



# Infrastructure/Capital Program Report 1996 - 2018



March 2018

Providence Water



**PROVIDENCE WATER SUPPLY BOARD**

**INFRASTRUCTURE/CAPITAL  
PROGRAM REPORT**

**For July 1, 1995 through December 31, 2017**

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**March 2018**



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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 five-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 more dense, 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, and 2015 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 over \$440 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.

# IFR / CIP PROGRAM HISTORY



## SOURCE OF FUNDS\*

	<u>CIP &amp; Infrastructure Replacement</u>		<u>Water Operating</u>		<u>RI Water Resources Board</u>	<u>RICWFA Bonds</u>	<u>Total IFR / CIP Expenditures</u>
	<u>Funds</u>	<u>Meter AMR Fund</u>	<u>Fund</u>	<u>Bond</u>	<u>'94, '99, '01, '02, '03, '08, '09, '13, '14, '15, '17</u>		
FY 1997	\$6,218,945	\$0	\$805,992	\$2,506,182	\$3,241,456	\$12,772,575	
FY 1998	\$9,238,174	\$0	\$911,427	\$324,021	\$0	\$10,473,622	
FY 1999	\$14,067,247	\$0	\$1,077,270	\$0	\$0	\$15,144,517	
FY 2000**	\$4,453,264	\$615,379	\$1,059,091	\$0	\$4,842,508	\$10,970,242	
FY 2001	\$6,989,458	\$948,305	\$2,044,602	\$0	\$2,589,224	\$12,571,589	
FY 2002	\$9,297,372	\$795,496	\$1,614,338	\$0	\$2,418,731	\$14,125,937	
FY 2003	\$8,435,588	\$1,217,768	\$1,171,251	\$0	\$2,580,661	\$13,405,268	
FY 2004	\$8,122,198	\$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	\$18,229,137	\$88,055	\$515,334	\$0	\$0	\$18,832,526	
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	\$22,908,552	\$0	\$543,148	\$0	\$7,136,900	\$30,588,600	
FY 2012	\$17,719,849	\$0	\$970,373	\$0	\$2,282,309	\$20,972,530	
FY 2013	\$10,340,836	\$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	\$18,480,163	\$0	\$0	\$0	\$8,639,729	\$27,119,892	
FY 2016	\$28,281,479	\$0	\$0	\$0	\$13,202,055	\$41,483,534	
FY 2017	\$31,200,807	\$0	\$0	\$0	\$2,336,090	\$33,536,897	
FY 2018	\$12,777,569	\$0	\$0	\$0	\$10,280,913	\$23,058,482	

\* Provided by Providence Water Finance Department

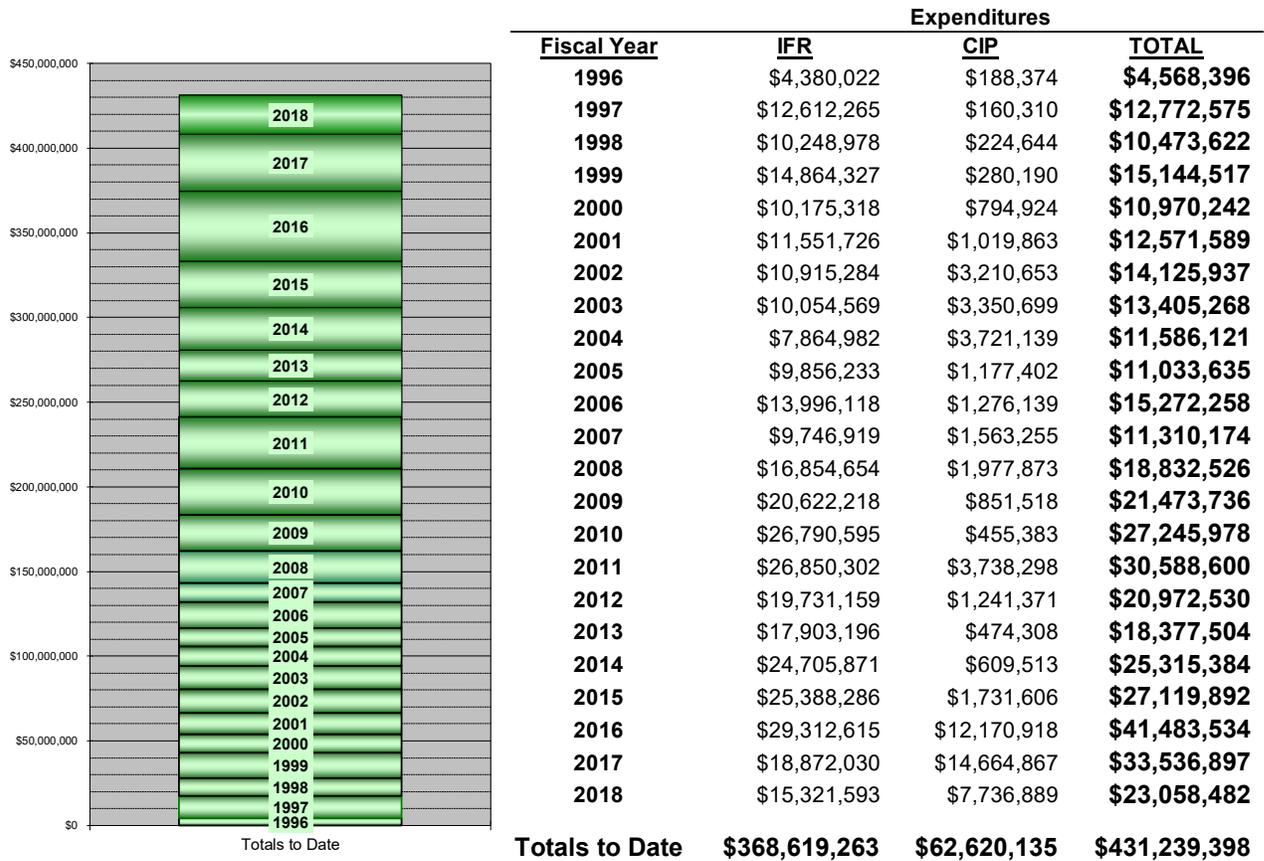
\*\* \$3,199,639 of RICWFA Bond proceeds reimbursed CIP/IFR Funds for expenses incurred in FY 99

