PROVIDENCE WATER

Infrastructure/Capital Program Report 1996 - 2023

March 2023

Providence Water

PROVIDENCE WATER SUPPLY BOARD

INFRASTRUCTURE/CAPITAL PROGRAM REPORT

For July 1, 1995 through December 31, 2022

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March 2023

PROVIDENCE WATER

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INTRODUCTION

Providence Water supplies drinking water and fire protection to approximately 60 percent of the State's population. The utility and the workforce operate and maintain a vast system of mains, hydrants, service connections, and meters with a multitude of appurtenances. The source water comes from a six-reservoir surface water complex, is treated to meet and exceed current and projected drinking water regulations as administered by the Rhode Island Department of Health consistent with national drinking water laws. The water supply is distributed through a complex system of transmission mains, distribution reservoirs, and pumping stations to various retail and wholesale customers.

Providence Water has an active Infrastructure Replacement Program in place which is intended to stave off deterioration and obsolescence. Providence Water began this program in 1990. The program was expanded in 1996 with the further availability of Infrastructure Replacement Funds.

Reliable drinking water has always been the basis of economic development and the seed for communal life throughout the world. Initially, Rhode Island's population, centered around Providence, received its water from wells. As development became denser, industrialization and urbanization generated waste, threatening the groundwater upon which the population relied. By the mid-1860's, Providence created its first formal water utility which impounded water in an open-surface reservoir and distributed it through an ever-growing piping system within the communities in the central portion of the State. Continued pressure by urbanization and industrialization led to more intense pollution of the rivers and the underground basin and it became apparent that a new source of water needed to be found. By 1925, the Scituate Reservoir complex and a modern water treatment plant had been constructed, which is the source of water supply to approximately 600,000 people today.

In 1993, the state legislature was asked to adopt a law which would set aside portions of water revenue for a long-term planned infrastructure replacement program. The R.I. Public Utilities Commission, who recognized the same need as Providence Water did, provided funding incrementally for this program. Since 1993, Providence Water allocates a portion of its revenue to ensure the reliability of the system into the next century.

The initial Infrastructure Replacement Plan was submitted in February 1996, with updated plans filed in 2001, 2006, 2010, 2015, and 2020 in accordance with the requirements of the Comprehensive Clean Water Infrastructure Act of 1993.

The plan is internally amended as needed to meet new challenges as they manifest themselves. An infrastructure replacement plan is a living document which must be monitored and amended periodically to meet the initial objective of the program under which it was established.

Since 1990, Providence Water has reinvested nearly $591 million into the utility's infrastructure replacements and capital improvements. None of this could have happened had this program not been proposed by us initially, had the legislature and the Commission not supported the wisdom of the need, and had our engineers and workforce not dedicated themselves to this mission as we did.

The success of Providence Water's IFR program can be attributed to the hard working staff which until his retirement were guided by the leadership of Steven Santaniello. Over the course of 30 years Steve created the foundations of the program from the ground up and led the program through many tremendous successes. Under his direction, the program grew from an original annual budget of $4 million in 1996 to an annual budget of almost $30 million. Steve's initiative, ground breaking work, and dedication enabled Providence Water to effectively implement a plan to provide support for the organization's critical infrastructure for years to come.

IFR / CIP PROGRAM HISTORY

SOURCE OF FUNDS*

	CIP & Infrastructure Replacement Funds	Meter AMR Fund	Water Operating Fund	RI Water Resources Board Bond	RICWFA Bonds	Total IFR / CIP Expenditures
FY 1997	$6,219,053	$0	$805,992	$2,506,182	$3,241,456	$12,772,683
FY 1998	$9,238,722	$0	$911,427	$324,021	$0	$10,474,170
FY 1999	$14,067,331	$0	$1,077,270	$0	$0	$15,144,601
FY 2000**	$4,453,264	$615,379	$1,059,091	$0	$4,842,508	$10,970,241
FY 2001	$6,989,464	$948,305	$2,044,602	$0	$2,589,224	$12,571,595
FY 2002	$9,297,373	$795,496	$1,614,338	$0	$2,418,731	$14,125,937
FY 2003	$8,435,589	$1,217,768	$1,171,251	$0	$2,580,661	$13,405,268
FY 2004	$8,122,197	$750,247	$1,211,479	$0	$1,502,197	$11,586,121
FY 2005	$9,530,028	$487,538	$992,721	$0	$23,348	$11,033,635
FY 2006	$13,520,361	$764,454	$987,443	$0	$0	$15,272,258
FY 2007	$9,569,062	$772,658	$968,454	$0	$0	$11,310,174
FY 2008	$18,229,138	$88,055	$515,334	$0	$0	$18,832,527
FY 2009***	($4,006,988)	$55,091	$521,131	$0	$24,904,502	$21,473,736
FY 2010	$20,007,683	$0	$282,961	$0	$6,955,335	$27,245,978
FY 2011	$22,908,554	$0	$543,148	$0	$7,136,900	$30,588,602
FY 2012	$17,719,849	$0	$970,373	$0	$2,282,309	$20,972,530
FY 2013	$10,340,835	$0	$812,646	$0	$7,224,023	$18,377,504
FY 2014	$12,775,345	$0	$775,401	$0	$11,764,638	$25,315,384
FY 2015	$18,014,700	$0	$0	$0	$10,982,688	$28,997,388
FY 2016	$28,281,479	$0	$0	$0	$13,202,055	$41,483,534
FY 2017	$21,464,197	$0	$0	$0	$12,651,799	$34,115,997
FY 2018	$19,377,972	$0	$0	$0	$17,977,518	$37,355,490
FY 2019	$28,389,703	$0	$0	$0	$758,735	$29,148,438
FY 2020	$20,129,172	$0	$0	$0	$12,708,921	$32,838,093
FY 2021	$16,896,286	$0	$0	$0	$8,955,049	$25,851,336
FY 2022	$14,076,201	$0	$0	$0	$15,074,786	$29,150,987
FY 2023	$5,858,621	$0	$0	$0	$8,967,956	$14,826,577

