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November 18, 2022

Ms. Luly Massaro, Clerk
Rhode Island Division of
Public Utilities and Carriers
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket D-22-15 - Pawtucket Water Supply Board,
Application For Borrowing Authority

Dear Ms. Massaro:

Enclosed please find an original and nine (9) copies of the following document:

1. The Pawtucket Water Supply Board's Response to the Advocacy Section's Data Requests (First Set, Requests 1, 2, 5-10).

Please be advised that an electronic copy of this document has been sent to the service list. Also please be advised that the Pawtucket Water Supply Board will submit its responses to request 3 and 4 under separate cover. Thank you for your attention to these matters.

Sincerely,

Joseph A. Keough, Jr.

Enclosures

cc: Docket D-22-15 Service List (via electronic mail)

STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
DOCKET NO. D-22-15
Response Of The Pawtucket Water Supply Board
To The Advocacy Section's
Data Requests
Set 1

AS 1-1: Provide PWSB's latest Infrastructure Replacement plan.

Response: Please see attached.

Prepared by: J. DeCelles

CLEAN WATER INFRASTRUCTURE REPLACEMENT PLAN 2020 UPDATE

Pawtucket WATER SUPPLY BOARD

PAWTUCKET WATER SUPPLY BOARD MISSION STATEMENT

TO CONTINUE TO IMPLEMENT COMPREHENSIVE STRATEGIES TO FACILITATE A WATER SUPPLY, TRANSMISSION AND DISTRIBUTION SYSTEM FOR OUR CUSTOMERS AT AN AFFORDABLE RATE THAT PROVIDES A RELIABLE SAFE SUPPLY OF POTABLE WATER IN ACCORDANCE WITH STATE AND FEDERAL SAFE WATER ACT REQUIREMENTS FOR DOMESTIC, COMMERCIAL, INDUSTRIAL, MUNICIPAL, FIRE FLOW AND ALL OTHER NEEDS

Section 1 – Introduction

Section 2 – Water Supply System Description

Section 3 – Capital Improvement Program

SECTION 1.0 INTRODUCTION

1.1 Overview

This Clean Water Infrastructure Replacement Plan (CWIRP) has been prepared in accordance with the Rules and Regulations for Clean Water Infrastructure Plans (216-RICR-50-05-7) promulgated by the Rhode Island Department of Health (Health) pursuant to the requirements and provisions of RIGL Chapter 46-15.6 Clean Water Infrastructure of the General Laws of Rhode Island, as amended. As such, this Plan maintains consistency with the Clean Water Infrastructure Act, Chapter 46-15.6 of the General Laws of Rhode Island, as amended.

As mandated by the Clean Water Infrastructure Act, Health requires that every Rhode Island water supplier develop a long-term management strategy for infrastructure rehabilitation of its water supply, treatment, pumping, storage, transmission, and distribution system components. The Regulations require that the CWIRP be updated at 5-year intervals or as otherwise deemed necessary when significant modifications are required. The Pawtucket Water Supply Board (PWSB) completed its CWIRP in 2005. The 2005 CWIRP Plan was approved by Health and has provided the foundation for PWSB's major infrastructure improvement projects. This CWIRP is intended to update the previous CWIRP and was completed by PWSB in-house engineering staff.

This CWIRP was also prepared in conformance with applicable provisions of State and Federal laws including the Federal Safe Drinking Water Act (42 USC Section 300f et seq.) and Chapter 46-13 of the General Laws of Rhode Island, Public Drinking Water Supply. The CWIRP also maintains consistency with the goals and policies outlined within the PWSB's Water Supply System Management Plan and is consistent with the Comprehensive Plans for the Cities of Pawtucket and Central Falls and the Town of Cumberland

1.2 Purpose of Plan

The Clean Water Infrastructure Act, Title 46, Chapter 15.6 designates Health as the primacy agency to administer the program for CWIRP's in Rhode Island. This Act requires all water purveyors which on an annual basis purchase or sell over 50 million gallons of water prepare, maintain and implement a detailed infrastructure plan for the principal components of the water

supply, treatment and distribution system. The Act also mandates that public water systems provide a mechanism for funding to replace and/or rehabilitate identified infrastructure components prior to the end of their "useful life" within the framework of the Regulations.

The PWSB is a water supplier serving approximately 99,000 residents in the Cities of Pawtucket and Central Falls and the Valley Falls section of the Town of Cumberland, Rhode Island. The PWSB also provides water to the neighboring Town of Cumberland on a wholesale contractual basis. As outlined in the PWSB mission statement, the PWSB is committed to providing safe, reliable, and adequate water supply to its retail and wholesale customers and wholesale retailers.

The PWSB, following a detailed evaluation of its water system infrastructure components, has developed this updated CWIRP, which provides a valuable infrastructure rehabilitation management and planning tool for all aspects of PWSB's water system from supply, through treatment, pumping, transmission, distribution and storage. By employing the methodologies presented in this document for infrastructure replacement and rehabilitation, the PWSB will continue to efficiently and economically serve its customer base over the next 20 years and beyond while providing a safe, reliable and high quality water supply to its customers.

1.3 CWIRP Plan Goals

The goal of this CWIRP is to comply with the provisions of the Act as detailed in the Rules and Regulations for Clean Water Infrastructure Plans, by developing a comprehensive CWIRP for the PWSB's Water Supply System. This was accomplished by reviewing and evaluating the condition of the major system infrastructure components within the water system. Each component was assigned a life expectancy and necessary improvements were defined within the context of the Regulations. Appropriately, a cost and schedule for identified improvements or replacement was developed.

The PWSB is operated as an enterprise fund and is financially self-sufficient, funding its operations through water rates and charges to its service customers. The funding for identified improvements as detailed in this CWIRP is completed through a combination of one of the following mechanisms: bonding, infrastructure fund, general operations fund, restricted funds, or budget surplus, as required by the Act. It is intended that any improvements in the form of

rehabilitation and/or replacement be completed through a program in which the water system is upgraded and maintained to ensure the present and future needs of the consumers.

The PWSB also recognizes that maintenance and component replacement should not be deferred until failure and full cost of replacement is necessary. It is current policy that water system components, to the extent practical, be maintained continuously to avoid malfunction or unexpected failure, as emergency repairs can be costly and inconveniencing to the consumer. To that end, beginning in 1988 the PWSB took an aggressive approach to either replacing or cement line rehabilitating the 272 miles of cast iron water transmission and distribution mains within the service territory. It is anticipated that by 2021, the PWSB will have completed its goal of replacing or rehabilitating all the water mains within its service territory.

In 2008, the PWSB officially decommissioned its water treatment plant located at 120 Mill Street in Cumberland, RI that had been in operation since 1938. This facility was replaced by a newly constructed water treatment facility at 87 Branch Street in Pawtucket located approximately 1-mile south of the old Mill Street plant.

1.4 CWIRP Update Contents

This CWIRP document is organized as follows.

- *Section 1*: Provides an overview, purpose and scope and defines the goals of the CWIRP.
- *Section 2*: Describes and summarizes the PWSB's existing water supply system from raw water supply transmission, through treatment to transmission, storage, and distribution.
- *Section 3:* Description of the PWSB's Infrastructure Replacement and Capital Improvement Programs.
- *Section 4:* A financial analysis for the funding of the PWSB's Infrastructure Replacement and Capital Improvement Programs.

SECTION 2.0 WATER SUPPLY SYSTEM DESCRIPTION

This section details the Pawtucket Water Supply Board's (PWSB) water supply system including legal and managerial aspects and the physical infrastructure of the supply, treatment, and distribution system.

2.1 Organization and Legal Structure

2.1.1 Legal Structure

The PWSB is a semi-autonomous agency of the City of Pawtucket, Rhode Island and operates a water system that serves the Cities of Pawtucket and Central Falls and the Valley Falls section of the Town of Cumberland. The system also provides wholesale water to the neighboring community of Cumberland, RI. In Pawtucket, the PWSB operates under the Pawtucket City Charter, Sections 3-709 and 4-1900 through 4-1906, which grants PWSB the power to manage and control all waterworks facilities within the PWSB system.

The City of Pawtucket City Charter provides that the PWSB is the sole entity that will provide water service to all City residents and businesses. The City and PWSB, as a City agency, owned the water system until 1990 when ownership was transferred to the Pawtucket Public Buildings Authority (PPBA). At the time, PPBA leased the system back to the City and the water system was then subleased to the PWSB. In 2003, ownership was transferred back to the City and the PWSB now operates as a semi-autonomous agency of the City of Pawtucket.

The legal and mailing address for the PWSB is:

Pawtucket Water Supply Board
85 Branch Street
Pawtucket, RI 02860
Telephone: 401-729-9050

The PWSB operates as an enterprise fund which is separate from the general funds of the communities it directly services. All operational procedures of the PWSB are self-sufficient, funding its operations through water rates and charges to its users. No subsidization exists between the City and the PWSB. The sole revenue stream for the PWSB is from rates and tariffs established by the PWSB with the concurrence of the Rhode Island Public Utilities Commission. No general taxes support the PWSB system.

The PWSB is governed by a Board of Directors that is comprised of six members. Four of those members are appointed by the Mayor of the City of Pawtucket, the fifth is the Finance Director of the City of Pawtucket, who serves ex-officio, and the sixth member is a Pawtucket City Council Representative.

The financial management of PWSB is vested in its Board of Directors (Board) and is subject to the Rules and Regulations of the Rhode Island Public Utility Commission (PUC) and the Rhode Island Division of Public Utilities and Carriers. The Board establishes rules and regulations and determines the rates to be charged for water and all miscellaneous related services. The rules and regulations and rates and charges, as are amended from time to time, are subject to final approval of the PUC.

2.1.2 Organizational Structure

The organizational structure of the PWSB is shown in Figure 2-1. The Chief Engineer/General Manager position is established and defined in the City Charter. Incumbents for this position are selected and contracted by the PWSB Board of Directors. The Chief Engineer/General Manger heads the administrative efforts of the PWSB and is the interface between the PWSB Board of Directors and the PWSB staff with other agencies and organizations.

There are six primary divisions within the PWSB which serve to provide the overall day to day function of the water system and include Administration, Engineering, Transmission and Distribution, Source Water, Water Treatment and Finance Divisions.

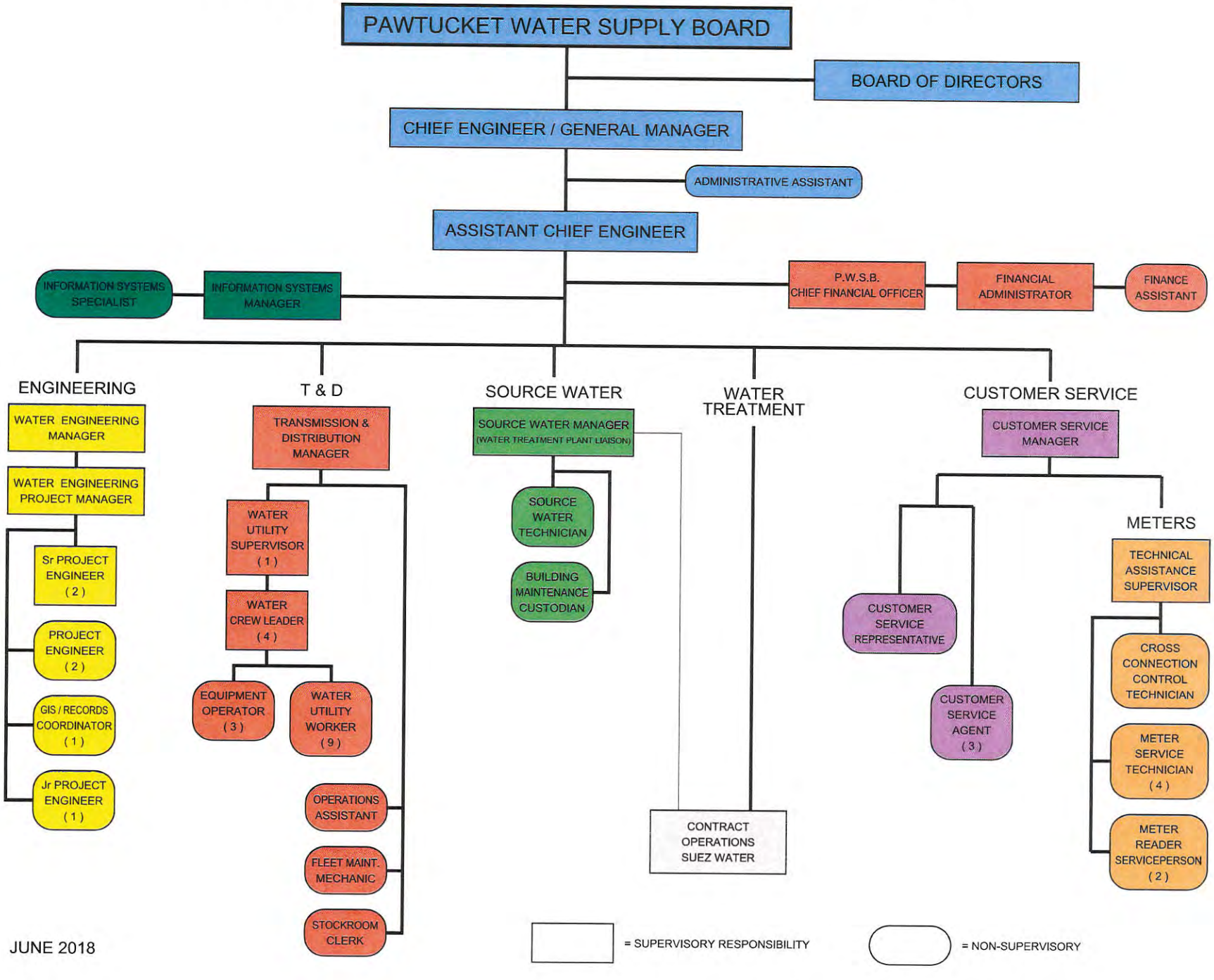
Description of Managerial Responsibilities

Chief Engineer/ General Manager (CE/GM) – The position is established and defined in the City Charter. Incumbents for this position are selected and contracted by the PWSB Board of Directors. The CE/GM heads the administrative efforts of the PWSB and is the interface between the PWSB Board of Directors, PWSB staff and with other agencies and organizations. The CE/GM is responsible for administration, planning, organizing, and directing all activities of the PWSB. The CE/GM is responsible for assessing and classifying emergency events, implementing training procedures and implementing public notices.

Assistant Chief Engineer (ACE) – The ACE is responsible for technical and supervisory work involving all engineering functions as well as the supervision and management of treatment, distribution, engineering, meter reading and accounting sections of the PWSB. The ACE provides direct supervision and management control over the Engineering Division and indirect supervision through second-level supervisors of the treatment, distribution, meter reading and accounting sections. In the absence of the Chief Engineer, the ACE serves as the Acting Chief Engineer for all Water Supply Board operations.

The ACE oversees the work of office and field engineering on all Water Supply Board construction projects. Responsibilities include reviewing plans, specifications and construction methods on proposed projects (including those of outside agencies which may involve or conflict with Water Supply Board facilities)

P.W.S.B. ORGANIZATIONAL FLOW CHART



JUNE 2018

involving water storage, treatment, pumping and distribution, and providing field supervision for general contractors and their sub-contractors during construction.

Source Water Manager - The Source Water Manager is responsible for the PWSB sources of supply and related facilities. Responsibilities include operation and maintenance of the dams, reservoirs, and wells in the raw water system, watershed management, testing raw water quality, interfacing with the public and state and local agencies in the development of land and watershed policy, and the acquisition of additional land and property to protect the watershed. In addition, this individual acts as a liaison with the Water Treatment Division.

Water Treatment Division - The Water Treatment Division is handled through Contract Operations with Suez (formerly United Water). Suez is responsible to operate and maintain the existing water treatment plant on Branch Street in Pawtucket and is also in responsible charge of the operation and maintenance of the groundwater sources of supply including the well pump stations and the distribution water storage facilities. Suez is responsible for all aspects of water treatment including routine water testing and reporting of results to the Rhode Island Department of Health and other regulatory authorities.

Transmission and Distribution Division - The Transmission and Distribution (T&D) Division is responsible for the field operation and maintenance of the transmission and distribution system and is overseen by the T&D Manager. This Division implements new service installations, installs, and repairs hydrants and customer services, maintaining water works inventory, repairing main breaks and overall maintenance of the PWSB's fleet of vehicles and equipment. The Manager is responsible for planning and organizing projects and maintenance activities within the PWSB transmission and distribution system, supervising employees in the Division, scheduling and inspecting completed work.

Engineering Division – The Engineering Division performs a number of functions including preparation of plans and specifications for PWSB infrastructure projects, inspection of projects, oversight of projects by outside contractors, and the maintenance and update of water system records all of which is overseen by the Water Engineering Manager. This individual is responsible for the technical and managerial aspects involving engineering functions of the PWSB including planning, scheduling, and coordinating activities of the employees in the Engineering Division, and ensures compliance with PWSB Rules and Regulations.

Finance Division – This Division is responsible for all financial aspects of the PWSB. Finance Division staff are responsible for accounts payable and complete accounting of PWSB funds. This Division is responsible for the daily function of the business office including interfacing with service customers,

providing customer assistance and general information, preparation and mailing of water and tax bills and collection of payments, information technology systems, and customer meter and service applications. The Manager of this Division coordinates the operation of PWSB staff to ensure sound financial management of PWSB funds.

