Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-40: With regard to Mr. Caruolo's testimony on page 7, please state the cost to Providence for retiring, rather than selling, its RECs.

Response: As noted in my testimony on page 7, it's important for Providence Water to reduce and possibly eliminate our carbon footprint. It has always been our intent to be 100% renewable power or 100% green which does not allow us to sell the Renewable Energy Certificates (RECs). As a company we value natural resources, therefore it's very important that we take a leadership role in our industry to preserve and protect our environment. We are well aware that we are foregoing a potential savings in order to protect our environment by producing and utilizing 100% green energy.

Below is a forecast of what PW could sell the total RECs produced by our rooftop solar array (in operation) at the COF and the solar field located at the Deca property in Johnston once completed and on line.

	Est. Annual REC Produced	Est. Low Value	Est. Annual Low Value
COF:	750	$11.00	$ 8,250
DECA:	8,500	$11.00	$ 93,500
		TOTAL:	$101,750

	Est. Annual REC Produced	Est. High Value	Est. Annual High Value
COF:	750	$40.00	$ 30,000
DECA:	8,500	$40.00	$340,000
		TOTAL:	$370,000

Please note, that our solar consultant believes that the REC program may go away within the next 7 years. Estimated REC values were obtained from New England Power Pool (NEPOOL) and provided to us by our third party verifier Daymark Energy Advisors.

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-41: Please provide any and all Providence Water Board minutes in which it approves the Providence Water's decision to retire the RECs.

RESPONSE: The Renewable Energy Policy approved at the June 26, 2019 meeting of the Providence Water Supply Board is attached along with the June 26, 2019 meeting minutes.

Providence Water

General Policy
Renewable Energy

POLICY: It is the policy of the Board of Directors of Providence Water to promote green renewable energy and install the necessary renewable systems to supply all of Providence Water's electricity demands. It is also the policy of Providence Water to maintain ownership or exclusive rights to all associated Renewable Energy Certificates (RECs) created through our systems in order to receive the social and environmental value of all electricity produced by our renewable energy systems.

GOAL: It is the goal of Providence Water to produce enough renewable electricity in order for Providence Water to become 100% green and utilize all electricity from our own in-house renewable energy systems.

STRATEGY: A REC is a tradable, market-based instrument that represents the legal property rights to the social, environmental and other non-power attributes of renewable electricity generation. A REC is issued for every megawatt hour (MWh) of electricity generated and delivered to the electrical grid from a renewable energy source. Electricity cannot be considered renewable without an associated REC to substantiate the renewable attribute. Maintaining ownership of the RECs created through our systems will allow Providence Water to take a community leadership role by being reliant on renewable energy to power our facilities.

AUTHORITY: The General Manager shall ensure the implementation of practices and procedures consistent with this policy, as empowered by the Board of Directors on the 26th day of June 2019.

Attested by: Carissa R. Richard

Carissa R. Richard
Secretary for the Board

PROVIDENCE WATER

Tap Water Delivers

THE CITY OF PROVIDENCE
WATER SUPPLY BOARD
JUNE 26, 2019 MINUTES

(401) 521-6300

125 Dupont Drive
Providence, RI 02907

www.provwater.com

Follow us @provwater

Like us at:
facebook.com/Providencewater

BOARD MEMBERS PRESENT:
Mr. Xaykham Khamsyvoravong, Chairman
Mr. Joseph Cataldi, Vice Chairman
Mr. Lawrence Mancini, Ex-Officio
Ms. Cristen Raucci, Board Member
Ms. Kerri Lynn Thurber, Board Member

Mr. William E. O'Gara, Esq., Legal Advisor
Mr. Ricky Caruolo, General Manager
Ms. Carissa Richard, Board Secretary

BOARD MEMBERS ABSENT:
Councilman Luis Aponte, Board Member
Councilwoman Jo-Ann Ryan, Board Member

PROVIDENCE WATER SUPPLY BOARD STAFF ATTENDING:
Mr. Peter J. Pallozzi, Deputy General Manager – Administration
Ms. Nancy Parrillo, Senior Manager – Finance
Ms. Mary Deignan-White, Senior Manager – Budget and Regulatory
Mr. Gary Marino, Division Manager – Engineering
Mr. Peter DiLorenzo, Principal Engineer
Ms. Alicia Mignanelli, Financial Analyst
Mr. Levi Swanson, Governmental Aide

OTHERS ATTENDING:
None

The Providence Water Supply Board met in the Alderman's Chambers, Room 302, of Providence City Hall located at 25 Dorrance Street, Providence, Rhode Island.

1. CALL TO ORDER:

Chairman Khamsyvoravong called the meeting to order at 4:10 p.m. Chairman Khamsyvoravong led the assemblage in the Pledge of Allegiance to the Flag of the United States of America.

2. ROLL CALL:

A quorum was established by calling attendance of all Board members.

Note - the Board took various agenda items out of order.

4. REPORTS:

4.1 General Manager's Report
4.2 Financial Report
4.3 Personnel Report
4.4 Procurement and Project Status Report

General Manager (GM) Ricky Caruolo provided the Board with an overview of the information contained in Item 4.1 – General Manager's Report. GM Caruolo stated that on May 17, 2019, Providence Water received a rating letter and report from S & P Global Ratings. They have reaffirmed our AA-/stable bond rating for the $14,700,000 RI Infrastructure Bank/Safe Drinking Water bond transaction.

GM Caruolo informed the Board that the American Council of Engineering Companies (ACEC) of RI recently presented Providence Water and Pare Corporation with the second place ACEC RI's Engineering Excellence Award for the Providence Police Department Firing Range Lead Remediation and Facility Upgrades Project (enclosed). The ACEC awards are given for projects that promote the advancement of engineering through innovative design and best practices to serve RI communities. Projects were evaluated based on uniqueness and/or innovative applications of new or existing techniques, future value to the engineering profession and perception by the public, social/economic/sustainable development considerations and complexity.

GM Caruolo noted that in 2018, Providence Water set a goal to raise $2,500 and we ended up collecting $4,789. This year we increased our goal to $7,200 with the hope of receiving ten (10) CPR training kits. We surpassed our goal and raised $10,506. We are now eligible to receive twenty (20) CPR training kits. Providence Water will donate the kits to two (2) Providence area schools. The engineering/water supply divisions collected the most money.

GM Caruolo also noted that the Providence Water finance team is working on a new rate filing and the Public Utilities Commission ordered a new rate model.

GM Caruolo informed the Board that Providence Water has been in discussions with the Town of Johnston related to the Johnston Water System, which we may be acquiring by the end of the year. The system is comprised of approximately 1700 accounts and Providence Water would not be paying any money to acquire the system.

8. EXECUTIVE SESSION IN ACCORDANCE WITH R.I.G.L. 42-46-5(a)(1) - Personnel Matters:

Vice Chairman Cataldi made a motion to enter into Executive Session under R.I.G.L. 42-46-5(a)(1) to discuss personnel (compensation) matters. This motion was seconded by Ms. Thurber. All members present were in favor of the motion. The motion passed 4 to 0.

Roll Call	
Chairman Khamsyvoravong	yes
Vice Chairman Cataldi	yes
Councilman Aponte	absent
Councilwoman Ryan	absent
Mr. Mancini	yes
Ms. Thurber	yes
Ms. Raucci	absent

9. RETURN FROM EXECUTIVE SESSION:

A motion was made by Vice Chairman Cataldi, and seconded by Ms. Thurber, to exit from Executive Session. All present were in favor of the motion. The motion passed 4 to 0.

Roll Call	
Chairman Khamsyvoravong	yes
Vice Chairman Cataldi	yes
Councilman Aponte	absent
Councilwoman Ryan	absent
Mr. Mancini	yes
Ms. Thurber	yes
Ms. Raucci	absent

A motion was made by Vice Chairman Cataldi, and seconded by Ms. Thurber, to seal the records of Executive Session. All members present were in favor of the motion. The motion passed 4 to 0.

3. APPROVAL OF MINUTES OF THE PREVIOUS MEETING:

3.1 May 15, 2019 Meeting

A motion by Vice Chairman Cataldi, seconded by Mr. Mancini, to approve Agenda Item 3.1 was made. All members present were in favor of the motion. The motion passed 4 to 0.

A motion by Vice Chairman Cataldi, seconded by Mr. Mancini, to approve Agenda Items 4.1, 4.2, 4.3, and 4.4 concurrently, was made. All members present were in favor of the motion. The motion passed 4 to 0.

5. OLD BUSINESS:

There was no old business to discuss.

6. NEW BUSINESS:

6.1 Approval of the Fiscal Year 2020 Budget

Ms. Parrillo provided the Board with a brief overview of the highlights of the proposed Providence Water fiscal year 2020 budget and explained the few minor changes that had been made since the May budget presentation to the Board. Mr. Mancini informed the Board that he and his staff were pleased with the budget. Chairman Khamsyvoravong thanked the Providence Water finance staff for their work.

Vice Chairman Cataldi made a motion to approve the Fiscal Year 2020 budget. This motion was seconded by Mr. Mancini and Ms. Thurber. All members present were in favor of the motion. The motion passed 4 to 0.

6.2 Approval of Renewable Energy Policy

GM Caruolo informed the Board that it is the goal of Providence Water to produce enough renewable electricity in order for Providence Water to become 100% green and utilize all of our electricity from our own in-house renewable energy systems. The rooftop solar array at our Dupont Central Operations Facility produces between 50 % – 60% of the total electricity used at the Dupont building. When our second renewable energy project is completed in the summer of 2020, Providence Water is expected to produce enough renewable energy to offset electricity use at all of our facilities. In order for Providence Water to claim that we are reducing our carbon footprint or being powered by solar energy, we need to keep (retire) the Renewable Energy Certificates (RECs) generated by our solar projects. We believe that maintaining ownership of the RECs created through our projects will allow Providence Water to take a community leadership role by being reliant on renewable energy to power our facilities.

Vice Chairman Cataldi made a motion to approve the Renewable Energy Policy. This motion was seconded by Ms. Thurber. All members present were in favor of the motion. The motion passed 4 to 0.

7. OTHER BUSINESS:

There was no other business to discuss.

10. ADJOURNMENT:

A motion by Vice Chairman Cataldi, seconded by Mr. Mancini, to adjourn the meeting, was made. All members present were in favor of the motion. The motion passed 4 to 0. The meeting was adjourned at 4:50 p.m.

ATTEST: A true attest.

Carissa R. Richard

Carissa R. Richard, Board Secretary

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-42: Regarding Mr. Caruolo's testimony on page 10, please state the status of Providence Water's analysis of determining whether it is fiscally responsible to acquire the Johnston Water District and all factors that have been evaluated to determine the fiscal responsibility.

Response: Providence Water (PW) and Johnston town officials are having preliminary discussions with regard to PW potentially acquiring the Johnston Water District (JWD). PW requested information from the JWD in order to perform a thorough fiscal analysis, however the information has yet to be received. The information requested includes, but is not limited to the following:

1. All pertinent customer, meter, billing and collection information.
2. All associated capital costs.
3. Current contractual obligations.
4. Future infrastructure needs.

Providence Water Docket 4994

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-43: Regarding Mr. Caruolo's testimony on page 12, please set forth all facts upon which he basis his testimony that the Central Operating Facility was completed "on budget."

Response: Providence Water borrowed $30 million from the Drinking Water State Revolving Fund for the purchase and renovation of 125 Dupont Drive. We did not borrow additional funds for the purchase or renovation of 125 Dupont Drive.

As I stated during my cross examination in Docket 4571 before the commission (page 93), ***"If I need more than $30 million and we made a mistake then I would come back to this Commission and ask for direction or advice. I won't be spending money that I'm not authorized to spend."***

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-46: Regarding Ms. Parrillo's testimony on page 3, please provide all data, assumptions, calculations and work papers used to derive the estimates for New Debt Service in FY22 and FY23.

RESPONSE:
See the proforma schedule BCWA 1-46a attached.

This schedule is a basic amortization schedule provided through the Microsoft Excel program. To run this schedule we assumed a market interest rate of 5% over 20 years. The program calculates debt service of a little more than $1.5 million per year. We also have to add the Rhode Island Infrastructure Bank (RIIB) administrative fees of 0.5% of outstanding principal every 6 months.

These are estimates. The actual debt service will be different and will be a function of how RIIB structures the bond issuse and the market interest rate conditions at the time the bonds are sold.

At the time of the filing, the assumption was to finance, through RIIB, the $19.1 million needed for the water main rehabilitation project each year. That would add an additional $2 million in FY22 for the work done in FY22 and then an additional $2 million for the $19.1 million planned in FY23.

We will be working with our financial advisor on what the debt service may look like as we get closer to the issue date of the bonds. To the extenet we have actual numbers before the rate case concludes, we will adjust to actual numbers.

BCWA 1-46 (A) ATTACHMENT

Loan Amount	19,100,000.00			
Interest Rate	5.00		Annual payment	(1,512,618.55)
# of months	240.00			
Monthly Payment	(126,051.55)			