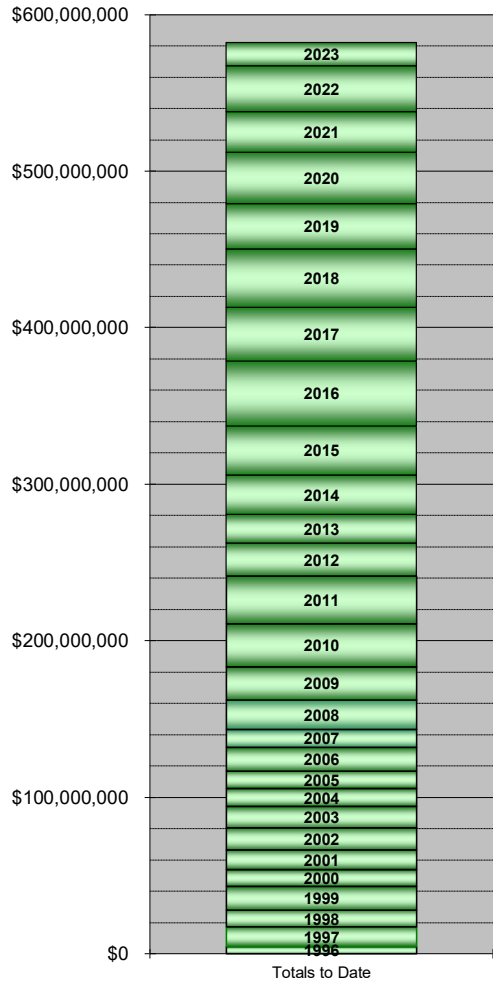
* Provided by Providence Water Finance Department