The fulltime staff, as described herein, is of adequate qualification, experience, and number to effectively and efficiently perform duties necessary to operate and maintain the PWSB water supply, treatment, and distribution delivery system. Personnel at the PWSB possess and maintain the proper water works licenses and certificates as required by the Rhode Island Department of Health Division of Drinking Water Quality.

2.2 Service Area

The PWSB provides water service to approximately 99,000 customers within a service area that includes the cities of Pawtucket and Central Falls, and the Valley Falls section of the Town of Cumberland. The service area is nearly fully developed and generally includes portions of medium/high density residential, commercial, and industrial zoning. Wholesale water is also supplied through a contract to Cumberland, RI. Bordering cities and towns include: East Providence, Providence, North Providence and Lincoln in Rhode Island, and Attleboro and Seekonk in Massachusetts. The service area is considered fully developed and includes medium to high-density residential, commercial and industrial zoning. In general, there is little undeveloped land in the service area.

2.3 System Overview

The Pawtucket Water Supply Board (PWSB) through a system utilizing both surface and groundwater sources, supplies water to the City of Pawtucket, the City of Central Falls and the Valley Falls portion of Cumberland. The original water supply system was established in 1875. The water system's source water is derived from the Abbott Run watershed and its underlying aquifer. The primary source of water for the system is the intake structure at Happy Hollow Pond which supplies the nearby Raw Water Pump Station (RWPS). Water is drawn from Happy Hollow Pond through a submerged intake into the RWPS from where it is pumped south to the water treatment plant. The raw surface supply from Happy Hollow Pond can be supplemented, up to a maximum of 5 MGD, with water from the series of eight groundwater wells that are located along the shoreline of the reservoir complex.

2.3.1 Description of Watershed and Surface Water Supplies:

The source of the PWSB's water supply is the Abbott Run watershed and its underlying aquifer, a sub basin of the Blackstone River Valley Drainage Basin. The PWSB operates 4 surface water reservoirs and 8 groundwater wells. The four surface water reservoirs, (in order proceeding down the watershed) Diamond

Hill Reservoir, Arnold Mills Reservoir, Robin Hollow Pond Reservoir, and Happy Hollow Pond Reservoir, have a combined storage capacity of 4,970 MG. The PWSB owns a series of 8 wells located in the Abbott Run Valley Aquifer that can supplement the surface water supply; wells 2A through 9 are currently available for use. Wells 1 and 2 have been abandoned and wells 10 and 11 have no main electric supply and are periodically pumped to waste via onsite engine drives. The watershed covers an area of about 27 square miles in the Town of Cumberland, RI and the Towns of Wrentham, Franklin, Plainville, North Attleboro and Attleboro, MA. Major storage basins and groundwater wells are tabulated in Table 2-3.

2.3.2 Surface Water Supply Sources

Diamond Hill Reservoir

The Diamond Hill Reservoir was originally constructed in 1887 but has been enlarged twice. The present usable storage capacity is 3.67 billion gallons of water. Diamond Hill Reservoir is in Cumberland, Rhode Island, and is the largest reservoir of the PWSB system. The watershed to this reservoir (Diamond Hill Reservoir watershed) is approximately 7.4 square miles and includes parts of Wrentham, Franklin, and Plainville in Massachusetts, and in Cumberland, Rhode Island. The watershed has rolling, hilly topography with ponds, streams, and swamps. The major stream contributing to the reservoir is Burnt Swamp Brook. This drainage area is sparsely populated. The village of Sheldonville in Wrentham is the only semi-urban area. Interstate Route 495 passes through the far northerly section of the watershed. There is residential development scattered along the main roads.

The dam is located at the southern end of the impoundment and extends from east to west. The dam system is comprised of three major dam structures; the Main Dam, the West Dike, and the East Dike, and two appurtenant structures; the Spillway and Outlet Works. In addition, there are two causeways partially spanning the east side of the reservoir. Chain link fencing encloses the entry into the east and west dikes and the entire spillway and channel sections. The Diamond Hill Reservoir Dam is considered an intermediate size, high hazard category structure.

Arnold Mills Reservoir

This reservoir is in Cumberland, Rhode Island on the Abbott Run River about 7.5 miles upstream from its confluence with the Blackstone River, a tributary of the Providence River. It is situated to the east of Diamond Hill Road (State Highway 114) about 6 miles north of Pawtucket, 1,300 ft. north of the junction of North Attleboro and Sneech Pond Roads. The Arnolds Mills Reservoir is just downstream from the Diamond Hill Reservoir. Constructed in 1927, its present usable storage capacity is approximately 1.163 billion gallons of water.

The direct watershed to Arnold Mills Reservoir (Arnold Mills watershed) is approximately 10.4 square miles that includes a large portion of Cumberland, Rhode Island, and sections of North Attleboro, Plainville and Wrentham, Massachusetts. The watershed features rolling hills with several streams such as Sylvys, Catamint, Long and East Sneech Brooks, Miscoe Lake and Pine Swamp. In addition, other smaller ponds and swamps are found throughout the area.

There are several subdivisions west of Arnold Mills Reservoir, off Diamond Hill Road, that are within this portion of the watershed. Also, in the southwestern section of the watershed, part of Lippitt Estates eventually drains into Arnold Mills Reservoir. There is a large portion of open space within this portion of the watershed. This is due in part to the presence of Diamond Hill State Park, several open space parcels owned by the Town of Cumberland and/or the PWSB, and several wetlands parcels that preclude development. There are several major roadways that cross the watershed: Diamond Hill Road, Nate Whipple Highway, Route 123, and Interstate 295. Arnold Mills is operated in conjunction with Diamond Hill Reservoir. The Arnold Mills Reservoir Dam is considered an intermediate size, high hazard category structure.

Robin Hollow Pond

There are four other smaller ponds along the seven-mile length of Abbott Run. The Pawtucket Water Supply Board owns two: The Robin Hollow Pond and the Happy Hollow Pond. The direct watershed to Robin Hollow Pond (Abbott Run watershed) is approximately 8.23 square miles, which includes sections of Cumberland, Rhode Island and North Attleboro and Attleboro, Massachusetts. Water that is released from the Arnold Mills Reservoir, which is approximately 4 miles upstream of Robin Hollow Pond, travels down the Abbott Run through the Rawson Pond and the Howard pond (both private-owned) and into the Robin Hollow Pond.

Robin Hollow Pond Dam (RI Dam # 81) is located approximately 2.5 miles north of the City of Pawtucket along the Rhode Island/Massachusetts border in Cumberland, Rhode Island. The dam impounds water along the Abbot Run River to form an irregularly shaped impoundment that extends across the state line into Attleboro, Massachusetts. The dam is located at the southwestern comer of the impoundment.

Happy Hollow Pond

Happy Hollow Pond Dam (RI Dam # 82) is located approximately 1.6 miles north of the City of Pawtucket approximately 0.2 miles west of the Rhode Island/Massachusetts border in Cumberland, Rhode Island. The dam impounds water along the Abbot Run River to form a long and narrow shaped impoundment. The dam is located at the southern end of the impoundment. The direct watershed to Happy Hollow Pond (Happy

Hollow Reservoir watershed) is approximately 0.87 square miles. At the south end of Happy Hollow Reservoir, just upstream of the confluence of Abbott Run with the Blackstone River, is the intake for the raw water pump station that supplies the water treatment plant. Spills from this reservoir are lost from the system and continue to the Blackstone River.

The private ownership of the Rawson and Howard Ponds does not negatively affect the PWSB operation of the raw water system. The impoundments have a relatively small storage capacity, and the dam overflow elevations are not adjustable, so these ponds simply act as "wide spots in the stream". The storage capacity of these ponds is not included as useable storage.

According to the 1996 CDM Safe Yield report for the PWSB, there are no minimum downstream flow release requirements for Diamond Hill, Arnold Mills, Robin Hollow, or Happy Hollow.

Table 2-3: PWSB Water Supply Sources

Description/Name	Operational Status	Type	Hydrological Data*
Diamond Hill Reservoir	Active	Surface water reservoir	DA: 7.4 mi^2 SA: 390 Acres Vol: 3666 mg SE: 197.73 ft.
Arnold Mills Reservoir	Active	Surface water storage	DA: 10.4 mi^2 SA: 248 Acres Vol: 1165 mg SE: 162.20 ft.
Rawson Pond	Active	Surface water storage	12.4 mg SE: 114.60
Howard Pond	Active	Surface water storage	Capacity is small and not used by PWSB SE: 104.50
Robin Hollow Pond	Active	Surface water storage	DA: 8.23 mi^2 SA: 34 Acres Vol: 87 mg SE: 64.74 ft.
Happy Hollow Pond	Active	Surface water storage	DA: 0.87 mi^2 SA: 22 Acres Vol: 77 mg SE: 54.2 ft.

DA: Drainage Area VOL: Volume SA: Surface Area SE: Spillway Elevation

*NGVD 29 Elevations

2.3.3 Operation & Management of Water Supply Sources

Diamond Hill Reservoir is the main storage body for the PWSB. It is located on the extreme northern end of Abbott Run and is in the Town of Cumberland, Rhode Island. The spillway elevation on this reservoir is

197.73 feet. When full, Diamond Hill Reservoir holds approximately 3.666 billion gallons. Flows from this reservoir are controlled from a gatehouse at the southern end of the reservoir. The gatehouse contains 2 upper and 2 lower sluice gates with manual operators, interconnected by a wet well. Each sluice gate measures 36 by 48 inches.

Arnolds Mills Reservoir is immediately south of Diamond Hill Reservoir. Diamond Hill empties directly into Arnolds Mills Reservoir, either over the spillway or through the (2) 36-inch discharge lines from the gatehouse, located at elevation 138.7 feet. The spillway at Arnolds Mills is at elevation 162.20 feet. The Arnolds Mills Reservoir holds approximately 1.165 billion gallons. There is a gatehouse that controls the flow from the Arnolds Mills Reservoir into Abbot Run Stream. Arnold Mills' two upper gate valves are manually operated and discharge through one or both 36-inch discharges. There is a 24-inch discharge at elevation 147.50 CL that is mainly used when Arnolds Mills Reservoir is full or near full and the water temperatures are 60 degrees or below. Arnold Mills' 36-inch discharge is at elevation 133.60 feet. Typically Diamond Hill Reservoir is not opened until Arnolds Mills reaches an elevation of approximately 144.00 feet. At this point, the south sluice gates are opened approximately 2 to 3 inches each. Diamond Hills upper northern sluice gates are left open 12 inches and are exercised twice a year. Flows from Arnolds Mills are gauged at Happy Hollow Pond at the raw water pump station.

The Robin Hollow Dam was entirely reconstructed in 2012 – 2013. The new facility is comprised of three major components: an earthen embankment dam that is divided into right and left sections by a concrete spillway; the concrete spillway; and the armored section of the embankment which serves as an emergency spillway. The spillway consists of an overflow structure that is controlled by multiple gates. The dam has an overall length of approximately 400 feet and a maximum height of 16.5 feet. The Robin Hollow Pond has 87 million gallons of storage at the normal spillway elevation and covers a surface area of 34 acres. Under normal year-round operating conditions, the level of the impoundment is generally self-regulating with the surface level maintained at the crest of the primary spillway elevation of 64.74 approximately 6.6 feet below the top of dam embankment crest elevation. Spills and releases from this reservoir enter Happy Hollow Pond.

Per the guidelines of the Rhode Island Emergency Management Agency and the Rhode Island Department of Environmental Management, an Emergency Action Plan (EAP) was created for the Robin Hollow Pond Dam in 2019. The EAP identifies responsibilities and procedures in the case of unusual or unlikely conditions that may threaten the Robin Hollow Pond Dam. Updates to the plan are to be performed on a yearly basis.

Happy Hollow Pond is a relatively small shallow pond with a capacity of 57.0 million gallons. This reservoir has a hydraulic bascule gate with a top elevation of 54.2 feet. Typically, water in this reservoir is kept between elevations 49.0 to 52.0 feet, if the elevation is lower than 48.0 feet, the raw water intake pumps will draw air and cavitate. It takes approximately 22 hours for water to travel down Abbott Run Stream from Arnolds Mills to Happy Hollow, so all flows, times and demands must be anticipated. On a typical winter day, with a demand of 8 MGD and no wells operational, the 36-inch discharge at Arnolds Mills can be opened to as little as 3 inches. On a hot summer day, with a demand of 14 MGD, the discharge can be opened as much as 12 inches, with wells 2A, 3, 6, 7, 8, and 9 on and producing approximately 3.75 MGD.

In hurricane season, Diamond Hill Reservoir is typically lowered to an elevation of 190.00 feet to provide a buffer to hold back large flows into Arnolds Mills Reservoir. Arnolds Mills should be brought to elevation 144.0 feet, and so maintained throughout the hurricane season.

2.3.4 Primary Reservoir and Dam Structures

Diamond Hill Reservoir

Diamond Hill Reservoir (RI Dam # 06802) is located approximately 5.0 miles east of the City of Woonsocket, Rhode Island and is just upstream of the north end of the Arnold Mills Reservoir. The Diamond Hill Reservoir Watershed area extends northerly and easterly into Wrentham and Plainville, Massachusetts and is drained by Burnt Swamp Brook. The dam is located at the southern end of the impoundment and extends from east to west.

The dam system is comprised of three major dam structures; the Main Dam, West Dike and the East Dike and two appurtenant structures; the Spillway and Outlet Works. In addition, there are two Causeways partially spanning the east side of the reservoir. Chain link fencing encloses the entry into the east and west dikes and the entire spillway and channel sections.

The Main dam is 2,000 feet long, including the Spillway, with a maximum structural height of 80 feet. The dam embankment is a zoned structure with an impervious core that extends to bedrock and is flanked by chimney drains and filters. The crest of the dam supports the 40-foot-wide Reservoir Road. Upstream and downstream embankment slopes are approximately 2.0 H to 1.0V. The upstream slope and lower portions of the downstream slope are rip rapped. The remaining slopes are grass and tree covered.

The West Dike is 1,000 feet long with a maximum structural height of 30 feet. The embankment of the dike is a zoned structure with an impervious core that extends to bedrock and is surrounded by pervious shell material and a toe drain system. Reportedly, the dike was constructed over an existing structure. The 10-foot

crest is protected by a thin pavement. Upstream and downstream embankment slopes are approximately 2.5H to 1.0V and 3.0H to 1.0V, respectively. The upstream slope is rip rapped while the downstream slope is grassed. The dike generally runs from the northwest to southeast direction and abuts the main dam about 1,200 feet west of the main dam's right abutment.

The East Dike is 630 feet long with a maximum structural height of 20 feet. The embankment is like the embankment for the West Dike with an impervious core extending to bedrock, a pervious shell and a toe drain system. The crest is also protected by a thin pavement, which fully covers the 10-foot-wide crest. Upstream and downstream embankment slopes are approximately 2.5.H to 1.0V. The upstream slope is rip rapped while the downstream slope is grassed. The dike is a separate structure located about 800 feet east of the intersection of Reservoir Road and Kern Boulevard closing off a depressed portion of the reservoir.

The appurtenant structures are the Main Spillway and the Outlet Works. The spillway system is located near the left abutment of the main dam and is 90 feet upstream from the longitudinal axis of the dam. The spillway consists of a 74-foot-long reinforced concrete, free flowing, ogee spillway with concrete core walls extending from the spillway abutments to the impervious core of the dam and vertically bearing on bedrock. The design also incorporates a grout curtain to minimize potential under seepage. Flows over the spillway discharge into a rip rapped apron area at the base of the spillway and continue over a rock channel into Arnold Mills Reservoir about 225 feet downstream of the spillway. The channel is spanned by a bridge approximately 85 feet in length that supports Reservoir Road. The side slopes of the channel are a combination of vertical concrete training walls, and sloping walls (about 1.5H to 1.0V) of concrete, chinked stone slabs, and shaped rock.

Two causeways (road embankments), about 1,850 feet and 880 feet long, carry Reservoir Road around the east side of the impoundment. The crest of the causeways supports the 40-foot-wide Reservoir Road. The rip rapped upstream and downstream embankment slopes are approximately 2.0H to 1.0V. The causeway embankments were equipped with 12-inch diameter corrugated "Equalizer" culverts to minimize hydrostatic pressure differentials between the two ponds. Access to the dam, dike and causeway structures is via Reservoir Road.

Inspection and Condition Assessment – Diamond Hill Reservoir Dam

In August 2014, a visual inspection and assessment of the dam and its associated facilities was performed. In general, the structure was found to be in fair to good condition and was being properly maintained. Recommendations were provided for intermediate and short-term maintenance (i.e. brush removal, etc.) as

well as long term maintenance and operational procedures to be employed. PWSB continues to routinely maintain the facility consistent with standard care of practice and recommendations in the Assessment.

Per the guidelines of the Rhode Island Emergency Management Agency and the Rhode Island Department of Environmental Management, an Emergency Action Plan (EAP) was created for the Diamond Hill Reservoir Dam in 2019. The EAP identifies responsibilities and procedures in the case of unusual or unlikely conditions that may threaten the Diamond Hill Reservoir Dam. Updates to the plan are to be performed on a yearly basis.

Arnold Mills Reservoir Dam

Arnold Mills Dam which impounds Arnold Mills Reservoir, is a municipal water supply facility for the City of Pawtucket, Providence County, Rhode Island. The reservoir is in Cumberland, Rhode Island on the Abbott Run River about 7.5 miles upstream from its confluence with the Blackstone River, a tributary of the Providence River. It is situated to the east of Diamond Hill Road (State Highway Rt. 114) about 6 miles north of Pawtucket, 1,300 feet north of the junction of North Attleboro and Sneech Pond Roads. The facility is operated in conjunction with Diamond Hill Reservoir immediately upstream and to the north of Arnold Mills Reservoir as a single water supply storage facility.