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



# SUMMARY OF EXPENDITURES

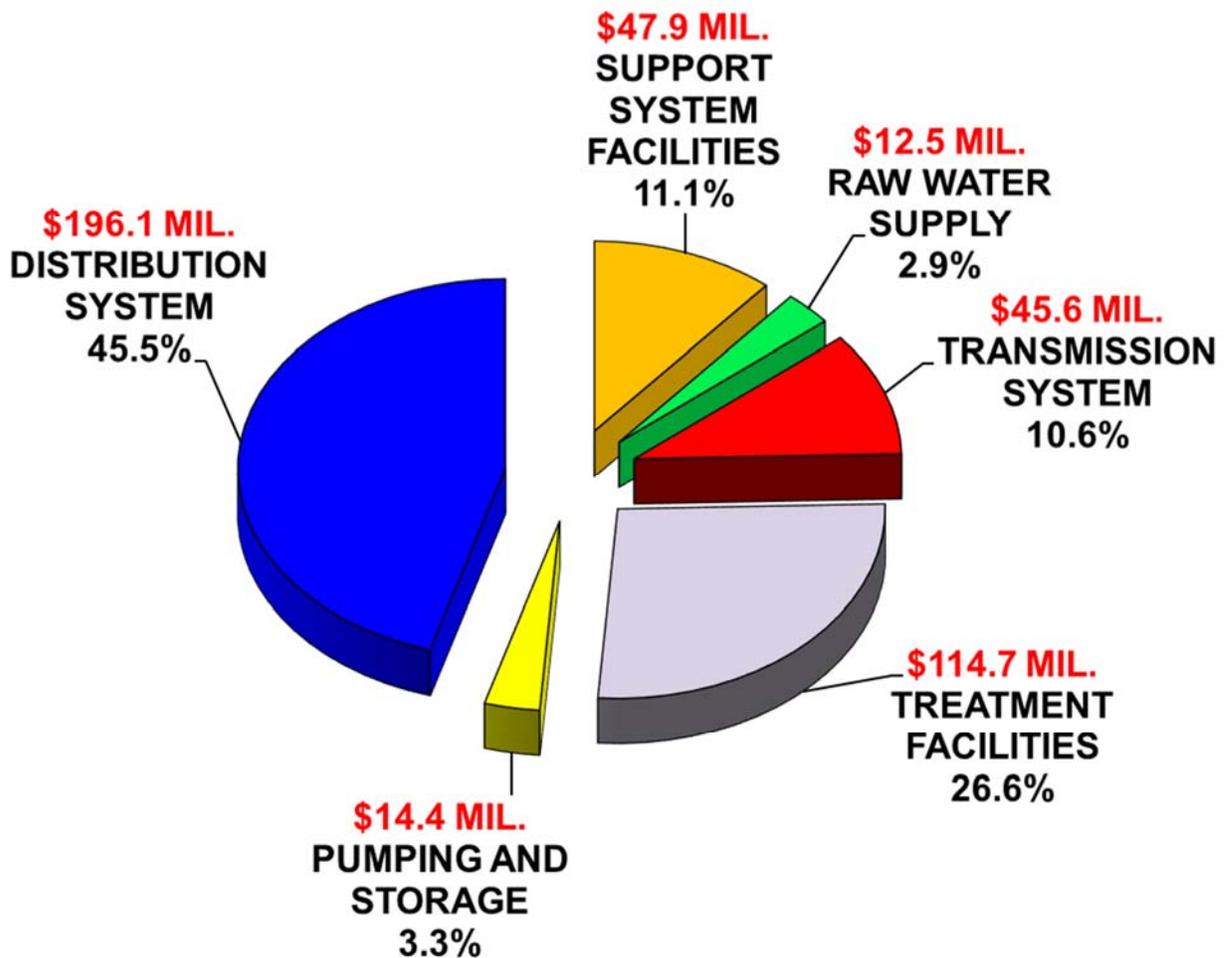
Fiscal Years 1996 To 2018





# IFR / CIP EXPENDITURES BY CATEGORY

## Fiscal Years 1996 through 2018\*



**Total Investment Into System \$431.2 MIL**

\* Expenditures Through December 31, 2017

# IFR PROJECT STATUS REPORT

## PROJECT NARRATIVES

**Treatment Plant Facilities****Chlorine Room Monorail and Scales Replacement**

The chlorine room monorail is used to transport one ton cylinders of chlorine gas from the loading dock to the chlorine room. The electrical components had outlived their useful lives and parts became obsolete. The weight scales for the chlorine system were also in need of replacement. The two (2) weight scales and the chlorine monorail have been replaced.

**Pumping and Storage****Fruit Hill Pump Station Upgrades**

Construction is complete on upgrades to the Fruit Hill Pump Station. Upgrades consisted of new VFD's for each pump, new pump motors, new LED lighting, new discharge piping, new pumps, and a new quick-disconnect switch for a temporary generator. Upgrades were performed to increase station reliability, improve station efficiency, and allow for the Ridge Road Tank to be taken offline and inspected.

## **Raw Water Supply**

### **Dam Inspections and Improvements**

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.

## **Treatment Plant Facilities**

### **Treatment Process and Water Quality Studies**

In accordance with a June 2012 consent agreement between Providence Water and the RI Department of Health, an expert advisory panel was convened to evaluate corrosion control treatment. The goal of the expert advisory panel is to provide recommendations, including additional water quality studies and/or treatment adjustments needed, to achieve the lead action level while optimizing corrosion control within the distribution system. Providence Water also provides Health with an annual report identifying recommendations and strategies for treatment adjustments for achieving optimal corrosion control. The various studies conducted on the treatment train processes that are in progress are as follows.

A study that evaluated alternative pre-treatment chemical and clarification processes has been completed. This study included initial bench scale and desktop analyses followed by the operation of a year-long pilot plant consisting of various treatment trains.

The treatment trains consisted of MIEX/Direct Filtration, Ozone/High Rate Plate Settlers, Potassium Permanganate/High Rate Plate Settlers, and Chlorine Dioxide/Dissolved Air Flotation.

The water quality data collected from these treatment trains are being compared against data from the current pre-treatment and clarification process at the plant. Providence Water is in the process of reviewing a draft version of the final report. Results from the study will be developed into a future project.

Experimental lead pipe loops have been installed at the treatment plant and a study utilizing these pipe loops is in progress. The study will determine the effectiveness of orthophosphate as a lead corrosion inhibitor in treated water at our current pH.

Orthophosphate is a corrosion inhibitor which combines with lead to form an insoluble scale on the inside diameter of the distribution system piping to control corrosion and leaching of lead into the finished water. Orthophosphate and caustic are being introduced at the Fruit Hill Pump Station to pilot the effects of orthophosphate as a corrosion control agent in the extra high service pump-zone area of the system. Construction of a pilot system at the Fruit Hill Pump Station has been completed for two chemical feeders. The pilot system is part of Providence Water's overall plan for optimizing corrosion control in the distribution system in accordance with USEPA's lead and copper rule. The partial system test is anticipated to last for approximately 6 to 12 months, during which time sampling will be performed in the test area to validate the effectiveness of orthophosphate.

Additionally, acquisition of the East Smithfield Water District (ESWD) was completed.

Providence Water has also completed conversion of a portion of the ESWD from Providence Water's High Service area to Providence Water's Extra High Service Area. Providence Water has eliminated one of the two pumping stations previously owned by the ESWD. This portion of the ESWD is now within the orthophosphate pilot area.

### **Process Control and Control System Upgrades**

Work under this project is to address upgrades to the control system necessary because of a need for added functionality or the replacement of obsolete equipment.

### **Process Meter and Lab Equipment Replacement**

Work under this project is to address the replacement needs of several types of process metering and laboratory equipment that are used at the treatment plant and in the distribution system for monitoring and maintaining water quality. Data is collected and logged for recording and reporting purposes. This equipment needs to be replaced at regular recommended intervals to ensure continued accuracy and reliability.

**Treatment Plant Facility Improvements**

Work under this project is to address 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.

**Transmission System****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 distribution valves in the system on main rehabilitation projects or as they become defective.

**Pumping and Storage****Various Pumping and Storage Improvements**

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

**Distribution System****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 Lead Services*

The EPA Lead and Copper Rule requires that systems monitor drinking water at the customer tap. In accordance with the Rule, if after corrosion control optimization is implemented, lead concentrations exceed an action level of 15 ppb in more than 10% of customer taps sampled, the system is required to replace lead service lines under its ownership. The regulations require that the utility must replace annually 7% of the total amount of lead services in the system. In accordance with EPA requirements, the Rhode Island Department of Health found that Providence Water exceeded the lead action level on September 30, 2006 (the date of conclusion of the latest monitoring period) and was required to begin the annual replacement of 7% of its 25,600 lead services. Because of lead-time in gearing up for an undertaking of this magnitude, RIDOH and Providence Water agreed to a compliance schedule that fulfilled the intent of the regulation whereby 14% of the lead services were to be replaced over the two-year period ending September 30, 2008 and 7% annually thereafter. Replacement of lead services began in August of 2007.

In consideration of concerns that were raised about the effectiveness of partial lead service line replacements, Health granted Providence Water a conditional stay on its 7% lead service line replacement requirement during the 2012 construction season.

### *Replace / Upgrade Water Mains*

Construction is in progress for replacing 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.