Payment #	Start Balance	Int. for month	Monthly Payment	End Balance
1	19,100,000.00	79,583.33	(126,051.55)	19,053,531.79
2	19,053,531.79	79,389.72	(126,051.55)	19,006,869.96
3	19,006,869.96	79,195.29	(126,051.55)	18,960,013.70
4	18,960,013.70	79,000.06	(126,051.55)	18,912,962.21
5	18,912,962.21	78,804.01	(126,051.55)	18,865,714.68
6	18,865,714.68	78,607.14	(126,051.55)	18,818,270.27
7	18,818,270.27	78,409.46	(126,051.55)	18,770,628.19
8	18,770,628.19	78,210.95	(126,051.55)	18,722,787.59
9	18,722,787.59	78,011.61	(126,051.55)	18,674,747.66
10	18,674,747.66	77,811.45	(126,051.55)	18,626,507.56
11	18,626,507.56	77,610.45	(126,051.55)	18,578,066.47
12	18,578,066.47	77,408.61	(126,051.55)	18,529,423.53
13	18,529,423.53	77,205.93	(126,051.55)	18,480,577.91
14	18,480,577.91	77,002.41	(126,051.55)	18,431,528.78
15	18,431,528.78	76,798.04	(126,051.55)	18,382,275.27
16	18,382,275.27	76,592.81	(126,051.55)	18,332,816.53
17	18,332,816.53	76,386.74	(126,051.55)	18,283,151.72
18	18,283,151.72	76,179.80	(126,051.55)	18,233,279.98
19	18,233,279.98	75,972.00	(126,051.55)	18,183,200.43
20	18,183,200.43	75,763.34	(126,051.55)	18,132,912.22
21	18,132,912.22	75,553.80	(126,051.55)	18,082,414.47
22	18,082,414.47	75,343.39	(126,051.55)	18,031,706.32
23	18,031,706.32	75,132.11	(126,051.55)	17,980,786.88
24	17,980,786.88	74,919.95	(126,051.55)	17,929,655.28
25	17,929,655.28	74,706.90	(126,051.55)	17,878,310.63
26	17,878,310.63	74,492.96	(126,051.55)	17,826,752.05
27	17,826,752.05	74,278.13	(126,051.55)	17,774,978.64
28	17,774,978.64	74,062.41	(126,051.55)	17,722,989.50
29	17,722,989.50	73,845.79	(126,051.55)	17,670,783.74
30	17,670,783.74	73,628.27	(126,051.55)	17,618,360.46
31	17,618,360.46	73,409.84	(126,051.55)	17,565,718.75
32	17,565,718.75	73,190.49	(126,051.55)	17,512,857.70
33	17,512,857.70	72,970.24	(126,051.55)	17,459,776.40
34	17,459,776.40	72,749.07	(126,051.55)	17,406,473.92
35	17,406,473.92	72,526.97	(126,051.55)	17,352,949.35
36	17,352,949.35	72,303.96	(126,051.55)	17,299,201.76
37	17,299,201.76	72,080.01	(126,051.55)	17,245,230.22
38	17,245,230.22	71,855.13	(126,051.55)	17,191,033.80
39	17,191,033.80	71,629.31	(126,051.55)	17,136,611.56
40	17,136,611.56	71,402.55	(126,051.55)	17,081,962.56
41	17,081,962.56	71,174.84	(126,051.55)	17,027,085.86
42	17,027,085.86	70,946.19	(126,051.55)	16,971,980.50
43	16,971,980.50	70,716.59	(126,051.55)	16,916,645.54
44	16,916,645.54	70,486.02	(126,051.55)	16,861,080.02
45	16,861,080.02	70,254.50	(126,051.55)	16,805,282.97
46	16,805,282.97	70,022.01	(126,051.55)	16,749,253.44
47	16,749,253.44	69,788.56	(126,051.55)	16,692,990.45
48	16,692,990.45	69,554.13	(126,051.55)	16,636,493.03
49	16,636,493.03	69,318.72	(126,051.55)	16,579,760.20
50	16,579,760.20	69,082.33	(126,051.55)	16,522,790.99
51	16,522,790.99	68,844.96	(126,051.55)	16,465,584.41
52	16,465,584.41	68,606.60	(126,051.55)	16,408,139.46
53	16,408,139.46	68,367.25	(126,051.55)	16,350,455.17
54	16,350,455.17	68,126.90	(126,051.55)	16,292,530.52
55	16,292,530.52	67,885.54	(126,051.55)	16,234,364.51
56	16,234,364.51	67,643.19	(126,051.55)	16,175,956.15
57	16,175,956.15	67,399.82	(126,051.55)	16,117,304.42

58	16,117,304.42	67,155.44	(126,051.55)	16,058,408.31
59	16,058,408.31	66,910.03	(126,051.55)	15,999,266.80
60	15,999,266.80	66,663.61	(126,051.55)	15,939,878.87
61	15,939,878.87	66,416.16	(126,051.55)	15,880,243.48
62	15,880,243.48	66,167.68	(126,051.55)	15,820,359.62
63	15,820,359.62	65,918.17	(126,051.55)	15,760,226.24
64	15,760,226.24	65,667.61	(126,051.55)	15,699,842.30
65	15,699,842.30	65,416.01	(126,051.55)	15,639,206.76
66	15,639,206.76	65,163.36	(126,051.55)	15,578,318.58
67	15,578,318.58	64,909.66	(126,051.55)	15,517,176.69
68	15,517,176.69	64,654.90	(126,051.55)	15,455,780.05
69	15,455,780.05	64,399.08	(126,051.55)	15,394,127.59
70	15,394,127.59	64,142.20	(126,051.55)	15,332,218.24
71	15,332,218.24	63,884.24	(126,051.55)	15,270,050.94
72	15,270,050.94	63,625.21	(126,051.55)	15,207,624.60
73	15,207,624.60	63,365.10	(126,051.55)	15,144,938.16
74	15,144,938.16	63,103.91	(126,051.55)	15,081,990.52
75	15,081,990.52	62,841.63	(126,051.55)	15,018,780.60
76	15,018,780.60	62,578.25	(126,051.55)	14,955,307.31
77	14,955,307.31	62,313.78	(126,051.55)	14,891,569.54
78	14,891,569.54	62,048.21	(126,051.55)	14,827,566.20
79	14,827,566.20	61,781.53	(126,051.55)	14,763,296.18
80	14,763,296.18	61,513.73	(126,051.55)	14,698,758.37
81	14,698,758.37	61,244.83	(126,051.55)	14,633,951.65
82	14,633,951.65	60,974.80	(126,051.55)	14,568,874.90
83	14,568,874.90	60,703.65	(126,051.55)	14,503,527.00
84	14,503,527.00	60,431.36	(126,051.55)	14,437,906.82
85	14,437,906.82	60,157.95	(126,051.55)	14,372,013.22
86	14,372,013.22	59,883.39	(126,051.55)	14,305,845.06
87	14,305,845.06	59,607.69	(126,051.55)	14,239,401.20
88	14,239,401.20	59,330.84	(126,051.55)	14,172,680.49
89	14,172,680.49	59,052.84	(126,051.55)	14,105,681.78
90	14,105,681.78	58,773.67	(126,051.55)	14,038,403.91
91	14,038,403.91	58,493.35	(126,051.55)	13,970,845.71
92	13,970,845.71	58,211.86	(126,051.55)	13,903,006.02
93	13,903,006.02	57,929.19	(126,051.55)	13,834,883.67
94	13,834,883.67	57,645.35	(126,051.55)	13,766,477.47
95	13,766,477.47	57,360.32	(126,051.55)	13,697,786.25
96	13,697,786.25	57,074.11	(126,051.55)	13,628,808.81
97	13,628,808.81	56,786.70	(126,051.55)	13,559,543.97
98	13,559,543.97	56,498.10	(126,051.55)	13,489,990.52
99	13,489,990.52	56,208.29	(126,051.55)	13,420,147.27
100	13,420,147.27	55,917.28	(126,051.55)	13,350,013.01
101	13,350,013.01	55,625.05	(126,051.55)	13,279,586.51
102	13,279,586.51	55,331.61	(126,051.55)	13,208,866.58
103	13,208,866.58	55,036.94	(126,051.55)	13,137,851.98
104	13,137,851.98	54,741.05	(126,051.55)	13,066,541.48
105	13,066,541.48	54,443.92	(126,051.55)	12,994,933.86
106	12,994,933.86	54,145.56	(126,051.55)	12,923,027.87
107	12,923,027.87	53,845.95	(126,051.55)	12,850,822.27
108	12,850,822.27	53,545.09	(126,051.55)	12,778,315.82
109	12,778,315.82	53,242.98	(126,051.55)	12,705,507.25
110	12,705,507.25	52,939.61	(126,051.55)	12,632,395.32
111	12,632,395.32	52,634.98	(126,051.55)	12,558,978.76
112	12,558,978.76	52,329.08	(126,051.55)	12,485,256.29
113	12,485,256.29	52,021.90	(126,051.55)	12,411,226.64
114	12,411,226.64	51,713.44	(126,051.55)	12,336,888.54
115	12,336,888.54	51,403.70	(126,051.55)	12,262,240.70
116	12,262,240.70	51,092.67	(126,051.55)	12,187,281.82
117	12,187,281.82	50,780.34	(126,051.55)	12,112,010.61
118	12,112,010.61	50,466.71	(126,051.55)	12,036,425.78
119	12,036,425.78	50,151.77	(126,051.55)	11,960,526.01

120	11,960,526.01	49,835.53	(126,051.55)	11,884,309.99
121	11,884,309.99	49,517.96	(126,051.55)	11,807,776.40
122	11,807,776.40	49,199.07	(126,051.55)	11,730,923.92
123	11,730,923.92	48,878.85	(126,051.55)	11,653,751.22
124	11,653,751.22	48,557.30	(126,051.55)	11,576,256.97
125	11,576,256.97	48,234.40	(126,051.55)	11,498,439.83
126	11,498,439.83	47,910.17	(126,051.55)	11,420,298.45
127	11,420,298.45	47,584.58	(126,051.55)	11,341,831.48
128	11,341,831.48	47,257.63	(126,051.55)	11,263,037.57
129	11,263,037.57	46,929.32	(126,051.55)	11,183,915.34
130	11,183,915.34	46,599.65	(126,051.55)	11,104,463.45
131	11,104,463.45	46,268.60	(126,051.55)	11,024,680.50
132	11,024,680.50	45,936.17	(126,051.55)	10,944,565.12
133	10,944,565.12	45,602.35	(126,051.55)	10,864,115.93
134	10,864,115.93	45,267.15	(126,051.55)	10,783,331.53
135	10,783,331.53	44,930.55	(126,051.55)	10,702,210.53
136	10,702,210.53	44,592.54	(126,051.55)	10,620,751.53
137	10,620,751.53	44,253.13	(126,051.55)	10,538,953.12
138	10,538,953.12	43,912.30	(126,051.55)	10,456,813.87
139	10,456,813.87	43,570.06	(126,051.55)	10,374,332.39
140	10,374,332.39	43,226.38	(126,051.55)	10,291,507.23
141	10,291,507.23	42,881.28	(126,051.55)	10,208,336.96
142	10,208,336.96	42,534.74	(126,051.55)	10,124,820.15
143	10,124,820.15	42,186.75	(126,051.55)	10,040,955.35
144	10,040,955.35	41,837.31	(126,051.55)	9,956,741.12
145	9,956,741.12	41,486.42	(126,051.55)	9,872,176.00
146	9,872,176.00	41,134.07	(126,051.55)	9,787,258.52
147	9,787,258.52	40,780.24	(126,051.55)	9,701,987.22
148	9,701,987.22	40,424.95	(126,051.55)	9,616,360.62
149	9,616,360.62	40,068.17	(126,051.55)	9,530,377.24
150	9,530,377.24	39,709.91	(126,051.55)	9,444,035.60
151	9,444,035.60	39,350.15	(126,051.55)	9,357,334.20
152	9,357,334.20	38,988.89	(126,051.55)	9,270,271.55
153	9,270,271.55	38,626.13	(126,051.55)	9,182,846.13
154	9,182,846.13	38,261.86	(126,051.55)	9,095,056.44
155	9,095,056.44	37,896.07	(126,051.55)	9,006,900.97
156	9,006,900.97	37,528.75	(126,051.55)	8,918,378.17
157	8,918,378.17	37,159.91	(126,051.55)	8,829,486.54
158	8,829,486.54	36,789.53	(126,051.55)	8,740,224.52
159	8,740,224.52	36,417.60	(126,051.55)	8,650,590.57
160	8,650,590.57	36,044.13	(126,051.55)	8,560,583.16
161	8,560,583.16	35,669.10	(126,051.55)	8,470,200.71
162	8,470,200.71	35,292.50	(126,051.55)	8,379,441.66
163	8,379,441.66	34,914.34	(126,051.55)	8,288,304.46
164	8,288,304.46	34,534.60	(126,051.55)	8,196,787.51
165	8,196,787.51	34,153.28	(126,051.55)	8,104,889.25
166	8,104,889.25	33,770.37	(126,051.55)	8,012,608.07
167	8,012,608.07	33,385.87	(126,051.55)	7,919,942.39
168	7,919,942.39	32,999.76	(126,051.55)	7,826,890.61
169	7,826,890.61	32,612.04	(126,051.55)	7,733,451.11
170	7,733,451.11	32,222.71	(126,051.55)	7,639,622.27
171	7,639,622.27	31,831.76	(126,051.55)	7,545,402.49
172	7,545,402.49	31,439.18	(126,051.55)	7,450,790.12
173	7,450,790.12	31,044.96	(126,051.55)	7,355,783.53
174	7,355,783.53	30,649.10	(126,051.55)	7,260,381.08
175	7,260,381.08	30,251.59	(126,051.55)	7,164,581.12
176	7,164,581.12	29,852.42	(126,051.55)	7,068,382.00
177	7,068,382.00	29,451.59	(126,051.55)	6,971,782.04
178	6,971,782.04	29,049.09	(126,051.55)	6,874,779.59
179	6,874,779.59	28,644.91	(126,051.55)	6,777,372.96
180	6,777,372.96	28,239.05	(126,051.55)	6,679,560.47
181	6,679,560.47	27,831.50	(126,051.55)	6,581,340.42

182	6,581,340.42	27,422.25	(126,051.55)	6,482,711.13
183	6,482,711.13	27,011.30	(126,051.55)	6,383,670.88
184	6,383,670.88	26,598.63	(126,051.55)	6,284,217.96
185	6,284,217.96	26,184.24	(126,051.55)	6,184,350.66
186	6,184,350.66	25,768.13	(126,051.55)	6,084,067.24
187	6,084,067.24	25,350.28	(126,051.55)	5,983,365.97
188	5,983,365.97	24,930.69	(126,051.55)	5,882,245.12
189	5,882,245.12	24,509.35	(126,051.55)	5,780,702.92
190	5,780,702.92	24,086.26	(126,051.55)	5,678,737.64
191	5,678,737.64	23,661.41	(126,051.55)	5,576,347.50
192	5,576,347.50	23,234.78	(126,051.55)	5,473,530.74
193	5,473,530.74	22,806.38	(126,051.55)	5,370,285.57
194	5,370,285.57	22,376.19	(126,051.55)	5,266,610.21
195	5,266,610.21	21,944.21	(126,051.55)	5,162,502.87
196	5,162,502.87	21,510.43	(126,051.55)	5,057,961.76
197	5,057,961.76	21,074.84	(126,051.55)	4,952,985.05
198	4,952,985.05	20,637.44	(126,051.55)	4,847,570.94
199	4,847,570.94	20,198.21	(126,051.55)	4,741,717.61
200	4,741,717.61	19,757.16	(126,051.55)	4,635,423.22
201	4,635,423.22	19,314.26	(126,051.55)	4,528,685.94
202	4,528,685.94	18,869.52	(126,051.55)	4,421,503.92
203	4,421,503.92	18,422.93	(126,051.55)	4,313,875.30
204	4,313,875.30	17,974.48	(126,051.55)	4,205,798.24
205	4,205,798.24	17,524.16	(126,051.55)	4,097,270.85
206	4,097,270.85	17,071.96	(126,051.55)	3,988,291.27
207	3,988,291.27	16,617.88	(126,051.55)	3,878,857.60
208	3,878,857.60	16,161.91	(126,051.55)	3,768,967.96
209	3,768,967.96	15,704.03	(126,051.55)	3,658,620.45
210	3,658,620.45	15,244.25	(126,051.55)	3,547,813.15
211	3,547,813.15	14,782.55	(126,051.55)	3,436,544.16
212	3,436,544.16	14,318.93	(126,051.55)	3,324,811.55
213	3,324,811.55	13,853.38	(126,051.55)	3,212,613.38
214	3,212,613.38	13,385.89	(126,051.55)	3,099,947.73
215	3,099,947.73	12,916.45	(126,051.55)	2,986,812.63
216	2,986,812.63	12,445.05	(126,051.55)	2,873,206.14
217	2,873,206.14	11,971.69	(126,051.55)	2,759,126.28
218	2,759,126.28	11,496.36	(126,051.55)	2,644,571.10
219	2,644,571.10	11,019.05	(126,051.55)	2,529,538.60
220	2,529,538.60	10,539.74	(126,051.55)	2,414,026.79
221	2,414,026.79	10,058.44	(126,051.55)	2,298,033.69
222	2,298,033.69	9,575.14	(126,051.55)	2,181,557.29
223	2,181,557.29	9,089.82	(126,051.55)	2,064,595.56
224	2,064,595.56	8,602.48	(126,051.55)	1,947,146.50
225	1,947,146.50	8,113.11	(126,051.55)	1,829,208.06
226	1,829,208.06	7,621.70	(126,051.55)	1,710,778.22
227	1,710,778.22	7,128.24	(126,051.55)	1,591,854.91
228	1,591,854.91	6,632.73	(126,051.55)	1,472,436.10
229	1,472,436.10	6,135.15	(126,051.55)	1,352,519.70
230	1,352,519.70	5,635.50	(126,051.55)	1,232,103.65
231	1,232,103.65	5,133.77	(126,051.55)	1,111,185.87
232	1,111,185.87	4,629.94	(126,051.55)	989,764.27
233	989,764.27	4,124.02	(126,051.55)	867,836.74
234	867,836.74	3,615.99	(126,051.55)	745,401.18
235	745,401.18	3,105.84	(126,051.55)	622,455.47
236	622,455.47	2,593.56	(126,051.55)	498,997.49
237	498,997.49	2,079.16	(126,051.55)	375,025.10
238	375,025.10	1,562.60	(126,051.55)	250,536.16
239	250,536.16	1,043.90	(126,051.55)	125,528.51
240	125,528.51	523.04	(126,051.55)	0.00

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-47: Ms. Parrillo's testimony on page 3 indicates that Providence Water "is proposing an increase in funding to the IFR Fund in the amount of $2.0 million per year to cover the estimated Debt Service on the new bonds that we anticipate borrowing over the next three fiscal years. See Schedule HJS 10-c." However, Schedule HJS-10c provides no detail on the estimated debt service for each individual new bond. To that end, please reproduce Schedule HJS 10-C and show the estimated New Debt Service for each individual bond.