The main dam is a zoned earth fill embankment about 2,900 ft. long with a maximum height of about 33 ft. The dam has a crest width of 18 feet, and 2 to 1 slope on both upstream and downstream faces. Where the height exceeds 19 feet berms are provided at the 19-foot level; the width of the upstream berm varies while the downstream berm is 6 feet wide. Below the downstream berm, the dam slope continues on 3 to 1 for about 8 feet and then flattens onto a wide sand and gravel bench placed in the original riverbed section.

The dam zoning consists of a central concrete core trench to within 2 feet of the top of the dam, a clay backfill in the excavated core trench and surrounding the concrete core wall and a gravel and loam filled outer shell. The upstream face of the dam is paved with a laid-up riprap which was surface flushed with cement mortar. Two continuous horizontal concrete walls are carried along the upstream slope flush with the top of the riprap to act as "paving stops" to hold the riprap in place. One wall is approximately at the normal water surface and one wall is at the toe of the slope.

The foundation of the dam for the most part is a sandy material with some stone lenses of gravel. For about the 1,500-foot left portion length of the dam, the core trench was excavated through this previous foundation to a ledge rock formation, noted on the drawing as "hard red rock". For the remaining length of dam beyond the left 1,500-foot length, the core trench did not reach bedrock, but was carried only to about the level of the

reservoir floor. The concrete core wall is 12-inch-thick at its top and 24-inch-thick at the base, founded on a 6 to 7 foot wide footing slab at the bottom of the core trench. Along portions of the wall length where the bottom footing trench did not reach bedrock and where the sand foundation appeared particularly pervious a line of wooden sheet tongue and groove piling was driven to depths of about 8 feet below the bottom of trench level.

The East Dike is located about 1,000 feet to the right of the main Arnold Mills Dam, to close off a saddle area leading to a small tributary which flows into Abbott Run about 1 mile below the dam. The dike is approximately 540 ft. long with a maximum height of 17.5 feet. The cross section of the dike is like that of the main dam, except for the dike variable crest elevation where a minimum elevation of 167.5, or 1.5 feet lower than the main dam was recorded. The foundation at the dike, except for short lengths where bedrock was encountered, is coarse sand and gravel. The core trench was carried only to about the level of the bottom of the reservoir and the concrete core wall was extended from the bottom of the trench to within 2 feet of the top of the dike.

The spillway is located near the east abutment of the dam, about 300 ft. to the right of the main river channel. The crest of the spillway has a length of about 15 t feet at elevation 162.3 ft. (MSL) or 7.0 feet below the top of the dam. The ogee weir is about a 30-foot-high, gravity, cyclopean, concrete section presumably founded on bedrock. Construction drawings indicate that the bedrock foundation was grouted with Portland cement. The gravity section has width of about 5 feet at its top and 27 feet at its base, with ¼ to 1 and ½ to 1 slope for its upstream and downstream faces, respectively. The overflow empties into a 20-foot-wide stilling basin whose floor is about 24 foot below crest level. A wide concrete sill, the top 5 feet above the basin floor, is provided at the end of the stilling basin. Concrete gravity sidewalls retain the earth embankment adjacent to the spillway.

The spillway outlet channel beyond the stilling basin is excavated to about downstream river level and is unpaved. The channel, for about 100 ft. downstream from the stilling basin, is excavated in bedrock while the rest is in earth. Concrete gravity retaining walls are provided on each side of the channel. The right wall varies from 10 feet high at the stilling basin to about 2.5 feet high at about 310 feet downstream. The left wall varies from a 10-foot height at the basin to a 4-foot height at about 150 feet downstream.

The outlet discharges are controlled from a gatehouse structure situated on the crest of the dam, in which closure and operating valves are located. High- and low-level intake pipes lead to a 36-inch diameter cast iron cross piece in the shaft, from which two outlet pipes lead to an exit structure at the toe of the dam. Outlet releases are regulated by two 36-inch gate valves, which are installed on the upstream and

downstream ends of the cross piece. Outlet discharges flow through approximately 72 feet of 60-inch diameter precast concrete blow-off chamber with a concrete headwall at the downstream toe of the dam below the gatehouse. The 60-inch pipe is supported throughout its length by a concrete cradle and has concrete seepage collars intermittently spaced along its length. Parallel to this outlet, there is a 36-inch diameter cast iron outlet pipe leading from the gatehouse to the blow-off chamber.

Inspection and Condition Assessment

In August 2014, a visual inspection and assessment of this dam and its associated facilities was performed. In general, the structure was found to be in good condition and was being properly maintained. Recommendations were provided for intermediate and short-term maintenance (i.e. brush removal, slope stabilization, etc.) as well as long term maintenance and operational procedures to be employed. PWSB continues to routinely maintain the facility consistent with standard care of practice and recommendations in the Assessment.

Per the guidelines of the Rhode Island Emergency Management Agency and the Rhode Island Department of Environmental Management, an Emergency Action Plan (EAP) was created for the Arnold Mills Reservoir Dam in 2019. The EAP identifies responsibilities and procedures in the case of unusual or unlikely conditions that may threaten the Arnold Mills Reservoir Dam. Updates to the plan are to be performed on a yearly basis.

2.3.5 Groundwater Sources

The Pawtucket Water Supply Board owns a series of ten wells along Abbott Run that can supplement the surface water supply; wells 2A through 9 are currently available for use. Wells No 1 and 2 have been abandoned and are no longer in service. Wells 10 and 11 have no power and are not connected to the system. They are exercised via the generator and discharge to an adjacent stream.

Runoff from the 27 square mile drainage area of Abbott Run is utilized by both Cumberland and Pawtucket water supply systems. Two surface reservoirs, Diamond Hill Reservoir and Arnold Mills Reservoir, having a combined usable storage capacity of 4.8 billion gallons, capture runoff from an area of 17.8 square miles upstream from Arnold Mills. Water is released from the reservoir to Abbott Run as needed and is ultimately withdrawn at a treatment plant at Happy Hollow Pond. Part of the released water is withdrawn by municipal wells that induce infiltration from Robin Hollow Pond and Happy Hollow Pond.

2.3.6 Groundwater Wells

PWSB's eight operating wells are in the Abbott Run Valley Aquifer. All wells are fed directly into the raw water intake at Happy Hollow Pond as water quality dictates. These wells are also activated when raw water quality is poor, as can happen with high turbidity in the spring or during periods of intense rainfall.

2.3.7 Water Purification (Treatment) Plant

The treatment plant located at 87 Branch Street in Pawtucket was placed into operation in March of 2008 and was designed to replace the old treatment facility located at 120 Mill Street in Cumberland. The treatment plant utilizes a fixed bubble aeration system to oxygenate and circulate the water in Happy Hollow Pond near the raw water intake and Raw Water Booster Pump (RWBP) Station. Approximately 500 feet of aeration diffusion piping is placed in the bottom of Happy Hollow Pond to overcome stratification, eliminate stagnation, oxidize organics, control algae, and enhance raw water quality. The mixing action controls temperature variation in the reservoir and permits optimization of coagulation chemistry at the water treatment plant.

The Raw Water Pump Station is located at 118 Mill Street in Cumberland, RI adjacent to the old Water Treatment Facility at 120 Mill Street. The Raw Water Pump Station (RWPS) draws water from Happy Hollow Pond through the submerged intake. The intake consists of two, 30-inch branches; each branch separates via a tee fitting into two sub-branches that each connects to two intake screens. The individual groundwater wells, Well No. 2A through Well No. 9, connect to a 20-inch well water header. Water from the wells passes through a cascade aerator to strip the radon prior to connection with the raw water intake line from Happy Hollow Pond. Raw water can be dosed with PAC for taste and odor prior to reaching the treatment plant. Caustic soda can be added to adjust the pH of the water at the RWPS. Raw water from Happy Hollow Pond is pumped from the RWPS approximately one mile through two, 36-inch raw water transmission pipelines to the treatment facility at 87 Branch Street. The single 36-inch pipeline from the RWPS separates via a tee fitting into the two, 36-inch pipelines that then rejoin via a tee fitting to one 36-inch pipeline prior to entering the treatment plant.

In 2014, the raw water pump station was retrofit with a system designed to feed powder activated carbon (PAC) to the raw water supply to aid in the control of seasonal taste and odor problems. These taste and odor problems have been attributed to the levels of Geosmin and 2-Methylisoborneol (MBE) which are naturally organic compounds that occur in surface waters and both of which are discernable to consumers at extremely low levels. Their occurrence is most associated with the warmer weather and algal blooms. In 2019, the granular activated carbon beds at the water treatment plant were changed out with new carbon. Moving forward, the carbon will be routinely regenerated on a rotating schedule with several of the 8 filter beds being periodically regenerated.

The water treatment plant is designed to produce up to 25 MGD of finished water. Additionally, it was designed to allow 30 MGD to flow through the facility without major piping or structural modifications. The facility design also allows implementation of chloramines without major modification or plant shut down.

The treatment plant uses polyaluminum chloride (PAC)/alum as a coagulant and contact clarification to remove TOC, color, and turbidity prior to deep bed Granular Activated Carbon (GAC) filters. The water then passes through UV disinfection units then dosed with sodium hypochlorite and sent to a channeled 1.4 MG clearwell with a contact time of 90 minutes, and either pumped directly into the distribution system or to the on-site 5 MG storage tank. The treatment plant is completely controlled by in-line process analyses and a computer based Supervisory Control and Data Acquisition (SCADA) System.

Each contact clarifier is back flushed every 4 hours of operation using a raw water/air scour flush. The GAC filters backwash with potable water and air every 24 to 48 hours. The flush and backwash wastewater flows into equalization basins located under the filters. From the equalization basins, the combined residuals waste is pumped to two dewatering lagoons via a 12-inch force main to the new lagoons located at the site of the old treatment plant lagoon site. These lagoons are lined and have an underdrain system for proper dewatering of the PAC/alum sludge. One hundred percent of the clarified water is recycled. This water is sent back to the intake and blended with surface water and which cannot exceed 5% of the total daily flow.

Emergency generators are provided at the raw water pump station and the WTP to allow full production of up to 25 MGD during extended power outages. With diesel fuel deliveries at 48-hour intervals, the WTP and pumps could operate indefinitely on the auxiliary power system. The process flow is provided in Figure 2-3a; Figure 2-3b provides the system flow.

2.3.8 Storage Facilities

The system has two distribution storage facilities located in Lincoln, and two other storage facilities (clear well and 5.0 MG storage tank). The total system storage is 19.4 million gallons. A brief description of each storage facility is provided below.

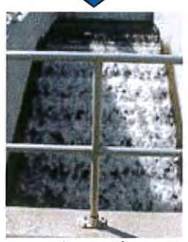
Stump Hill – Green Tank

Location: Stump Hill / Lincoln, RI
Volume: 3,000,000 gallons
Type: Standpipe
Material: Steel
Age: 1959
Condition: Fair
Cathodic Protection: No

Figure 2-3a

Pawtucket, R.I. Water Treatment Process Schematic

Well Water



Aeration

Happy Hollow Pond Water

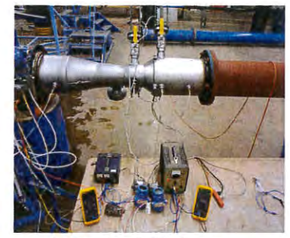
Flow meter

RWPS Pumps

Coagulant

Polymer

Static Mixer



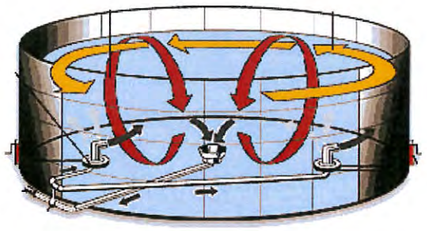
Venturi Tubes

Contact Clarifiers

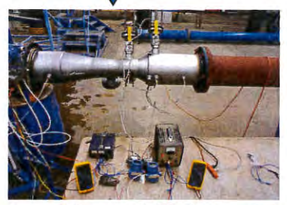
Overflow to Blackstone River

GAC Filters

Branch Street WTF



In-plant Equalization Basins



Venturi Tubes

Backwash Pumps

Backwash (Red Color)

Flow meter

Decant to Blackstone River

Solids Ponds

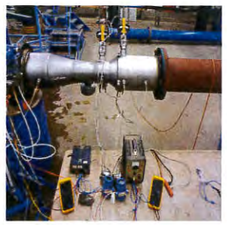
Lime
Chlorine
Calciquest
Ammonium

Lime/Acid
Chlorine
Fluoride

UV

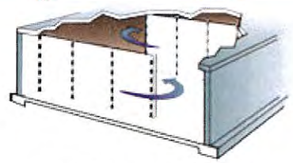
5MG Storage Tank

To distribution system and storage tank



Flowmeter

High Service Pumps



In-Plant Clearwells

To existing backup pumps (to distribution system)

PRV

Figure 2-3b

Wells (8)

C4

C3

Radon Stripper

Raw Water Pump Station

Caustic Soda

Well Influent Diffuser

C2

Screens
Bubbler System

Surface Influent:
- Happy Hollow Reservoir

Robin Hollow Reservoir

C1

2

Water Treatment Plant

Polymer (SuperFloc)
Hypochlorite
PACL
Lime

Static Mixer

Up-flow Contact Clarifier (4)

C5

Filters (8 – 2 for each clarifier)

UV System

Hydrofluosilicic Acid
Hypochlorite
Muriatic Acid

C6

C11

Distribution System

Clearwell (2)

Clearwell Overflow

Tank feed to system

Backwash to Equalization Basins

C10

Equalization Basin Overflow

Lined Residuals Settling Basins

Lime
Calciquest
Hypochlorite

C9

5.0 MG Tank

Note: To feed distribution system, water from the tank returns to the plant and is then fed to the distribution

Tank Overflow

C12

C7

C8

C13

Outfall #005A
Aerator Emergency Overflow to outside of building with overland flow to Happy Hollow Reservoir

Outfall #003A
Emergency Raw Water Drain Line to Blackstone River

Outfall #002A
Lagoon Decant to Abbott Run

Outfall # 004A
Tank/Clearwell/Equalization Basin Emergency Overflow to Blackstone River

Pawtucket Water Flow Diagram – Compliance Map

Stump Hill – Blue Tank

Location: Stump Hill / Lincoln, RI
Volume: 10,000,000 gallons
Type: Reservoir (Above Ground)
Material: Steel
Age: 1996
Condition: Good
Cathodic Protection: No

Branch Street Tank

Location: 85 Branch Street / Pawtucket, RI
Volume: 5,000,000 gallons
Type: Reservoir (Above ground)
Material: Concrete
Age: 2007
Condition: Good
Cathodic Protection: No

Treatment Plant Clearwell

Location: 87 Branch Street / Pawtucket, RI
Volume: 1,400,000 gallons
Type: Underground Reservoir
Material: Concrete (Below Grade)
Age: 2007
Condition: Good
Cathodic Protection: No

WATER STORAGE TANK	TYPE	CAPACITY	OVERFLOW EL. MSL
1) Stump Hill – Green Tank	Standpipe	3 MG	301'
2) Stump Hill – Blue Tank	Reservoir	10 MG	301'
3) Branch Street	Reservoir	5 MG	120'
4) Treatment Plant Clearwell	Clearwell	1.4 MG	N/A
Total Storage		**19.4 MG**	

2.3.9 Pump Stations

The PWSB owns and operates two pump stations. The facilities are identified as the Raw Water Pump Station (RWPS) for the treatment plant and the high lift finish water pumps at the water treatment plant.

Raw Water Pump Station

This pump station was constructed in 2007 and is located at 118 Mill Street in Cumberland adjacent to Happy Hollow Pond. It is designed to deliver raw water approximately one mile south to the water treatment facility. The station is equipped with three (3) 13.2 MGD pumps, for a total reliable pumping capacity of

26.4 MGD. Two of the three 200 HP pump motors were retrofit with variable frequency drives in 2014 (VFD's) to optimize efficiency of the facility.

Finish Water Pump Station

This pump station was constructed in 2007 and is located at 87 Branch Street at the water treatment plant. The pump station consists of four (4) 13 MGD pump, for a total reliable (one spare) pumping capacity of 39 MGD. Each of the 900 HP pump motors have been retrofit with variable frequency drives (VFD's) in 2012 to optimize efficiency of the facility.

2.3.10 Transmission System

System Overview

The PWSB's current system consists of approximately 272 miles of water main with approximately 24 miles of transmission mains (16-inch water main and greater). Pipe sizes range from 2-inch diameter to 12-inch for distribution mains. Transmission mains are 16-inch diameter to 48-inch diameter. These mains transport water from the water treatment plant, the 5.0-million-gallon storage tank at 87 Branch Street and the two distribution system storage tanks at Stump Hill to the entire water distribution system. The transmission and distribution system are comprised predominantly of cement lined cast iron, cement lined ductile iron and a limited amount of unlined cast iron water main.

Since 1988, the PWSB has undertaken an aggressive approach to replacing or rehabilitating the entire distribution system with a predominate goal of either cement lining or replacing all unlined cast iron water mains. PWSB has largely completed its goal of replacing or rehabilitating the entire distribution system in Pawtucket, Central Falls and the Valley Falls section of Cumberland.