### *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.

### **Support System Facilities**

#### **Various Support System and Facility Improvements**

Work under this project is to address deficiencies as identified through continuing inspections of the Fencing, Roads and Buildings at Providence Water Facilities. Improvements are conducted by priority as determined by previously conducted inventories and evaluations.

## **Raw Water Supply**

### **90" and 60" Influent Conduits – Inspection**

The 90" and 60" influent conduits that transport raw water from Gainer Dam to the treatment plant are over 90 years old. The project was combined with the "Plant Influent and Aerator Rehabilitation". Inspection of the conduits has been completed and revealed minor deficiencies. Restoration of the conduits will be scheduled for rehabilitation during the spring of 2018 to complete the project.

## **Treatment Plant Facilities**

### **Aerated, Settled, and Filter Influent Conduits**

Construction is in progress. The project is comprised of the following four projects.

#### *Settled Water Conduit - Installation of Access Hatch*

An access hatch was needed and installation has been completed because there was limited access to the upper settled water conduit. The hatch enables entry into the settled water conduit by providing a safer and more convenient access point for inspection and rehabilitation operations.

#### *Concrete Conduits Inspect / Rehabilitate*

The 12 foot high by 8.5 foot wide rectangular reinforced concrete lower conduit conveys the aerated water to the tangential mixer. The lower conduit was inspected and did not require rehabilitation.

The upper settled water conduit is an 11.5 foot high by 10 foot wide rectangular reinforced concrete conduit that conveys settled water from the settling basins to the filter influent conduit which conveys the settled water to the 18 filters. An internal inspection and structural evaluation of the concrete structure revealed deteriorated areas. Design is in progress and construction for rehabilitation of the conduit is expected to be conducted during the spring of 2018.

*Influent Venturis (Aerated Water Conduit) Inspection*

Aerated water enters two 72 inch diameter reinforced concrete conduits, 45 feet in length, which lead to two 72 inch by 36 inch cast in place venturi flow meters. These venturis measure the flow rate of water entering the plant. An internal inspection, structural and performance evaluations, and plant operational considerations concluded that it was not cost effective to rehabilitate the existing venturi meters to original specifications. The project consists of encapsulating and abandoning the existing venturi meters in place and installing new vortex meters within the twin existing 60" plant influent conduits upstream of the junction chamber, and incorporating the flow signals into the existing SCADA system. The reliability and accuracy of the new vortex meters have been problematic since they were installed and they have never been operational. Providence Water is evaluating subsequent course of action.

*Emergency Bypass - Clean Tunnel and Install Sluice Gate*

A 6 foot wide by 7.5 foot high bypass tunnel connects the lower influent (aerated water) conduit to the emergency bypass chamber. The purpose of the bypass tunnel is to allow aerated water, with emergency disinfection treatment, to flow directly to the effluent conduit in the event it becomes necessary to bypass the plant because of an emergency. A buildup of lime sludge was occurring in the bypass tunnel due to its location downstream of the lime solution injection point in the lower conduit. The lime sludge buildup in the tunnel was removed and a flap gate was installed at the entrance of the bypass tunnel to prevent the future buildup of lime sludge.

**Transmission System****Supplemental Tunnel – Investigation / Rehabilitation (2016)***102" Aqueduct – Investigation / Rehabilitation*

In accordance with our inspection schedule, plans are to inspect the aqueduct every 5 years, and to rehabilitate the pipeline as necessary. Plans are to next inspect the aqueduct during the latter half of 2018 and to conduct restoration as necessary. A RFP for inspection and rehabilitation of the aqueduct is currently being prepared.

*78" Aqueduct – Investigation / Rehabilitation*

A contract was competed during 2017 consisting of inspection and rehabilitation of the 78" aqueduct. The first phase of the project entailed inspecting the upper section of the aqueduct. The inspection revealed two separate locations, both 6 continuous pipe sections in length, which contained multiple broken pre-stressed wires and concrete delamination. Both areas, representing a total length of 335 feet, were rehabilitated by slip-lining the pipeline with a centrifugally cast, fiberglass-reinforced, polymer mortar pipe.

The second phase of the project consisted of inspecting the lower section of the 78" aqueduct. The inspection revealed two separate locations which contained concrete delamination and multiple broken pre-stressed wires. Both areas, representing a total length of 1000 feet, were rehabilitated by slip-lining the pipeline using the same method of rehabilitation as the upper section of conduit.

**Treatment Plant Facilities****Lime System Upgrades**

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 construction phase of the project is scheduled to commence early Spring 2018.

**Pumping and Storage****Aqueduct, Neutaconkanut, and Bath Street Pumping Station Upgrades**

Design is currently in progress to replace VFDs at Bath Street and Neutaconkanut pumping stations and installation of new VFDs at the Aqueduct pumping station. This project is being performed to replace aging equipment at Bath Street and Neutaconkanut. Also, this project is being performed at Aqueduct to increase system reliability and operational flexibility of taking Lawton Hill offline for inspection and repair.

**Greenville Ave Pump Station Upgrades**

Citizens Bank is currently constructing a new campus that will accommodate approximately 3,200 employees in the Town of Johnston. The new campus will impose additional domestic, irrigation, and fire flow demands on Providence Water's system. As a result, Citizens Bank will be required to install new water mains, a water storage tank, and make upgrades to the Greenville Avenue Pump Station. Providence Water's IFR program budgeted for additional upgrades in the Greenville Avenue pump zone to address future anticipated build-out demands. Design is in progress for upgrades to the Greenville Avenue Pumping Station with construction slated to commence late fall 2018.

**Atwood Avenue and Ashby Street Pumping Station Replacement**

Design is currently in progress for the replacement of the Atwood Avenue and Ashby Street Pumping Stations. This project is being performed due to failures of various components at the existing pumping stations requiring a high level of maintenance and repair. The new pumping stations are being designed to minimize the current maintenance issues.

**Transmission System****Condition Assessment Transmission Mains**

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

**Pumping and Storage****Storage Tanks Inspections / Improvements**

Aqueduct Reservoir and the Ridge Road tank have been inspected. Minor deficiencies were detected which will eventually need to be addressed. Planning is in progress to inspect other various distribution system reservoirs.