RESPONSE:
See BCWA 1-47a.

Providence Water Supply Board **BCWA 1-47a**
Docket 4994
Application for Rate Increase
Direct Testimony of Harold J. Smith
Test Year Ending June 30, 2019
Rate Years Ending June 30, 2021 through 2023

Description	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Source of Funds					
D4618 (effective 2/17/2017)	$ 27,300,000	$ 27,300,000	$ 27,300,000	$ 27,300,000	$ 27,300,000
New Rate Funding			$ 2,000,000	$ 4,000,000	$ 6,000,000
Miscellaneous Revenue (incl. Transfer for ESWD DS)	$ 53,800	$ 52,853	$ 52,802	$ 52,689	$ 52,513
Interest Income	$ 348,660	$ 42,000	$ 25,000	$ 10,000	$ 1,000
Carryover funds from prior year estimated	$ 12,914,333	$ 8,312,576	$ 1,256,586	$ 12,517,619	$ 938,773
Total Sources	**$ 40,616,793**	**$ 35,707,429**	**$ 30,634,388**	**$ 43,880,308**	**$ 34,292,285**
Less obligated uses of funds:					
RIIB (Arra) $9.3M 2009 (P&I)	$ 491,080	$ 491,005	$ 491,074	$ 490,542	$ 490,220
RIIB $35M 2008 (P&I)**	$ 2,374,237	$ 2,339,550	$ 2,371,550	$ 2,369,540	$ 2,367,832
RIIB $25M 2013 (P&I)	$ 1,545,394	$ 1,545,575	$ 1,544,360	$ 1,542,870	$ 1,542,106
RIIB $8M 2014 (P&I)	$ 501,911	$ 500,873	$ 500,850	$ 500,896	$ 500,127
RIIB $16.3M 2017 (P&I)	$ 1,035,775	$ 1,036,028	$ 1,036,743	$ 1,035,388	$ 1,034,854
RIIB $14.7M 2019 (P&I)		$ 176,864	$ 934,390	$ 935,151	$ 935,636
East Smithfield RIIB 2013 (P&I)	$ 39,775	$ 39,177	$ 39,477	$ 39,174	$ 39,888
East Smithfield RIIB 2008 (P&I)	$ 14,025	$ 13,675	$ 13,325	$ 12,975	$ 12,625
Est. New Debt Service				$ 950,000	$ 1,900,000
Est. New Debt Service					$ 950,000
Est. New Debt Service	$ -	$ -	$ -	$ -	$ -
Sub-total Debt Service	**$ 6,002,197**	**$ 6,142,748**	**$ 6,931,769**	**$ 7,876,535**	**$ 9,773,287**
Cash Funded Projects **	**$ 26,302,020**	**$ 28,308,095**	**$ 11,185,000**	**$ 35,065,000**	**$ 17,955,000**
Total Uses	**$ 32,304,217**	**$ 34,450,843**	**$ 18,116,769**	**$ 42,941,535**	**$ 27,728,287**
End of Year Balance - Cash Balance Carry Fwd.	**$ 8,312,576**	**$ 1,256,586**	**$ 12,517,619**	**$ 938,773**	**$ 6,563,998**
Bond Funding Activity					
Bond Proceeds	$ 15,458,735	$ 13,490,000	$ 19,100,000	$ 19,100,000	$ 19,100,000
Bond Funded Projects	$ 1,840,830	$ 13,617,905	$ 19,100,000	$ 19,100,000	$ 19,100,000
Net Bond funding	**$ 13,617,905**	**$ (127,905)**	**$ -**	**$ -**	**$ -**

**** The debt service due on he RIIB Series 2008 for $35 million has changed slightly as RIIB recently reallocated the savings from the refunding that they issued in 2015/2016 across all debt service payments equally going forward.**

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-48: Please provide Debt Service schedules for each of the proposed new bonds that shows the draw down schedule, the interest rate, the amount of yearly payments and all costs and fees associated with the borrowings including the Debt Service Reserve.

RESPONSE:

See BCWA 1-46a for the estimated debt service schedules. We are using the same caculations for all of the new bond issues until we begin working with our financial advisor on what the debt service may look like as we get closer to the issue date of the bonds. To the extenet we have actual numbers before the rate case concludes, we will adjust to actual numbers.

Additional costs to Providence Water are estimated to be the following:

Cost of Issuance:	$80,000
Origination Fee	1% of total par amount borrowed (for $19.1 million borrowed, the origination fee is $191,000)
Debt Service Reserve Fund:	This amount is a calculation based on the max annual debt service. Based on this example, the debt service reserve could be $1.5 million.

In our estimates we assumed a 5% interest rate with a 20 year amortization.

Bristol County Water Authority
Data Request – Set 1
February 17, 2020

BCWA 1-49:

With regard to, Ms. Parrillo's testimony on page 3 that: "the last cost attributable to the IFR is the applied overhead associated with the engineering wages for those employees working directly on IFR projects."

a. Please state why this cost is not shown in Schedule HJS 10c.

b. Please state where this cost is reflected in Mr. Smith's schedules.

RESPONSE:

a. This cost is reflected under cash funded projects on HJS-10C.

b. The total labor cost (capitalized and non-capitalized) is included in each department on HJS-12. Capitalized labor is then removed with a negative adjustment (-$1,888,937) on the final page of HJS-12. This adjustment is also shown on HJS-14A.

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-50: With regard to Ms. Parrillo's testimony on page 4-5 regarding equipment vehicle replacement funds:

a. Please provide the schedule of vehicles and replacement of vehicles referenced in Ms. Parrillo's testimony.
b. Please provide an itemized breakdown of each of the expenses listed under obligated use of funds in Schedule HJS 10e for FY20 and FY21.
c. Please provide all supporting data, assumptions, calculations, work papers and facts supporting Ms. Parrillo's testimony on page 5 that "repair costs are increasing for some older assets that have exceeded our acceptable functional threshold, therefore replacement has become favorable."
d. Please provide all supporting data, assumptions, calculations, work papers and facts supporting Ms. Parrillo's testimony on page 5 that "in order to optimize our replacement cycle it is important to expand our actual vehicle replacement rotation."

Response:

a. Please see the vehicle and replacement schedule submitted in BCWA 1-14(a).

b. The vehicle replacement schedule identifies projected vehicle replacements through 2030. This schedule is updated once vehicles are purchased in accordance with the schedule submitted in BCWA 1-14 (a). Additional IP security cameras will be purchased. Existing security equipment is being replaced in accordance with the schedule submitted under BCWA 1-14(d). Shop and plant equipment is purchase as needed - typically PW departments will submit request with justification with each annual budget submission. Once all shop and plant equipment requests are submitted, they are vetted prior to being sent out for public bid.

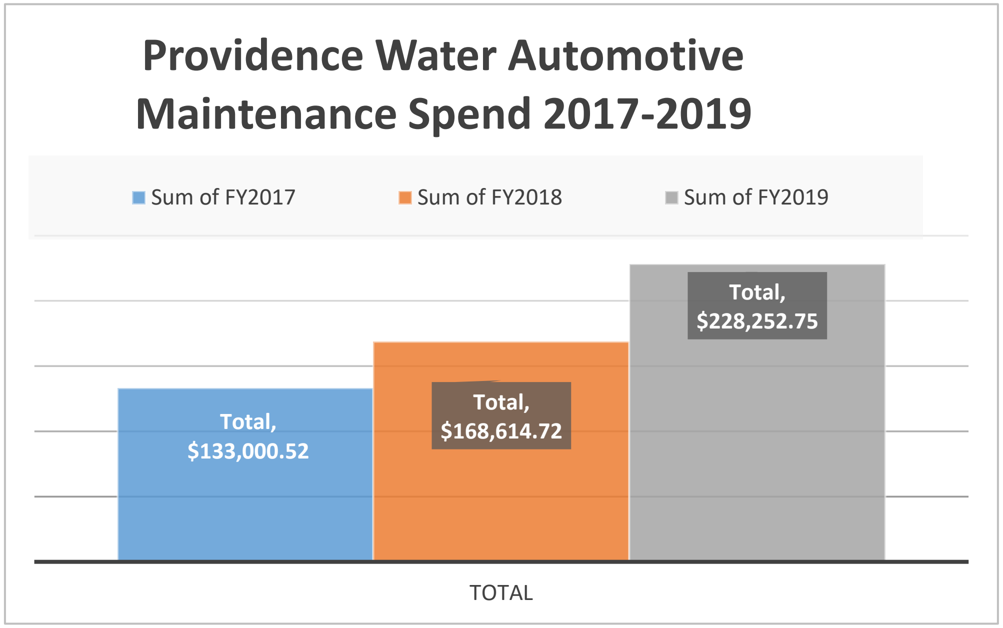
c. Please see attached BCWA 1-50(c) repair cost summary for FY 2017 –FY 2019.

d. New clean diesel truck engines have reduced particulate emissions, including the reduction in black carbon emissions. Modernizing and upgrading existing diesel vehicles and equipment is a proactive means to aid PW's efforts to lower the company's carbon footprint and helps us remain in compliance with the Energy Policy Act of 2015. Adding electric vehicles to the fleet is part of Providence Water's green initiative program as we currently have three electrical vehicles. An aggressive replacement plan provides the opportunity to lower overall maintenance cost, lower emissions and increase production by lessening downtime.

BCWA 1-50
Providence Water
Providence Water Automotive Maintenance 2017-2019

PW's Automotive Maintenance Spend FY17 - FY19

Accounts	FY2017	FY2018	FY2019	Increase fy17 - fy18		Increase fy18 - fy19	
Expensed 601-443-54700-0003	$87,485.02	$116,932.65	$169,578.58	$29,447.63	34%	$52,645.93	45%
Expensed 601-443-52912-0000	$45,515.50	$51,682.07	$58,674.17	$6,166.57	14%	$6,992.10	14%
Total	$133,000.52	$168,614.72	$228,252.75	$35,614.20	27%	$59,638.03	35%



Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-51: Please provide any and all documentation from Providence Water's insurance carriers requesting that it undertake a full asset reevaluation.

Response: Please see the attached property assessment justification as directed by Travelers Insurance.

January 30, 2020
G & L Insurance Associates Inc.
963 Charles Street
North Providence, RI 02904

Mr. Antonio M. Araujo, III
Director Support Services
Providence Water Supply Board
125 Dupont Dr
Providence, RI 02907

Dear Mr. Araujo:

Over the past 10 or so years, you and I have discussed the insurable values on the various properties covered under the Providence Water Supply Board's Property, Dams, and reservoirs insurance policies. The policies you have require replacement cost coverage and also have an inflation guard endorsement which means values are normally increased the "specifiied" value each year. However, each year your office has asked us to surpress those increases.

As you know the cost of doing business in just about every field goes up each and every year, from materials to actual construction costs. The values on these policies need to be based on "today's" replacement cost and not the costs from 2010. I did a quick review of our digitial files and I see the values on the dams and reservoirs policy are exactly the same for 2019-2020 as they were on the 2007-2008 policy. As far as the property policy, there has been some added and deleted locations over the years which the change from Academy to Dupont and the purchase of the East Smithfield Water District. Most of the orginal properties (from our 2007-2008) schedule are still present but a lot of the values have stayed the same or even "decreased" which is unheard of unless portions of a building are demolished.

In order to determine the correct replacement, an updated appraisal needs to be done on all properties. Once we receive these reports, we can determine if the limits you currently carry are enough to satisfy the requirements. The key things to remember are when we insured a property we do it for "insurable value and not market value (value someone is willing to pay for it) or actual cash value (value after deprecation)". Insurance companies use Insurable Value which is "the cost to replace and insured asset with property of like kind and quality without consideration for any depreciation and it includes the construction, installation, and demolition costs, but does not include the site itself or any underground utilities or foundations as they are not usually destroyed.

A new insurance term is approaching and we will need to address the values. Please advise if you will be able to obtain appraisals for the 7/1/2020 renewals. We appreciate your business. If you have questions, please feel free to give me a call.

Sincerely,

Pamela L Mowry
pammowry@glins.necoxmail.com
G & L Insurance Associates Inc.
President

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-52: Regarding Ms. Parrillo's testimony on page 6 regarding the chemicals/sludge maintenance fund, please explain why it is necessary for Providence Water to keep a balance in excess of $1,000,000 in this account for FY21 and FY22.

RESPONSE:

The chemical expense shown on Schedule HJS-10g is based on current and future expected chemical use. As Mr. Giasson explains in his testimony on page 8, the chemical expenses may increase by $500,000 for the additional use of orthophosphate once the full scale chemical feed is completed.

The other significant known and measurable expense is the sludge maintenance line item. As shown on Schedule BCWA 1-52a, with no additional funding, this fund is expected to be in a negative position by approximately $860,000. The current contract expires in August of 2021 (FY2022). We are currently evaluating sludge removal and disposal options at this time to ensure we are utilizing the most cost effective means for sludge removal and disposal. At this time we are assuming a similar cost going out into FY2023. If we use the current cost of sludge maintenance, the fund position worsens in FY2023 to approximately negative $2.1 million.