Transmission and Distribution Main Lining and Replacement

PWSB considers transmission lines as the pipes that are 16 inches in diameter or greater and are the pipes required to carry potable water from a water source to or throughout an area served or to be served by a water supply system for the specific purpose of supplying water to support a general population. The PWSB owns and operates a total of approximately 24 miles of transmission water main. Less than 1% of these transmission mains are unlined pipe. A listing by water main size and length is provided in Table 2-4.

Since 1988, the PWSB has been replacing, cleaning, and lining mains as part of a capital improvements plan. As of 2020, virtually all mains (transmission and smaller) repair and replacement project have been completed. A listing by city and pipe lining status is provided in Table 2-5.

Table 2-4: PWSB Transmission Mains

Main Size (diameter, inch)	Length (feet)	Length (miles)
48	79	0.01
42	2,598	0.49
36	7,989	1.51
30	9	0.002
24	39,570	7.49
20	49,213	9.32
16	25,738	4.87
	TOTAL TRANSMISSION MAINS	23.71

Table 2-5: PWSB Transmission and Distribution Water Mains by Community

City	Unlined (pre 1958)	Lined (post 1958) Cleaned & Lined	Total
Pawtucket	2.43 miles	200.31 miles	202.74 miles
Valley Falls Section of Cumberland	0.24 miles	39.07 miles	39.31 miles
Central Falls	13.1 miles	19.5 miles	28.76 miles
Lincoln/Attleboro	0.01 miles	1.74 miles	1.75 miles
TOTAL	3.76 miles	268.8 miles	272.56 miles

(Source: Memorandum from Engineering to Chief Engineer, December 2019, updated to include CL-7 project)

2.3.11 Interconnections

The PWSB can supply water to six neighboring municipal water systems: The Town of Cumberland, Town of Lincoln, City of East Providence, and Providence Water Supply Board in Rhode Island, and the Towns of Seekonk and Attleboro in Massachusetts. There is a contract to supply wholesale water to Cumberland although it is expired. However, both parties continue to honor the contract and Cumberland continues to purchase water under the terms of the original contract. The remainder of the interconnections are "emergency" only and would only be utilized as such. All the available contracts, agreements, and letters of understanding are for the supply of water from the PWSB; none are reciprocal in nature to supply the PWSB.

Cumberland, Rhode Island

By contract, Cumberland can draw up to 5 MGD. Cumberland's Marshall Avenue pumping station is the connection between the Cumberland and PWSB systems. A 20-inch transmission main is primarily used to deliver water to the Marshall Avenue pumping station. The transmission main has a capacity of 7 MGD.

Cumberland has a total of six (6) interconnections to the PWSB system, one (1) main interconnection and five (5) emergency interconnections.

Seekonk, Massachusetts

The PWSB is connected to the Seekonk Water District through a 12-inch main on Armistice Boulevard in Pawtucket. The interconnection is considered an emergency transmission connection. The transmission main has a capacity of 2.5 MGD. No Agreement exists.

Lincoln, Rhode Island

The PWSB is connected to the Lincoln Water District through a 12-inch main on Reservoir Avenue in Lincoln. This interconnection is considered an emergency transmission connection. The transmission main has a capacity of 1.0 MGD. Lincoln also has three more emergency interconnections (one is a hydrant to hydrant interconnection) to the PWSB system. A mutual understanding between the systems is in place for assistance however no formal agreement is in place.

Attleboro, Massachusetts

The PWSB system is connected to the City of Attleboro, MA water system through a 12-inch main on Branch Street in Pawtucket, RI. The interconnection is considered an emergency transmission connection. The transmission main has a capacity of 0.635 MGD. Attleboro also has another hydrant to hydrant emergency transmission connection located at Ralco Way and Turner Street in Attleboro, MA. No Agreement exists.

East Providence, Rhode Island

The PWSB has three system interconnections to the City of East Providence: a 12-inch pipe on Prospect Street (Pawtucket), and two 12-inch pipes on Narragansett Park Drive (Pawtucket) roadways 'A' and 'B'. No bulk sale contract currently exists between the PWSB and the City of East Providence; all three interconnections are considered emergency transmission connections. The transmission mains have a total capacity of 6.8 MGD. The connections on Prospect Street and Narragansett Park Drive roadway 'B' are scheduled to be upgraded by the City of East Providence in late summer 2020. These upgrades are to include

new meter vaults, hydrant assemblies, pressure reducing valves, and all other associated appurtenances. No Agreement currently exists.

Providence Water Supply Board, Rhode Island

The PWSB has two system interconnections to the Providence Water Supply Board: a 6-inch pipe on North Main Street and Hillside Avenue and a 12-inch pipe on Mineral Spring Avenue and Dorman Avenue. No bulk sale contract exists between the PWSB and the Providence Water Supply Board; these interconnections are considered emergency interconnections (hydrant to hydrant). As part of the Main Replacement Capital Improvements Plan in 2006, an existing 12-inch main was extended to the Providence City line on East Avenue, which also included a new hydrant. Providence would need to install a new hydrant off their existing main on Hillside Drive to complete a hydrant to hydrant interconnection. No Agreement exists.

2.3.12 Source and Distribution Metering

Master Meters

In 2008, the PWSB installed a 36 inch "turbine" water meter at the raw water pump station to meter flows being pumped to the treatment plant. At the water treatment plant there exists a 36-inch magnetic flow meter that is used to record flow produced by the plant and distributed to the transmission and distribution system.

Distribution System Meters

The PWSB meters 100 percent of its customer service base and as of 2019 included 22,944 residential, commercial, industrial and government customers service accounts. The PWSB also maintains a Meter Installation, Maintenance, and Replacement (MIMR) Plan that is funded through the Infrastructure Replacement Fund (IFR). Typically, meters are replaced on a 15-20-year basis however this is premised on available funding of the IFR account.

In 2005, the PWSB, undertook an aggressive in-house meter replacement program whereby over a three year period all water system meters (Neptune ARB style meters) within the distribution system were replaced and fitted with a remote read meter interface unit (MIU). The MIU is a two-way radio frequency (RF) read device that is designed for use by the water utility to quickly and accurately record a customer's meter reading. This program was completed in 2008 and permitted the collection of all customer service meter reads over a three – four-day period.

Utilizing the new radio read meter system, the PWSB continued with its quarterly billing system and in 2008 switched to a monthly billing program. Since 2008, the PWSB has maintained a monthly billing program for

the entire customer service territory and which has been proven tremendously successful and well received by the customer base. The monthly billing permits customers to budget for water use on a regular basis, reduces water loss and accelerates leak detection and prevention.

The PWSB also maintains an ongoing program of meter replacement which targets 5/8-inch to 2-inch meters that have been in service for 15 years or longer. These "older" meters are routinely replaced by in-house staff on a daily basis (average of 6 – 8 per day) and will continue through the IFR program. All meters 3-inch and larger are owned by the customer and are required to be tested every 2 years. The PWSB averages approximately 1,600 to 1,800-meter replacements per year.

SECTION 3 – CAPITAL IMPROVEMENT PROGRAM

3.1 Background

Beginning in 1988, the Pawtucket Water Supply Board (PWSB) began a comprehensive and aggressive Capital Improvement Program (CIP) of the entire water supply, treatment, transmission and distribution system. This resulted in the replacement of an aging Water Treatment Plant (WTP) with a newly constructed WTP which was placed into operational service in March of 2008. In addition, the PWSB will have either replaced or cleaned and relined the entire PWSB owned transmission and distribution system by 2021. To that end, the CIP outlined below is a continuation of these efforts. A summary of the 20-year CIP plan including projects and anticipated costs is provided in Table 3.1.

3.2 Raw Water Supply and Transmission Improvements

3.2.1 Land Acquisition

Summary

The PWSB owns 2,046 acres (3.2 square miles) of watershed property and controls the development rights of another 140 acres through the purchase of conservation easements. A conservation easement allows the property to remain in the hands of the private landowner but prohibits residential, industrial or commercial development and subdivisions and prohibits activities which are potentially damaging to the land and/or water resources. These restrictions are binding on all future owners of the property and ensures that the land will perpetually remain in its natural state. This is critical in that a pristine watershed will naturally filter pollutants and improve water quality by slowing surface runoff and increasing the infiltration of water into the soil. The result is less flooding and soil erosion and cleaner water downstream; all of which helps reduce water treatment costs and increase groundwater recharge.

It is the policy of the PWSB to evaluate all properties within the watershed as they become available for purchase or control of conservation easements. The PWSB also continues to look for partnership opportunities with other public or private organizations that may have funds available for participation in land conservation within the Watershed. The PWSB will continue to remain diligent in the protection of its water resources and the delivery of safe drinking water to its customers.

Protective Actions Taken by the PWSB

The PWSB has in the past and will continue to work with the Town of Cumberland, the Cumberland Land Trust (CLT) and the Cumberland Open Space Commission (OSC) to acquire properties or development rights of properties within the Watershed. The PWSB has also coordinated a participated funding program with these agencies to acquire and purchase land within the Watershed.

20 YEAR CIP PROJECTS
PAWTUCKET WATER SUPPLY BOARD
CAPITAL IMPROVEMENTS AND INFRASTRUCTURE PLAN PROJECTS

Updated as of 1/21/2022

Project Name	Funding Source	CY 2022	CY 2023	CY 2024	CY 2025	CY 2026	CY 2027	CY 2028	CY 2029	CY 2030	CY 2031	CY 2032	CY 2033	CY 2034	CY 2035	CY 2036	CY 2037	CY 2038
Land Acquisition	RES/WRB																	
Watershed Security Fencing	IRF	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Slope Mower (spider) & Trailer (X-Mark in 2022)	IRF	$ 10,000	$ 60,000															
Well Station Rehabilition Construction 2, 3, 4, 5	IRF		$ 1,500,000															
Well Station Rehabilition Construction 6, 7, 8, 9	IRF			$ 1,500,000														
Well Field Assesment and Design (RFQ)	IRF	$ 200,000																
Sisters of Mercy Building Demolition	IRF	$ 75,000																
EAP for Dams - Update Plan	IRF																	
Dam Inspections	IRF		$ 5,000		$ 5,000		$ 5,000		$ 5,000		$ 5,000		$ 10,000					
Reservoir Road Bridge Repair	IFR		$ 2,000,000															
Dam Facility Assess - Design / Const. Recommed's	IFR	$ 100,000																
Happy Hollow Dam Improve (Eng/Perm/Const)	IRF		$ 100,000	$ 400,000														
Arnold Mills Dam Improve (Eng/Perm/Const)	IRF				$ 400,000	$ 400,000												
Diamond Hill Dam Improve (Eng/Perm/Const)	IRF							$ 50,000	$ 200,000									
Raw Water Facilities Total		**$ 425,000**	**$ 3,705,000**	**$ 1,940,000**	**$ 445,000**	**$ 440,000**	**$ 45,000**	**$ 90,000**	**$ 245,000**	**$ 40,000**	**$ 45,000**	**$ 50,000**	**$ 45,000**	**$ 40,000**	**$ 45,000**	**$ 40,000**	**$ 45,000**	**$ 40,000**
Sludge Removal	IRF	$ 250,000																
120 Mill Street ESA & Demolition Assess.	IRF	$ 30,000																
WTP Residuals Line Relocation	IRF		$ 750,000															
120 Mill St WTP Engineering Assessment	IRF		$ 100,000															
Decomission 120 Mill St WTP (Eng/Perm/Const)	IRF			$ 1,000,000	$ 2,000,000													
WTP Maintenance and Repairs	IRF	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000
Water Treatment Facilities Total		**$ 780,000**	**$ 1,350,000**	**$ 1,500,000**	**$ 2,500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**	**$ 500,000**
Hydraulic Model Software (model update)	IRF					$ 25,000												
Hydraulic Model Additional Services	IRF		$ 20,000		$ 20,000				$ 20,000				$ 20,000				$ 20,000	
Distribution System Tank Assessment	IRF		$ 50,000	$ 900,000														
3 MG Stump Hill Tank Rehab. (Eng/Const)	IRF				$ 5,000						$ 5,000						$ 5,000	
3 MG Tank Inspection & Clean	IRF					$ 800,000	$ 2,500,000											
10 MG Stump Hill Tank Rhb (Eng/Const)	IRF				$ 10,000						$ 10,000						$ 10,000	
10 MG Tank Inspection & Clean	IRF										$ 5,000						$ 5,000	
5 MG Branch ST Tank Rehabilitation	IRF	$ 400,000																
5 MG Concrete Tank Inspection & Clean	IRF				$ 5,000													
Attleboro, Mass Emerg. Interconnection	IRF	$ 150,000																
BCWA / EP Wholesale Inter (24" at 7600 ft)	SRF		$ 1,600,000	$ 1,600,000														
MR-12 Improvements	IRF	$ 2,600,000																
MR-13 Improvements	SRF				$ 2,000,000	$ 2,000,000												
MR-14 Improvements	IRF						$ 1,000,000	$ 1,000,000										
Leak Detection in Distribution System (5 yr)	IRF		$ 30,000					$ 30,000						$ 30,000				
Main, Hydrant & Service repl. (T&D)	IRF	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
Road and sidewalk rest. (T & D)	IRF	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000
Transmission & Distribution Total		**$ 3,500,000**	**$ 2,050,000**	**$ 2,850,000**	**$ 2,390,000**	**$ 3,175,000**	**$ 3,850,000**	**$ 1,380,000**	**$ 370,000**	**$ 350,000**	**$ 370,000**	**$ 350,000**	**$ 370,000**	**$ 380,000**	**$ 350,000**	**$ 350,000**	**$ 390,000**	**$ 350,000**
Vehicles & Equipment (backhoe in 2023)	IRF	$ 140,000	$ 300,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000	$ 140,000
MUNIS / CityWorks Integration	IRF		$ 50,000															
Computer Hardware & Software	IRF	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Misc Bldg. Facility Repairs / Installations	IRF	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Meter Propagation Path Study	IRF	$ 50,000																
Fixed Network "Smart" Meters / L&C Inventory	SRF		$ 10,000,000															
Meter replacement (materials)	IRF	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000	$ 110,000
Administration Total		**$ 400,000**	**$ 10,560,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**
Grand Total		**$ 5,105,000**	**$ 17,665,000**	**$ 6,640,000**	**$ 5,685,000**	**$ 4,465,000**	**$ 4,745,000**	**$ 2,320,000**	**$ 1,465,000**	**$ 1,240,000**	**$ 1,265,000**	**$ 1,250,000**	**$ 1,265,000**	**$ 1,270,000**	**$ 1,245,000**	**$ 1,240,000**	**$ 1,285,000**	**$ 1,240,000**

Funding Source	CY 2022	CY 2023	CY 2024	CY 2025	CY 2026	CY 2027	CY 2028	CY 2029	CY 2030	CY 2031	CY 2032	CY 2033	CY 2034	CY 2035	CY 2036	CY 2037	CY 2038
Infrastructure Reserve Fund - "Pay as You Go"	$ 5,105,000	$ 16,065,000	$ 5,040,000	$ 3,685,000	$ 2,465,000	$ 4,745,000	$ 2,320,000	$ 1,465,000	$ 1,240,000	$ 1,265,000	$ 1,250,000	$ 1,265,000	$ 1,270,000	$ 1,245,000	$ 1,240,000	$ 1,285,000	$ 1,240,000
Debt Service - SRF	$ -	$ 11,600,000	$ 1,600,000	$ 2,000,000	$ 2,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Restricted Land Fund	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
WTP Reserve Fund	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Additionally, the PWSB maintains an active involvement in all developments within the Watershed. All construction plans within the Watershed are reviewed by the PWSB, and if comments are warranted, they are sent to the Town or RIDEM.

The PWSB has also worked with the Zoning Committee to create a watershed overlay district. This watershed overlay district will help protect both Cumberland's and Pawtucket's watersheds by prohibiting certain types of commercial and industrial activities. In addition to the work with the Zoning Committee, the PWSB worked with the RIDEM for two (2) years to get a Storm Water Management Plan (SWMP) completed and approved by the RIDEM.

Funding and Scheduling

Pursuant to RIGL § 46-15.3-5, "There is hereby imposed on each supplier of water, for the purpose of protecting the quality and safety of the public supply of water, a charge to be known as a "water quality protection charge" based upon billings for sales of every supplier of public drinking water at the rate of two and ninety-two hundredth cents ($0.0292) per one hundred (100) gallons of each sale." The water quality protection charge is collected by the Rhode Island Water Resources Board (RIWRB). A portion of the charge is used to fund the RI Infrastructure Bank and a portion of the charge is kept in a separate water quality protection fund. After sufficient money is available in the water quality protection fund, the money is returned to suppliers through bond issues for source water protection purposes.

The PWSB has established its own water quality protection fund. The funds are restricted to acquisition of a fee simple interest or of a conservation restriction, as that term is defined in RIGL § 34-39-2(a), or other interest in watershed lands, including, but not limited to, costs and expenses relating to the improvement of the lands or interests therein, maintenance of the lands or roads or interests therein, and taxes thereon, or the funding of the construction of physical improvements that directly protect the quality and safety of public drinking water supply. No funds shall be used to extend service lines or expand system capacity. The current balance in the water quality protection fund is $890,534. The purchase of land and rights is funded through the PWSB Restricted Land Fund. See Section 4 for additional detail. The PWSB will continue to evaluate watershed property that can be purchased within the funds available in the Restricted Land Fund.

3.2.2 Watershed Security Fencing

Summary

The PWSB owns and is responsible the preservation and protection of approximately 2,046 acres of watershed land. As such, the PWSB continually monitors and evaluates fencing needs for all properties.