# **IFR PROJECT STATUS REPORT**

## **PROJECT COST AND SCHEDULE DETAILS**

IFR STATUS REPORT	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	Expenditures to 12/31/17
<b>PROJECTS COMPLETED</b>								
<b>Raw Water Supply</b>								
Rehabilitate Large Dams (Gainer/Regulating Dam)	Planning Design Construction	In House Dec 95 Dec 95	Jan 95 Jun 96 Jun 96	100% 100% 100%	Nov 95 Dec 96 Oct 97	NA	\$1,803,960	NA
Rehabilitate Large Dams (Ponaganset Reservoir)	Planning Design Construction	In House Jan 97 Apr 98	Feb 97 Nov 97 Jul 98	100% 100% 100%	Nov 97 Mar 98 Oct 99	NA	\$862,563	NA
Burton Pond Dam Rehabilitation	Planning Design Construction	In House In House Jul 95	Feb 93 Mar 93 Sep 95	100% 100% 100%	Mar 93 Jun 95 Oct 95	NA	\$36,307	NA
Gainer Dam stonewall rehabilitation	Planning Design Construction	In House In House Apr 07	Jan 02 Jun 02 May 08	100% 100% 100%	Jun 02 Apr 07 Apr 10	NA	\$596,636	NA
60" influent conduits - Corrosion protection	Planning Design Construction	In House In House Jan 98	May 94 May 97 May 98	100% 100% 100%	Oct 94 Dec 97 Jun 99	NA	\$462,311	NA
Raw Water Booster Pump Station - replace generator	Planning Design Construction	In House In House Jun 96	Feb 96 Mar 96 Oct 96	100% 100% 100%	Mar 96 Apr 96 May 97	NA	\$506,045	NA
Raw Water Booster Pump Station - replace valves	Planning Design Construction	In House In House Jul 00	Dec 96 Jan 99 June 01	100% 100% 100%	Apr 98 Apr 99 Mar 02	NA	\$160,083	NA
Rehabilitate large dams (Barden Reservoir)	Planning Design Construction	In House Apr 00 Mar 01	Apr 99 Jul 00 Sep 01	100% 100% 100%	May 00 Feb 01 Sep 03	NA	\$1,602,216	NA
Raw Water Booster Pump Station - pump rehabilitation	Planning Design Construction	In House ----- In House	Mar 02 ----- Mar 02	100% ----- 100%	Mar 02 ----- Jun 03	NA	\$67,200	NA
Rehabilitate large dams (Westconaug Reservoir)	Planning Design Construction	In House Dec 00 Apr 02	Jun 00 May 01 Aug 02	100% 100% 100%	Nov 00 Mar 02 Jun 04	NA	\$1,288,836	NA
Rehabilitate large dams (Moswansicut Reservoir)	Planning Design Construction	In House Jul 01 Jan 03	Jun 99 Oct 01 Oct 03	100% 100% 100%	Feb 00 Nov 02 Sep 04	NA	\$395,964	NA
Gainer Dam gate house - replace valve shafts, sluice gates, stop shutters	Planning Design Construction	In House In House May 02	Sep 01 Dec 01 Jan 03	100% 100% 100%	Dec 01 Jan 02 Sep 05	NA	\$747,134	NA
Raw Water Booster Pump Station - replace boiler & heating system	Planning Design Construction	In House Apr 02 Jul 03	May 01 May 02 May 04	100% 100% 100%	Dec 01 Jul 03 Jun 06	NA	\$134,171	NA
Raw Water Booster Pump Station Electrical Upgrades	Planning Design Construction	In House In House Apr 06	Jul 05 Sep 05 Jun 06	100% 100% 100%	Sep 05 Mar 06 Dec 07	NA	\$783,064	NA
Raw Water Generator Replacement	Planning Design Construction	----- ----- Apr 11	----- ----- Apr 11	----- ----- 100%	----- ----- Dec 11	NA	\$301,592	NA
Meter and Junction Chambers Rehabilitation	Planning Design Construction	In House Sep 08 Jun 10	Feb 08 Sep 08 Oct 10	100% 100% 100%	Sep 08 Jun 10 Feb 13	NA	\$758,297	NA

IFR STATUS REPORT	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 12/31/17	Funds Needed to Complete
PROJECT DESCRIPTION								
<b>PROJECTS COMPLETED (cont)</b>								
<b>Treatment Plant Facilities</b>								
Process Control / Data Acquisition System (Central Control Board Replacement)	Planning	In House	Jan 92	100%	Sep 93	NA	\$2,611,954	NA
	Design	Sep 93	Aug 94	100%	Feb 96			
	Construction	Mar 96	Jun 96	100%	May 01			
Chlorine room rehabilitation	Planning	In House	Feb 92	100%	May 94	NA	\$571,007	NA
	Design	Jun 94	Jan 95	100%	Dec 95			
	Construction	Jan 96	Jun 96	100%	Sep 97			
Replace lime feed equipment	Planning	In House	Jun 95	100%	Jul 95	NA	\$837,465	NA
	Design	Jan 95	Jul 95	100%	Mar 96			
	Construction	Apr 96	Oct 96	100%	Jan 98			
Replace ferric feed equipment	Planning	In House	Apr 92	100%	Dec 93	NA	\$630,277	NA
	Design	Feb 93	Jan 94	100%	Feb 95			
	Construction	Feb 95	Jul 95	100%	Jun 97			
Wash Water Tank - replace check valves	Planning	In House	Jan 96	100%	Feb 96	NA	\$25,349	NA
	Design	In House	Feb 96	100%	Mar 96			
	Construction	Apr 96	Sep 96	100%	Jun 97			
48" Washwater Main Rehabilitation - Corrosion Protection	Planning	In House	Jul 00	100%	Oct 00	NA	\$480,861	NA
	Design	In House	Jul 00	100%	Nov 00			
	Construction	Dec 00	May 01	100%	Sep 01			
Auxiliary wash and blower system for filters	Planning	In House	Mar 93	100%	Jan 94	NA	\$400,000	NA
	Design	Feb 93	Feb 94	100%	Oct 95			
	Construction	Oct 95	Apr 96	100%	Jul 97			
Replace effluent valve actuators	Planning	In House	Jan 96	100%	Mar 96	NA	\$310,334	NA
	Design	In House	Mar 96	100%	Apr 96			
	Construction	Apr 96	Jan 97	100%	Jun 98			
Filter Gallery Rehabilitation	Planning	In House	Jan 95	100%	Jan 95	NA	\$55,426	NA
	Design	In House	Jan 95	100%	Feb 95			
	Construction	Mar 95	Jan 96	100%	Mar 96			
Treatment Plant - Replace boilers & water heaters	Planning	In House	Dec 93	100%	Jan 94	NA	\$202,087	NA
	Design	Feb 93	Feb 94	100%	Dec 94			
	Construction	Dec 94	Jun 95	100%	Jun 97			
Rehabilitate interior of clearwell	Planning	In House	Jan 96	100%	Mar 96	NA	\$689,786	NA
	Design	May 96	Apr 97	100%	Jan 99			
	Construction	Feb 99	Sep 99	100%	May 00			
Effluent clearwell yard - concrete repairs	Planning	In House	Jan 96	100%	Mar 96	NA	\$689,786	NA
	Design	May 96	Apr 97	100%	Jan 99			
	Construction	Feb 99	Jun 99	100%	Nov 00			
Emergency bypass rehabilitation	Planning	In House	Jan 96	100%	Mar 96	NA	\$276,179	NA
	Design	May 96	Mar 99	100%	Oct 99			
	Construction	Jun 00	Apr 01	100%	Jun 01			
Treatment Plant - Electrical Supply System upgrade	Planning	In House	Jan 94	100%	Jan 95	NA	\$945,081	NA
	Design	Jan 95	Feb 95	100%	May 95			
	Construction	Aug 95	Mar 96	100%	Sep 96			
Treatment Plant - Convert Secondary Voltage - 550V to 480V	Planning	In House	Feb 99	100%	Feb 00	NA	\$1,293,691	NA
	Design	In House	Jun 99	100%	Feb 00			
	Construction	Jun 00	Jan 01	100%	Dec 01			

