140,000	$140,000	$160,000	$140,000	$140,000
SUPPLY										
Pawtucket Pipeline (db serv >2017)										
Treatment					$50,000					$50,000
Sub total	$0	$0	$0	$0	$50,000	$0	$0	$0	$0	$50,000
DISTRIBUTION										
Water Storage Tanks										
Install flow valves										
Replace Barrington Tank				$2,000,000						
Rehab					$100,000		$1,000,000	$500,000	$500,000	$500,000
Water Main Rehab	$2,000,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000
Franklin St.										
Barrington 7980 ft										
Market St. Warren										
Bristol										
Barrington										
Service replacements	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Main Replacemts (in house	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
co projects	$0	$110,000	$110,000	$150,000	$80,000	$50,000	$90,000	$100,000	$80,000	$80,000
Equipment (hydrants, valves, etc)	$100,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Paving	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Sub total	$2,450,000	$3,160,000	$3,160,000	$5,200,000	$3,230,000	$3,100,000	$4,140,000	$3,650,000	$3,630,000	$3,630,000
Miscellaneous										
Meters & equipment	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Vehicles & equip (inc. dump & bh)	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Office Equip	$10,000	$20,000	$10,000	$20,000	$20,000	$10,000	$20,000	$10,000	$20,000	$20,000
Inspection C-B & trans mains	$23,000				$20,000	$20,000				
Leak detection (5yr req.)			$20,000					$20,000	$20,000	$20,000
Sub total	$333,000	$320,000	$330,000	$320,000	$340,000	$330,000	$320,000	$330,000	$340,000	$340,000
Total all Projects	$3,280,000	$3,740,000	$3,750,000	$5,750,000	$3,980,000	$3,760,000	$4,810,000	$4,320,000	$4,320,000	$4,370,000
IFR EXPENSE	$2,580,000	$3,040,000	$3,050,000	$5,050,000	$3,280,000	$3,060,000	$4,110,000	$3,620,000	$3,620,000	$3,670,000
OPERATIONS/CAPITAL EXPENSE	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000	$700,000

12/31/2012

FINANCIAL MANAGEMENT

Operating income and expenses include the following parameters:

Revenue

- Annual Water Rate Revenue – includes all income received from customers as service charges, water consumption fees and fire protection charges.
- General Facility Charge Revenue – Not used
- Special Assessment Revenue – Not used
- Capital Funds – Contributions and/or Grants in aid of construction projects
- Reserve Fund Revenue – Not used
- Other Earned Revenue – Interest Income
- Other Unearned Revenue – Not used

Expenses

- Debt Service on Bonds – Revenue that has been used to pay the interest and principal on outstanding bonds for previously completed capital improvements.
- Operation and maintenance expenses – Revenue that has been used to pay:
    - Salaries and benefits
    - Materials and supplies
    - Repair and maintenance
    - Miscellaneous expense
    - Utilities
    - Administrative expenses
    - Depreciation
- Purchasing water from Providence, via the East Bay Pipeline: currently the water charge for purchasing water from Providence is $2,104.17 per million gallons.
- Other Expenses – Loss on abandonment of distribution mains and maintenance of the East Bay Pipeline.

Outstanding Debt

Income earned from revenue after expenses has been used, in part, to pay down the principal $1,903,109.00 on outstanding debt in fiscal year 2020. The total long-term indebtedness of BCWA as of February 28, 2020 was $37.69 million. This included new loans from Chase in the amount of $18.0 million. The BCWA increased its long-term outstanding debt by a net of approximately $16.6 million, or about 80%, during FY 2020. The budgeted debt service for FY 2021 is budgeted to be $3.33 Million with about $2.44 Million toward Principal and another $0.9 million toward interest payments.

Current Rates & Rate Structure

Water rates, which are established by the BCWA Board of Directors, include a service charge based on meter size and a consumption charge. The rate structure is a five-step increasing/decreasing/increasing block structure applied to all customers, regardless of the type of account (i.e., residential, commercial, etc.). This rate structure is designed to promote efficient use of water for the residential sector without penalizing the commercial and industrial sector where water use may be higher and is oftentimes directly correlated to business operations.

The BCWA had a rate study performed in 2013, which recommended a modification of the 5-tier rate structure to a 3-tier rate structure with a separate rate for commercial customers. The BCWA is looking to restructure the 5-tier rate structure once a new billing system that is being implemented is fully functional.

Current water use rates are summarized in the following table and went into effect on March 1, 2020 for Fiscal Year 2021. Water use rates for Fiscal Year 2020 are also included for comparison.