Funding and Scheduling

The PWSB bids a contract for general fencing maintenance and repair every two years which establishes the unit prices for different types of fences. The PWSB budgets $40,000 annually to pay for the fencing contract. This is paid through the Infrastructure Reserve Fund (IRF).

3.2.3 Ground Water Well Redevelopment

Summary

The operational sequencing of the water treatment plant includes blending of both surface and well water at the intake structure at Happy Hollow Pond.

The WTP has required year-round usage of the wells to supplement the surface water. This is done to cool the surface water in the summer through blending as well as to decrease the burden of operational efficiency of the plant by introducing water that is less turbid. Subsequently, it is imperative that the wells are redeveloped on a regular basis.

Well 2A

As part of the Capital Improvements Plan Well 2 was replaced with Well 2A in April 2007. Well 2 was found to be out of plumb as it had shifted its position through the years and was severely plugged with the pumping rate reduced from a design of 700 gpm to approximately 85 gpm.

Well 2A was installed in vicinity to Well 2 and consists of a gravel-packed well that was installed in April 2007. The replacement well is 65.5 feet deep with 4.5 feet of screen. The facility is equipped with a vertical turbine pump with a rated capacity of 350 gpm at 80 feet total dynamic head (TDH) with an 8-inch discharge.

This well station was utilized from its installation in 2007 through 2011. In late 2011, the well yield began to significantly drop and the well was not utilized. There are ongoing efforts to rehabilitate and inspect the well. In addition, the underground electric service that supplies power to Well 2A and 3 is being upgraded due to service issues. Well 2A was last utilized in 2011.

Well 3

This facility consists of a gravel-packed well originally constructed in 1950 by Layne Christensen Company. The well is 40.43 feet deep with 10 feet of screen. The station is equipped with a vertical turbine pump with a rated capacity of 948 gpm at 77 feet TDH with a 10-inch discharge. The pump and motor were last serviced in 2013.

Well 4

This facility consists of a gravel-packed well originally constructed in 1958. The well is 80 feet deep with 10 feet of screen. The station is equipped with a vertical turbine pump with a rated capacity of 703 gpm at 249 TDH with an 8-inch discharge. The well was last serviced in 2016.

Well 5

This facility consists of a gravel-packed well originally constructed in 1958 and was chemically treated and redeveloped in 2004. The well is 54 feet deep with 10 feet of screen. The pump bowl and column assembly were replaced in February 2005. The station is equipped with a vertical turbine pump with a rated capacity of 600 gpm at 392 TDH with an 8-inch discharge. The well was last serviced in 2017.

Well 6

This facility consists of a gravel-packed well originally constructed in March 1966. The well is 55.5 feet deep with 10 feet of screen. The station is equipped with a vertical turbine pump with a rated capacity of 780 gpm at 64 feet TDH with an 8-inch discharge. The pump was removed and replaced in 1999 and the station was last inspected in February 2001. At the time of inspection, both the well and pump were noted in satisfactory condition and operating normally.

Well 7

This facility consists of a gravel packed well originally constructed in January 1966. The well is 47.55 feet deep with 10 feet of screen. The station is equipped with a vertical turbine pump with a rated capacity of 900 gpm at 67 feet TDH with an 8-inch discharge. The well was last serviced in 2018.

Well 8

This facility consists of a gravel-packed well originally constructed in June 1966. The well is 83 feet with 20 feet of screen. That station is equipped with a vertical turbine pump with a rated capacity of 1200 gpm at 64 feet TDH with an 8-inch discharge. The well was last inspected in February 2001.

Well 9

This facility consists of a gravel-packed well originally constructed in March 1966. The well is 55.6 feet deep with 10 feet of screen. The station is equipped with a vertical turbine pump with a rated capacity of 1067 gpm at 57 TDH with an 8-inch discharge. The well was last inspected in February 2001.

Wells 1, 2 (abandoned), 10, and 11

Wells 1 and 2 have been abandoned and are no longer in service. Wells 10 and 11 have no power and are not connected to the system. They are exercised via the generator and discharge to an adjacent stream.

Funding and Scheduling

Depending upon the size, depth, and construction of the well the cost to redevelop can vary. For planning purposes, PWSB budgets a cost of $15,000.00 for well redevelopment. Redevelopment of the wells will be paid through IRF. When properly maintained, the anticipated useful life of a gravel production well is estimated to be 75 years or greater. At such time, a well is no longer productive, the well shall be abandoned, and a satellite well shall be considered for installation.

3.2.4 Well Field Electric Power and Distribution System

In 2017 PWSB commissioned an electrical design project that included upgrading antiquated electrical switchgear within the old treatment plant that supplied electric service via overhead wires to Well Stations 3, 4 and 5, the aerators, and bascule gate. In addition to this equipment being 40 – 50 years in age, the overhead wires were problematic during winter and storm periods as periodic power outages were common.

A 1.1-million-dollar construction project was conducted in 2019 / 2020 which included upgrading the primary electric service from National Grid that supplies the well field facilities. This include new transformers, service entrance and switchgear, removing primary feed from the old WTP and installation of direct bury electrical cable to supply power to Well Stations 3, 4 and 5. The old equipment including overhead electric lines were removed and disposed. The useful life of the new electrical equipment is in the range of 40 – 60 years.

3.2.5 Well Structure Facilities 3 through 9 Replacement / Rehabilitation

Summary

The existing Well Stations facilities of 3, 4 and 5 are substantial concrete and brick buildings in fair to good condition and with minimal structural repair it is anticipated that their useful life is 50 years. The existing steel buildings for Wells 6 through 9 are well beyond their useful life and need to be replaced. All the well facilities require interior mechanical, electrical, structural, instrumentation and control and architectural rehabilitation that is planned within the next five years. The PWSB currently plans on replacing the existing steel buildings with precast concrete buildings like the building installed at Well 2A.

Funding and Scheduling

For the buildings at Wells 3 through 9, the PWSB will use an estimated construction cost of $300,000 for each building structure. As such, the PWSB will use a planning level cost of $350,000 for engineering and permitting related to the replacement or rehabilitation upgrade of the Well Station Facilities. The PWSB anticipates the design and construction of the well building replacement to take place in staged phases beginning in FY2020 through FY 2022.

3.2.6 Emergency Action Plan (EAP) for Dams

Summary

Rhode Island General Law (RIGL) section 46-19-9 requires "an emergency action plan shall be prepared for each significant or high hazard dam by the city or town wherein the dam lies." The PWSB currently owns four significant or high hazard dams (1) Diamond Hill Dam, (2) Arnolds Mills Dam, (3) Robin Hollow Dam, and (4) Happy Hollow Dam. All four dams are in the Town of Cumberland, RI. In addition, the city or town can be reimbursed for the costs for preparing the emergency action plan.

Funding and Scheduling

Per the guidelines of the Rhode Island Emergency Management Agency and the Rhode Island Department of Environmental Management, an Emergency Action Plan (EAP) was created for the four dam structures in 2019 by the Town of Cumberland. The EAP identifies responsibilities and procedures in the case of unusual or unlikely conditions that may threaten the dam structures. Updates to the plan are to be performed on a yearly basis.

3.2.7 Happy Hollow Dam and Spillway Improvements

Summary

The Happy Hollow dam was last inspected in May of 2005 by Pare Corporation and was determined to be in generally good condition. As part of this inspection and evaluation, Pare provided recommendations for maintenance and possible improvements.

Funding and Scheduling

Based on the recommendations in Pare's 2006 report, the PWSB is using a planning level cost of $1,400,000 for the improvements to the Happy Hollow dam. In addition, the PWSB is using a planning level cost of $420,000 for engineering, permitting and construction services. The PWSB anticipates that design of the improvements will occur in FY2021 with construction spread across FY2021 and FY2022. The PWSB anticipates that engineering and construction will be paid through IRF.

3.2.8 Robin Hollow Dam Improvements

Summary

The Robin Hollow dam and spillway was inspected in 2005 by Pare Corporation and 2010 by Rhode Island Department of Environmental Management (RIDEM) and found to be in fair to poor condition.

Funding and Scheduling

Improvements to the Robin Hollow Dam were bid in February of 2011, and was awarded to New England Infrastructure, Inc., for a bid price of $1,559,760. After approval of Change Order #1, the final project cost was $1,560,329.22. The construction was funded through IRF and completed in fall of 2012.

3.2.9 Arnold Mills Dam and Spillway Improvements

Summary

The Arnold Mills dam and spillway was inspected in 2005 and again in 2014 by Pare Corporation and was determined to be in fair to good condition. As part of this inspection and evaluation, Pare provided recommendations for maintenance and possible improvements.

Funding and Scheduling

Based on the recommendations in Pare's 2006 report, the PWSB is using a planning level cost of $800,000 for the improvements to the Arnold Mills dam. In addition, the PWSB is using a planning level cost of $60,000 for engineering and permitting. The PWSB anticipates that design of the improvements will occur in FY2023 with construction spread across FY2024 and FY2025. The PWSB anticipates that engineering and construction will be paid through IRF.

3.2.10 Diamond Hill Dam and Spillway Improvements

Summary

The Diamond Hill dam and spillway was inspected in 2005 and again in 2014 by Pare Corporation and found to be in fair to good condition. As part of this inspection and evaluation, Pare provided recommendations for maintenance and possible improvements.

Funding and Scheduling

Based on the recommendations in Pare's 2006 report, the PWSB is using a planning level cost of $190,000 for the improvements to the Diamond Hill dam. In addition, the PWSB is using a planning level cost of $57,000 for engineering and permitting. The PWSB anticipates that design of the

improvements will occur in FY2023 with construction in FY2024 and FY 2025. The PWSB anticipates that engineering and construction will be paid through IRF.

3.3 Water Treatment Improvements

3.3.1 Sludge Removal

Summary

While the new WTP was being built, the old WTP was being operated by the Design, Build and Operate (D/B/O) contractor, Earthtech (now operated by SUEZ). As part of the First Settlement Agreement to the D/B/O contract with Earthtech related to the removal of sludge from the sedimentation basin, the PWSB "will, upon presentment by Earthtech of invoices substantiating the same, make payment to Earthtech of the percentage of costs incurred by Earthtech in removing and disposing of such sludge as 8 months to the total number of months from July, 2003 through the month in which Acceptance (of the WTP) occurs, with Earthtech responsible for the balance of the cost of such removal and disposal" of the water treatment sludge at the decommissioned water treatment plant at 120 Mill Street. Acceptance of the WTP occurred on March 2008, consequently the PWSB is responsible for 8/56ths of the cost of the removal and disposal.

Funding and Scheduling

AECOM, the company now responsible for the removal of the sludge, received an estimate of $1,200,000 to remove the sludge from the old sedimentation basin. This would result in a cost to the PWSB of $171,242. The cost for the PWSB's portion of the removal of the sludge will be paid for through the WTP decommission fund when completed with any overages due to miscalculated quantity derived from IRF funds. It is anticipated that this work will take place in FY 2020 and FY 2021.

3.3.2 12 inch Decant Line Relocation

Summary

In March of 2020, PWSB completed repairs on an existing 12-inch ductile iron residuals pipeline at the water treatment plant. This main is used to convey backwash water from the filters up to the settling lagoons located approximately one mile to the north. The repair was complicated by the depth of the main (30 feet), high groundwater table and proximity to the building facility. PWSB is considering options of relocating a portion of this main at a shallower more acceptable location for long term maintenance and function.

Funding and Scheduling

PWSB has commissioned an engineering firm to complete a design for the relocation of this 12-inch residuals main. It is estimated that the cost of relocation will be $750,000 to be funded from IFR account funds and will occur in FY 2021.

3.3.3 Decommission Old Water Treatment Plant

Summary

The old water treatment plant located at 120 Mill Street in Cumberland, Rhode Island has been idle since March 2008. The PWSB is considering possible uses for the building structures on the property however there are no definitive plans. In all likelihood, the lower levels including the filter galleries, clear well, etc. of the facility will need be to abandoned and properly decommissioned.

Funding and Scheduling

For planning purposes, the PWSB is anticipating the possibility for the decommission and demolition of the entire old WTP. Planning level cost estimate for decommission and demolition is $3,000,000 and is scheduled for implementation in FY2021 and FY2022 and will be funded through IRF. Prior to demolition PWSB will conduct an Environmental Site Assessment of the facility which is scheduled for FY 2021 with an estimated cost of $30,000 to be funded through IRF.

3.3.4 Water Treatment Maintenance and Repairs

Summary

The water treatment plant located at 87 Branch Street was placed into operational service in March of 2008. Generally, the structural and architectural components of the facility have an expected useful life of 75 – 100 years. Process piping, valves, filter equipment, electrical wiring and controls, etc. has an expected useful life of 25 – 50 years. Mechanical equipment is anticipated to have a useful life of approximately 25 years. Instrumentation control and SCADA (supervisory control and data acquisition systems) systems are expected to have a useful functional life of 10 years. In 2019, SCADA control systems including software and peripheral equipment was upgraded by SUEZ to a state-of-the-art system as the existing technology had become functionally obsolete.

Funding and Scheduling

For planning purposes, PWSB allocates $500,000 annually for various upgrades of existing equipment and systems at the WTP which is to be funded through IRF.

3.4 Transmission, Distribution and Storage Improvements

3.4.1 Distribution System Hydraulic Model

Summary

The PWSB commissioned the firm of CDM to update its computer hydraulic model of the entire supply, transmission, and distribution system in 2012 at a cost of $99,000. The hydraulic model was completed in 2014 and now serves as a useful tool for the PWSB to provide hydraulic analysis of the water system for system improvements, development of a uni-directional flushing program, etc. Before 2014, a hydraulic model was last performed for the water system in 1987.

Funding and Scheduling

In addition, The PWSB estimates that updates, training and the purchase of modeling software will cost an additional $60,000 to be expended over the ten fiscal years. The PWSB will periodically update the model to maintain accuracy as system improvements including main replacement and cleaning and lining occur. Costs associated with the hydraulic model have been and will continue to be funded through IRF.

3.4.2 Water System Storage Tanks

Summary

The system has two distribution storage facilities located at Stump Hill in Lincoln and two other storage facilities at the water treatment plant at Branch Street in Pawtucket. The Lincoln tanks, located within the distribution system, are composed of welded steel construction and total 13 million gallons in storage. The two tanks at the water treatment plant are primarily used for clear well storage and for aid in operational flexibility and total 6.4 million gallons. Generally, when properly maintained, water stoarge facilities are expected to have a useful life of between 75 – 100 years.

3.4.3 Storage Tanks Inspection and Rehabilitation

The two tanks in Lincoln are at the end of Reservoir Avenue at Stump Hill. The larger of the two tanks consists of a 10-million-gallon welded steel reservoir constructed in 1996. The other tank consists of a 3-million-gallon welded steel standpipe constructed in 1959. This tank was last recoated in 1990. The 3-million-gallon tank is currently out of service as the 10-million-gallon tank provides sufficient system storage capacity. The 1.4-million-gallon concrete clear well and 5-million-gallon concrete tank were both constructed in 2008 as part of the treatment plant. The 5-million-gallon concrete tank is used as additional clear well capacity for the treatment plant. These tanks were last inspected in 2018 and are periodically re-inspected at 5 year intervals.

The 2018 inspection indicated that the 3 million-gallon tank was in fair condition and that the structure should be rehabilitated in the next several years. As this facility has been removed from service, the rehabilitation program has been delayed. The 2018 report indicated that the 10-million-gallon tank was in good condition and that interior and exterior coatings exhibited good adhesion. Generally, coating systems last between 20 – 25 years. The 5-million-gallon tank was in good condition and it was recommended that exterior power washing and seal coating be performed within the next few years. Tank inspections will be completed at approximate 5-year intervals.

Consistent with good water works practice tank rehabilitation in addition to interior and exterior coatings rehabilitation shall consider required structural repairs to the tank and foundation, installation of safety and OSHA compliant rails, guards, fall protections systems, etc. and installation of internal mixing systems to reduce water age and enhance tank function. A pre maintenance inspection will be completed to determine the scope of the rehabilitation program.

Funding and Scheduling

The PWSB estimates that tank inspection and cleaning will cost $5,000 for the 3 and 5 million-gallon tanks and $10,000 for the 10-million-gallon tank all of which are to be completed at approximate 5-year intervals. SUEZ, PWSB's contract operations firm, is tasked with periodically inspecting and maintaining the 1.4 million gallon clear well as part of normal operations. The PWSB has a planning level cost of $300,000 for rehabilitation of the 5-million-gallon concrete tank which is anticipated to take place in FY 2021. The PWSB has a planning level cost of $900,000 for rehabilitation of the 3-million-gallon tank which is anticipated to take place in FY 2022/2023. The PWSB has a planning level cost of $3,300,000 for rehabilitation of the 10-million-gallon tank which is anticipated to take place in FY 2025 / 2026. These projects will be funded through the IRF.

3.4.4 Attleboro, Massachusetts Emergency Interconnection

Summary

As part of both their long term and emergency planning, the City of Attleboro Massachusetts has entered into a wholesale agreement with PWSB for the purchase of water on an emergency basis. Attleboro has in the past experienced episodes of water shortage during drought conditions and seeks alternate source of water supply. Attleboro will be constructing a pump station with metering and chemical controls for purchase and conveyance of water from PWSB.

Funding and Scheduling

Attleboro will bear the cost of design and construction for the facility which is to be located at the intersection of Ralco Way and Turner Drive in Attleboro. PWSB will require minimal piping modifications and SCADA improvements and the cost of which is projected at $150,000 for fiscal year 2021. This project will be funded through the IRF.