Restricted Account Sources and Uses of Funds
Projected FY2019 - FY2023

BCWA 1-52a

Pre-filed: Schedule HJS-10g
Chemicals/Sludge Maint. Fund

	FY2019	FY 2020	FY 2021	FY 2022	FY 2023
Source of Funds					
D4618 (effective 2/17/2017)	$ 2,800,000	$ 2,800,000	$ 2,800,000	$ 2,800,000	$ 2,800,000
New Rate Funding			1,000,000	1,000,000	1,000,000
Interest/Misc. Revenue	11,747	8,000	8,000	8,000	8,000
Carryover funds from prior year estimated	$ 3,344,882	$ 2,735,683	$ 1,572,464	$ 1,342,430	$ 1,139,964
Total Sources	**$ 6,156,629**	**$ 5,543,683**	**$ 5,380,464**	**$ 5,150,430**	**$ 4,947,964**
Less obligated uses of funds					
Chemicals	$ 1,761,764	$ 2,087,301	$ 2,349,117	$ 2,401,548	$ 2,442,681
Professional Engineering/Contractors	50,264	75,000			
Miscellaneous Expenses - Project inspections, pump rentals		200,000	80,000		
Sludge Maintenance	$ 1,608,918	$ 1,608,918	$ 1,608,918	$ 1,608,918	$ 1,608,918
Total Uses	**$ 3,420,946**	**$ 3,971,219**	**$ 4,038,035**	**$ 4,010,466**	**$ 4,051,599**
End of Year Balance	**$ 2,735,683**	**$ 1,572,464**	**$ 1,342,430**	**$ 1,139,964**	**$ 896,365**

Schedule HJS-10g without the $1,000,000 of additional rate funding

BCWA 1-52a

	FY2019	FY 2020	FY 2021	FY 2022	FY 2023
Source of Funds					
D4618 (effective 2/17/2017)	$ 2,800,000	$ 2,800,000	$ 2,800,000	$ 2,800,000	$ 2,800,000
New Rate Funding			0	0	0
Interest/Misc. Revenue	11,747	8,000	8,000	8,000	8,000
Carryover funds from prior year estimated	$ 3,344,882	$ 2,735,683	$ 1,572,464	$ 342,430	$ (860,036)
Total Sources	**$ 6,156,629**	**$ 5,543,683**	**$ 4,380,464**	**$ 3,150,430**	**$ 1,947,964**
Less obligated uses of funds					
Chemicals	$ 1,761,764	$ 2,087,301	$ 2,349,117	$ 2,401,548	$ 2,442,681
Professional Engineering/Contractors	50,264	75,000			
Miscellaneous Expenses - Project inspections, pump rentals		200,000	80,000		
Sludge Maintenance	$ 1,608,918	$ 1,608,918	$ 1,608,918	$ 1,608,918	$ 1,608,918
Total Uses	**$ 3,420,946**	**$ 3,971,219**	**$ 4,038,035**	**$ 4,010,466**	**$ 4,051,599**
End of Year Balance	**$ 2,735,683**	**$ 1,572,464**	**$ 342,430**	**$ (860,036)**	**$ (2,103,635)**

Bristol County Water Authority
Data Request – Set 1
February 17, 2020

BCWA 1-53:

Regarding the Private Side Lead Service Replacement Program, please state how much, if any, of the costs anticipated in FY22 and FY23 are allocated to the wholesale customers.

RESPONSE:

None of these costs are allocated to Wholesale customers.

Bristol County Water Authority
Data Request – Set 1
January 28, 2020

BCWA 1-54: Regarding Mr. Giasson’s testimony on page 2, please provide a copy of the IFR Plan submitted to RIDOH in December of 2015.

Response: See attached electronic version of the December 2015 IFR Plan.

20-YEAR INFRASTRUCTURE REPLACEMENT PLAN 2016-2035

December 2015

Providence Water

Providence Water

Infrastructure Replacement Plan

For Fiscal Years 2016 through 2035

Prepared In-House by the Development Team of:

Peter LePage, Senior Manager − Engineering
Steven Santaniello, Manager Capital Improvements
Christopher Labossiere, Principal Engineer
Kathleen Topp, Document Publishing

Engineering Department Support

Gary Marino, Principal Engineer − Project Manager
Leo Fontaine, Engineer − Project Manager

Finance Department Support

Thomas Massaro, Senior Manager − Finance
Nancy Parrillo, Senior Manager − Commercial Services
Mary Deignan-White, Senior Manager − Budget & Regulatory

Deputy General Manager Operations

Gregg Giasson, PE

General Manager

Ricky Caruolo

Table of Contents

Executive Summary

EXECUTIVE SUMMARY

Letter From The General Manager

How It All Began – Is a brief summary of the beginnings of the system, the mayors of the City of Providence through history, highlighting Mayor Joseph H. Gainer; and a listing of all of the General Managers in Providence Water history, featuring Philip J. Holton Jr.

20-Year IFR Expenditure Plan - FY 2016-2035 - Exhibit 1

20-Year IFR Expenditure Plan - FY 2016-2035 Pie Chart - Exhibit 2

20-Year Sources And Uses Of Funds - FY 2016-2035 - Exhibit 3

PROVIDENCE WATER
Tap Water Delivers

(401) 521-6300

552 Academy Avenue
Providence, RI 02908

www.provwater.com

Follow us @provwater

Like us at:
facebook.com/Providencewater

December 1, 2015

Ms. June Swallow, P.E., Chief
Office of Drinking Water Quality
Rhode Island Department of Health
3 Capitol Hill, Room 209
Providence, RI 02908

RE: Infrastructure Replacement Plan

Dear Ms. Swallow:

Providence Water is pleased to submit herein six (6) copies of its updated Infrastructure Replacement Plan consistent with the requirements of the Comprehensive Clean Water Infrastructure Act of 1993 in accordance with Chapter 46-15.6 of the General Laws of the State of Rhode Island and the appropriate rules and regulations pertaining to the Act.

Consistent with the requirements of the Act, our plan presents our infrastructure replacement needs for 5-year and 20-year planning horizons and addresses the funding requirements for implementing the plan.

The objective of the plan is to replace aging facilities and components of the water system on a systematic basis, within the limit of their useful lives, before failures jeopardize the reliability of water service and place the public's health and welfare at risk. Funding for the plan is from approved revenues annually set aside in a restricted account.

Since inception of our Infrastructure Replacement Program in 1996 through June 30, 2015, Providence Water has reinvested approximately $305 million into our treatment plant, storage reservoirs, pump stations, dams, and transmission and distribution system. Included in this plan, contained in the appendix of this document, is a report detailing the accomplishments of our infrastructure replacement and capital programs over the period from July 1996 through June 2015. It is our goal through these improvements, along with the ongoing planned improvements outlined in this plan submission that Providence Water will serve to safeguard the integrity and reliability of our water supply for generations to come.

Our plan was prepared by our in-house staff and reflects our best determination at this time of our anticipated system needs. The plan is subject to adjustments as may become necessary as the result of changes in the condition of system components, obsolescence, regulatory requirements, or unforeseen events which cannot now be reliably predicted over the period of the plan.

Respectfully,
PROVIDENCE WATER SUPPLY BOARD

Ricky Caruolo
General Manager

How It All Began

The founders of Providence who immigrated in 1636 settled on the east bank of the Providence River in the vicinity of what is now Market Square. West of the river, known as Weybosset, increased in population very slowly due to the difficulty of crossing the river, and it wasn't until 1711 a bridge was constructed and a new road laid out from the bridge westerly towards Plainfield. The commercial development of those areas became practical because of the operations of fountain societies, and fresh water was distributed to this area by a system of underground pipes of hollowed-out logs.

Providence grew steadily in population and because of that growth, a stress was placed on the existing wells and springs to a point that there was an actual shortage of water in some of the more populated sections of the city; and the water that was available was possibly polluted to such an extent that it was essential that something needed to be done to protect the health and well-being of the citizens in those sections. The increase in the number, size, and height of the buildings in the city, many of them containing large amounts of inflammable merchandise, required greater protection against loss by fire, and the need of a plentiful supply of water running through all the principal streets of the city was considered to be vital.

In 1852, a group of public spirited citizens led by Zachariah Allen began an active campaign to introduce a supply of pure water into the city, and on March 21, 1853, the first committee was appointed by the City Council with instructions to examine and report on a suitable public water supply for the City. The committee reported back to the Council that the most suitable solution would be to take water from the Ten Mile River in East Providence. The City Council authorized the purchase of certain lands and rights necessary to develop the supply, but the voters rejected the proposition. Five different committees prepared six reports between 1853 and 1868. The final report to the Council emphasized the need for an abundant supply of water for the development and protection of the community.

On February 15, 1869, the question was submitted to the voters for the fourth time, and finally the question of introducing water into Providence from the Pawtuxet River was approved. The distribution system would be designed for an ultimate consumption of 17 million gallons per day. The mains were to be bell and spigot cast iron pipe coated with cold pitch varnish. It was estimated that the cost of supplying the city with water from the Pawtuxet River would amount to approximately $4,447,000.


FIGURE 1 ORIGINAL PAWTUXET SUPPLY

The original water supply was obtained from the Pawtuxet River at Pettaconsett in the City of Cranston. A 48-inch conduit would connect the river with a pumping station and in 1902, the City Council ordered the construction of a slow sand filter plant at the Pettaconsett. Water was then delivered to an open distribution reservoir called Sockanosset Hill with a capacity of 55 million gallons. The reservoir was located in what is known today as the Glen Woods Development in the City of Cranston. From this reservoir, the water flowed by gravity to consumers and to the Hope Reservoir in Providence, the second open type which had a capacity of 76 million gallons.


FIGURE 2 HOPE DISTRIBUTION RESERVOIR

The athletic fields at Hope High School are now located over the site of this former reservoir. Pumps located at this storage basin supplied water to the system and to the old Fruit Hill Reservoir, which had a capacity of 25 million gallons. This open distribution reservoir was located in North Providence on the land now occupied by Our Lady of Fatima Hospital. The special fire service system in the high valued business district and congested


FIGURE 3 FRUIT HILL RESERVOIR

manufacturing district was supplied from the Fruit Hill Reservoir. The three open distribution reservoirs provided a reserve storage of 156 million gallons.

The 1900's - Growth of Providence and extension of the system

As early as 1910, only 39 years after the completion of this supply, it was apparent with the growth of Providence and the expansion of the distribution system in nearby communities, that it would not be many years before the flow from the Pettaconsett would be inadequate to meet the increased demands. In fact, for a number of years the consumption during extremely dry seasons exceeded the natural flow of the river, and the shortage was made up from water stored in small reservoirs owned by companies operating mills further upstream. In addition, the deteriorating quality of water, affected by disposal of residential and industrial pollutants entering the river, had become a serious problem. The Pawtuxet River served the City of Providence from the time water first reached customers' homes in 1871, but by the 1920's the average daily consumption had increased from 2.4 million gallons to 23.7 million gallons per day.

The constant threat of a possible shortage of water resulted in the appointment by the City Council in January 1913, of a committee to investigate the possibility of developing an increased water supply. They found a potential source on the north branch of the Pawtuxet River and its two main tributaries. In 1915, a bill for the development of the Scituate Supply was approved by the House of Representatives of the General Assembly, and Chapter 1278 of the Public Laws of 1915 was enacted, authorizing the establishment of the supply under the direction of a Water Supply Board consisting of the members of the Committee on Increased Water Supply.

The 1920's – The development of the modern system

The Scituate Reservoir and Dam

Before water could be stored in the Scituate Reservoir, preliminary work necessitated the construction of 26 miles of new highways replacing about 36 miles of highways which needed


Scituate Reservoir, Main Dam, Contract 3

to be abandoned, the establishment of a general burial ground for the reburial of bodies to be relocated from cemeteries and burial lots within the area to be flooded, the relocation of telephone lines, clearing and grubbing the area to be flooded, and the construction of Gainer Dam and its adjoining spillway.

It was expected that subsequent contracts for the continued construction of the Gainer Dam would quickly follow, but because of World War I and the declaration of war by the United States upon the German Empire on April 6, 1917, the Water Supply Board deemed it both wise and patriotic to temporarily abandon plans to vigorously continue work.

On May 16, 1919, work was resumed on the Gainer Dam by the Sperry Engineering Company of New Haven, CT under a contract consisting mostly of earthwork and site work. Work progressed rapidly and during November 1919, the diversion of the river was completed.

On May 4, 1921, a contract was awarded to Winston and Company of Kingston, New York for the completion of Gainer Dam, the spillway, and spillway bridge. The magnitude of the work required considerable preliminary preparation including the establishment of a construction camp and the installation of a standard gauge 2.3 mile railroad over a right-of-way from the village of Jackson to the site of the dam. A snapshot in time: source information notes that the camp population totaled 458,

consisting of 371 men, 44 women, and 43 children. The camp contained 106 buildings including an office, commissary, boarding house, bunk houses, saw sheds, garages, barns, storehouses, cottages, oil sheds, and a hospital.

By November 1925, work had progressed sufficiently to permit storage of water in the reservoir, and by April 1926, the storage of water in the Scituate Reservoir reached 20 billion gallons. By November 1927, the reservoir filled for the first time. Begun in 1915, the Scituate Reservoir, by the end of construction, became Rhode Island's largest body of fresh water.