** $3,199,639 of RICWFA Bond proceeds reimbursed CIP/IFR Funds for expenses incurred in FY 99

*** $12,435,056.81 of RICWFA Bond proceeds reimbursed CIP/IFR Funds for expenses incurred in FY 08

SUMMARY OF EXPENDITURES

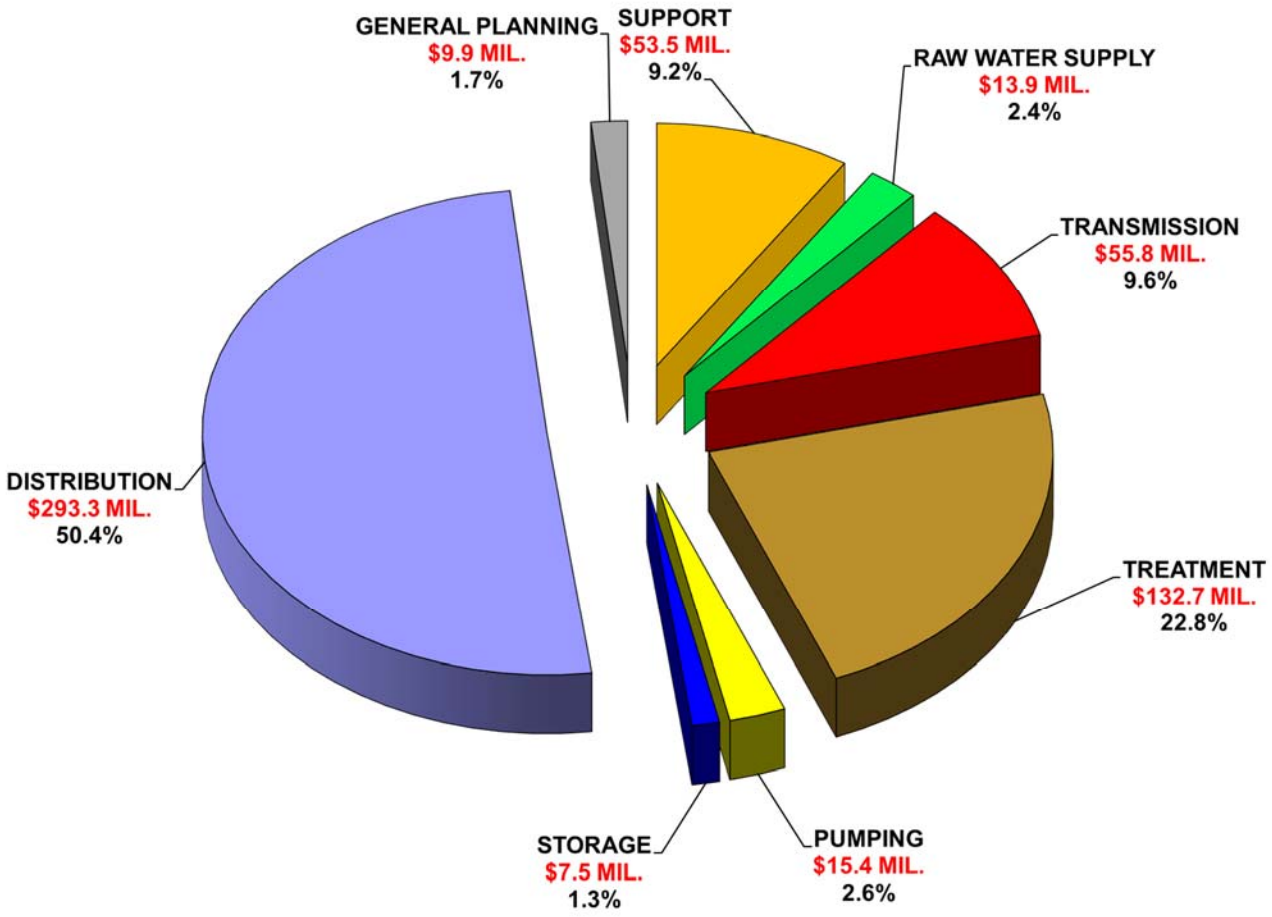
Fiscal Years 1996 To 2023



	Expenditures		
Fiscal Year	**IFR**	**CIP**	**TOTAL**
1996	$4,403,258	$189,547	**$4,592,805**
1997	$12,613,880	$158,802	**$12,772,683**
1998	$10,250,593	$223,577	**$10,474,170**
1999	$14,870,278	$274,322	**$15,144,601**
2000	$10,168,929	$801,312	**$10,970,241**
2001	$10,495,654	$2,075,941	**$12,571,595**
2002	$10,186,210	$3,939,727	**$14,125,937**
2003	$9,339,330	$4,065,938	**$13,405,268**
2004	$7,902,458	$3,683,663	**$11,586,121**
2005	$9,875,143	$1,158,492	**$11,033,635**
2006	$14,001,418	$1,270,840	**$15,272,258**
2007	$9,755,533	$1,554,641	**$11,310,174**
2008	$16,868,303	$1,964,223	**$18,832,527**
2009	$20,628,469	$845,267	**$21,473,736**
2010	$26,793,921	$452,057	**$27,245,978**
2011	$26,873,228	$3,715,373	**$30,588,602**
2012	$19,741,931	$1,230,599	**$20,972,530**
2013	$17,909,955	$467,549	**$18,377,504**
2014	$24,711,575	$603,808	**$25,315,384**
2015	$25,399,937	$5,781,005	**$31,180,943**
2016	$29,388,866	$12,094,668	**$41,483,534**
2017	$19,737,907	$14,378,090	**$34,115,997**
2018	$26,770,338	$10,585,152	**$37,355,490**
2019	$27,314,765	$1,833,673	**$29,148,438**
2020	$29,743,304	$3,094,789	**$32,838,093**
2021	$25,903,611	($52,276)	**$25,851,336**
2022	$29,150,987	$0	**$29,150,987**
2023	$14,826,577	$0	**$14,826,577**
Totals to Date	**$505,626,361**	**$76,390,782**	**$582,017,143**

IFR EXPENDITURES BY CATEGORY

Fiscal Years 1996 through 2023*



Total Investment Into System $582 MIL

* Expenditures Through December 31, 2022

IFR PROJECT STATUS REPORT

PROJECT NARRATIVES

PROJECTS COMPLETED - Raw Water Supply

Gainer Dam Spillway Rehabilitation

The upstream face of the spillway was showing signs of wear. Project included the removal and replacement of the old unsound concrete along the upstream face of the spillway with a new concrete surface.

PROJECTS COMPLETED - Treatment

Treatment Plant Building Rehabilitation (ongoing)

Improvements to the two elevators at the plant are complete. These elevators were installed in the 1960's and were not up to code. They were the last remaining items in the treatment plant still powered by 550 volts. The project modernized the elevators to bring them up to code and moved them to the plant's existing 480 volt electrical system.

Lime Feeder Replacement

A study was completed to investigate the benefits and the cost of converting from quicklime to hydrated lime. The study recommended the continued use of the current quicklime chemical and provided various slaking and feeder equipment options to replace the existing lime slakers and feeders. The project is completed and the four new lime feeders have been delivered and installed.

PROJECTS COMPLETED - Pumping

Ashby Street Pump Station Replacement

Construction is complete for the replacement of the Ashby Street Pump Station. This project was performed because the existing station was old and obsolete due to various component failures.

Various Pumping Facilities Projects (ongoing)

A project to add an additional pump to Waltham St pump station (paid by a developer) is complete. SCADA was also added to this station under this project.

Greenville Ave Pump Station Replacement

Citizens Bank constructed a new campus that accommodates approximately 3,200 employees in the Town of Johnston. The new campus along with additional development along Greenville Avenue imposed additional domestic, irrigation, and fire flow demands on Providence Water's system and required the replacement of the pump station to meet those additional demands. Construction to replace the pump station is complete.

PROJECTS COMPLETED - Transmission

Various Transmission System (16"- 66") Facilities Projects (ongoing)

Atwood Avenue Water Main Extension

Construction of the main extension is complete. The Atwood Avenue Pump Station has been decommissioned and the Atwood Avenue Pressure Zone was tied into the Greenville Avenue Pressure Zone. This work was performed in lieu of upgrading the Atwood Avenue Pumping Station which had extensive maintenance issues and required upgrades.

Raw Water Supply

Various Raw Water Supply Facilities Projects

Raw Water Supply Reservoirs, Dams and Facilities are inspected on a regular basis. The budget amount covers any minor, unscheduled improvements or rehabilitations that come up during these inspections. Also included in this budget amount will be improvements to the fences and access roads in the watershed, some of which date back to their original construction in the 1920's.