3.4.5 East Providence Interconnection

Summary

As part of both their long term and emergency planning, the City of East Providence is contemplating a wholesale agreement with PWSB for the purchase of water. East Providence currently relies exclusively on Providence Water for their entire water supply by two primary connections under the Providence River. Additionally, Bristol County Water currently relies on Providence Water for their primary supply under the Providence River. Recently, issues with this subaqueous pipeline has resulted in diminished capacity in that line forcing Bristol County to rely on additional supply from East Providence. Bristol County has also expressed interest in wholesale water purchase from PWSB via East Providence.

Funding and Scheduling

The timetable is uncertain for this project and will require a substantial commitment of funds from both East Providence and Bristol County Water. For planning purposes, PWSB has allocated an amount of 3,000,000 for water system transmission main improvements in the PWSB system. These funds would be secured though the Rhode Island Infrastructure Bank Program. Currently, this project is planned for FY 2021 however given the circumstances of the project and requisite funding requirements among multiple communities an exact time frame cannot be determined at this time.

3.4.6 Distribution System Improvements

Since 1988, the PWSB has undertaken an aggressive approach to replacing or rehabilitating the entire distribution system. By 2021, the PWSB will have completed the goal of replacing or rehabilitating the entire distribution system in Pawtucket, Central Falls, and the Valley Falls section of Cumberland.

Before 2019, PWSB has sought to fund main replacement and clean and line projects through the Rhode Island Infrastructure Bank Program (formerly Clean Water Finance Agency). Most recently and beginning with Main Replacement (MR) project 11, PWSB will be funding replacement and lining projects through the IRF fund. Additional MR projects 12 – 14 are envisioned for FY's 2022 through 2027 at approximately $750,000 per year to be funded through IRF. These projects are designed to replace undersized mains or areas with a high incident of main failures.

3.4.7 Leak Detection

Summary

Section 4.1.7 of the Rhode Island Water Resources Board (RIWRB) *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers* states that each major water supplier must:

> "Implement leak detection programs in accordance with AWWA standards and water supply system management plans. If leakage is more than 10% of the withdrawals and/or purchased water, as reported to the Board pursuant to rule 5.3.5, a system-wide leak detection program shall be initiated during the following fiscal year and progress reported pursuant to rule 5.3.6, per R.I General Laws § 46-15.3-5.1(c)."

Funding and Scheduling

As discussed in Section 3.4.5, the PWSB has implemented an aggressive main replacement program and is near the end of complete distribution and transmission system rehabilitation. As such, the PWSB has been delaying implementation of a leak detection program until after the main replacement program is completed in FY2021. Starting in FY2021, the PWSB will implement a leak detection program on the distribution system at an estimated cost of $30,000. The leak detection program will be funded through IRF and conducted routinely at five-year intervals. Any identified leaks will be repaired by in house staff and funded through normal operations budget.

3.4.8 Main, Hydrant and Service Replacements

Summary

The PWSB Transmission and Distribution (T&D), in addition to responding to emergency system repairs, is consistently replacing distribution system infrastructure.

Funding and Scheduling

The PWSB bids an annual contract every three years that sets the unit prices for different materials related to main, hydrant and service replacements conducted by the T&D department. The PWSB budgets $250,000 annually for main, service, and hydrant replacements which is funded through IRF. Generally, hydrants have been found to have a useful life of 50 – 75 years, water mains from 75 – 100 years or longer if rehabilitated and services approximately 75 years,

3.4.9 Road and Sidewalk Restoration

Summary

Most of the repair and replacement work conducted by the T&D department is performed on paved urban streets. Consequently, the cities of Pawtucket and Central Falls and the Town of Cumberland require roadway and sidewalk restoration.

Funding and Scheduling

The PWSB bids an annual contract every three years that sets the unit prices for paving and patching.
The PWSB budgets $250,000 annually for road patching and replacement as well as sidewalk replacement which is funded through IRF.

3.5 Administration Improvements

3.5.1 Vehicles and Equipment

Summary

The PWSB owns and maintains a fleet of vehicles (including passenger autos, vans, etc.) and construction equipment (backhoes, dump trucks, crew trucks, compressors, compactors, etc.). The vehicles and equipment ensure the efficient operation of the PWSB and the T&D department routinely performs maintenance and upkeep of this equipment.

Funding and Scheduling

The PWSB budgets $140,000 annually for vehicle and equipment which is funded through IRF. The useful life of the vehicles and equipment varies but is generally serviceable for 10 – 15 years.

3.5.2 GIS, ESRI and Asset Management Software Systems

Summary

Beginning in 2017 the PWSB began a conversion from AutoCAD/Access based to GIS based mapping systems. ESRI software was procured and the conversion was successfully performed by in house staff. The conversion to GIS asset-based system mapping was the prelude to instituting an asset management program. The PWSB tracks assets through an Access database and inventory through the City of Pawtucket billing software.

In 2018, with completion of conversion to GIS based mapping systems, PWSB began the conversion to a comprehensive asset management software system for work orders, inventory, inspections and overall workflow process. In 2019, PWSB contracted with an engineering firm to implement "Cityworks" which is a software product that is GIS based asset for use in tracking assets, creating work orders and inventory

control. Cityworks and ESRI have a partnered agreement whereby the ESRI GIS platform is the base mapping for assets in the Cityworks software and Cityworks allows for the effective management and tracking of the assets. This Asset management system was fully implemented by end of year 2019 and both the ESRI and Cityworks platforms have been deployed on a cloud-based computer system.

Funding and Scheduling

The cost of these software services including hosting of cloud-based computer systems is annually budgeted through government service contracts. The cost of the software and computer storage is budgeted through IRF at an annual cost of $80,000. PWSB shall continue to utilize both software system platforms moving forward with the goal of interfacing with a proposed meter and billing system software (MUNIS) that the City of Pawtucket is rolling out over a five-year period that began in 2019.

3.5.3 Computer Hardware and Software

Summary

Current day water utilities rely on computer hardware and software to efficiently operate the utility. This includes a server-based information and file system This includes a combination of desktops, laptops, and peripheral devices (i.e. field tablets, etc.) and related software operating systems. The PWSB Information Technology (IT) Manager is tasked with maintaining these devices as well as updating software systems and replacing technology as needed. The useful life of the hardware systems is approximately 5 years when at such time devices are replaced and upgraded accordingly.

The PWSB will seek to replace and upgrade software as required, to keep pace with technological advances and the cost of which shall be budgeted within the annual operation and maintenance fund.

Funding and Scheduling

The PWSB budgets $50,000 annually for software and hardware which is funded through IRF.

3.5.4 Miscellaneous Facility Maintenance and Repair

Summary

The Administration, Engineering, Finance, and Customer Service departments are located at 85 Branch Street in Pawtucket. The building at 85 Branch Street is a 130-year-old former pump station that was converted to office space. The building structure requires periodic upkeep and maintenance. Most recently, the PWSB issued a contract in 2019 for 1st floor office improvements to this facility. This included architectural improvements to wall, floor and ceiling surfaces. A project is also budgeted for FY

2020 for replacement of window and frame assemblies. The total cost of both projects is $310,000 and funded through IRF.

The PWSB also maintains a transmission and distribution facility that was constructed in 2014 at 239 Grotto Avenue which consists of two 10,000 square foot building facilities. The main building is utilized for administration, office, storage and stockroom, training room, "ready" room and locker and bathroom facilities. The second building houses the fleet mechanics garage as well as general vehicle and equipment storage. Although new, this facility also requires periodic upkeep and maintenance.

Funding and Scheduling

For planning purposes, the PWSB budgets $50,000 annually for miscellaneous building facility repairs which is funded through IRF.

3.5.5 Meter Replacement

Summary

The American Water Works Association (AWWA) advices that residential water meters be replaced, at a minimum, every 15 years. The PWSB owns and maintains all customer meters up to 2 inch in size within the service territory. As part of PWSB's monthly billing process, meters are constantly monitored for low or zero flow consumption. These water meters are promptly checked and replaced where necessary.

Funding and Scheduling

The PWSB bids an annual contract every two years that sets the unit prices for different size and type of meters. This contract is for meter assembly materials and PWSB staff provide the labor and manpower to physically replace the meter assembly.

The PWSB also maintains an ongoing program of meter replacement which targets 5/8-inch to 2-inch meters that have been in service for 15 years or longer. These "older" meters are routinely replaced by in-house staff on a daily basis (average of 6 – 8 per day) and will continue through the IFR program. All meters 3-inch and larger are owned by the customer and are required to be tested every 2 years. The PWSB averages approximately 1,600 to 1,800-meter replacements per year.

The PWSB budgets approximately $100,000 annually for water meter replacement (materials only) which is funded through IRF. The cost for meter technicians to replace the meters is funded through normal budget operations.

3.5.6 Fixed Network Meter System Install and Setup

Summary

The PWSB is seeking to upgrade its meter reading technology for its approximate 23,000 accounts with a state of the art "fixed network" metering system whereby flows are continuously monitored by radio and software monitors flow and billing. This type of system would require deployment of fixed network radio recorders throughout the distribution system and the replacement of all meter assemblies. This system would provide the ability to track and identify water loss (leaks), provide instantaneous readouts, track usage history, and simplify monthly reading and billing.

Funding and Scheduling

A meter propagation path study is planned for FY 2020 at a cost of $50,000 to determine the number and location of collectors. The cost to procure the meters, software and recording systems as well as replacement of existing meters is estimated at $4,000,000. The cost of this meter replacement system as well as the propagation study is estimated at $4,000,000 for implementation in FY 2021/2022.

SECTION 4 – FINANCIAL EVALUATION

4.1 Background

The Pawtucket Water Supply Board (PWSB) is a Division of the City of Pawtucket, Rhode Island and operates as an enterprise fund financially independent of the overall City budget. The PWSB's costs, expenses and debt service are recovered from user charges. Any surplus in the annual financial operations can be used for capital expenses, debt services, or future operating expenses. Deficits must be recovered by increasing rates.

The PWSB is regulated by the RIPUC, the state agency that is responsible for approving all rate increases for regulated utilities within Rhode Island. The PWSB establishes the system's water rates subject to approval by the PUC. The PUC is a three-person quasi-judicial body that rules on proposed rate increases after considering relevant positions and testimony relative to the proposed rate increase. Rate increases are granted in the form of gross revenue requirement. PWSB is regulated on a cash-basis.

Pursuant to Rhode Island General Law (RIGL) § 39-1-3, the Division of Public Utilities and Carriers, ("the Division",) which is headed by an administrator, exercises the jurisdiction, supervision, powers and duties not specifically assigned to the Rhode Island Public Utilities Commission, including the execution of all laws relating to public utilities and carriers and all regulations and orders of the commission governing the conduct and charges of public utilities. The Division holds exclusive jurisdiction over the rates, tariffs, tolls and charges and the sufficiency and reasonableness of facilities and accommodations of common carriers of property and passengers over the state's public roadways. The Division certifies all public utilities; and has independent regulatory authority over the transactions between public utilities and affiliates, and all public utility equity and debt issuances.

With any rate increase request to the PUC, the PWSB may issue a notice that the proposed rates will become effective thirty days after filing the application. The PUC can suspend the proposed new rates from taking effect for a period not to exceed nine months. During these nine (9) months, the PUC must conduct its hearing and investigation, and a decision must be rendered. As such, there can be a ten (10) month period from the date of filing a rate application until the PUC announces its decision on the application. However, this is the maximum time frame.

The following funds have been established and held by the Trustee, except the Operating Fund, the Insurance Reserve Fund, and the Unrestricted Fund, which are held by the City in the custody of one or more banks selected by the City, and the Revenue Fund, which, prior to the occurrence of any Event of

Default, is under the exclusive control of the City, and is held by the Trustee upon the occurrence of any Event of Default:

1. Project Fund
2. Revenue Fund
3. Operating Fund
4. Debt Service Fund
5. Redemption Fund
6. Debt Service Reserve Fund
7. Rebate Fund
8. Operation and Maintenance Reserve Fund
9. Insurance Reserve Fund
10. Unrestricted Fund

In addition, the Trust Indenture requires that revenue be allocated to the funds in the following priority.

1. Operating Expenses
2. Principal, Interest and Agency Fees
3. Operation and Maintenance Reserve Fund
4. Project Fund

4.2 Revenues

The PWSB's primary source of revenue is derived from wholesale and retail water sales. This revenue stream supports all the operations, debt service and capital improvements of the PWSB. Revenues fall into four major components: (1) metered water sales; (2) customer service fees based on meter size; (3) fire protection: both public and private; and (4) miscellaneous charges. A summary of each component and the percentage of total revenue is summarized below in Table 4-1.

Table 4-1
Summary of PWSB Revenues

	FY2017		**FY2018**		**FY2019**	
Metered Water Sales	$14,678,334	71.2%	$14,993,633	71.2%	$14,719,112	71.1%
Customer Service Fees	$3,276,471	15.9%	$3,350,734	15.9%	$3,355,443	16.2%
Fire Protection	$2,023,400	9.8%	$2,069,136	9.8%	$2,072,266	10.0%
Miscellaneous Charges	$632,711	3.1%	$647,641	3.1%	$563,331	2.7%
Total	**$20,610,916**		**$21,061,144**		**$20,710,152**	

As discussed previously, the RIPUC defines the rates the PWSB assesses to its customers. The PWSB most recent rate filing (Docket #4550) with the RIPUC was approved as of July 2017. A summary of the most recent filings is shown below in Table 4-2.

Table 4-2
Summary of PUC Rate Filings

PUC Docket No.	Filing Date	Effective Date	Increase Amount Requested	Increase Amount Allowed
3378	8/20/2001	4/1/2002	$3,828,966	$2,732,584
3497	2/28/2003	10/4/2003	$3,157,389	$2,382,459
3593	2/23/2004	4/1/2005	$3,414,969	$3,414,969
3674	4/11/2005	11/11/2005	$3,540,101	$1,259,117
3945	3/28/2008	10/1/2008	$3,109,387	$1,333,548
4171	4/14/2010	1/1/2011	$3,647,211	$1,869,918
4550 Step 1	2/4/2015	10/1/2015	$2,288,131	$1,598,016
4550 Step 2	2/4/2015	7/1/2016	$1,736,208	$581,772
4550 Step 3	2/4/2015	7/9/2017	$674,498	$472,167

4.3 Expenses

PWSB expenses can be broken down into three major categories: (1) operating, (2) debt service, and (3) infrastructure.

4.3.1 Operating Expenses

As part of the RIPUC rate filings, the PWSB operating expenses are examined in detail by the RIPUC and a summary of the last 3 fiscal years (FY) operating expenses are shown below in Table 4-3.

Table 4-3
Summary of Operating Expenses

	FY2017	FY2018	FY2019
General and Administrative	$2,319,041	$2,526,542	$2,294,936
Customer Service	$480,370	$557,098	$549,569
Source of Supply	$1,242,616	$1,359,740	$1,291,976
Purification	$3,827,076	$3,809,392	$3,799,633
Transmission and Distribution	$3,227,843	$3,264,287	$3,506,022
Engineering	$467,255	$526,958	$553,096
Metering	$400,314	$485,499	$515,465
Total	**$11,964,515**	**$12,529,526**	**$12,510,697**

4.3.2 Debt Service Expenses

The PWSB has existing debt carried from two different sources: (A) revenue loans from the Rhode Island Infrastructure Bank (RIIB) and its predecessor agency, Rhode Island Clean Water Finance Agency (RICWFA); and (B) General Obligation Bonds through the City of Pawtucket. The PWSB cannot incur any new debt service without prior approval of the Rhode Island Division of Public Utilities and Carriers (RIDPUC). A summary of the debt service as of June 30, 2020 is shown below in Table 4-4.

Table 4-4
Summary of FY2012 Debt Service Expenses

REVENUE LOANS				
	SINKING FUND	**PRINCIPAL**	**INTEREST**	**AGENCY FEES**
RICWFA Series 2004A, various %	$0	$2,463,000	$536,099	$89,333
RICWFA Series 2005A, 3.5%	$1,000	$1,578,000	$560,888	$88,880
RICWFA Series 2009A, various %	$0	$262,000	$108,043	$15,979
RICWFA Series DL 2012, various %	$0	$323,000	$181,061	$27,598
RICWFA Series 2012A, various %	$0	$84,000	$41,725	$7,385
RICWFA Series 2013A, various %	$0	$362,000	$171,804	$34,920
RICWFA Series 20015A, various %	$0	$268,000	$115,025	$21,901
RICWFA Series 2016A, various %	$0	$206,000	$91,756	$20,991
RICWFA Series 2015N, various%	$1,000	$0	$1,012,156	$15,164
Subtotal Loans Payable	**$1,000**	**$5,546,000**	**$2,818,557**	**$322,151**
GENERAL OBLIGATION BONDS				
	SINKING FUND	**PRINCIPAL**	**INTEREST**	**AGENCY FEES**
Pawtucket G.O. Bonds 336,651	$0	$40,321	$722	$0
Pawtucket G.O. Bonds 385,000	$0	$18,311	$2,048	$0
Subtotal Bonds Payable	$0	**$58,632**	**$2,770**	**$0**
TOTAL FY2012 DEBT SERVICE:	**$8,766,610**			

4.3.3 Infrastructure Expenses

As required by RIGL § 45-15.6, water utilities are required to establish a special restricted account, which is to be dedicated solely for the implementation of the infrastructure replacement program. The legislation permits an increase in funding for the account as necessary for the program. However, the PWSB must get prior approval from the RIPUC to set the level of funding for the infrastructure replacement program. In accordance with the terms of the trust indenture, the PWSB has created an Infrastructure Replacement Fund (IRF). A summary of approved and actual IRF funding is summarized below in Table 4-5.