The Purification Plant

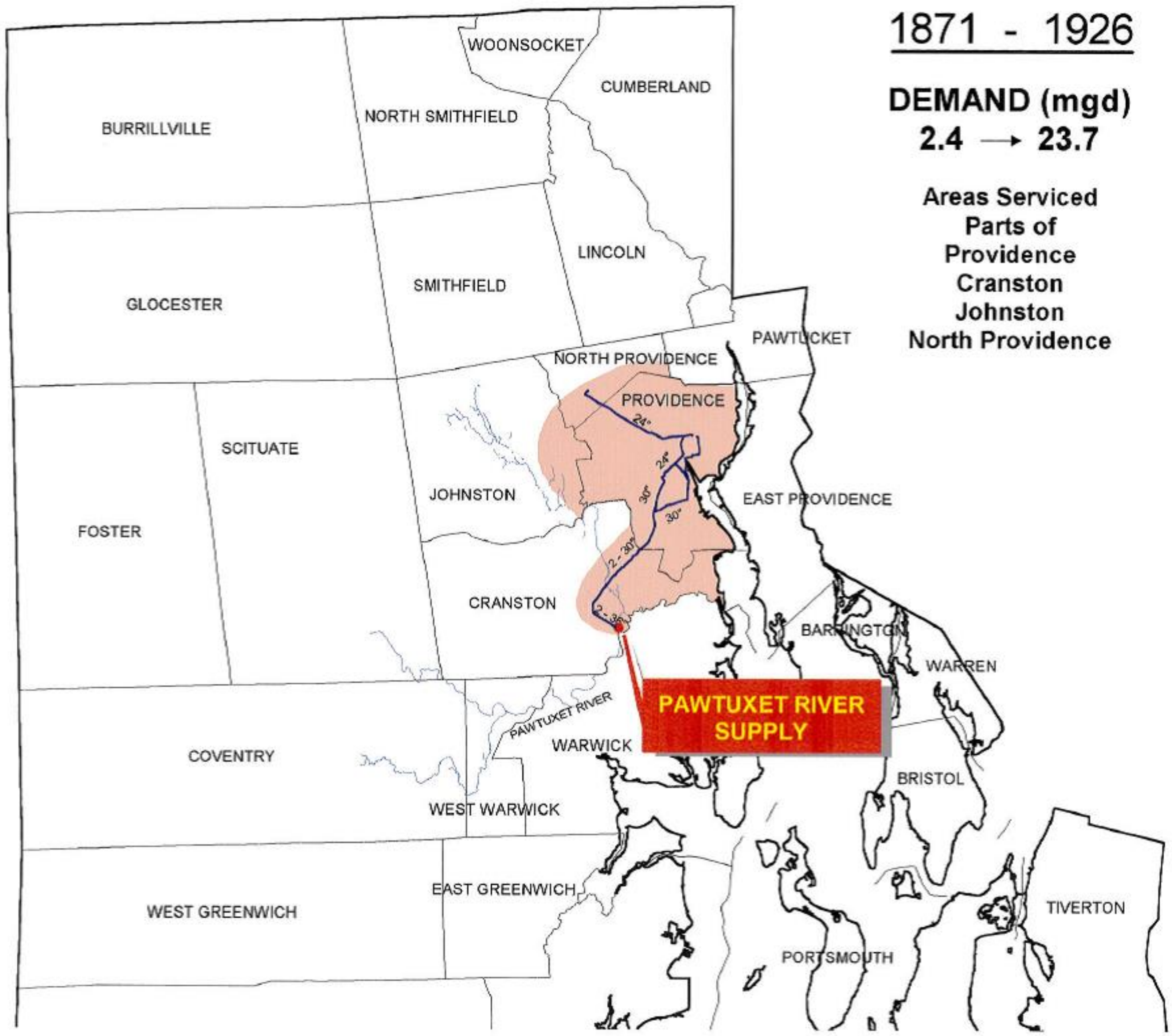
After a thorough investigation and study of the chemical and bacteriological records of reservoirs serving the Metropolitan District of Boston, the cities of Cambridge, Worcester, Lynn, Springfield, the reservoirs supplying New York City, and the results obtained at the Pettaconsett filter plant and other plants treating water of a character similar to that of the Scituate Reservoir, it was decided that the Scituate Supply should be filtered upon its introduction into the City.

Late in summer of 1922, an experimental filter plant was installed at North Scituate just below the Regulating Reservoir. The operation of this plant was mainly related to a process of color removal. Before the operation of the experimental plant was concluded, an agreement was made with the firm of Hazen and Whipple of New York City to examine and report on the best method of treating and purifying the Scituate

Supply. They recommended that the general principal of a rapid sand filter plant should be adopted for the supply. To acquaint themselves with rapid sand filter plants, the Water Board visited several plants in the Midwest.

General plans for a new treatment facility, to be located on the easterly side of the North Scituate-Hope Road approximately three-quarters of a mile east of the Gainer Dam, were prepared by Hazen and Whipple. On May 22, 1924, bids were received and a contract was awarded to Winston and Company of Kingston, New York for its construction. Work began on May 29, 1924 and on September 30, 1926, the plant was placed in operation. In addition to the Water Purification Works, construction included all conduit work and the construction of settling basins. The filter plant as originally placed in operation contained ten rapid sand filter units having a combined capacity of 44 million gallons per day. The filter media contained 28 inches of sand that supported 5 distinct layers of stone ranging in diameter from 1/12" to 2".

From the time water was delivered to the first service from the Pawtuxet River in 1871 to the time that construction of the reservoir and the purification plant was completed, the population of Providence had grown from 70,000 to 250,000. Providence was ranked the 37th largest City in the United States at that time.


1871 - 1926
DEMAND (mgd)
2.4 → 23.7
Areas Serviced
Parts of
Providence
Cranston
Johnston
North Providence
PAWTUXET RIVER SUPPLY
WOONSOCKET
CUMBERLAND
BURRILLVILLE
NORTH SMITHFIELD
LINCOLN
SMITHFIELD
GLOCESTER
PAWTUCKET
NORTH PROVIDENCE
PROVIDENCE
SCITUATE
JOHNSTON
EAST PROVIDENCE
FOSTER
CRANSTON
BARRINGTON
WARREN
PAWTUXET RIVER
WARWICK
COVENTRY
BRISTOL
WEST WARWICK
EAST GREENWICH
WEST GREENWICH
TIVERTON
PORTSMOUTH

Providence Water – The Directors throughout History (1869 – Present)

1. J. Herbert Shedd – 1869–1877
2. Samuel M. Gray – 1877-1915 [i]
3. Frank E. Winsor – 1915–1926
4. William M. Peabody – 1926–1928
5. Frank E. Waterman – 1928–1929
6. Phillip J. Holton Jr. – 1933–1941 [ii]

Chief Engineers and/or General Managers (continued)

1. **Phillip J. Holton Jr. – 1941-1968**
2. Joseph E. Martin – 1968–1972
3. John E. Rogers – 1972–1978
4. Peter P. Granieri Jr. – 1978–1979
5. Wiley J. Archer – 1979–1987
6. Domenic J. Mainelli – 1987–1989
7. Richard O. Rafanovic – 1990–2000
8. Robert J. Kilduff – 2000–2005
9. Pamela M. Marchand – 2006–2011
10. Boyce Sprinelli – 2012–2014
11. Ricky Caruolo – 2014–present

[i] *In 1880, the Highway, Water, and Sewer Departments were combined under the management of the Board of Public Works. The title, Chief Engineer or Superintendent, was commonly used for the Director of the Water Division.*

[ii] *Note that in 1933, Phillip J. Holton Jr. was appointed Superintendent of the Scituate Reservoir until 1941. From 1929 to 1933, no superintendents are referenced in available sources.*

1941 – The Formation of the Providence Water Supply Board on January 6.

Philip J. Holton Jr.

Born 1899 – Deceased 1976

Served 1941 to 1968

On June 6, 1941, Philip J. Holton Jr., who was the Superintendent of the Scituate Reservoir Division within the Department of Public Works, was appointed the first Chief Engineer of the newly formed **Providence Water Supply Board** and served in that capacity until his retirement on August 2, 1968.

FIGURE 1 FORMER CHIEF ENGINEER PHILIP J. HOLTON, WHO RETIRED IN AUGUST 1968 AND HIS SUCCESSOR, FORMER DEPUTY CHIEF ENGINEER JOSEPH E. MARTIN

Philip J. Holton, Jr., was a graduate of the R.I. School of Design in 1920. He worked for 10 years as assistant chief engineer of the United States Finishing Company, which operated five large mills in New England and two in the South.

Known throughout the waterworks industry for his efficiency, engineering, and administrative abilities, he began a modernization and expansion program in 1938 involving pumping, distribution, and treatment system improvements. The plant was changed to an all-electric operation facility, the highlight of which was the Central Control Board ... the first of its kind in the water industry. In response to a request of Mayor Walter H. Reynolds of the City of Providence to improve the efficiency of the Department of Public Works in the early 1960’s, he wore two hats ... one as the Director of Providence Public Works and one as Chief Engineer of the Providence Water Supply Board.

Mr. Holton served as President of the New England Water Works Association. He was named "Engineer of the Year" in 1963 by the Providence Engineering Society. In 1964, he received an honorary Doctor of Law degree from Rhode Island College. In 1963, Providence Water was given the American Water Works Association's Advancement Award ... a fitting recognition of the achievements of the man referred to as Rhode Island's "Mr. Water." On May 23, 1969 Providence Water named their water treatment and filtration plant the "**Philip J. Holton Water Purification Plant**." Mr. Holton was inducted in the Rhode Island Heritage Hall of Fame in 1986.

City of Providence – The Mayors throughout History

1. Samuel W. Bridgham – 1832–1840
2. Thomas M. Burgess – 1841–1852
3. Amos C. Barstow – 1852–1853
4. Walter R. Danforth – 1853–1854
5. Edward P. Knowles – 1854–1855
6. James Y. Smith – 1855–1857
7. William M. Rodman – 1857–1859
8. Jabez C. Knight – 1859–1864
9. Thomas A. Doyle – 1864–1869
10. George L. Clarke – 1869–1870
11. Thomas A. Doyle – 1870–1881
12. William S. Hayward – 1881–1884
13. Thomas A. Doyle – 1884–1886
14. Gilbert F. Robbins – 1886–1889
15. Henry Rodman Barker – 1889–1891
16. Charles Sydney Smith – 1891–1892
17. William Knight Potter – 1892–1894
18. Frank F. Olney – 1894–1896
19. Edwin D. McGuinness – 1896–1898
20. William C. Baker – 1898–1901
21. D.L.D. Granger – 1901–1903
22. Augustus S. Miller – 1903–1905
23. Elisha Dyer, Jr. – 1906–1906
24. Patrick J. McCarthy – 1907–1909
25. Henry Fletcher – 1909–1913
26. **Joseph H. Gainer – 1913–1927**
27. James E. Dunne – 1927–1939
28. John F. Collins – 1939–1941
29. Dennis J. Roberts – 1941–1951
30. Walter H. Reynolds – 1951–1965
31. Joseph A. Doorley, Jr. – 1965–1975
32. Vincent A. Cianci, Jr. – 1975–1984
33. Joseph R. Paolino, Jr. – 1984–1991
34. Vincent A. Cianci, Jr. – 1991–2002
35. John J. Lombardi – 2002–2003
36. David Cicilline – 2003–2011
37. Angel Taveras – 2011–2015
38. Jorge O. Elorza – 2015–present

Joseph H. Gainer

Born 1878 – Deceased 1945

Served January 1913 to January 1927

Birthplace: Providence. Mayor Gainer graduated from La Salle Academy, The College of the Holy Cross, and studied law at Catholic University. Notable during his administration were the unusually cold winters of 1917 and 1918 that caused the Providence Harbor and water pipes across the city to freeze. Mayor Gainer responded to the disaster by organizing an effective emergency coal-delivery program. He also directed the Fire Department to open the city's fire hydrants to supply residents with water. Mayor Gainer developed the Port of Providence, improved the City's highway system which led to the development of the downtown business center, and modernized the school system.

The dam, formerly known as the Scituate or Main Dam, was named the **Joseph H. Gainer Memorial Dam** on October 15, 1949 when it was dedicated to the memory of Joseph H. Gainer and during whose administration the Scituate Supply was conceived, planned and developed. A bronze plaque, attached to a large granite boulder in a landscaped area at the easterly end of the dam, was unveiled during the ceremonies. The plaque commemorating Mayor Gainer stands today. Mayor Gainer was inducted in the Rhode Island Heritage Hall of Fame in 2014.

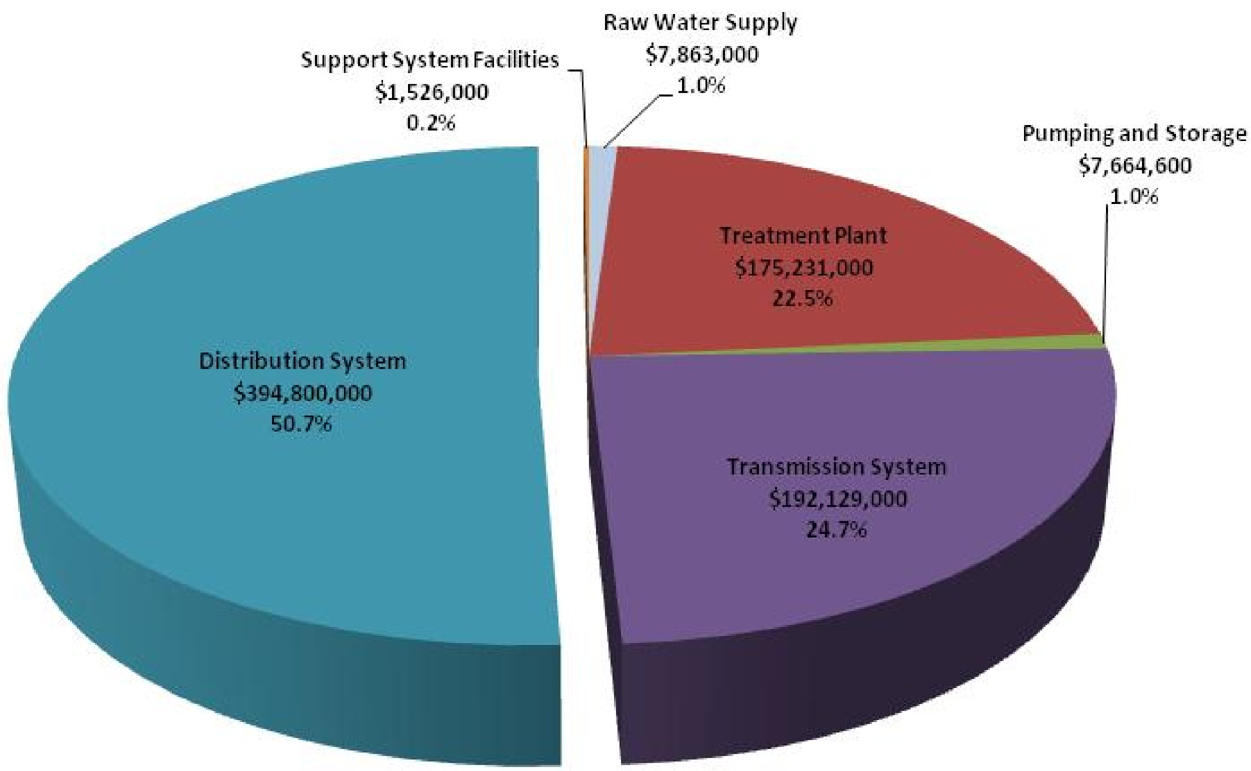
20-Year IFR Expenditure Plan - FY 2016-2035 - Exhibit 1

Providence Water

	Total Amount	Budget 2016-2020	Budget 2021-2025	Budget 2026-2030	Budget 2031-2035
Raw Water Supply	7,863,000	1,105,000	4,351,000	2,040,000	367,000
Treatment Plant	175,231,000	66,745,300	103,693,152	724,545	4,068,003
Pumping and Storage	7,664,600	4,334,000	320,600	300,000	2,710,000
Transmission System	192,129,000	7,454,000	12,925,000	17,225,000	154,525,000
Distribution System	394,800,000	88,100,000	97,500,000	103,700,000	105,500,000
Support Systems Facilities	1,526,000	551,000	325,000	325,000	325,000
Total	**779,213,600**	**168,289,300**	**219,114,752**	**124,314,545**	**267,495,003**

20-Year IFR Expenditure Plan - FY 2016-2035 Pie Chart - Exhibit 2

Providence Water



20 Year Investment - $779 Million

20-Year Sources and Uses of Funds - FY 2016-2035 - Exhibit 3

Providence Water

	2016 - 2020	2021 - 2025	2026 - 2030	2031 - 2035	2016 - 2035
	Phase 1	Phase 2	Phase 3	Phase 4	Total
Sources of Funding					
Current Authorized Funding	120,000,000	120,000,000	120,000,000	120,000,000	480,000,000
Current Bond Proceeds	-				
Funds Available from Prior Years	13,197,215	(1,724,384)	220,903	349,802	12,043,536
Additional Rate Revenue	15,500,841	60,928,000	94,285,000	118,285,000	288,998,841
Additional Bond Proceeds	63,000,000	136,500,000	31,000,000	153,000,000	383,500,000
Total Sources of Funds	211,698,056	315,703,616	245,505,903	391,634,802	1,164,542,377
Uses of Funding					
Cash Funded Construction Projects	168,289,300	219,114,752	124,314,545	267,495,003	779,213,600
Existing Debt Service	24,884,444	24,850,532	24,755,538	10,622,550	85,113,063
Applied Overhead	10,983,936	12,082,829	13,340,419	14,728,901	51,136,085
Additional Debt Service	9,264,760	59,434,600	82,745,600	97,239,600	248,684,560
Total Uses of Funds	213,422,440	315,482,713	245,156,102	390,086,054	1,164,147,308
IFR Program Surplus / (Deficit)	(1,724,384)	220,903	349,802	1,548,748	395,069

INFRASTRUCTURE REPLACEMENT PLAN FY 2016 THROUGH FY 2035

The Plan is made up of four sections and an appendix as follows:

Section I – Facilities Description – A description of the water system. Included in the section are statistical data for key components of the system, a flow diagram originating from the source of supply to the service system, and a summary of the principal components of the system. Two historical accounts are included in the section.