Reservoir and Dam Inspections and Improvements

In accordance with R.I. DEM Rules and Regulations, all of Providence Water's primary dams are to be inspected regularly. Gainer Dam, Ponagansett Dam, and Westconnaug Dam will be scheduled and inspected every 2 years and the remaining dams every 5 years.

Future work under this project is to address deficiencies as identified through continuing inspections and studies that sometimes include visual inspections of the dams as well as more detailed structural, hydraulic and hydrological analyses. Remedial work identified during the latest round of inspections has begun and is ongoing.

Secondary Reservoir and Dam Inspections and Improvements

In accordance with R.I. DEM Rules and Regulations, all of Providence Water's secondary dams are to be inspected every 5 years. Future work under this project is to address deficiencies as identified through continuing inspections and studies that sometimes include visual inspections of the dams as well as more detailed structural, hydraulic and hydrological analyses. Remedial work identified during the latest round of inspections has begun and is ongoing. A feasibility study for dam removal of 3 secondary dams is in progress.

Treatment

Various Treatment Plant Projects

The electrical, plumbing, mechanical, security and fire systems each have regularly scheduled inspections. Funds are budgeted for minor upgrades identified during these inspections. The budget amount also covers site improvements at the Treatment Plant Facility as required.

Projects currently underway include the replacement of the existing ferric transfer pumps, the addition of a second flash mix pump, and the inspection and rehabilitation of the piping inside the influent building. Other projects planned for the next couple of years include an inspection of the clearwell and upgrades to the Orthophosphate and Fluoride carrier water systems.

Process Meter and Lab Equipment Replacement

Extensive testing of the raw and treated water is required on a regularly scheduled basis. The testing and monitoring equipment utilized has various life expectancies depending on the type of equipment and frequency of use. Plans are to replace this equipment as it becomes necessary based on the life expectancy of each piece of equipment. Replacement of sample stations in the distribution system is currently in progress.

Treatment Process and Water Quality Studies

In 2012 Providence Water convened an expert advisory panel to evaluate corrosion control treatment, as directed by a June 2012 consent agreement between Providence Water and the RI Department of Health. The goal of the expert advisory panel is to provide recommendations, including additional studies and/or treatment adjustments needed, to achieve the lead action level while optimizing corrosion control within the distribution system. PW meets with the expert advisory panel at least annually.

PW plans to conduct extensive pipe loop testing to determine the effect of a distribution system pH reduction from 10.2 to about 7.8 on iron mobilization within unlined cast iron mains and lead release from lead service lines, after an established period of orthophosphate addition This pipe loop test will incorporate sections of unlined cast iron water mains and lead service lines that are currently in use within PW's distribution system. Currently, we estimate a testing duration of about 5 years.

Treatment Plant Building Rehabilitation

Work under this project includes addressing deficiencies as identified through continuing inspections of the Fencing, Roads and Buildings at the Providence Water Treatment Plant. Improvements are conducted by priority as determined by previously conducted inventories and evaluations.

Construction is in progress to replace sections of the treatment plant roof that were identified during inspections to need replacement. Design has begun on a project that includes the replacement and relocation of the North Entrance gate and the facilities fuel island. This project also includes the removal of the old CO2 system that is no longer in use.

Planning has begun on improvements to the Forestry Garage locker rooms, the treatment plant control room and office areas, the replacement of components of the fire system, the existing HVAC system and the addition of dehumidification in some areas around the plant.

Planning has also begun for the replacement of the siding on the north and west side of the treatment plant and the rehabilitation of the south side of the building. Siding on the building was installed in the 1960's and is in need of replacement. The east side of the building was completed during the recent filter upgrade project.

SCADA / Control System Improvements

Because computer technology is ever changing, funds have been budgeted for the upgrade of the remote PLC system and additional software programming on an as-needed basis. Annual funds are budgeted to anticipate ongoing needs, which include future hardware replacements and software upgrades.

Storage

Various Storage Facilities Projects

Work under this project is to address deficiencies as identified through continuing inspections of the Storage Facilities. Improvements are conducted by priority as determined by previously conducted inventories and evaluations.

Neutaconkanut Reservoir, Longview Reservoir, and Lawton Hill Reservoir have been inspected. Minor deficiencies were detected and addressed at each location. A limited scope of work remains to be completed at Longview Reservoir and the possible addition of a tank mixing system for Lawton Hill Reservoir is under evaluation. An ROV inspection is planned for the spring at the Greenville Ave and Ridge Road tanks.

Pumping

Various Pumping Facilities Projects

Work under this project is to address deficiencies as identified through continuing inspections of the Pump Stations. Improvements are conducted by priority as determined by previously conducted inventories and evaluations.

Transmission

102" Aqueduct fiber optic monitoring

A fiber optic data acquisition system and acoustic monitoring sensor line was installed in 5 miles of the 102" aqueduct in 2006. This system provides real-time monitoring on a continuous 24-hour per-day basis by monitoring the sounds transmitted through the pipeline to detect the acoustic events associated with the failure and break of pre-stressed wires. Funds are budgeted to continuously monitor and analyze the digital data to identify potential problem areas with the pipeline.

Various Transmission System (16”- 66”) Facilities Projects

Condition Assessment Transmission Mains (16”-66”)

Of the approximate 1000 miles of main in the system, about 100 miles of transmission mains are 66 inches or less. A project is planned to perform nondestructive testing utilizing available technologies and applications accepted by the water industry, such as electromagnetic testing, ultrasonic testing, and/or acoustic soundings.