IFR STATUS REPORT	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	Expenditures to 12/31/17	Funds Needed to Complete
<b>PROJECTS COMPLETED (cont)</b>								
<b>Treatment Plant Facilities (cont)</b>								
Treatment Plant roof/insulation	Planning	In House	Mar 96	100%	Apr 96	NA	\$243,618	NA
	Design	Jan 95	Apr 96	100%	Jun 96			
	Construction	Jul 96	Apr 97	100%	Dec 97			
Forestry garage roof / insulation	Planning	In House	Mar 96	100%	Apr 96	NA	\$81,206	NA
	Design	Jan 95	Apr 96	100%	Jun 96			
	Construction	Jul 96	Apr 97	100%	Dec 97			
Ferric sulfate - metering system	Planning	In House	Jan 01	100%	May 01	NA	\$42,535	NA
	Design	In House	May 01	100%	May 01			
	Construction	Jul 01	Jan 02	100%	Feb 02			
Treatment Plant - lab improvements	Planning	In House	Oct 94	100%	Jul 96	NA	\$511,399	NA
	Design	In House	Aug 96	100%	Nov 00			
	Construction	Dec 00	Sep 01	100%	Dec 02			
Replace wash water pumps	Planning	In House	Apr 01	100%	Oct 01	NA	\$269,816	NA
	Design	In House	Nov 01	100%	Dec 01			
	Construction	Dec 01	Mar 02	100%	Apr 04			
Replace service water and hydrant pumps	Planning	In House	Apr 01	100%	Oct 01	NA	\$63,388	NA
	Design	In House	Nov 01	100%	Dec 01			
	Construction	Dec 01	Mar 02	100%	Apr 04			
Access Road Drainage Improvements	Planning	In House	May 02	100%	Jun 03	NA	\$140,916	NA
	Design	----	----	----	----			
	Construction	Jun 03	Jul 03	100%	Dec 03			
Rehabilitate limestone and granite exterior blocks	Planning	In House	Nov 03	100%	Dec 03	NA	\$167,619	NA
	Design	In House	Dec 03	100%	Jan 04			
	Construction	Jan 04	Jun 04	100%	Sep 04			
Various Treatment Plant Facilities Projects	Planning	Various Projects				NA	\$98,097	NA
	Design							
	Construction							
Rehabilitate Lime Transfer System	Planning	In House	Jun 01	100%	Feb 02	NA	\$2,058,020	NA
	Design	Feb 02	Jun 02	100%	Sep 03			
	Construction	Oct 03	Jun 04	100%	Nov 05			
Rehabilitate Fluoride Transfer System	Planning	In House	Jun 01	100%	Feb 02	NA	\$882,008	NA
	Design	Feb 02	Jun 02	100%	Sep 03			
	Construction	Oct 03	Jun 04	100%	Sep 05			
Treatment Plant Office a/c and ventilation upgrades	Planning	In House	May 01	100%	May 01	NA	\$918,449	NA
	Design	Jun 01	Jun 01	100%	Jul 03			
	Construction	Jul 03	May 04	100%	Jun 06			
Replace water heaters for process water	Planning	In House	May 01	100%	Dec 01	NA	\$91,041	NA
	Design	Apr 02	May 02	100%	Jul 03			
	Construction	Jul 03	May 04	100%	Jun 06			
Treatment Plant - heating system upgrade	Planning	In House	Aug 02	100%	Sep 02	NA	\$539,334	NA
	Design	Oct 02	Oct 02	100%	Jul 03			
	Construction	Jul 03	May 04	100%	Jun 06			
Wash water tank - structural rehabilitation	Planning	In House	Dec 02	100%	Feb 03	NA	\$416,223	NA
	Design	Feb 03	Sep 03	100%	Apr 05			
	Construction	Apr-05	Oct 05	100%	Dec 06			

IFR STATUS REPORT	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 12/31/17	Funds Needed to Complete
PROJECT DESCRIPTION								
<b>PROJECTS COMPLETED (cont)</b>								
<b>Treatment Plant Facilities (cont)</b>								
Service Water Tank - inspection / rehabilitation	Planning	In House	Sep 06	100%	Oct 06	NA	\$3,229	NA
	Design	In House	Sep 07	100%	Sep 07			
	Construction	In House	Oct 07	100%	Nov 07			
Clarification Optimization (Pumped Flash Mixer System)	Planning	In House	Nov 03	100%	Jul 03	NA	\$1,174,211	NA
	Design	Feb 03	Mar 03	100%	Sep 04			
	Construction	Sep 04	Jun 05	100%	Jul 08			
Chlorine Room Upgrades	Planning	In House	Sep 05	100%	Sep 05	NA	\$46,433	NA
	Design	In House	Sep 05	100%	Sep 05			
	Construction	In House	Sep 05	100%	Sep 05			
Ferric System Upgrades	Planning	In House	Feb 13	100%	Apr 13	NA	\$401,710	NA
	Design	In House	Apr 13	100%	Sep 13			
	Construction	Aug 13	Jun 13	100%	Dec 13			
Sludge handling / disposal	Planning	In House	Jan 96	100%	Nov 02	NA	\$26,580,853	NA
	Design	Jan 95	Feb 96	100%	Feb 03			
	Construction	Sep 97	Jun 98	100%	Jul 16			
Replace sand filters	Planning	In House	Jul 03	100%	Nov 04	NA	\$49,683,157	NA
	Design	Feb 05	Oct 05	100%	Jan 09			
	Construction	Feb 09	Sep 09	100%	Oct 16			
Plant Influent and Aerator Rehabilitation	Planning	In House	May 01	100%	Jun 06	NA	\$5,893,653	NA
	Design	Jun 06	May 07	100%	Feb 13			
	Construction	Feb 13	Oct 13	100%	Jun 16			
<b>Transmission System</b>								
102" Aqueduct-Investigation/Rehabilitation	Planning	In House	Dec 96	100%	Feb 98	NA	\$6,038,079	NA
	Design	In House	Nov 98	100%	Oct 99			
	Construction	In House	Jan 00	100%	Apr 00			
Aqueduct Siphon Chamber - replace roof	Planning	In House	Jan 96	100%	Jul 96	NA	\$5,754	NA
	Design	In House	Jul 96	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Aug 98			
Cathodic protection - transmission mains	Planning	In House	Apr 97	100%	Jun 98	NA	\$83,050	NA
	Design	Jun 98	Jul 98	100%	Jan 00			
	Construction	Jul 00	Aug00	100%	Dec 00			
90" effluent finished water aqueduct - Inspection / Rehabilitation	Planning	In House	Apr 99	100%	Dec 00	NA	\$7,373,121	NA
	Design	Jun 00	Jun 00	100%	Nov 01			
	Construction	Dec 01	May 02	100%	Mar 05			
Supplemental Tunnel - inspection / rehabilitation	Planning	In House	Sep 04	100%	Dec 04	NA	\$8,274,926	NA
	Design	Dec 04	Sep 05	100%	Nov 08			
	Construction	Dec 04	Nov 05	100%	Nov 08			
66" Transmission Main Inspection	Planning	In House	Sep 06	100%	Jun 07	NA	\$48,530	NA
	Design	In House	Sep 07	100%	Sep 07			
	Construction	In House	Dec 07	100%	Jan 08			
60" Transmission Main Inspection	Planning	In House	Sep 06	100%	Jan 08	NA	\$48,530	NA
	Design	----	----	----	----			
	Construction	----	----	----	----			
102" aqueduct - investigation / rehabilitation (2010-2011)	Planning	In House	Jun 10	100%	Aug 10	NA	\$3,786,626	NA
	Design	Aug 10	Nov 10	100%	Sep 13			
	Construction	Aug 10	Nov 10	100%	Sep 13			
78" Aqueduct Inspection	Planning	In House	Jul 12	100%	Oct 12	NA	\$2,360,840	NA
	Design	Oct 12	Mar 13	100%	Apr 13			
	Construction	Oct 12	Feb 13	100%	Nov 13			