Section II – IFR Program Accomplishments – A summary of IFR program accomplishments with costs from fiscal years 1996 through 2015.

Section III – IFR Expenditure Plan – The section contains the projects and descriptions for the 20-Year IFR Plan (fiscal years 2016 through 2035), the 5-Year IFR Plan (fiscal years 2016 through 2020), and the 15-Year Plan (fiscal years 2021 through 2035).

Section IV – Revenue Requirements – The sources and uses of funds for the 20 -Year IFR Plan (fiscal years 2016 through 2035) and the IFR funding projections for the same period.

Appendix – The Comprehensive Clean Water Infrastructure Act of 1993, the Rules and Regulations for the Clean Water Infrastructure Plans, and the Infrastructure / Capital Program Report 1996 – 2015 (September 2015).

Section I

Facilities Description

I. FACILITIES DESCRIPTION

The Providence Opera House – The significance of the Opera House is that it was the first service opened in the Providence Water distribution system.

The System Description – Included in the description are the sources of supply, the treatment facility components and processes, the pump stations and storage facilities, an overview of the transmission and distribution systems, and the wholesale interconnections.

Exhibit 4 – Statistical Data – Exhibit 4 contains a summary of the major statistical data and information for the system.

Exhibit 5 – Process Diagram – Exhibit 5 is a process diagram of the Providence Water system. It shows in schematic form the sequence and inter-relation of various water treatment and delivery processes.

Exhibit 6 – Summary of the System's Principal Components by Facility Category – Exhibit 6 is a tabular listing of the various major components of the Providence Water system. Provided is a brief narrative description of the general condition of the facility, its approximate average age, and an estimate of its approximate remaining life, where applicable.

The Providence Grays – is a brief historical perspective of the City of Providence and a section of the distribution system in 1884, for the World Series Champions.

The Providence Opera House

During June 1871, The Providence Opera House Association was chartered, having a capital of $100,000, and the erection of a theater was immediately commenced.[iii] The Opera House was erected on the corner of Dorrance and Pine Streets and was opened on December 4, 1871. The theater had a seating capacity of 1350. It was in operation until March 14, 1931.

FIGURE 1 PROVIDENCE OPRA HOUSE

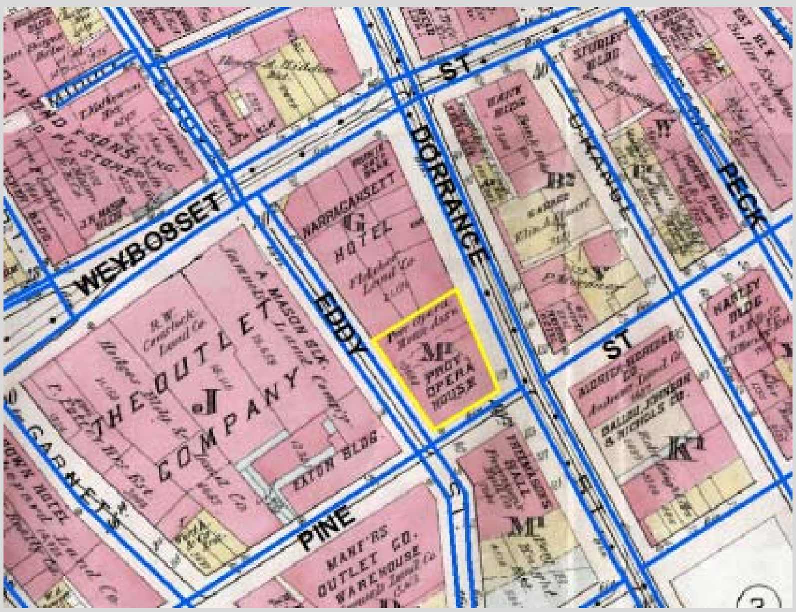


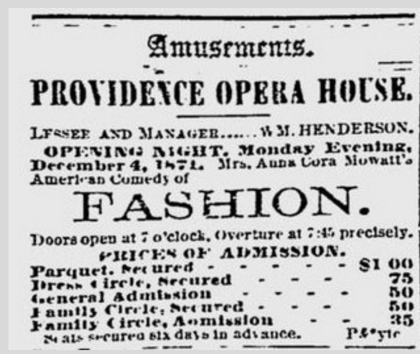
FIGURE 2 1918 PROVIDENCE PLAT BOOK WITH DISTRIBUTION SYSTEM

During November 1871 construction had been sufficiently accomplished in parts of the distribution system to permit the introduction of water. In honor of that occasion a municipal celebration was organized consisting of festivities and a parade on Thanksgiving Day, November 30, 1871.

The Procession moved from Market Square through Westminster Street and Dorrance Street into Exchange Place (Kennedy Plaza) where the exercises began with music by the American Band*, the singing of the One Hundred Psalm of David by the Orpheus Club and the assembled people, after which the Reverend Alexis Caswell, President of Brown University offered prayer: "Almighty God Our Heavenly Father we worship Thee as the Father of mercies and the God of all grace……And we now invoke Thy blessing O Lord upon this great enterprise which has called us together at this time……We thank Thee in Thy good providence and Thy favor that this undertaking so conductive to the health, comfort and prosperity of our city has been commenced and carried forward with success and now so near to its consummation. Let Thy blessing rest upon it to its completion. Give all needful knowledge and skill to those who are charged with its execution and grant that it may be to our citizens for generations to come as a fountain of living water.

And at the conclusion of the festivities, the gathering took their places at a hydrant whose gate valve was gradually opened in full view of the participants and a large group of spectators. At the opening of the gate, a salute of thirteen guns was fired by a detachment of the Providence Marine Corps Artillery, and "As the gate opened wider and wider and the water rose from height to height, the music of the band, the loud guns of the marines, and the hearty cheers of the assembled thousands rose in the air with the bright waters of the Pawtuxet, and the bells of the churches, signaled by the artillery, united in the universal joy and delight while nature approvingly caught the sparkling particles of spray that arched a beauteous bow over the whole scene."

The first service stop opened was at the Providence Opera House on December 1, 1871 (photo circa 1872).[IV] The first offering of the theatre was the comedy play entitled ***Fashion***, by Anna Cora Mowatt. The opening day ad for the Providence Opera House from the Providence Evening Press, December 4, 1871 is shown. [V]


Amusements.

PROVIDENCE OPERA HOUSE.

LESSEE AND MANAGER......WM. HENDERSON.

OPENING NIGHT, Monday Evening, December 4, 1871. Mrs. Anna Cora Mowatt's American Comedy of

FASHION.

Doors open at 7 o'clock, Overture at 7:45 precisely.

PRICES OF ADMISSION.

Parquet, Secured	$1 00
Dress Circle, Secured	75
General Admission	50
Family Circle, Secured	50
Family Circle, Admission	35

Seats secured six days in advance.

*The American Band, founded in 1837, is one of America's oldest civilian concert bands to present day. In April of 1861 the Band, whose members served as stretcher-bearers for the wounded, saw action at the battle of Bull Run. Its only casualty was the loss of its bass drum during the Union retreat.

Excerpts condensed from historical records, except as noted.

[iii] *History of Providence County, Rhode Island, Volume 1, edited by Richard Mather Bayles, page 548.*

[IV] *Photo from website, Cinema Treasures, Gerald A. DeLuca contributor*

[V] *Advertisement from website, Cinema Treasures, Gerald A. DeLuca contributor*

The System Description

WATER SUPPLY SOURCES

Providence Water's sole source of supply is the Scituate Reservoir Complex. The Scituate Reservoir complex consists of six reservoirs: the main (Scituate) reservoir and five smaller reservoirs which are tributary to the main reservoir.

Scituate Reservoir

The total storage capacity of the Scituate Reservoir is 37.011 billion gallons (BG). Dead storage is 400 million gallons (MG), resulting in a net storage volume of 36.611 BG. The reservoir has a water surface area of 5.30 square miles, and a watershed area of 92.8 square miles.

Water in the Scituate Reservoir is impounded behind the Gainer Dam, a large zoned earth structure at the southeast end of the Reservoir which is traversed along its 3,200 foot length by Rhode Island Route 12 (Scituate Avenue). Elevation of the crest of the dam is 299.0 feet Mean High Water Datum (MHW).

Crest elevation of the spillway is 284.00 feet (MHW). The flow discharges through a natural rock channel to the Pawtuxet River below the dam.

Water needed for water supply flows from the reservoir to the treatment plant.

Regulating Reservoir

Regulating Reservoir has a total storage capacity of 428 MG, of which 7 MG is dead storage. The drainage area of this reservoir is 22.3 square miles, while the water surface area is 0.38 square miles.

The dam impounding the waters in the Regulating Reservoir is an approximately 600 foot long earth embankment structure which includes a 260 foot long concrete overfall spillway. Elevation of the crest of the overfall is 285.50 feet (MHW).

Barden Reservoir

The total storage in Barden Reservoir is 853 MG. Due to the arrangement of the outlets there is no dead storage. The water surface area is 0.38 square miles, and the watershed area is 33.0 square miles.

The Barden Reservoir Dam is an earth embankment structure with a concrete corewall. The length, including the spillway, is approximately 612 feet. The crest of the dam is at elevation 352.2 feet (MHW). Elevation of the crest of the spillway is 345.1 feet (MHW).

Moswansicut Reservoir

Moswansicut Reservoir covers a surface area of about 0.44 square miles. It has a total storage capacity of 1.781 BG and dead storage of 1.066 BG, for a net storage of 715 MG. The drainage area of this reservoir is about 3.9 square miles.

The dam forming Moswansicut Reservoir is a 450 feet long earth embankment structure. There are two spillways, an overflow spillway and an emergency spillway. Elevation of the overflow spillway crest is 301.90 feet (MHW); elevation of the emergency spillway crest is 303.4 feet (MHW).

Ponaganset Reservoir

Ponaganset Reservoir has a watershed area of 2.1 square miles, and a water surface area of 0.36 square miles. Total storage in the reservoir is 742 MG of which 49 MG is dead storage. Net storage capacity is 693 MG.

The dam impounding the Ponaganset Reservoir is an approximately 635 foot long earth embankment structure. Crest of the dam is elevation 641.4 feet (MHW). Spillway crest elevation is 633.05 feet (MHW).

Westconnaug Reservoir

Westconnaug Reservoir has a total storage capacity of 453 MG with no dead storage. Its surface area covers about 0.27 square miles. It has a drainage area of 4 square miles.

The dam is an earth embankment structure with a steel sheeting and concrete corewall. The length of the dam is approximately 320 feet long, with a crest elevation of 457.2 feet (MHW). The crest elevation of the spillway is 454.17 feet (MHW). Both the spillway and the outlet conduit discharge into Westconnaug Brook.

TREATMENT FACILITIES

Providence Water operates one conventional water treatment plant to purify source water which flows from the Scituate Reservoir to the plant. The raw water characteristics from the Scituate Reservoir are typical of well protected surface water supplies in the New England region. It is a low pH, low alkaline, low turbidity water with seasonal overturn events.

The plant utilizes a conventional treatment process. The hydraulics of the plant allow it to be normally operated under gravity flow conditions. The Raw Water Booster Pump Station is available for pumping water to the plant under extremely low reservoir conditions. The treatment process consists of aeration, coagulation-flocculation, lime addition for corrosion control and pH adjustment, sedimentation, disinfection, filtration, and fluoridation.

Influent Control Chamber

The influent control chamber is a concrete structure consisting of internal chambers and control and drain valves that regulate the flow of water entering the plant.

Aeration Basin

Water flows from the influent chamber to the aeration basin. The aeration system works under gravity pressure and sprays water into the air in a fountain style. This treatment step removes volatile organics and gases. The aerated water travels by gravity to the sedimentation basins.

Basin Influent Conduit

The aerated water travels to the sedimentation basins through a 108-inch conduit and then through two 72-inch by 36-inch diameter venturi meter tubes which measure the influent flow. Water then travels on to the basins through an 8.5-foot wide, 10-foot high rectangular concrete conduit.

Coagulation/Flocculation

Ferric sulfate is added as a coagulant to the aerated water as it passes through the 108-inch conduit utilizing the pumped flash mix system. Quicklime is added to the water as it passes through the basin influent conduit. The pH of the water is increased to approximately 7.0 as a result of the lime addition at this point. Further mixing and flocculation takes place in a tangential mixer. The water enters the mixer through a 4-foot wide, 3-foot high opening at the bottom of the mixing chamber. The mixer works under gravity feed and imparts a slow cylindrical motion to the water. This step is commonly known as flocculation. The next step is the removal of the flocculated colloidal material through sedimentation. The treatment plant has two large sedimentation basins; the north basin (43 million gallon capacity) and the south basin (111 million gallon capacity). Here, the flocculated material is allowed to settle on the bottom of the basins. The resulting ferric sludge must be removed manually by periodically draining and flushing the basins.

Filtration

Settled water travels from the basins through a 10-foot wide, 11-foot high rectangular concrete conduit to the plant's filters. Chlorine is added in this conduit for disinfection purposes. A second lime injection point is located in this conduit to raise the pH from 7.0 to 10.3. There are eighteen (18) filters which remove non-settleable floc and impurities remaining following the coagulation, flocculation, and sedimentation stages. Existing filters are mono media sand filters; however, construction is in progress to rehabilitate the filter boxes, including installing new underdrain systems and new dual (sand and anthracite) media along with air scour backwash and filter to waste capability. Rehabilitation of all 18 filters is scheduled to be completed soon. Each filter is operated over a flow range of 5 to 8 million gallons per day. The number of filters on-line concurrently is dependent upon water demand. Each filter has two 16-inch effluent lines with 14-inch butterfly valves that control discharge into the clearwell. The average filter run is approximately 72 hours and, generally, a backwash is initiated when head loss through the filter reaches approximately 6.5 feet of water. The filter backwash water is supplied by gravity via a 400,000 gallon wash water tank which is then discharged to the sludge lagoons.