Replace 16" and Larger Valves

Since 1996, old and outmoded gate style transmission valves in the system are replaced with new butterfly valves. Construction is ongoing to replace older transmission valves in the system on main rehabilitation projects or as they become defective.

Distribution

Water Main Rehabilitation

Construction is in progress for rehabilitating water mains, with the priority being given to older mains where water quality complaints and/or low-pressure problems have been identified. Factors such as flow testing, hydraulic modeling, past leak history, and main sampling are all considered in the selection process. Emphasis is also given to replacements in areas of local and state road resurfacing projects where cost savings can be realized.

Various Distribution System Improvements

Replace Distribution Valves

Construction is ongoing to replace older distribution valves in the system on main rehabilitation projects or as they become defective.

Replace Fire Hydrants

Construction is ongoing to replace fire hydrants in the system on main rehabilitation projects or as they become defective.

Replace Blowoffs

A blowoff is typically located at the end of a dead end main. The purpose of opening a blowoff is to release air from a main that can enter the main after a main is shutdown, or to run water to waste in order to clean out the main. When we receive water quality complaints we sometimes run the blowoff to discharge any deposits or sediment from the main. In our system, a typical blowoff assembly has a 2" tap and a 2" blowoff connection. At times because of recurring problem areas in the system it is preferred to purge the main from a larger diameter connection. Our plan is to replace some of these old blowoff connections with fire hydrants, which have two 2 ½ ports, and one 4 ½ port. This will provide the ability to run a larger volume of water from the end of the dead end main.

Lead Service Replacements

In anticipation of the October 2024 compliance deadline for the Environmental Protection Agency's Lead and Copper Rule Revisions (LCRR) and funding provided by the Bipartisan Infrastructure Law (BIL), PW has proactively engaged a program management team to help direct the replacement of the remaining 9,200 public side services within the next 5 years. Providence Water continues to remove lead services when the customer side of the service is replaced as part of our ongoing effort to mitigate lead at our customers tap.

Support

Various Support System and Facility Improvements

The various components of each support system facility are inspected regularly throughout each year. Funds are budgeted to cover any improvements identified during these inspections. These funds will also cover any damaged fencing and rehabilitate deteriorated roads at these support service facilities. The fencing and road improvement projects are determined through condition assessments and priority. Projects to replace the existing generator and some of the older HVAC units at Dupont Drive are under design.

Records Management System (GIS/AM) Improvements

Because computer technology is ever changing and upgrades are routinely needed, annual funds are budgeted to anticipate ongoing needs, which include future hardware replacements and software upgrades.

General Planning and Overhead

General Planning and Overhead

This project captures all costs associated with the IFR program that aren't associated with a specific project. The project also includes all work order and payroll costs associated with the operation of the program.

PROJECTS IN CONSTRUCTION - Treatment

Replace Sand Filters

Plant operations staff identified a potential issue with the underdrains in Filter #4 during a routine backwash in which it was determined that several adjacent underdrain blocks had failed. The cause of the failure is being investigated, and PW is assessing subsequent courses of action.

The rehabilitation of Filter 4 is complete. The existing failed plastic filter underdrain system was replaced with a higher quality stainless steel system. Additional filters have begun to show similar signs of failure and are currently under evaluation to determine if any additional work is required.

PROJECTS IN DESIGN – Treatment

Residuals System Upgrades

The current residual management process is struggling to meet existing regulatory requirements. Prior to investing a significant amount of money on a rehabilitation project, Providence Water reviewed alternatives for residuals management. This evaluation compared all of the alternatives to determine the best path forward for the future. The evaluation identified the need for modifications to the existing residuals process to allow for the constant removal of residuals as opposed to the every few years process that currently exists. The new process will be much more manageable, cost effective and make it easier for Providence Water to meet the existing regulatory requirements. The design of the residuals improvements has begun.

PROJECTS IN DESIGN - Storage

Golden View Tank Replacement

Golden View tank is an above ground steel tank that was taken over with the acquisition of Johnston water. An inspection of the tank was performed and it was determined that the tank is in need of replacement. Design is underway to replace the tank in a new location as part of the upgrades to the Johnston system.

PROJECTS IN DESIGN - Pumping

Raw Water Booster Pump Station Building Improvements

Raw Water Booster Pump Station rehabilitation and improvements consist of; replacement of the tile floor, garage doors, interior lights, single glaze windows, brick chimney, driveway and the 12,200 sf roof, restoration of the pump pedestals and front terrace, and remodeling the bathroom.

Fruit Hill Pump Station Replace Generator

The 150kW generator at Fruit Hill Pump Station was originally installed in 1988 and nearing the end of its useful life. Plans are to replace the generator.

PROJECTS IN PLANNING – Treatment

Clarification and Residuals System Improvements

The treatment plant sedimentation basins were built in 1939 and have not had any major rehabilitation since their creation. The basins are constructed of large concrete slabs with troughs in the bottom designed to collect residuals from the treatment process. The basins are periodically taken out of service to remove the residuals and deliver them to the residual management system which is located across the street from the treatment plant. The basins are in need of major concrete rehabilitation but are effectively meeting the treatment needs at the plant. Prior to investing a significant amount of money on a rehabilitation project, Providence Water reviewed alternatives for clarification processes at the plant. This evaluation compared all of the alternatives to determine the best path forward for the future. Following the evaluation, a decision was made to replace the basins with an alternative process for clarification. A RFP will be developed to design and construct the new clarification improvements. Included in the scope of this RFP will be the following projects.