Table 4-5
Summary of IRF Funding

	PUC Approved Funding	Actual Funding
FY2019	$2,500,000	$2,500,000
FY2018	$2,500,000	$2,500,000
FY2017	$2,500,000	$2,500,000

4.4 Capital Improvement Plan Revenue Requirements

As outlined in Section 3, the PWSB has maintained an aggressive approach to the CIP. Since 1988, the PWSB has replaced or relined approximately 99% of the transmission and distribution system and constructed a new Water Treatment Plant, which went online in March of 2008. The PWSB estimates that the entire distribution system will be either replaced or relined by FY2020 (after the completion of MR-11). Additional smaller scale main replacement (MR) projects are envisioned to take place beyond FY 2020 extending into FY 2027 to continue to upgrade and improve the distribution system including upgrading undersized mains, replacing mains with an extensive break history or other similar conditions. A complete summary of the 20-year Capital Improvement Plan (CIP) is shown in Table 3-1.

The total cost of the CIP is estimated to be $70,096,513 during the period from Fiscal Year FY2012 through FY2031. The PWSB has four funding sources for the CIP; (1) Infrastructure Replacement Fund (IRF); (2) Debt Service; (3) Restricted Land Fund and Water Quality Protection Charges; and (4) WTP Decommissioning Reserve Fund. As such, the breakdown of how the PWSB anticipates funding the projects on the CIP is summarized in Table 3-1 and Table 4-6 below.

Table 4-6
Summary of CIP Funding Sources

Infrastructure Replacement Fund	$41,562,089
Debt Service	$26,569,424
Restricted Land Funds and Water Quality Protection Charges	$1,265,000
WTP Reserve Fund	$700,000
Total	**$70,096,513**

As shown in Table 4-6 and Table 3-1, the PWSB is currently planning on only utilizing debt service for the last five (5) main replacement projects (MR-7 through MR-11). The PWSB has designed and provided construction oversight, utilizing in-house staff, on twenty-five (25) distribution improvement projects. Eight (8) of those projects have been funded through debt service including the five (5) most recent projects. As such, the PWSB utilized debt service for MR-7 through MR-10 for the following reasons: (A) the PWSB has a good handle on what to expect for future costs for main replacement; and (B) the PWSB is seasoned in the process of designing main replacement projects specifically for debt service funding. The PWSB anticipates funding the majority of the remaining projects with Infrastructure Replacement Funds apart from purchasing watershed land and work at the decommissioned water treatment plant.

STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
DOCKET NO. D-22-15
Response Of The Pawtucket Water Supply Board
To The Advocacy Section's
Data Requests
Set 1

AS 1-2: Provide the Rhode Island Department of Health's Project Priority List identifying the proposed projects to be funded by this borrowing.

Response: Please see attached.

Prepared by: J. DeCelles

1-2

PROJECT PRIORITY LIST 2022
FINAL

VERSION DATE: May 13, 2022

SYSTEM NAME	PWS ID	POP. SERVED	NEW	SOURCE FUND[1]	PROJECT DESCRIPTION	SCORES								EST. START DATE	FUNDS REQUESTED
						A	B	C	D	E	F	G	TOTAL		
Prudence Island Water District	1592023	1500		SS	4-log Chlorination and Fe and Mn removal	45	2	0	0	5	0	0	52	Mar-22	$1,000,000
Narragansett North-End	1858429	4432		BS	Tank Aeration System	35	2	0	0	5	5	0	47	Apr-23	$225,000
Narragansett North-End	1858429	4432		BS	Chlorine Treatment and Controls at Tank	35	2	0	0	5	5	0	47	Apr-23	$430,000
Narragansett Point Judith	1858428	8210		BS	Tank Aeration System	35	2	0	0	5	5	0	47	Apr-23	$450,000
Narragansett Point Judith	1858428	8210		BS	Chlorine Treatment and Controls at Tanks	35	2	0	0	5	5	0	47	Apr-22	$410,000
Block Island Water	1858430	9999	✓	BS	New Well #7	21	13	0	0	5	5	0	44	Oct-24	$425,000
Bristol County Water Authority	1647515	49000		BS	Emergency Interconnections with East Providence and Pawtucket	21	10	0	1	5	5	0	42	May-23	$45,000,000
Cumberland Water Department	1647530	21178		BS	Site 2 New Well and appurtenances and distribution system upgrades	21	4	0	1	5	5	0	36	Apr-23	$6,100,000
Stonebridge Fire District	1615619	2607	✓	BS	Emergency Interconnect	21	4	0	1	5	5	0	36	Aug-22	$250,000
Block Island Water	1858430	9999	✓	BS	New water storage tank	12	13	0	0	5	5	0	35	Oct-23	$850,000
Pascoag Utility District	1592020	2985	✓	BS	Well Exploration/Development	21	4	0	0	5	5	0	35	Jun-22	$1,450,000
East Providence Water Utilities	1615610	47618		BS	Emergency Connection/Alternate Source	21	7	0	1	5	0	0	34	May-24	$22,000,000
Smithfield Water Supply Board	1615616	9460	✓	BS	New Water Supply Exploration	21	2	0	1	5	5	0	34	Jun-23	$500,000
Greenville Water District	1858410	9500		BS	Emergency Inerconnection with Providence and a new pump station	21	1	0	1	5	5	0	33	Apr-23	$4,800,000
Harrisville Fire District	1858411	2850	✓	BS	New Well in Oakland	21	1	0	1	5	5	0	33	Jul-22	$3,367,000
Jamestown Water Department	1858419	3178	✓	BS	Water Storage Tank Rehabilitation	12	10	0	1	5	5	0	33	Jul-22	$1,500,000
Providence Water	1592024	600000		BS	Coagulation/Clarification Treatment Improvements	19	4	0	0	5	5	0	33	Mar-23	$150,000,000
City of Newport	1592010	42000		BS	Forest Ave Pump Station Improvements	14	7	0	1	5	5	0	32	Jul-24	$2,300,000
North Kingstown	1559517	23568	✓	BS	Replacement for Well #6	21	1	0	0	5	5	0	32	Oct-23	$4,000,000
Village on Chopmist Hill	2943224	250		SS	Water System Improvements	21	0	0	1	5	5	0	32	Jul-22	$918,000
Bristol County Water Authority	1647515	49000		BS	Water Distribution System Improvement Program	10	10	0	1	5	5	0	31	May-23	$4,000,000
Bristol County Water Authority	1647515	49000	✓	LL	Lead Service Line Replacements	10	10	0	1	5	5	0	31	May-23	$1,000,000

Jamestown Water Department	1858419	3178	✓	BS	Water Distribution Improvements	10	10	0	1	5	5	0	31	Sep-22	$2,000,000
Quonochontaug East Beach	1647511	300	✓	EC	PFAS Treatment	19	2	0	0	5	5	0	31	Apr-24	$450,000
South Kingstown - Middlebridge	1000015	576		BS	WQ Study and Treatment	19	1	0	1	5	5	0	31	Jun-23	$100,000
Ashaway Elementary School	1858417	300	✓	BS	Generator and Repair Well #1	21	0	0	1	3	5	0	30	Apr-23	$115,000
Slatersville Public Supply	1615614	3224		BS	Constock Standpipe Improvements Upgrade Pump Station, Demo Old Tanks	12	7	0	1	5	5	0	30	Jul-22	$3,394,340
South Kingstown - South Shore	1615623	4517		BS	WQ Study and Treatment	19	1	0	0	5	5	0	30	Jun-23	$500,000
South Kingstown - South Shore	1615623	4517		BS	New Factory Pond Well Field Water Treatment Plant	19	1	0	0	5	5	0	30	Jun-23	$7,000,000
University of Rhode Island	1858422	19354	✓	EC	PFAS Source and Drinking Water Remediation	19	0	0	1	5	5	0	30	Jun-22	$10,000,000
Central Beach Fire Dristrict	1647512	470		BS	4-log chlorination system, iron removal and possible new well	19	0	0	0	5	5	0	29	Jun-23	$1,600,000
Prudence Island Water District	1592023	1500		BS	New Well	21	2	0	0	5	0	0	28	Apr-23	$250,000
Champlin Scout Reservation	2980248	200		BS	Connect to Municipal Water	21	0	5	1	1	0	0	28	Sep-23	$175,000
Champlin Scout Reservation	2980249	75		BS	Connect to Municipal Water	21	0	5	1	1	0	0	28	Sep-23	$175,000
Kingston Water District	1858421	3968		BS	West Kingston Well	21	1	0	1	5	0	0	28	Jul-24	$1,000,000
City of Newport	1592010	42000		BS	Construction Distribution Main Improvements IV	10	7	0	1	5	5	0	28	Sep-22	$3,300,000
City of Newport	1592010	42000		BS	Construction Distribution Main Improvements V	10	7	0	1	5	5	0	28	Jul-24	$4,000,000
City of Newport	1592010	42000	✓	LL	Lead Service Line Replacement Program	10	7	0	1	5	5	0	28	Jul-23	$5,150,000
City of Newport	1592010	42000	✓	BS	Emergency Interconnect between Low and Medium Presure Zones	10	7	0	1	5	5	0	28	Jul-23	$850,000
Newport Boys and Girls Club- Well	2980477	125	✓	BS	Well Improvements, Transmission Replacement	21	0	0	1	1	5	0	28	Apr-23	$29,000
Slatersville Public Supply	1615614	3224		BS	St. Paul Water Main	10	7	0	1	5	5	0	28	Jul-23	$2,544,720
West Glocester Elementary	1900041	541	✓	EC	PFAS Treatment and Water System Upgrades	19	0	0	1	3	5	0	28	Apr-24	$450,000
Shannock Water District	1647529	75	✓	SS	Interconnect/Resileincy/Redundancy	21	0	0	1	5	0	0	27	Jul-22	$95,000
Stonebridge Fire District	1615619	2607	✓	BS	Improvements N. Brayton Standpipe	12	4	0	1	5	5	0	27	Aug-22	$300,000
City of Newport	1592010	42000		BS	Leak Detection Program	8	7	0	1	5	5	0	26	Sep-24	$200,000
Greenville Water District	1858410	9500	✓	BS	Mapleville S. Pump Station Upgrade	14	1	0	1	5	5	0	26	Aug-22	$400,000
Pascoag Utility District	1592020	2985	✓	BS	Tank Mixing Systems	12	4	0	0	5	5	0	26	Jun-22	$41,940

Providence Water	1592024	600000		BS	Storage Tanks Rehabilitation and Improvements	12	4	0	0	5	5	0	26	Mar-23	$25,000,000
Shannock Water District	1647529	75		SS	Manganese Treatment System	19	0	0	1	5	0	0	25	Feb-23	$98,000
Pawtucket Water Supply Board	1592021	98130		SS	East Providence Interconnection	10	4	0	1	5	5	0	25	Oct-22	$4,000,000
Captain Isaac Paine School	1583823	460		BS	Replace Well, Construct Pump House and Associated Appurtenances	21	0	0	1	3	0	0	25	Aug-21	$450,000
Chariho Middle School	2980185	1500	✓	BS	Repair Wells #2 and #3, consolidate with HS	21	0	0	1	3	0	0	25	Apr-23	$425,000
Cumberland Water Department	1647530	21178	✓	BS	Replace Transmission Line to Coppermine Tank	10	4	0	1	5	5	0	25	May-23	$1,000,000
Pawtucket Water Supply Board	1592021	98130	✓	SS	Main Replacement - MR13	10	4	0	1	5	5	0	25	Apr-23	$5,000,000
Pawtucket Water Supply Board	1592021	98130	✓	LL	Lead Service Line Inventory	10	4	0	1	5	5	0	25	Oct-22	$2,000,000
Prudence Park Water Co-op	1647514	40		BS	Well, Storage Tank, Pump House Impr., Distribution Replacement	21	2	0	1	1	0	0	25	Oct-22	$1,200,000
Stonebridge Fire District	1615619	2607	✓	BS	Water Main Replacement	10	4	0	1	5	5	0	25	Aug-22	$450,000
Richmond Water	1000040	2501		BS	4-log chlorination system	19	0	0	0	5	0	0	24	Sep-22	$400,000
Nasonville Water District	1900034	150		SS	Replace Failing Tank Mixing System	12	2	0	0	5	5	0	24	Sep-22	$20,000
Greene School	2980310	25	✓	BS	Well Improvements and Consolidation	21	0	0	0	3	0	0	24	Apr-23	$120,000
Greene School	2980050	250	✓	BS	Generator, Well Improvements, Consolidation	21	0	0	0	3	0	0	24	Apr-23	$120,000
Providence Water	1592024	600000		BS	Rehab/Repl Transmission and Distrib. & Appurt. & Publ/Priv Pb Services	10	4	0	0	5	5	0	24	Apr-22	$488,000,000
Providence Water	1592024	600000	✓	LL	Lead Service Line Replacement Program	10	4	0	0	5	5	0	24	Jun-22	$184,000,000
Pawtucket Water Supply Board	1592021	98130		SS	Water Meter Replacement and Meter Reading System	8	4	0	1	5	5	0	23	Oct-22	$8,000,000
East Providence Water Utilities	1615610	47618		BS	Cleaning and Lining of Water Mains	10	7	0	1	5	0	0	23	Sep-22	$20,000,000
Cumberland Water Department	1647530	21178		BS	Distribution System Improvements	10	2	0	1	5	5	0	23	Apr-23	$3,500,000
East Providence Water Utilities	1615610	47618	✓	LL	Lead Service Line Repalcements	10	7	0	1	5	0	0	23	Oct-22	$100,000
Kingston Water District	1858421	3968		BS	Transmission Line Replacement	10	2	0	1	5	5	0	23	May-24	$2,500,000
Kingston Water District	1858421	3968	✓	BS	Water Main Replacement	10	2	0	1	5	5		23	May-23	$1,000,000
Stonebridge Fire District	1615619	2607	✓	BS	WTP Monitoring, Controls and Scada System	8	4	0	1	5	5	0	23	Jun-22	$250,000
Smithfield Water Supply Board	1615616	9460	✓	BS	Water Main Installation on Stillwater Rd for Redundancy/Resiliency	10	2	0	1	5	5	0	23	Jun-23	$4,400,000
Smithfield Water Supply Board	1615616	9460	✓	BS	Water Main Installation on Stillwater, Limerock and Douglas for Redundancy/Resiliency	10	2	0	1	5	5	0	23	Jun-23	$4,000,000

Smithfield Water Supply Board	1615616	9460	✓	BS	Water Main Replacement and Looping	10	2	0	1	5	5	0	23	Jun-23	$800,000
Smithfield Water Supply Board	1615616	9460	✓	BS	Water Main Installation on Harris for Redundancy/Resiliency	10	2	0	1	5	5	0	23	Jun-23	$4,400,000
Smithfield Water Supply Board	1615616	9460	✓	BS	Pressure Contol and Water main Looping	10	2	0	1	5	5	0	23	Jun-23	$750,000
Smithfield Water Supply Board	1615616	9460	✓	BS	Water Transmission Line Replacement	10	2	0	1	5	5	0	23	Jun-23	$750,000
University of Rhode Island	1858422	19354	✓	BS	New Storage Tank and Rehabilitation of Existing Storage Tank	12	0	0	1	5	5	0	23	Jun-22	$9,620,000
Harrisville Fire District	1858411	2950	✓	LL	Lead Service Line Inventory	10	1	0	1	5	5	0	22	Dec-22	$100,000
Harrisville Fire District	1858411	2950	✓	BS	Lapham Farm Rd Distribution Loop	10	1	0	1	5	5	0	22	Oct-22	$2,000,000
Harrisville Fire District	1858411	2950	✓	BS	Smith Rd, Round Top Rd, Central St, Carrie Ln, and Rt 102 looping	10	1	0	1	5	5	0	22	Jul-22	$2,980,000
Harrisville Fire District	1858411	2950	✓	BS	Connect Cherry Farm Rd Storage Tank to Sherman Farm Rd distribution	10	1	0	1	5	5	0	22	Jul-22	$1,971,997
City of Warwick	1615627	75000		BS	Distribution System Replacement/Cleaning and Lining	10	1	0	0	5	5	0	21	Jul-22	$15,000,000
City of Warwick	1615627	75000		BS	Replacement of Valves, By-pass and Valve Chamber	10	1	0	0	5	5	0	21	Nov-22	$2,000,000
East Providence Water Utilities	1615610	47618		BS	Meter Replacement Project	8	7	0	1	5	0	0	21	Sep-22	$3,000,000
Kingston Water District	1858421	3968	✓	BS	Generator Well #2	8	2	0	1	5	5	0	21	Jul-22	$25,000
North Kingstown	1559517	23568	✓	LL	Lead Service Line Replacement	10	1	0	0	5	5	0	21	Oct-23	$900,000
Shady Harbor Fire District	1559513	300		BS	Distribution System Replacement	10	0	0	1	5	5	0	21	Apr-23	$1,200,000
City of Warwick	1615627	75000		LL	Lead Service Line Replacement	10	1	0	0	5	5	0	21	Mar-23	$2,500,000
Woonsocket Water Division	1559518	43806	✓	SS	Highland Park Water Tower Replacement	12	4	0	0	5	0	0	21	Apr-23	$3,500,000
Nasonville Water District	1900034	150		SS	Replace Radio Communication Equipment for Storage Tank and Pump	8	2	0	0	5	5	0	20	Sep-22	$20,000
Narragansett North-End	1858429	4432		BS	Replace Water Meters and Remote Read System	8	2	0	0	5	5	0	20	Sep-22	$515,000
Narragansett Point Judith	1858428	8210		BS	Replace Water Meters and Remote Read System	8	2	0	0	5	5	0	20	Sep-22	$950,000
Greenville Water District	1858410	9500		BS	Meter Replacement Project	8	1	0	1	5	5	0	20	Sep-22	$500,000
South Kingstown - Middlebridge	1000015	576		BS	Leak Detection Program	8	1	0	1	5	5	0	20	Sep-22	$20,000
Chariho High School	1592030	1300	✓	BS	Generator and Improvements to Well	16	0	0	1	3	0	0	20	Apr-23	$300,000
Kingston Water District	1858421	3968		BS	4-Log Chlorination for Each Well	7	2	0	1	5	5	0	20	Jan-23	$50,000
Narragansett North-End	1858429	4432	✓	BS	Wholesale Meter Pit Replacement	8	2	0	0	5	5	0	20	Apr-23	$450,000