Emergency Provisions

Emergency provisions at the plant include stand-by power and an emergency by-pass process that could allow chlorinated unfiltered water to flow to the system.

Electrical service is provided by a 23 kilo-volt (KV) transmission line to a 2.3 KV service to the treatment plant. The emergency electrical power at the plant is provided by a 600 KW diesel generator. This generator is capable of providing adequate power for treatment operations and life safety requirements during power outages. Redundant backup power for the system is also available through a 2000 KW diesel generator located at the Raw Water Booster Pump Station.

Chemical Feed Systems

<u>Ferric Sulfate</u>

The plant uses ferric sulfate as a coagulant. Ferric sulfate arrives at the plant in liquid form and is stored and then transferred by pumps, as needed, into two (2) day tanks. Metering pumps are then used to provide a measured feed rate to the raw water. Ferric sulfate is added to the treatment process after aeration occurs.

<u>Quicklime</u>

Quicklime is added to aerated water for pH adjustment and corrosion control purposes. A pneumatic blower-style transfer system is utilized to convey lime from bulk storage to secondary feeder hoppers from which gravimetric feeders, slakers, float tanks, and pumps are utilized to add lime to the unfinished water. Lime is added to the treatment process in two locations, both prior to, and after sedimentation.

Chlorine

Chlorine is added to the settled water for disinfection. Chlorine is delivered to the plant in one ton containers which are transported to a storage room. The storage room is equipped with a ventilation system that would turn on and exhaust air to the outdoors in the event that a chlorine leak is detected.

Hydrofluorosilicic Acid (Liquid Fluoride)

Hydrofluorosilicic acid is added to filtered water just downstream of the clearwell. Fluoride is delivered in liquid form and is stored in four storage tanks. Fluoride is then pumped to the injection point from a day tank at a rate paced to the metered effluent flow of the plant.

Solids Handling and Disposal

Two treatment processes consisting of clarification (coagulation-flocculation-sedimentation) and filtration generate ferric hydroxide sludge residuals which must be periodically removed. Approximately 90% of the sludge residuals settle in the basins during the sedimentation process. The residuals removal from the sedimentation process is accomplished by dredging the sedimentation basins through by-pass piping that transports the sludge to drying beds located adjacent to the off-site settling lagoon system. In addition, the residuals removal from the filtration process is accomplished through the backwashing of the filters. For this process, the sludge residuals are transported through the plant's main drain which then conveys the residuals to the off-site settling lagoon system.

The lagoon system consists of three settling lagoons, three overflow structures and outfalls, and a series of swales and control structures that allow the lagoons to be independently placed out of service for dewatering and cleaning operations. Lagoons 1a and 1b are used to store the majority of residuals received by the lagoons. Lagoon 2 is used as a 'polishing' lagoon for further removal of sediments. Discharge limits including flow, pH, iron and total suspended solids are established by our RIPDES permit issued by the Rhode Island Department of Environmental Management.

STORAGE FACILITIES

Providence Water operates five water storage facilities throughout the distribution system. Water is also collected in a 260,000 gallon clearwell at the plant before being delivered to the distribution system. These facilities are used to meet peak demand flows and to provide storage for emergency and firefighting purposes.

Aqueduct Reservoir

The Aqueduct Reservoir has a storage capacity of 43.4 MG and is 390 x 590 foot enclosed underground concrete structure with a water depth of approximately 25 feet and an overflow elevation of 231 feet mean high water (MHW). The facility is gravity fed and provides operational storage for the Low Service area of the distribution system. Water is supplied to the reservoir through aqueducts and transmission mains from the treatment plant.

Neutaconkanut Reservoir

Water continues to flow through the Neutaconkanut Conduit to the further downstream Neutaconkanut Reservoir. The Neutaconkanut Reservoir has a storage capacity of 42.09 MG and is a 397 x 597 foot enclosed underground concrete structure with an average water depth of approximately 25 feet and an overflow elevation of 227 feet MHW. The facility provides operational storage for the gravity fed Low Service area and a portion of the pumped supply to the High Service area of the distribution system.

Longview Reservoir

The Longview Reservoir has a storage capacity of 24.8 MG and has an overflow elevation of 306 feet MHW. A 200 foot x 323 foot x 29 foot deep cast in place concrete underground addition was constructed immediately adjacent to the existing reservoir and was put on line in 1990. This doubled the size of the reservoir to its current capacity. The facility provides operational, emergency, and fire storage to the High Service area of the distribution system.

Ridge Road Reservoir

The Ridge Road Reservoir has a capacity of 3.5 MG and provides operational, emergency, and fire storage for the Extra-High Service area of the distribution system. Water is pumped to the reservoir by the Fruit Hill Pump Station. The structure is a prestressed concrete tank with a water depth of 40 feet and an overflow elevation of 398 feet MHW.

Lawton Hill Reservoir

The Lawton Hill Reservoir has a storage capacity of 5.0 MG and is a 187-foot by 187-foot enclosed underground concrete structure with a water depth of 20 feet and an overflow elevation of 485 feet mean high water (MHW). The facility provides operational storage for the Western Cranston area of the distribution system. Water is pumped to the reservoir by the Aqueduct Pump Station adjacent to the Aqueduct Reservoir.

PUMP STATIONS

In order to maintain an adequate supply of potable water at a sufficient pressure, Providence Water owns and operates ten water pump stations in the distribution system, one emergency pump station in the transmission system, and one raw water pump station. A description of the pump stations follows:

Structure "D"

Structure "D" in its normal capacity is an isolation transmission structure for the 78-inch Aqueduct. Stucture "D" also contains two 2800 gpm pumps that can provide a wholesale emergency pump station connection.

Raw Water Pumping Station

The Raw Water Booster Pumping Station (RWBPS) contains four pumps, two with a pumping capacity of 50 MGD and two with a pumping capacity of 30 MGD. The station is used to supplement the head to provide adequate delivery capacity the water treatment plant under low reservoir water level conditions. The RWBPS is equipped with emergency power supplied by a 2000 KW diesel generator.

Dean Estates Pump Station

The Dean Estates Pump Station contains one 200 GPM pump, two 475 GPM pumps and two 1,200 GPM pumps. Emergency power is supplied by a 150 KW natural gas generator. The Dean Estates Pump Station serves the higher elevations in the Dean Estates and the Garden Hills subdivisions.

Greenville Avenue Pump Station

The Greenville Avenue Pump Station contains one 50 GPM jockey pump, three 320 GPM pumps, and one 750 GPM fire pump. Emergency power is supplied by a 125 KW diesel generator.

Fruit Hill Pump Station

The Fruit Hill Pump Station contains two 1,500 GPM pumps and provides water to the Extra High Service area. Emergency power is provided by a 150 KW natural gas generator.

Bath Street Pump Station

The Bath Street Pump Station contains three pumps with a pumping capacity of approximately 6,700 GPM each. A 1000 KW diesel generator supplies emergency power for the station. The station pumps water to Longview Reservoir and supplies water to the High Service area as well as the high pressure fire zone in downtown Providence.

Neutaconkanut Pump Station

The Neutaconkanut Pump Station contains four pumps with a pumping capacity of approximately 6,700 GPM each. A 1000 KW diesel generator supplies emergency power for both the Ashby and Neutaconkanut pump station. The station pumps water from the Neutaconkanut Reservoir and supplies water to Longview Reservoir and the High Service area.

Aqueduct Pump Station

The Aqueduct Pump Station contains four vertical turbine pumps with a pumping capacity of approximately 2,000 GPM each. A 600 KW diesel generator supplies emergency power for the station. The station pumps water to Lawton Hill Reservoir and the Western Cranston Service area.

Alpine Estates Pump Station

The Alpine Estates Pump Station contains one 100 GPM jockey pump and three 370 GPM domestic pumps. An 80 KW diesel generator supplies emergency power for the station. This station is currently out of service and serves as a back-up to the Cranston Commons Pump Station to provide water to the Alpine Estates subdivision in Western Cranston.

Ashby Street Pump Station

The Ashby Street Pump Station contains one 50 GPM jockey pump, two 100 GPM domestic pumps and one 750 GPM fire pump. Electrical power and emergency power is supplied to the station from the Neutaconkanut Pump Station. The station provides water to approximately 100 residential services in the Neutaconkanut Hill area in Johnston.

Cranston Commons Pump Station

The Cranston Commons Pump Station contains two 130 GPM jockey pumps and three 800 GPM domestic pumps. The station utilizes an underground 528 gallon hydro-pneumatic storage tank. Emergency power is supplied by a diesel generator, which is owned and maintained by a privately managed water/sewer utility company who also uses the generator as an emergency power supply for a booster pump station for the sewer system in the City of Cranston. The station provides water to Cranston Commons and Alpine Estates subdivision in Western Cranston.

Atwood Avenue Pump Station

The Atwood Avenue pump station was taken over by Providence Water from the Town of Johnston in 2010. The Atwood Avenue pump station contains one 45 GPM jockey pump, two 170 gpm domestic pumps, and one 750 gpm high flow pump. Emergency power is supplied by a 200 KW natural gas generator.

TRANSMISSION AND DISTRIBUTION SYSTEM

Large diameter pipe conduits transfer raw water by gravity from the dam intakes to the treatment plant.

Finished water is transmitted from the clearwell at the plant to the distribution system through two major transmission conduits, the 90-inch diameter Scituate Tunnel and Aqueduct (ScTA) and the 78-inch and 102-inch diameter Supplemental Tunnel and Aqueduct (STA).

Providence Water currently operates approximately 4 miles of concrete lined tunnel, 10 miles of concrete aqueduct, 131 miles of various sizes of transmission piping (16" to 66") and 874 miles of distribution piping (6" to 12").

Service Area

Providence Water supplies approximately 600,000 people in the State of Rhode Island with potable water through both its retail and wholesale customers.

The Retail Area

The retail service area consists essentially of all of Providence, Cranston, North Providence, and a significant portion of Johnston. The 74,864 retail service connections include residential, industrial, commercial, and fire service supplies.
The retail service area is divided into four major separate pressure zones: the Low Service, High Service, Extra High Service, and the Western Cranston water district.

The Low Service area comprises approximately 75% of the retail area and serves portions of Cranston, Johnston and Providence. The Low Service area is generally defined as the area within elevations 0 to 140 feet above Mean High Water (MHW). The pressure in the Low

Service area is maintained by the levels at the Neutaconkanut and Aqueduct Reservoirs which are maintained at approximate elevations 225 and 230 feet MHW respectively.

The High Service area serves the higher elevation sections of North Providence, Providence and the Town of Johnston. The High Service area is generally defined as the area within elevations 140 to 220 feet above MHW. The pressure in the High Service area is maintained by the operating level at the Longview Reservoir, which is maintained at the approximate elevation of 305 feet MHW. Water for the High Service area is supplied by water pumped from the Low Service system by the Neutaconkanut and Bath Street Pumping Stations.

The Extra High Service area serves a small portion of the retail area in the Fruit Hill section of North Providence. The Extra High Service area is generally defined as the area with elevations from 220 feet to 315 feet above MHW. The water for this service area is drawn from the High Service system and pumped from the Fruit Hill Pump Station to the Ridge Road Reservoir where the water level is maintained at the approximate elevation of 397 feet MHW.

The Western Cranston water district encompasses 3.5% of the retail area. The pressure in this service area is maintained by the operating level at Lawton Hill Reservoir at the approximate elevation of 484 feet MHW. Water for this service area is supplied by water pumped from the Low Service system by the Aqueduct Pump Station.

Various smaller booster pump stations supply water to smaller areas of the system from these primary pressure zones.

Service area mains range in size from 6 inches to 66 inches in diameter and are constructed of a variety of materials including cast iron, ductile iron, concrete, steel, and asbestos cement. Service connections range from 5/8-inch to 12-inches in size, based upon customers' demands. Service connections are generally constructed of lead, copper, cast iron, or ductile iron. All services are metered.

The Wholesale Area

Providence Water wholesales water to nine water utilities in the Providence area. These include the Bristol County Water Authority (one interconnection), East Providence Water Division (one interconnection), Greenville Water District (one interconnection), Kent County Water Authority (three interconnections), Lincoln Water Commission (two interconnections), Smithfield Water Department (one interconnection), Warwick Water Department (three interconnections), Johnston Sewer and Water Department (six interconnections), and the East Smithfield Water District (three interconnections).

System Metering

Providence Water measures water produced at the treatment plant and meters 100% of its service connections. Raw water flowing into the plant is measured by two 72" x 36" diameter venturi meters. These venturi meters measure the flow of raw water from the influent control chamber to the sedimentation basins.

The flow of effluent discharged from the plant to the distribution system is measured by the plant's 36 master effluent meters. These meters are 16-inch venturi tube meters located on the effluent lines from the plant's filters. Plant effluent flows can also be measured by two 72" X 42" finished water effluent venturi meters.

Providence Water meters all customers in its entire service area. Service area metering includes meters at interconnections to wholesale customers as well as normal metering of all retail service connections. The retail service area contains a variety of water consumers including large industrial and manufacturing accounts, commercial accounts, and residential users.

The System Description - Exhibit 4

Providence Water

WATER SUPPLY SOURCES

	Watershed Area (Sq Miles)	Surface Area (Sq Miles)	Storage Capacity (MG)	Dam Length (feet)	Spillway Elevation (MHW)
Scituate Reservoir	92.8	5.30	37011	3200	284.00
Regulating Reservoir	22.3	0.38	428	340	285.50
Barden Reservoir	33.0	0.38	853	530	345.10
Moswansicut Reservoir	3.9	0.44	1781	450	301.90
Ponaganset Reservoir	2.1	0.36	742	635	633.05
Westconnaug Reservoir	4.0	0.27	453	320	454.17

TREATMENT FACILITIES

Providence Water operates one treatment plant to purify the Scituate Reservoir water. The plant is located approximately 4,400 feet from the Gainer Dam in Scituate and operates as a conventional treatment process. The treatment process consists of aeration, coagulation-flocculation, corrosion control, sedimentation, filtration, disinfection, and fluoridation.