Service and Wash Water System Improvements

The 40,000 gallon welded steel service water tank, constructed in 1961, is a double ellipsoidal tank, approximately 90 feet high and 20 feet in diameter with a 36-inch diameter riser 63 feet in height. The tank provides service and process water to the Treatment Plant. An evaluation of the Service Water System, including the Tank, Pumps, Piping and other related equipment has been completed and it has been recommended to replace the tank to better satisfy the increased demand.

Wash Water System Inspection

The 400,000-gallon Wash Water tank, which provides backwashing water to the treatment plant's filters, is a circular reinforced concrete underground tank. The internal inspection of the tank has been completed. The evaluation of the wash water system determined that improvements to the tanks are needed and that the tank could be replaced by an expanded clearwell that is planned for construction as part of the clarification project.

PROJECTS IN PLANNING - Pumping

Dean Estates Pump Station Upgrades

A project to evaluate Dean Estate Pump Stations' performance during the high demand times has begun. Funds have been allocated for the anticipated upgrades of the pumps, generator and associated equipment.

Western Cranston and Johnston System Improvements

An evaluation of multiple existing service areas in Johnston and Western Cranston is underway to determine the ideal setup of these areas in the future. Once the additional improvements necessary to implement a new configuration are identified, a project will be created. This may include the construction of a new pump station to eliminate two of the existing pump stations, a new storage tank in a new location and some additional transmission piping.

PROJECTS IN PLANNING – Transmission

Raw Water Conduits and Valves Inspection / Rehabilitation

Raw Water Conduits Inspection

The 60 inch steel riveted conduits are equipped with a cathodic protection system consisting of four impressed current anode beds along 1000 feet of the underground portion of the twin mains. Plans are to inspect the system and make necessary corrections if needed. Plans also include the inspection of the exposed piping inside the meter chamber and the excavation of a test pit of the buried section to assess the condition of the exterior coating along with soil resistivity testing. Plans are to internally inspect the 90-inch mortar lined steel pipe encased in concrete, which runs from the junction chamber to the treatment plant. In 2014, two test pits were excavated for an external inspection of the 90" influent pipe. The exterior of the pipe was in excellent condition. Previous internal inspections completed in 2015 identified two areas in need of minor rehabilitation. Plans are to make these repairs during the upcoming inspections.

Raw Water Valve Rehabilitation

The two (2) electrically actuated 60" valves that divert water into the RWBPS are scheduled to have their actuators replaced. Additionally, one of the valves used to allow discharge of raw water down the northern branch of the Pawtuxet River is currently inoperable and plans are also to replace that valve. The two 48" valves located in the junction chamber just upstream of the location where the two pipes combine into the 90" raw water pipe need rehabilitation. Plans are to rehabilitate these two valves during the inspection process.

Scituate Aqueduct and Tunnel (90") Inspection and Rehabilitation

The 90" effluent finished water aqueduct, constructed in the 1920's, runs approximately 4.5 miles. It is constructed of a concrete lined tunnel section between the west and east portals, and reinforced concrete pipe thereafter. An amount has been budgeted for inspection of the entire length of the aqueduct and future rehabilitative work will be based upon the results of the inspection. An amount has also been budgeted for any rehabilitation found as a result of the inspection.

78” Aqueduct Inspection and Rehabilitation

The 78" aqueduct transmission line consists of 20,131 feet (3.81 miles) of pre-stressed concrete cylinder pipe (PCCP), and two sections of concrete lined tunnel consisting of 3,046 feet (0.58 miles). The 78" aqueduct has undergone significant rehabilitation since previous inspections have discovered extensive corrosive damage. In accordance with the inspection and rehabilitation program developed, both the 78" and 102" lines will continue to be inspected and rehabilitated, as necessary, every five years. Plans are also to continue the repair of the 78-inch Aqueduct by means of slip lining. The plan is to do this proactively during the upcoming inspection and repair campaigns. Previously evaluated repairs options determined Slip Lining serves a dual purpose; quick trenchless repairs and cost effectiveness. The process of Slip Lining effectively replaces the damaged PCCP sections with new, structurally sound sections of FRP pipe. Funds have been allocated to slip line approximately 2000 feet of pipe in conjunction with each inspection project.

102” Aqueduct Inspection and Rehabilitation

The 102-inch pipeline is 27,325 feet long (5.18 miles). It was constructed in the 1960's and consists of pre-stressed concrete cylinder pipe (PCCP). Extensive corrosive damage has been identified from previous inspections and it has undergone significant rehabilitation. In accordance with the inspection and rehabilitation program developed, both the 78" and 102" lines will continue to be inspected and rehabilitated, as necessary, every five years. Plans are also to continue the repair of the 102-inch Aqueduct by means of slip lining. The plan is to do this proactively during the upcoming inspection and repair campaigns. Previously evaluated repairs options determined Slip Lining serves a dual purpose; quick trenchless repairs and cost effectiveness. The process of Slip Lining effectively replaces the damaged PCCP sections with new, structurally sound sections of FRP pipe. Funds have been allocated to slip line approximately 2000 feet of pipe in conjunction with each inspection project.

Supplemental Tunnel and Aqueduct Rehabilitation Plan

The 78- and 102-inch Supplemental Tunnel and Aqueduct (STA) is one of two large diameter pipelines that deliver drinking water from the treatment plant to the distribution system. The majority of the nine-mile long STA was constructed of pre-stressed concrete cylinder pipe (PCCP).