IFR STATUS REPORT	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 12/31/17	Funds Needed to Complete
PROJECT DESCRIPTION								
<b>PROJECTS COMPLETED (cont)</b>								
<b>Pumping and Storage</b>								
Bath Street pump station upgrade	Planning	In House	Nov 89	100%	Jan 93	NA	\$2,472,410	NA
	Design	Feb 93	Oct 93	100%	Apr 95			
	Construction	May 95	Oct 95	100%	Nov 99			
Neutaconkanut pump station upgrade	Planning	In House	Nov 89	100%	Jan 93	NA	\$1,847,123	NA
	Design	Feb 93	Oct 93	100%	Apr 95			
	Construction	May 95	Oct 95	100%	Nov 99			
Aqueduct pump station (electrical upgrade)	Planning	In House	Jul 98	100%	Dec 98	NA	\$105,723	NA
	Design	In House	Jan 99	100%	Apr 99			
	Construction	Jul 99	Oct 99	100%	Mar 00			
Aqueduct pump station (pump upgrade)	Planning	In House	Mar 00	100%	Apr 00	NA	\$80,542	NA
	Design	In House	Mar 00	100%	Apr 00			
	Construction	Apr 00	Jun 00	100%	Jul 00			
Dean Estates Pump Station - replace roof	Planning	In House	Jan 96	100%	Jul 96	NA	\$5,754	NA
	Design	In House	Jul 96	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Aug 98			
Various Pump Stations - electronic equipment upgrades	Planning	In House	Jan 96	100%	Mar 96	NA	\$15,202	NA
	Design	In House	Apr 96	100%	May 96			
	Construction	May 96	Jun 96	100%	Jul 97			
Longview reservoir - structural rehabilitation	Planning	In House	Jan 96	100%	Mar 96	NA	\$652,785	NA
	Design	May 96	Jan 97	100%	Jun 97			
	Construction	Jun 97	Apr 98	100%	Sep 99			
Aqueduct reservoir - inspection / rehabilitation	Planning	In House	Jan 96	100%	Mar 96	NA	\$1,451,462	NA
	Design	May 96	Sep 97	100%	Feb 98			
	Construction	Mar 98	Apr 99	100%	Oct 00			
Neutaconkanut Reservoir Gatehouse - replace roof	Planning	In House	Jan 96	100%	Jul 96	NA	\$5,754	NA
	Design	In House	Jul 96	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Aug 98			
Neutaconkanut Reservoir Gatehouse Rehabilitation	Planning	In House	Oct 99	100%	Mar 00	NA	\$45,848	NA
	Design	In House	Apr 00	100%	Jun 00			
	Construction	Jul 00	Nov 00	100%	May 01			
Greenville Ave Pump Station - Replace surge valve	Planning	In House	Apr 00	100%	Aug 01	NA	\$11,989	NA
	Design	----	----	----	----			
	Construction	Sep 01	Oct 01	100%	Nov 01			
Ridge Road Tank - inspection	Planning	In House	Sep 06	100%	Nov 06	NA	\$9,687	NA
	Design	----	----	----	----			
	Construction	----	----	----	----			
Aqueduct Pump Station Rehabilitation	Planning	In House	Oct 02	100%	Mar 03	NA	\$2,353,475	NA
	Design	Jun 03	Dec 03	100%	Sep 04			
	Construction	Dec 04	Apr-05	100%	Nov 07			
Neutaconkanut reservoir - inspection / rehabilitation	Planning	In House	Dec 02	100%	Feb 03	NA	\$2,630,223	NA
	Design	Feb 03	Sep 03	100%	Apr 05			
	Construction	Apr-05	Oct 05	100%	Jun 08			
Dean Estates Pump Station upgrade	Planning	In House	Dec 04	100%	Feb-05	NA	\$1,458,621	NA
	Design	Jun 05	Sep 05	100%	Apr 10			
	Construction	Apr 10	Aug 10	100%	Oct 12			

IFR STATUS REPORT	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	Expenditures to 12/31/17	Funds Needed to Complete
<b>PROJECTS COMPLETED (cont)</b>								
<b>Distribution System</b>								
Replace water meters	Planning Design Construction	80,546 meters replaced				NA	\$13,841,637	NA
Leak Detection	Planning Design Construction	In House In House May 08	May 01 Jun 07 Oct 08	100% 100% 100%	Jan 02 May 08 Sep 10	NA	\$191,994	NA
Valve and Hydrant Condition Assessment Program	Planning Design Construction	In House ----- Apr 10	Dec 04 ----- Sep 10	100% ----- 100%	Aug 10 ----- Sep 12	NA	\$1,509,611	NA
<b>Support System Facilities</b>								
Replace telephone system	Planning Design Construction	In House In House Jul 97	Apr 97 Jun 97 Nov 97	100% 100% 100%	Jun 97 Jul 97 Nov 98	NA	\$350,370	NA
Academy Avenue Administration Building - heating system	Planning Design Construction	In House In House Jul 97	May 97 Jun 97 Oct 97	100% 100% 100%	Jun 97 Jul 97 Oct 97	NA	\$40,370	NA
Academy Avenue Administration Building - ventilation improvements	Planning Design Construction	In House In House May 97	Apr 97 May 97 Oct 97	100% 100% 100%	Apr 97 May 97 Oct 98	NA	\$74,555	NA
Academy Avenue Administration Building - roof / insulation	Planning Design Construction	In House In House Jun 95	Mar 95 Apr 95 Oct 95	100% 100% 100%	Apr 95 Mar 95 Aug 96	NA	\$69,208	NA
Academy Avenue Administration Building - office renovation	Planning Design Construction	Various Projects				NA	\$580,539	NA
Remove / replace underground storage tanks	Planning Design Construction	Various Projects				NA	\$629,948	NA
Forestry Building - heating system upgrade	Planning Design Construction	In House Oct 02 Jul 03	Aug 02 Oct 02 May 04	100% 100% 100%	Sep 02 Jul 03 Jun 06	NA	\$299,568	NA
Fire Safety System Improvements	Planning Design Construction	In House In House In House	Jul 04 Apr 05 Apr 05	100% 100% 100%	Jun 06 Sep 06 Jul 07	NA	\$1,888,610	NA
Watershed Storage Facility	Planning Design Construction	In House In House Feb 08	Jul 04 Oct 05 Jul 08	100% 100% 100%	Nov 05 Feb 08 Sep 09	NA	\$934,141	NA
<b>PROJECTS COMPLETED(Last 12 Months)</b>								
<b>Treatment Plant Facilities</b>								
Chlorine Room Monorail and Scales Replacement	Planning Design Construction	In House In House In House	Jun 16 Jun 16 Dec 16	100% 100% 100%	Oct 16 Nov 16 Feb 17	NA	\$222,153	NA
<b>Pumping and Storage</b>								
Fruit Hill Pump Station Upgrades	Planning Design Construction	In House In House In House	Feb 16 Feb 16 Apr 16	100% 100% 100%	Apr 16 Apr 16 Dec 16	NA	\$129,308	NA

IFR STATUS REPORT	SCHEDULE					COST		
	Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	Latest Cost Estimate	Expenditures to 12/31/17	Funds Needed to Complete
PROJECT DESCRIPTION								
<b>ONGOING PROJECTS</b>								
<b>Raw Water Supply</b>								
Dam Inspections and Improvements	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$533,701	NA
<b>Treatment Plant Facilities</b>								
Treatment Process and Water Quality Studies	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$5,943,077	NA
Process Control and Control System Upgrades	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$1,908,234	NA
Process Meter and Lab Equipment Replacement	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$229,608	NA
Treatment Plant Facility Improvements	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$887,562	NA
<b>Transmission System</b>								
Replace 16 inch & larger valves	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$6,649,813	NA
<b>Pumping and Storage (cont)</b>								
Various Pumping and Storage Improvements	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$409,423	NA
<b>Distribution System</b>								
Various Distribution System Improvements	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$6,819,958	NA
Replace distribution valves	Planning Design Construction		Work is Ongoing - 2062 valves replaced			NA	\$3,549,592	NA
Replace fire hydrants	Planning Design Construction		Work is Ongoing - 2371 fire hydrants replaced			NA	\$6,543,912	NA
Replace lead services	Planning Design Construction		Work is Ongoing - 17,548 lead services replaced			NA	\$56,526,307	NA
Replace / upgrade water mains	Planning Design Construction		Work is Ongoing - 385,245 feet of main rehabilitated			NA	\$95,839,610	NA
Replace blowoffs	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$18,982	NA
<b>Support System Facilities</b>								
Various Support System and Facility Improvements	Planning Design Construction		Work is Ongoing - Various Projects			NA	\$1,865,178	NA