Portsmouth Water and Fire District	1592022	16530		BS	Rehab of Sakonnet R. Crossing Pipeline	10	4	0	1	5	0	0	20	Sep-22	$767,625
Portsmouth Water and Fire District	1592022	17090	✓	BS	Water Main Rehab	10	4	0	1	5	0	0	20	Dec-23	$8,000,000
South Kingstown - South Shore	1615623	4517		BS	Leak Detection Program	8	1	0	0	5	5	0	19	Sep-22	$40,000
Woonsocket Water Division	1559518	43806		LL	Private-side lead service line replacement	10	4	0	0	5	0	0	19	Jul-22	$525,000
Lincoln Water Commission	1858423	21780	✓	BS	Replace Old River Rd Standpipe	12	1	0	1	5	0	0	19	Aug-22	$4,300,000
North Kingstown	1559517	23568	✓	BS	Meter Replacement	8	1	0	0	5	5	0	19	Oct-23	$1,460,000
North Kingstown	1559517	23568	✓	BS	Generator Well #9	8	1	0	0	5	5	0	19	Oct-23	$150,000
Woonsocket Water Division	1559518	43806	✓	SS	Security System for Assests	10	4	0	0	5	0	0	19	Jul-22	$200,000
Woonsocket Water Division	1559518	43806	✓	SS	Fairmount St Water Main Replacement	10	4	0	0	5	0	0	19	Apr-23	$1,369,000
Woonsocket Water Division	1559518	43806	✓	SS	South Main St Water Main Replacement	10	4	0	0	5	0	0	19	Apr-23	$1,650,000
Woonsocket Water Division	1559518	43806	✓	SS	Asylum St Water Main Replacement	10	4	0	0	5	0	0	19	Apr-23	$107,500
Woonsocket Water Division	1559518	43806	✓	SS	Logee St Water Main Replacement	10	4	0	0	5	0	0	19	Apr-23	$505,417
Scituate HS & MS	161512	1400		BS	System Upgrades, New Pump House, Generator	14	0	0	1	3	0	0	18	Apr-23	$450,000
Portsmouth Water and Fire District	1592022	17090	✓	BS	SCADA Improvements	8	4	0	1	5	0	0	18	Aug-22	$300,000
Quonset Business Park	1592025	11000	✓	BS	Transmission Main Upgrades for Main Water Supply Lines	10	0	0	0	3	5	0	18	Jul-23	$550,000
Trinity Lutheran Preschool	2980127	45		BS	Generator	8	0	0	1	3	5	0	17	Apr-23	$12,000
Lincoln Water Commission	1858423	21780	✓	BS	Water Main Improvements	10	1	0	1	5	0	0	17	Aug-22	$2,500,000
Yawgoog Scout Reservation	1000018	1200		BS	Water Main Replacement	10	0	0	1	1	5	0	17	Sep-23	$425,000
Woonsocket Water Division	1559518	43806	✓	SS	SCADA for Distribution System	8	4	0	0	5	0	0	17	Jul-22	$300,000
Woonsocket Water Division	1559518	43806	✓	SS	Water Meter Replacement	8	4	0	0	5	0	0	17	Jul-22	$5,000,000
Charlestown Elementary School	1647525	350	✓	BS	Generator	8	0	0	0	3	5	0	16	Apr-23	$100,000
Frosty Drew Observatory	2980176	28		BS	System Improvements and Generator	8	0	0	1	1	5	0	15	Apr-23	$100,000
Hog Island Water Assn-South End	1000097	100		BS	Pump House, Storage, Electrical/Solar/Generator and Mechanical Improvements	12	1	0	0	1	0	0	14	Jul-22	$125,000
Shannock Water District	1647529	75	✓	SS	Generator	8	0	0	1	5	0	0	14	Jul-22	$30,000
Shannock Water District	1647529	75	✓	BS	Installation of Backflow Preventers	8	0	0	1	5	0	0	14	Jul-22	$22,000

Kingston Water District	1858421	3968	BS	Lime and Material Storage Building/Alternate Ops Center	0	2	0	1	5	5	0	13	Mar-23	$50,000
Hog Island Water Assn-South End	1000097	100	BS	Distribution System Improvments	10	1	0	0	1	0	0	12	Sep-22	$450,000
Westwood YMCA	2051712	610	BS	Emergency Generator	8	0	0	0	1	0	0	9	Sep-22	$10,000
Exeter Public Library	2980403	33	BS	Emergency Generator	8	0	0	0	1	0	0	9	Oct-22	$40,000
Kent County Water Authority	1559511	88780	BS	New Office and Maintenance Facility	0	2	0	0	5	0	0	7	May-22	$20,000,000

[1] **BS** - Base SRF Grant
SS - Supplemental SRF Grant
LL - Lead Service Line Replacement Grant
EC - Emerging Contaminants Grant

	NEW PROJECTS	65
SOURCE TOTALS	BASE SRF GRANT TOTAL	$915,980,622
	SUPPLEMENTAL SRF GRANT TOTAL	$31,812,917
	LEAD SERVICE REPLACEMENT GRANT TOTAL	$196,275,000
	EMERGING CONTAMINANTS GRANT TOTAL	$10,900,000
	TOTAL REQUESTED FUNDS	$1,152,453,539

STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
DOCKET NO. D-22-15
Response Of The Pawtucket Water Supply Board
To The Advocacy Section's
Data Requests
Set 1

AS 1-5: Regarding the proposed main replacement Project 13, provide a detailed description of the project including cost breakdown, length and diameter of main being replaced and associated services to be replaced. Also estimate how many are lead services.

Response: The PWSB's records do not indicate that any of the PWSB side services on the MR 13 Project are lead, but if any are encountered, PWSB crews will replace them. System wide it is believed there are approximately 50 lead services on the PWSB's side of the 23,500 services. For a description of the project, please see attached.

Prepared by: J. DeCelles

Pawtucket Water Supply Board

MR-13 Water Main Replacement Contract

Project Description: The project includes the installation of 15,562 linear feet of 6- and 8-inch cement lined, ductile iron water main within the Pawtucket Water Supply Board (PWSB) service territory. The new water mains will replace existing "aged" and undersized cast iron mains that are nearing the end of their useful life expectancy (installed circa 1895 - 1960) and includes water mains that have evidenced a history of water main breaks. Installation includes standard "cut and cover" method of utility installation; abandonment of old water main; switch over and upgrade of customer services; hydrants and valves; pressure testing and chlorination of the new water main and roadway restoration.

Reason for Project: The existing water mains are of cast iron construction and were installed between 1895 – 1960. These water mains are nearing the need of their useful life and in certain instances are undersized and exhibited a history of water main breaks. Undersized water mains reduce flow capacity and pressure and increases overall pumping costs. The replacement water mains will resolve these issues.

Public Health Benefits of Projects: The new cement lined, ductile iron water mains will increase flow carrying capacity and pressure; reduce overall pumping costs; allow for consistent and reliable chlorine residuals; minimize future time and materials required to repair water main breaks.

	Final Streets for MR-13							
#	Street	City	Limits	Main Length	Existing Diameter / Year	New Diameter	Year (s) Paved	Comments
1	Anthony Ave	Pawt	Main St to West Ave	1070	6" - 1895	8"	1985	
2	Ashton St	Pawt	Walcott St to # 85 Ashton St	359	6" - 1912	8"	2016	
3	Bart Dr	Pawt	Rice St to Revere St	499	6" - 1950	8"	2014	
4	Bedford Rd	Pawt	Sayles Ave to Cambria Ct	477	6" - 1949	8"	2016	
5	Buchanan St	Pawt	Toledo Ave to Frank St	894	8" - 1950	8"	2015	
6	Cedarcrest Dr	Pawt	Ridgewood Rd to Monticello Rd	641	6" - 1953	8"	2014	
7	Day St	Pawt	Beverage Hill Ave to Plain St	606	6" - 1949	8"	2014	
8	Dorset Rd	Pawt	Sayles Ave to Cambria Ct	523	6" - 1949	8"	2016	
9	Ferncrest Dr	Pawt	Benjamin St to Gates St	815	6" - 1951	8"	1999	
10	Fiume St	Pawt	Gorizia St to Rome St	1,152	6" - 1949	8"	N/A	
11	Follett St	Pawt	Ashton St to # 63 Follett St	215	6" - 1960	8"	2002	
12	Forest Ave	Pawt	Hurley Ave to Dix Ave	893	6" - 1905	8"	2015	
13	Humes St	Pawt	Broad St to Montgomery St	299	8" - 1924	8"	2015	
14	Hurley Ave	Pawt	Mineral Spring Ave to Grotto Ave	903	6" - 1903	8"	2016	
15	Hyde Ave	Pawt	Gates St to Waterman St	748	6" - 1915	8"	2009	
16	Joan Dr	Pawt	Benjamin St to Ferncrest Dr	292	6" - 1951	8"	1999	
17	Kirk Dr	Pawt	Rice St to Bart Dr	927	6" - 1948	8"	2015	
18	Oneida St	Pawt	Toledo Ave to Grand View Rd	1,560	6" - 1948	8"	1994	
19	Parker Dr	Pawt	Lincoln Ave to Cedarcrest Dr	279	6" - 1953	8"	2016	
20	Poirier St	Pawt	Kenmore St to Pollard Ave	575	6" - 1951	8"	2015	
21	Raymond Ave	Pawt	Lauder St to # 40 Raymond Ave	525	6" - 1953	8"	2016	
22	Revere St	Pawt	Arland Dr to Cove St	529	6" - 1950	8"	2014	
23	Sando St	Pawt	Grosvenor Ave to Oliver St (North Providence)	217	6" - 1964	6"	N/A	
24	South Union St	Pawt	Pine St to Park Pl/George St	564	8" - 1921	8"	1988	
			Total	15,562				

Pawtucket
WATER SUPPLY BOARD

85 Branch Street
Pawtucket, RI 02860
401-729-5000
www. PWSB. org

Interoffice Memorandum

From: Russell Houde, Asst. Chief Eng.

Subject: **MR 13 - Water Main Replacement Contract**
Construction Cost Estimate – Eligible DWSRF Funding

Date: October 2022

Summary of construction costs related to MR 13 Water Main Replacement Project by Category

Item / Description	**Estimated Cost**
1. Construction Contract Items	$ 2,921,965.00
2. Bituminous Overlays	$ 738,780.00
3. Police Details / Traffic Control	$ 250,000.00
4. Project Sign	$ 1,500.00
5. Legal / Advertisement	$ 11,000.00
Total Estimated Construction Cost	$ 3,923,245.00

CC: File

STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
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Response Of The Pawtucket Water Supply Board
To The Advocacy Section's
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AS 1-6: Regarding the proposed main replacement in Project 13, were these mains relined since PWSB began its water main rehabilitation program? If so, explain why they need to be replaced.

Response: Some of the mains that are being replaced in MR-13 may have been lined in previous projects. However,the mains being replaced for the most part are either undersized or mains with a history of breaks.

Prepared by: J. DeCelles

STATE OF RHODE ISLAND
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Response Of The Pawtucket Water Supply Board
To The Advocacy Section's
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AS 1-7: Provide an update on PWSB's water main rehabilitation program including how many miles of main remain to be rehabilitated.

Response: At this point, the PWSB has basically been through the entire distribution system once and either cleaned and lined or replaced all mains that required upgrade. We are now starting to replace mains that are either undersized or have a history of breaks. In particular, we are focusing on cast iron mains installed between 1946-1960. In our experience, most of our main breaks occur on pipe of this vintage.

Prepared by: J. DeCelles

STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
DOCKET NO. D-22-15
Response Of The Pawtucket Water Supply Board
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Set 1

AS 1-8: How many public-side, lead service connections remain in the PWSB distribution system?

Response: The PWSB has less than 50 known public side lead services.

Prepared by: J. DeCelles

STATE OF RHODE ISLAND
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AS 1-9: Provide an estimate of how many private-side, lead services may exist in the PWSB distribution system. State the basis for the estimate provided.

Response: The PWSB does not have any reliable data regarding the number of private side lead services, which is one of the drivers for the meter replacement project. As meters are being replaced, private side service material will be identified, inventoried and published for homeowners to see.

Prepared by: J. DeCelles

STATE OF RHODE ISLAND
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To The Advocacy Section's
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Set 1

AS 1-10: Regarding the $2.25 million in principal forgiveness associated with green projects, explain how a project is considered green in order for PWSB to qualify for these funds.

Response: It is our experience that a project need not be considered green to qualify for principal forgiveness in connection with loans from the Rhode Island Infrastructure Bank (RIIB). Under federal laws establishing and funding the Drinking Water State Revolving Funds, green infrastructure projects that address stormwater runoff, provide green space, fund water conservation and efficiency, and improve habitat efficiency may be eligible for Principal Forgiveness. Principal Forgiveness is also used to assist communities with lower income levels and funding lead service line replacements.

Following are excerpts from the Fiscal Year 2022 RIIB Intended Use Plan:

"Under the Congressional Additional Subsidy Authority, the Bank is required to use at least 14% of the Base Capitalization Grant ($981,120) to provide additional subsidy to eligible recipients in the form of principal forgiveness or grants. In addition, through BIL, the SDWA mandates that states use at least 12 % (but no more than 35%) of the Base Capitalization Grant ($840,960) to provide subsidy to Disadvantaged Communities in the form of principal forgiveness or grants.

"The BIL General Supplemental and Lead Service Line Replacement Grants each require 49% of the respective portions to be provided as additional subsidy to Disadvantaged Communities. The BIL Emerging Contaminants require 100% to be provided as additional subsidy, with 25% to Disadvantaged Communities or public water systems serving fewer than 25,000 people."

The principal forgiveness on this loan is not for green projects. A portion of the principal forgiveness is due to the service area being a distressed community and part of the forgiveness is for the lead service identification as part of the meter replacement program.

Prepared by: M. Gurghigian, K. Grande and J. DeCelles

STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
DOCKET NO. D-22-15
Response Of The Pawtucket Water Supply Board
To The Advocacy Section's
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AS 1-11: Regarding the meter replacement program, provide a detailed description of the program including cost breakdown, type of meter technology, and installation schedule.

Response: Please see attached.

Prepared by: J. DeCelles

Pawtucket Water Supply Board

Replacement of Water Meters and Upgrade of AMR/AMI System

Project Description:

The project includes the purchase of approximately 23,500 new ultrasonic water meters from 5/8 inch to 2 inch to be used in the project to replace existing water meters in PWSB's system. This project also includes the upgrade of the existing AMR system to a fixed AMI meter reading system and is expected to be completed by December 2024.

The upgrade of the existing AMR System to an AMI Fixed Network System on existing structures will improve the accuracy and reliability of collecting metering data, improve the customer experience with live and accurate data and capture water loss/leakage data proactively to. The collected data will be integrated into the existing billing software.

Summary of estimated construction costs related to the Replacement of Water Meters and Upgrade of AMR/AMI System

Item	Description	Estimated Cost
1.	Purchase of Meters (5/8" to 2") and Appurtenances	$ 4,900,000.00
2.	Purchase of MIUs	$ 2,550,000.00
3.	Purchase of Flange kits, couplings, gaskets and incidentals	$ 150,000.00
4.	Upgrade of AMR/AMI System	$ 250,000.00
5.	Installation/Replacement of Meters and Appurtenances	$ 2,150,000.00
	Total Estimated Project Cost	**$ 10,000,000.00**

STATE OF RHODE ISLAND
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Response Of The Pawtucket Water Supply Board
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AS 1-12: Identify who will be installing the new meters, PWSB or a private contractor? Please explain.

Response: The new meters will be installed by a private contractor.

Prepared by: J. DeCelles

AS 1-13: Will commercial large compound meters be included in the meter replacement program? Please explain.

Response: No. The project will only consist of the replacement of PWSB owned meters which are all meters 2" and below in size.

Prepared by: J. DeCelles

STATE OF RHODE ISLAND
DIVISION OF PUBLIC UTILITIES AND CARRIERS
DOCKET NO. D-22-15
Response Of The Pawtucket Water Supply Board
To The Advocacy Section's
Data Requests
Set 1

CERTIFICATION

I hereby certify that on November 18, 2022, I sent a copy of the within to all parties set forth on the attached Service List by electronic mail and copies to Luly Massaro, Commission Clerk, by electronic mail and regular mail.

Parties/Address	**E-mail Distribution**	**Phone**
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