In November 1996, a major failure occurred on the 102-inch PCCP aqueduct located just east of Oaklawn Avenue in Cranston. This failure in 1996 raised concerns about the structural integrity of the entire STA system and its susceptibility to failure. In addition to the immediate repair in 1996, PW commissioned an engineering study to determine the cause of the failure, perform a risk assessment of the entire STA system, and evaluate the likelihood of another failure occurring in the future.

Beginning in April of 1998, PW has regularly inspected the entire aqueduct and repaired many areas of concern. Following each inspection, the findings and results are reviewed and evaluated against finite-element failure risk curves to determine pipe sections that need to be repaired. Over the years, this comprehensive program has led to the identification and repair of several distressed pipe sections.

PW plans to commission an engineering study to perform an updated risk assessment, evaluate the remaining useful life of the entire STA, and develop a long-term master plan. The work of this study and master plan will build upon all prior inspections and investigations, repairs, condition assessments, forensic pipe investigation and repair databases, drawings of the pipelines showing historical deficiencies, investigations and repairs, and a recently developed surge/transient analysis. The master plan will be prioritized to rehabilitate, replace, and strengthen the 78- and 102-inch aqueducts based upon critical risk factors. The criticality assessment risk factors in the master plan will be based on considerations for likelihood of failure and consequence of failure.

PROJECTS IN PLANNING – Support

Billing System Replacement

The Customer Service Department has begun the process of replacing the existing billing system. By replacing the outdated, inflexible billing system Providence Water will be able to provide enhanced customer service, achieve cost savings and improve process efficiencies. The replacement project has been awarded to Sprypoint and the two year project will begin in January of 2023.

IFR PROJECT STATUS REPORT

PROJECT COST AND SCHEDULE DETAILS

IFR STATUS REPORT - ACTIVE PROJECTS	SCHEDULE					COST		
PROJECT DESCRIPTION	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest 5 Year Plan Cost Estimate 7/1/20 to 6/30/25	Project Expenditures 7/1/20 to 12/31/22	Funds Needed to Complete
Projects Complete (since 7/1/20)								
Raw Water Supply								
Gainer Dam Spillway Rehabilitation	Planning Design Construction	----- ----- In House	----- ----- Oct 20	----- ----- 100%	----- ----- Dec 20	$111,453	$111,453	$0
Treatment								
Lime Feeder Replacement	Planning Design Construction	In House In House May 17	Jan 13 Jun 15 Oct 18	100% 100% 100%	Dec 14 Apr 17 Dec 21	$437,330	$437,330	$0
Pumping								
Ashby Street Pump Station Replacement	Planning Design Construction	In House In House Apr 18	Dec 16 Jun 17 Jan 19	100% 100% 100%	Jun 17 Dec 18 Dec 20	$468,521	$468,521	$0
Greenville Ave Pump Station Replacement	Planning Design Construction	In House In House Jan 19	Mar 17 May 17 Apr 19	100% 100% 100%	May 17 Feb 19 Jun 21	$600,385	$600,385	$0
ONGOING PROJECTS								
Raw Water Supply								
Various Raw Water Supply Facilities Projects	Planning Design Construction	Work is Ongoing - Various Projects				$250,000	$126,175	$123,825
Reservoir and Dam Inspections and Improvements	Planning Design Construction	Work is Ongoing - Various Projects				$250,000	$139,204	$110,796
Secondary Reservoir and Dam Inspections and Improvements	Planning Design Construction	Work is Ongoing - Various Projects				$800,000	$0	$800,000
Treatment								
Various Treatment Plant Facilities Projects	Planning Design Construction	Work is Ongoing - Various Projects				$1,550,000	$560,966	$989,034
Process Meter and Lab Equipment Replacement	Planning Design Construction	Work is Ongoing - Various Projects				$50,000	$2,019	$47,981
Treatment Process and Water Quality Studies	Planning Design Construction	Work is Ongoing - Various Projects				$2,400,000	$168,845	$2,231,155
Treatment Plant Building Rehabilitation	Planning Design Construction	Work is Ongoing - Various Projects				$7,750,000	$1,721,759	$6,028,241
SCADA / Control System Improvements	Planning Design Construction	Work is Ongoing - Various Projects				$1,750,000	$295,152	$1,454,848
Storage								
Various Storage Facilities Projects	Planning Design Construction	Work is Ongoing - Various Projects				$3,000,000	$583,280	$2,416,720
Pumping								
Various Pumping Facilities Projects	Planning Design Construction	Work is Ongoing - Various Projects				$450,000	$287,430	$162,570