IFR STATUS REPORT	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	Expenditures to 12/31/17	Funds Needed to Complete
<b>CONSTRUCTION</b>								
<b>Raw Water Supply</b>								
90" and 60" influent conduits inspection / rehabilitation	Planning	In House	Aug 01	100%	Jun 06	\$800,000	\$784,742	\$15,258
	Design	Jun 06	May 07	100%	Feb 13			
	Construction	Feb 13	Oct 13	95%	(Jun 18)			
<b>Treatment Plant Facilities</b>								
Aerated, Settled, and Filter Influent Conduits	Planning	In House	May 01	100%	Jun 06	\$1,500,000	\$1,175,973	\$324,027
	Design	Jun 06	May 07	100%	Feb 13			
	Construction	Feb 13	Oct 13	90%	(Jun 18)			
<b>Transmission System</b>								
Supplemental Tunnel - Investigation Rehabilitation (2016)	Planning	In House	Jul 15	100%	Sep 15	\$14,000,000	\$5,819,421	\$8,180,579
	Design	Jul 15	Sep 15	50%	(Mar 20)			
	Construction	Jul 15	Sep 15	50%	(Mar 20)			
<b>DESIGN</b>								
<b>Treatment Plant Facilities</b>								
Lime System Upgrades	Planning	In House	Jan 13	100%	Dec 14	\$1,500,000	\$105,833	\$1,394,167
	Design	In House	Jun 15	100%	Apr 17			
	Construction	May 17	Mar 18	0%	(Feb 19)			
<b>Pumping and Storage</b>								
Aqueduct, Neutaconkanut and Bath Street Pump Station Upgrades	Planning	In House	Dec 16	100%	Mar 17	\$1,300,000	\$18,230	\$1,281,770
	Design	In House	Dec 16	50%	(Sep 18)			
	Construction	(Sep 18)	(Dec 18)	0%	(Apr 19)			
Greenville Ave Pump Station Upgrades	Planning	In House	Mar 17	100%	May 17	\$1,000,000	\$71,404	\$928,596
	Design	In House	May 17	100%	Mar 18			
	Construction	Apr 18	(Jul 18)	0%	(May 19)			
Atwood Ave and Ashby Street Pump Station Upgrades	Planning	In House	Dec 16	100%	Jun 17	\$2,000,000	\$0	\$2,000,000
	Design	In House	Jun 17	60%	Apr 18			
	Construction	Apr 18	Sep 18	0%	(Mar 19)			
<b>PLANNING</b>								
<b>Transmission System</b>								
Condition Assessment Transmission Mains	Planning	In House	Jan 16	25%	----	\$500,000	\$41,446	\$458,554
	Design	----	----	----	----			
	Construction	----	----	----	----			
<b>Pumping and Storage</b>								
Storage Tanks Inspections / Improvements	Planning	In House	Mar 14	25%	(Jun 19)	\$408,000	\$116,614	\$291,386
	Design	----	----	----	----			
	Construction	In House	Sep 14	25%	(Jun 19)			

Total IFR Expenditures

\$368,619,263

# **CIP PROJECT STATUS REPORT**

## **PROJECT NARRATIVES**

## **Treatment Facilities**

### **De-Chlorination System Sludge Lagoons**

Construction of a de-chlorination system at the Treatment Plant has been completed. This system allows Providence Water to de-chlorinate the treatment plant's waste water prior to its discharge into the lagoon system.

## **Distribution System**

### **Unidirectional Flushing (UDF) Program Development**

A UDF program is an advanced preventive maintenance program to systematically flush the system to improve water quality in specific areas of the system. The program utilizes hydraulic modeling software and mapping sequences to select the valves and hydrants to be operated in order to attain required optimal flushing velocities.

A pilot project was completed in 2013 to determine and establish preferred UDF practices for Providence Water's flushing program. A data tracking system for the program was developed and materials and equipment for the program were purchased. Procedures to effectively flush the entire distribution system were developed, and design of the flushing sequences for the entire system has been completed. Since inception of the program in 2013, 420 miles of the system has been flushed, with another 90 miles planned to be flushed for construction season 2018.

## **Support System Facilities**

### **Central Operations Facility**

A facility and property became available that met organizational needs and Providence Water purchased the building and the site on December 29, 2015. The 180,000 SF building is situated on a 16.5 acre site in Providence. The building will accommodate both the administration and operations divisions of Providence Water. Construction was completed and the facility was fully operational in October 2017.

**Central Operations Facility – Operating Expenses**

The costs required for maintaining the facility during construction such as electricity, heat, internet, etc., are being paid from the capital fund. Once renovation work is complete, these costs will be charged to the operating budget.

**Security Equipment/CCTV/Readers**

Security equipment is needed at the new Central Operating Facility consisting of cameras, TV monitors, and card access readers. The purpose of this equipment is to upgrade the existing security work station, hardware and software for the security hub that currently exist at the Academy Avenue facility.

## Treatment Facilities

### **Security Improvements - Treatment Plant**

Construction is in progress to upgrade the security at the plant by limiting and altering access at the front gate. The scope of work consists of reconfiguration of the main entry gate leading into the treatment plant, the installation of a security guard shack that will monitor and control entry, construction of a new visitor parking lot, and new fencing along the perimeter of the aerator. Construction is anticipated to be completed during the Spring of 2018.

## Distribution System

### **Water Main Tie-Ins**

Dead end mains are mains that are not looped that receive a supply of water from only one source. Because these mains are not tied in, the flow velocities for these mains are sometimes low, and water in these mains are stagnant which can lead to these mains having a higher degree of water quality complaints and flow issues than mains that are tied in.

There are approximately 350 dead end mains in the system that can potentially be connected. The total linear footage of connecting these mains is estimated at approximately 60,000 feet. Plans are to install new pipe to connect some of these existing dead ends.

### **Transmission/Distribution system improvements – Johnston**

Citizens Bank is currently constructing a new campus that will accommodate approximately 3,200 employees in the Town of Johnston. The new campus will impose additional domestic, irrigation, and fire flow demands on Providence Water's system. As a result, Citizens Bank will be required to install new water mains, a water storage tank, and upgrades to the Greenville Avenue Pump Station. Providence Water's IFR program budgeted for additional upgrades in the Greenville Avenue pump zone to address future anticipated build-out demands. Construction is in progress on new 12-inch and 16-inch transmission mains and a new 1 MG water storage tank.

**Support System Facilities****Geographic Information System (GIS) and Asset Management System**

A Geographical Information System (GIS) was developed to provide Providence Water with the capability to access information on all of the distribution system asset records that previously resided in various software programs and paper records from one centralized database and mapping system. The project also included the purchase and development of all computer hardware, software applications, and data needed to support a fully functional, customized GIS program. A new hydraulic model has been developed and calibrated by converting the existing GIS record data to a new water model database.

A project to link Providence Water's water main asset records with our scanned as-built records and drawings is in progress. Following completion of this project Providence Water will be able to access all of our scanned as-built records directly from the internal GIS viewer.

A project is in progress to convert our existing client asset management and work order system to a web based system that will provide better organizational integration with the GIS. This project will also improve the ability for field staff to gain access to our asset and work order data in the field. Design of the system is complete. The system implementation and training being are presently being phased throughout the organization by department.

**Computer/ IT Equipment – Virtualization**

Providence Water is updating its current network, telephone, and computer systems to a modern visualized environment that will meet current organizational needs.

**Support System Facilities****Renewable Energy / Feasibility Study**

Construction is complete on a new rooftop solar PV array located at the new Central Operations Facility. The rooftop solar PV array is approximately 664 kW DC in size producing enough electrically to offset approximately 40% of the electrical use at the new Central Operations Facility. Planning is in progress on other Renewable Energy projects with the goal of making Providence Water 100% supplied by Renewable Energy.

**Cyber Security**

A Cyber Security plan is being developed which includes policies, procedures, and organizational practices for upgrading and protecting the IT infrastructure and systems. Anticipated system upgrades will consist of hardware and software upgrades to improve the infrastructure to modern day standards, and monitoring and measuring the IT system components and infrastructure to protect the system.