Per 100 Cubic Foot Usage Charge				
	Monthly	**Quarterly**	**FY2021**	**FY2020**
For the first:	500 CF	1,500 CF	$4,055	$3.686
For the next:	1,000 CF	3,000 CF	$11,455	$10,414
For the next:	8,500 CF	25,500 CF	$8,725	$7,932
For the next:	20,000 CF	60,000 CF	$4,055	$3.686
All Over:	30,000 CF	90,000 CF	$5,523	$4.775

Service Charge				
	Monthly		**Quarterly**	
	FY2021	**FY2021**	**FY2021**	**FY2020**
5/8" x 3/4" Meter:	$31.09	$28.26	$93.25	$84.77
3/4" x 3/4" Meter:	$46.67	$42.43	$140.00	$127.27
1" Meter:	$77.79	$70.72	$233.37	$212.15
1 1/2" Meter:	$155.52	$141.38	$466.62	$424.20
2" Meter:	$248.83	$226.21	$746.47	$678.61
3” Meter	$466.62	$424.20	$1,399.88	$1,272.62
4” Meter	$777.62	$706.93	$2,332.91	$2,120.83
6” Meter	$1,555.35	$1,413.95	$4,665.96	$4,241.78
8” Meter	$2,488.52	$2.262.29	$7,465.47	$6,786.79
10” Meter	$3,577.26	$3,252.05	$10,731.64	$9,756.04
65 Yrs/Older Rate:	$25.74	$22.91	$77.19	$68.71

Private Fire Services				
	Annual		**Quarterly**	
	FY2021	**FY2020**	**FY2021**	**FY2020**
4” or Smaller	$603.30	$548.45	$150.81	$137.10
6”	$1,357.27	$1,233.88	$339.32	$308.47
8”	$2,413.33	$2,193.94	$603.34	$548.49
10”	$3,770.19	$3,428.17	$942.79	$857.08

The rates for Fiscal Year 2021 represent an average increase of 10% from the previous year’s rates, while Fiscal Year 2020 rates were approximately 4.5% higher than rates in Fiscal Year 2019. Rate increases have been enacted to raise revenue for the cost of planned capital improvement projects, in accordance with the BCWA’s 20-Year ICP, as well as to account for an increase in the wholesale rate charged by Providence Water.

Billing Frequency

Currently the BCWA reads meters and bills customers as follows:

- Residential accounts – Quarterly
- Small Commercial accounts – Quarterly
- Large Commercial accounts – Monthly
- Public accounts (Governmental) – Monthly & Quarterly
- Industrial accounts – Monthly & Quarterly

Bills are due when rendered and collections of the bills are actively pursued. The new smart metering system will BCWA to transition to monthly metering and billing for all accounts.

COORDINATION

The BCWA is the legal organization that has been established to provide potable water service to the service area of Bristol County, which includes the Towns of Barrington, Bristol and Warren. The BCWA has reviewed the appropriate sections of each town's Comprehensive Plans and has provided information to each town as follows:

Bristol – The Town of Bristol Comprehensive Plan, last updated and adopted in 2009, is updating their plan and currently has a 2014 draft. On January 25, 2017, the Bristol Town Council adopted the plan. The draft update was states that the Town will help protect current water sources from further deterioration and will work with the BCWA and RI Water Resources Board for drought management.

Warren – The Town of Warren updated their Comprehensive Plan in 2010. It states that the Town of Warren will help maintain the BCWA as the primary water source for the Town and will cooperate with the BCWA and neighboring towns for the protection of the Kickemuit Reservoir and its watershed. It also states that the Town will work with the BCWA and RI Water Resources Board for drought management.

Barrington – The Town of Barrington Comprehensive Plan was updated in 2009 and adopted on January 18, 2010. It was amended in 2012. The Town updated their plan for 2015 which has been amended in 2019. It is important to note that the Town does recognize BCWA's Nayatt Road wells being inactive but continues to monitor the groundwater recharge areas. Barrington maintains a Groundwater Overlay District around the Nayatt wellfield aquifer and proposes rezoning this area from "Open Space-Passive" to "Conservation" which may include developing trails and other connections between recreational areas.

The BCWA and the towns it serves interact as needed to assure coordination of the Comprehensive Town Plans with the BCWA's plans. In each case the BCWA is specifically designated as the supplier of potable water to the Town and its citizens. The Town of Barrington and the BCWA worked jointly with DEM to develop protection of the groundwater recharge area for the Nayatt Road wells. Barrington has executed an overlay district for protection of the aquifer. Since the BCWA Board of Directors is composed of three members appointed by each town, it is considered that the elements of coordination exist.

The BCWA was created by State Legislature and was formed after approval by the residents of the towns served. Each Town Council appointed three residents to serve on the BCWA Board. As such, each town and the BCWA have a continuing relationship in any current or future planning actions by any of the towns in Bristol County. The towns in Bristol County have the responsibility to determine the future character of their town, and the BCWA will continue its efforts to assure that the residents have adequate supplies of potable water to meet their needs.

The BCWA will continue to work with the towns to provide adequate supplies of potable water for the needs of the residents of each town in Bristol County.

Past versions of this WSSMP have been provided to each town in Bristol County for their review relative to their comprehensive plans. Letters from each town's planning department have been requested, identifying BCWA coordination with local comprehensive plans. Similarly, the revised WSSMP will be provided to each town's planning department as has been done in the past.

The BCWA also actively coordinates with neighboring water systems. The BCWA is pursuing a potential connection to the Pawtucket Water Supply Board system and maintains three emergency interconnections with the City of East Providence. Also, the BCWA has made an emergency connection with the Town of Swansea for transferring water from their water system in case of an emergency to an extent of 1.0 MGD. The BCWA has tied in numerous dead ends at the eastern end of Child Street in the event this connection proves feasible.