IFR STATUS REPORT - ACTIVE PROJECTS	SCHEDULE					COST		
PROJECT DESCRIPTION	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest 5 Year Plan Cost Estimate 7/1/20 to 6/30/25	Project Expenditures 7/1/20 to 12/31/22	Funds Needed to Complete
ONGOING (cont)								
Transmission								
102" Aqueduct Fiber Optic Monitoring	Planning Design Construction	Work is Ongoing - Various Projects				$800,000	$649,935	$150,065
Various Transmission System (16" - 66") Facilities Projects	Planning Design Construction	Work is Ongoing - Various Projects				$1,750,000	$385,799	$1,364,201
Distribution								
Water Main Rehabilitation	Planning Design Construction	Work is Ongoing - Various Projects				$100,000,000	$45,074,307	$54,925,693
Various Distribution System Facilities Projects	Planning Design Construction	Work is Ongoing - Various Projects				$4,000,000	$1,649,565	$2,350,435
Lead Service Replacements	Planning Design Construction	Work is Ongoing - Various Projects				$36,500,000	$4,650,546	$31,849,454
Support								
Various Support System and Facility Improvements	Planning Design Construction	Work is Ongoing - Various Projects				$4,000,000	$945,839	$3,054,161
Records Management System Improvements	Planning Design Construction	Work is Ongoing - Various Projects				$2,250,000	$914,332	$1,335,668
General Planning and Overhead								
General Planning and Overhead	Planning Design Construction	Work is Ongoing - Various Projects				$11,000,000	$5,555,618	$5,444,382
CONSTRUCTION								
Treatment								
Replace sand filters	Planning Design Construction	In House Feb 05 Feb 09	Jul 03 Oct 05 Apr 21	100% 100% 40%	Nov 04 Jan 09 (Jun 24)	$3,500,000	$1,517,500	$1,982,500
DESIGN								
Treatment								
Residuals System Upgrades	Planning Design Construction	In House In House -----	Dec 20 Jul 22 -----	100% 40% -----	Jun 22 (Oct 23) -----	$22,500,000	$224,036	$22,275,964
Storage								
Golden View Tank Replacement	Planning Design Construction	In House In House (Jan 23)	Jun 21 Aug 22 -----	100% 100% -----	Aug 22 Dec 22 -----	$8,000,000	$0	$8,000,000
Pumping								
Raw Water Booster Pump Station Building Improvements	Planning Design Construction	In House In House In House	Jul 22 Aug 22 Nov 22	100% 100% 30%	Aug 22 Oct 22 (May 23)	$1,600,000	$0	$1,600,000
Fruit Hill Pump Station Replace Generator	Planning Design Construction	In House In House -----	Mar 21 Sep 22 -----	100% 70% -----	Sep 22 (May 23) -----	$500,000	$6,120	$493,880

IFR STATUS REPORT - ACTIVE PROJECTS	SCHEDULE					COST		
PROJECT DESCRIPTION	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest 5 Year Plan Cost Estimate 7/1/20 to 6/30/25	Project Expenditures 7/1/20 to 12/31/22	Funds Needed to Complete
PLANNING								
Treatment								
Clarification System Upgrades	Planning	In House	Dec 19	90%	(May 23)	$60,000,000	$2,492,300	$57,507,700
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
Pumping								
Dean Estates Pump Upgrades	Planning	In House	Jan 21	70%	(Aug 23)	$780,000	$0	$780,000
	Design	In House	-----	-----	-----			
	Construction	-----	-----	-----	-----			
Western Cranston and Johnston System Improvements	Planning	In House	Jan 22	80%	(Jan 23)	$6,000,000	$0	$6,000,000
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
Transmission								
Raw Water Conduits and Valves Inspection / Rehabilitation	Planning	In House	Jan 21	80%	(Dec 23)	$1,000,000	$117,427	$882,573
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
Scituate Aqueduct and Tunnel (90") Inspection / Rehabilitation	Planning	In House	Nov 21	10%	(Jan 24)	$3,000,000	$0	$3,000,000
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
78" Aqueduct Inspection / Rehabiliation	Planning	In House	Nov 21	70%	(Jun 23)	$10,000,000	$0	$10,000,000
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
102" Aqueduct Inspection / Rehabilitation	Planning	In House	Nov 21	10%	(Jan 25)	$0	$0	$0
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
Supplemental Tunnel and Aqueduct Rehabilitation Plan	Planning	In House	Nov 21	10%	(Dec 23)	$50,000	$0	$50,000
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
Support								
Replacement of Billing System	Planning	In House	Sep 21	100%	Dec 22	$4,000,000	$195,332	$3,804,668
	Design	In House	(Jan 23)	-----	(Dec 24)			
	Construction	Sep 22	-----	-----	-----			

IFR Expenditures from 07/01/2020 - 12/31/2022	$299,480,000	$69,881,175	$229,598,825
IFR Expenditures from 07/01/1995 - 06/30/2020		$435,745,186	
Total IFR Expenditures from 07/01/1995 - 12/31/2022		**$505,626,361**	

CIP PROJECT STATUS REPORT

PROJECT NARRATIVES

PROJECTS IN PLANNING - Support

Cyber Security Monitoring System Upgrade

Providence Water is looking to upgrade and augment the existing Cyber Security Monitoring systems to help better protect the organization from the growing threats to critical infrastructure in the Cyber world. These upgrades, which follow the security model recommended by the Department of Homeland Security are crucial to the continuing protection of our system.

There are no other currently active projects utilizing CIP funds. All remaining CIP funds collected are used to cover the debt service of this fund.

CIP PROJECT STATUS REPORT

PROJECT COST AND SCHEDULE DETAILS

CIP STATUS REPORT - ACTIVE PROJECTS	SCHEDULE					COST		
PROJECT DESCRIPTION	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate CIP Plan	Project Expenditures To Date	Funds Needed To Complete
PLANNING								
Support								
Cyber Security Monitoring System Upgrade	Planning Design Construction	In House In House Jan 23	Jul 22 Aug 22 (May 23)	100% 100% 0%	Aug 22 Dec 22	$400,000	$0	$400,000

NOTE:The Capital Fund will be utililized primarily for Debt Service until further notice

CAPITAL IMPROVEMENT PROGRAM TOTALS (FY1996 - 2023) **$76,390,782**