# CIP PROJECT STATUS REPORT

## PROJECT COST AND SCHEDULE DETAILS

CIP STATUS REPORT	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	Expenditures to 12/31/17	Funds Needed to Complete
<b>PROJECTS COMPLETED</b>								
<b>Raw Water Supply</b>								
Alternate Source of Supply Study	Planning	Jul 96	May 97	100%	Jun 04	NA	\$643,794	NA
	Design	-----	-----	-----	-----			
	Construction	-----	-----	-----	-----			
<b>Treatment Facilities</b>								
Electronic treatment process monitoring equipment	Planning	In House	Apr 95	100%	Jun 95	NA	\$111,157	NA
	Design	In House	Jul 95	100%	Nov 95			
	Construction	Aug 95	Feb 96	100%	Jun 97			
Treatment Plant - Install pipes for effluent metering / sampling	Planning	In House	Jan 96	100%	Mar 96	NA	\$3,444	NA
	Design	In House	Dec 97	100%	Dec 97			
	Construction	In House	May 98	100%	May 98			
Install New CO2 System	Planning	In House	Oct 01	100%	Jan 10	NA	\$3,160,608	NA
	Design	Mar 10	Apr 10	100%	Sep 10			
	Construction	Mar 10	Sep 10	100%	Aug 11			
Dredge Piping to Bypass Lagoons	Planning	In House	Mar 13	100%	Jul 13	NA	\$341,528	NA
	Design	Aug 13	Sep 13	100%	Apr 14			
	Construction	May 14	Aug 14	100%	Dec 14			
Treatment Plant On Site Waste Treatment System	Planning	In House	Feb 15	100%	Apr 15	NA	\$121,343	NA
	Design	Apr 15	Jun 15	100%	Oct 15			
	Construction	Nov 15	Dec 15	100%	Apr 16			
<b>Transmission System</b>								
Install Transmission Mains (W. Cranston)	Planning	Various Projects				NA	\$2,891,203	NA
	Design							
	Construction							
78" & 102" Valves for Wholesale Connections	Planning	In House	Feb 01	100%	Nov 01	NA	\$1,737,502	NA
	Design	Oct 01	Feb 02	100%	Jan 08			
	Construction	Oct 01	Jul 02	100%	Jan 08			
Emergency Interconnection - Structure D	Planning	In House	Dec 06	100%	Apr 07	NA	\$475,694	NA
	Design	In House	Dec 06	100%	Oct 07			
	Construction	In House	Jul 07	100%	Oct 07			
Western Cranston - water system improvements	Planning	Various Projects				NA	\$293,542	NA
	Design							
	Construction							
<b>Pumping and Storage</b>								
Neutaconkanut Hill Booster Pump Station	Planning	In House	Oct 97	100%	Jan 98	NA	\$202,135	NA
	Design	In House	Jan 98	100%	Sep 98			
	Construction	Sep 98	Dec 98	100%	Sep 99			
<b>Distribution System</b>								
Various Main Extensions for System Improvements	Planning	Various Projects				NA	\$70,584	NA
	Design							
	Construction							
AMR system	Planning	In House	July 94	100%	July 96	NA	\$6,849,859	NA
	Design	In House	Apr 98	100%	Dec 98			
	Construction	In House	Aug 99	100%	Dec 08			

CIP STATUS REPORT	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	Expenditures to 12/31/17	Funds Needed to Complete
<b>PROJECTS COMPLETED (cont)</b>								
<b>Distribution System (cont)</b>								
MLOG Leak Detection	Planning	In House	Jun 09	100%	Dec 09	NA	\$1,744,214	NA
	Design	Dec 09	Dec 09	100%	Mar 10			
	Construction	NA	Mar 10	100%	Mar 12			
Hydrant Locks	Planning	NA	NA	NA	NA	NA	\$446,711	NA
	Design	NA	NA	NA	NA			
	Construction	In House	Mar 10	100%	Jun 12			
<b>Support System Facilities</b>								
Forestry Building - Office Construction	Planning	In House	Apr 96	100%	Mar 97	NA	\$18,325	NA
	Design	In House	Apr 97	100%	Dec 97			
	Construction	In House	Apr 97	100%	Jun 98			
New fencing and roads - PW property	Planning	In House	Apr 97	100%	Jun 97	NA	\$257,274	NA
	Design	In House	Jun 97	100%	Aug 97			
	Construction	Oct 97	Mar 98	100%	Apr 98			
Security upgrade at treatment plant and facilities	Planning	May 97	Dec 97	100%	Nov 99	NA	\$4,271,728	NA
	Design	Jul 01	Dec 01	100%	Aug 02			
	Construction	Mar 02	Mar 02	100%	Jun 08			
Various Capital Projects	Planning					NA	\$171,149	NA
	Design	Various Projects						
	Construction							
<b>COMPLETED (Last 12 Months)</b>								
<b>Treatment Facilities</b>								
De-Chlorination System Sludge Lagoons	Planning	In House	Sep 16	100%	Oct 16	NA	\$91,042	NA
	Design	In House	Oct 16	100%	Dec 16			
	Construction	Dec 16	Mar 17	70%	(Dec 17)			
<b>Distribution System</b>								
Unidirectional Flushing (UDF) Program Development	Planning	In House	Aug 12	100%	Feb 13	NA	\$1,707,934	NA
	Design	In House	Feb 13	100%	Jun 17			
	Construction	In House	Jun 13	100%	Dec 13			
<b>Support System Facilities</b>								
Central Operations Facility	Planning	In House	Jan 08	100%	Dec 15	NA	\$29,050,943	NA
	Design	Jan 16	Feb 16	100%	Jun 16			
	Construction	Jun 16	Jun 16	100%	Oct 17			
Central Operations Facility (Operating Expenses)	Planning	----	----	----	----	NA	\$154,471	NA
	Design	----	----	----	----			
	Construction	In House	Dec 15	100%	Sep 17			
Security Equipment / CCTV / Readers	Planning	In House	Jan 08	100%	Dec 15	NA	\$0	NA
	Design	Jan 16	Feb 16	100%	Jun 16			
	Construction	Sep 16	Mar 17	100%	Oct 17			

CIP STATUS REPORT	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	Expenditures to 12/31/17	Funds Needed to Complete
<b>CONSTRUCTION</b>								
<b>Treatment Facilities</b>								
Security Improvements - Treatment Plant	Planning	In House	Feb 15	100%	Dec 16	\$1,400,000	\$115,854	\$1,284,146
	Design	In House	Feb 15	100%	Aug 17			
	Construction	In House	Sep 17	20%	(Jun 18)			
<b>Distribution System</b>								
Water Main Tie -ins	Planning	In House	Oct 15	100%	Jan 16	\$280,000	\$191,621	\$88,379
	Design	In House	Jan 16	50%	----			
	Construction	In House	Sep 16	40%	----			
Transmission & Distribution System Improvements - Johnston	Planning	In House	Apr 16	100%	Mar 17	\$1,000,000	\$198,513	\$801,487
	Design	In House	Jul 16	100%	Mar 17			
	Construction	Mar 17	Mar 17	90%	(Jul 18)			
<b>Support System Facilities (cont)</b>								
GIS System and Asset Management System	Planning	Jan 02	Feb 02	100%	Jun 03	\$6,000,000	\$4,997,024	\$1,002,976
	Design	Jan 04	Apr 04	100%	Dec 06			
	Construction	Apr 05	Nov 05	80%	(Jun 18)			
Computer / IT Equipment - Virtualization	Planning	In House	Oct 15	100%	Oct 16	\$2,300,000	\$747,015	\$1,552,985
	Design	Oct 15	Nov 15	100%	Jan 17			
	Construction	Sep 16	Jan 17	20%	(Sep 18)			
<b>PLANNING</b>								
<b>Support System Facilities</b>								
Renewable Energy / Feasibility Study	Planning	In House	Jul 16	100%	Aug 16	\$1,700,000	\$1,553,926	\$146,074
	Design	In House	Oct 16	100%	Aug 17			
	Construction	In House	Sep 17	100%	(Jan 18)			
Cyber Security	Planning	In House	Sep 15	50%	----	\$800,000	\$0	\$800,000
	Design	----	----	----	----			
	Construction	----	----	----	----			

**Total CIP Expenditures**

**\$62,620,135**