STORAGE FACILITIES

	Storage Capacity (MG)	Overflow Elevation (MHW)
Aqueduct Reservoir	43.4	231
Neutaconkanut Reservoir	42.1	227
Longview Reservoir	24.8	306
Ridge Road Reservoir	3.5	398
Lawton Hill Reservoir	5.0	485

PUMP STATIONS

Raw Water	2 - 30 MGD pumps; 2 - 50 MGD pumps; 2000 KW diesel generator
Dean Estates	1 - 200 GPM pump; 2 - 475 GPM pumps; 2 - 1,200 GPM pumps; 150 KW natural gas generator
Greenville Ave.	1 - 50 GPM jockey pump; 3 - 320 GPM pumps; 1 - 750 GPM pump; 125 KW diesel generator
Fruit Hill	2 - 1,500 GPM pumps; 150 KW natural gas generator
Bath Street	3 - 6,700 GPM pumps; 1000 KW diesel generator
Neutaconkanut	4 - 6,700 GPM pumps; 1000 KW diesel generator
Aqueduct	4 - 2,000 GPM pumps; 600 KW diesel generator
Alpine Estates	1 - 100 GPM jockey pump; 3 - 370 GPM pumps; 80 KW diesel generator
Ashby St.	1 - 50 GPM jockey pump; 2 - 100 GPM pumps; 1 - 750 GPM pump; emergency power provided by Neut. P.S. and generator.
Cranston Commons	2 - 130 GPM jockey pumps; 3 - 800 GPM pumps; emergency power provided by private source
Atwood Ave.	1 - 45 GPM jockey pump; 2 - 170 GPM pumps; 1 - 750 GPM pump; 200 KW natural gas generator

TRANSMISSION AND DISTRIBUTION SYSTEM

4.5 miles - 90" Scituate Tunnel and Aqueduct

9.5 miles - 78" / 102" Supplemental Tunnel and Aqueduct

131 miles of transmission piping (16" to 66")

774 transmission valves

874 miles of distribution piping (6" to 12")

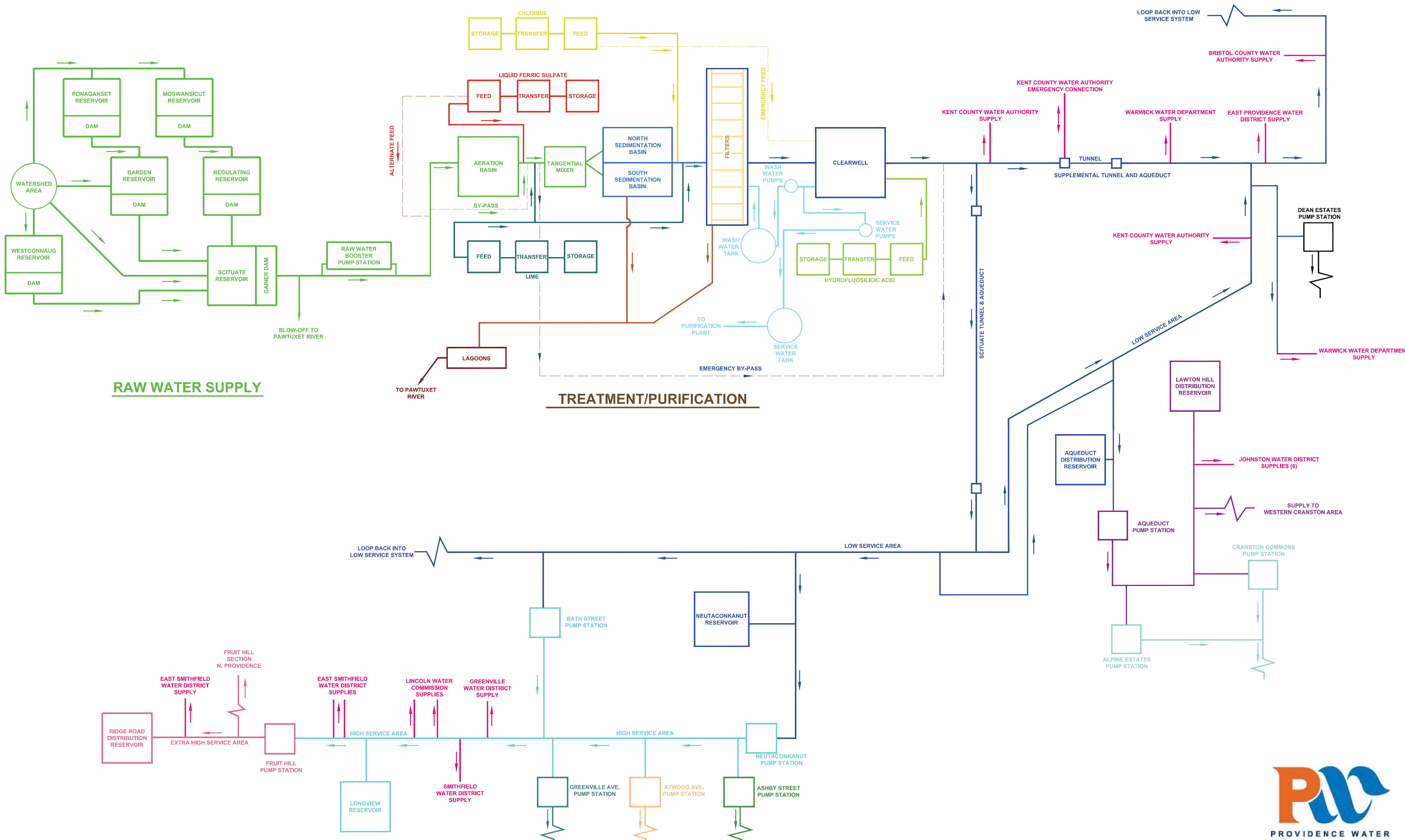
13,120 distribution valves

6,086 hydrants

74,869 active service connections

WHOLESALERS

	Interconnections
Bristol County Water Authority	1
East Providence Water Division	1
Greenville Water District	1
Kent County Water Authority	3
Lincoln Water Commission	2
Smithfield Water Department	1
Warwick Water Department	3
Johnston Sewer and Water Department	6
East Smithfield Water District	3
Total	21



PROCESS DIAGRAM
EXHIBIT 5

Summary of the System's Principal Components by Facility Category - Exhibit 6

Providence Water

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Raw Water Supply				
Principal Reservoirs and Dams	1917 to 1927	Various	100	Generally all the dams are in good to excellent condition. Gainer Dam has been rehabilitated but requires further concrete rehabilitative work on the upstream face of the spillway. Ponaganset, Barden, Westcoonnaug, and Moswansicut Reservoir Dams have been rehabilitated and are in good condition. Improvements to Regulating Reservoir Dam will eventually need to be conducted to both the upstream and downstream slopes of the dam and the outlet structure and spillway.
Reservoir Watershed Area	Various	Various	Various	Generally in good condition. Various rehabilitative work will be needed to the fencing, gates, access and fire roads as they are required. Coomer Dam will need to be rehabilitated in the first five years of the plan. Harrisdale/ Peeptoad Pond Dam and Jordon Pond Dam will need to be rehabilitated later in the 20 year plan.
Gainer Dam Gate House	1927	89	50	The gatehouse dates back to its original construction in the 1920's and is generally in good condition. All Sluice gates, stop shutters, and drain valves have been replaced. Electrical actuators were installed to operate the sluice gates. Instrumentation and telemetry have been replaced. The roof of the building is in good condition. The gatehouse is in need of architectural improvements along with a replacement of the two existing cranes.

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Raw Water Supply				
60-Inch Raw Water Influent Conduits	1926	90	75	The twin 60" mains appear to be in good condition. The exposed pipe of the twin 60 inch mains inside the meter and junction chambers is in good condition and does not require any remedial work in the first five years of the plan, and will be reassessed before the next plan is submitted 5 years from now. The cathodic protection system installed for the underground portion is in good working condition and will be periodically inspected. An internal inspection of the conduits will need to be conducted and is scheduled in the 20 year plan. Two of the 6 60-inch influent BFV's need to be replaced.
90-Inch Steel Raw Water Influent Conduit	1926	90	50	Dates back to original plant construction. The 90-inch raw water conduit is in good condition. Minor internal surface imperfections were identified during a previous structural inspection. Internal and external inspections of the pipeline are scheduled in the 20-year plan
Raw Water Booster Pump Station	1966	50	50	The station is in relatively good condition. A 2000 kW generator was installed in 1996, replacing the old diesel generator. Upgrades to the generator are in the first 5 years of the plan. The electrical feeder lines to the 60-inch control valves from the station have been replaced. The suction and discharge valves, as well as the valve actuators for each of the booster pumps have been replaced. The motor control center has been replaced and the pumps rehabilitated. SCADA has been added to the station. The station is in need of architectural improvements.
Treatment Plant Facilities				
Treatment Plant Structure / Infrastructure	1926	90	Various	The plant is generally in good condition with improvements made to the roof, lab, HVAC system, electrical system, and public address system. Both the passenger and freight elevators will need to be rehabilitated. The plant will be in need of various architectural improvements and upkeeping.

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Treatment Plant Facilities				
Electrical Supply System - Treatment Plant	Various	Various	Various	The overall system is in excellent condition. The feeder lines from the Hope substation to the treatment plant have been replaced. A 480-volt transformer and feed line has been installed at the treatment plant replacing the old 550V system. The old 175 kW generator was replaced with a 600 kW diesel generator.
Aeration	2016	0	75	The influent structure and aeration basin are in excellent condition. Improvements to the aeration basin and influent structure are completing construction, which consisted of the relocation and reconstruction of the basin, rehabilitation of concrete surfaces of the structures and conduits, replacement of the influent control valves, and reconstruction work on the influent control chamber. Plant influent hydraulics were improved by raising the overflow and aerator weirs.
Sedimentation Basins	1939	77	10	The concrete sedimentation basins at the plant consist of two large open water surface basins dating back to 1939. The concrete walls and slabs making up the basin have deteriorated over time. In light of the outmoded nature of this sedimentation process by today's standards, Providence Water is conducting a full-scale pilot of pretreatment alternatives using available bench-scale technology for coagulation, flocculation, and sedimentation to evaluate water quality in the treatment process train.
Filters	2016	0	50	Construction is in progress for the rehabilitation of all 18 filters at the treatment plant. Rehabilitation work consists of completely replacing the existing filters' valves, underdrains, washwater troughs, and media, and erecting a new superstructure to house the filters. In addition to the filter rehabilitation, all associated washwater and effluent piping and appurtenances have been replaced, including the replacement and relocation of the 48-inch washwater pipe. New filter-to-waste piping has been installed to enhance turbidity and water quality.

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Treatment Plant Facilities				
Clearwell	1927/1943 1968	Varies	50	The exterior yard and the interior of the clearwell have been fully rehabilitated. The two venturi meters at the outlet have been rehabilitated. The interior of the clearwell will need to be periodically inspected.
Wash Water System	1926 Tank 2004 Pumps	90 (Tank) 12 (Pumps)	50 (Tank) 13 (Pumps)	The pumps are in good condition. Concrete rehabilitative work was performed on the washwater tank. The washwater tank is in good condition. Inspection of the tank will need to be periodically conducted. The pumps are scheduled to be replaced in the 20 year plan.
Service Water System	1960 Tank 2004 Pumps	56 (Tank) 12 (Pumps)	50 (Tank) 13 (Pumps)	The pumps are in good condition. Magnesium anodes were installed in the tank for corrosion protection. The service water tank and cathodic protection system were inspected and in good condition. Inspection of the tank will need to be periodically conducted. The pumps are scheduled to be replaced in the 20 year plan.
Ferric Storage/Transfer Feed System	The parts of the storage, transfer, and feed systems are various ages.	N/A	Various	The three 16,000 gallon liquid ferric storage tanks have been replaced with three 19,000 gallon fiberglass tanks. All containment and bulk transfer pump room piping has been replaced, and the concrete containment area has rehabilitated and recoated. Some upgrades will be needed to the system that are required with normal use and are addressed in the plan.
Lime Storage/Transfer Feed System	The parts of the storage, transfer, and feed systems are various ages.	N/A	Various	The feeders are ending their useful lives and are planned for replacement in the first 5 years of the plan. The rest of the system is in good working condition. Some upgrades will be needed to the system that are required with normal use and are addressed in the plan.
Chlorine Storage/Transfer Feed System	The parts of the storage, transfer, and feed systems are various ages.	N/A	Various	The overall system is in good working condition. The monorail, loading dock, and weight scales are in need of upgrades in the first 5 years of the plan. Some upgrades will be needed to the system that are required with normal use and are addressed in the plan.

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Treatment Plant Facilities				
Fluoride Storage/Transfer Feed System	The parts of the storage, transfer, and feed systems are various ages.	N/A	Various	The system is in good operating condition. Some upgrades will be needed to the system that are required with normal use and are addressed in the plan.
Sludge Handling/ Disposal System	2004	12	50	The system is in excellent operational condition. Sludge has been removed from all lagoons (#1A, #1B, and #2). A by-pass piping system has been installed that will transfer sludge directly from the sedimentation basins to drying beds, by-passing the lagoon system.
Process Control / Data Acquisition System	2010	6	Various	The SCADA system is new and in excellent condition. Periodic hardware and software upgrades will be needed.
Transmission System				
90-inch Scituate Tunnel and Aqueduct	1925	91	75	The entire 4.5 mile 90” conduit is in good condition. The conduit was inspected and various concrete rehabilitative work was conducted including crack injections, spalled concrete repairs, and the investigation and repair of hollow sounding areas. Further rehabilitative work will be required in the tunnel section consisting of contact grouting to fill various voids between the concrete tunnel and the bedrock. The tunnel and aqueduct will need to be inspected again.
Supplemental Tunnel and Aqueduct (102" & 78")	1970	46	Unknown	The 78" and 102" transmission lines, approximately 9.6 miles in length, were constructed in the 1960's and consist of prestressed concrete cylinder pipe (PCCP) and two sections of concrete lined tunnel. Because of prior deficiencies encountered on these pipelines, a program has been adopted in which the pipelines are inspected and repairs are conducted at regular intervals. In addition to the inspections, a fiber optic acoustic monitoring system has been installed in the 102" pipeline that continually monitors the pipeline for wire breaks.

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Transmission System				
Transmission Mains (16" to 66")	1871-2006	Various	Various	Some of the mains are older than 100 years and will eventually need to be replaced. None of the large transmission mains have been identified for replacement in the plan.
Transmission Valves (16" to 60")	1871-2006	Various	Various	Presently the transmission valves are in good condition. Valves that are found to be defective are replaced. In the last stage of the 20 year plan about 40 valves will be approaching the end of their useful lives and will be replaced.
Distribution System				
Distribution Mains (6" to 12")	1871-2015	Various	Various	A scheduled program is in place to rehabilitate water mains with the priority on unlined cast iron pipe where water quality and flow issues have been documented, and mains in areas of local and state road resurfacing projects.
Distribution Valves (6" to 12")	1871-2015	Various	Various	Plans are to replace valves in conjunction with the main rehabilitation program. Older distribution valves that are found to be defective are also replaced.
Services	1871-2015	Various	Various	Lead services will be replaced on main rehabilitation projects. Lead services are also replaced that are found leaking.
Hydrants	1871-2015	Various	Various	Plans are to replace older hydrants on main rehabilitation projects with new breakaway style hydrants. Hydrants that are found to be defective are also replaced.
Pumping and Storage				
Aqueduct Reservoir and Gatehouse	1962	54	50	The reservoir and gatehouse are in good condition. Improvements are addressed in the first 5 years of the plan to improve tank turnover. During a recent inspection it was observed that a construction joint on the ceiling of the structure will need to be sealed. All of the reservoirs are scheduled to be inspected regularly.
Neutaconkanut Reservoir and Gatehouse	1928	88	50	The reservoir and gatehouse were rehabilitated under a past contract and are in good condition. Cracks and construction joints on the interior of the tank were sealed. Improvements are addressed in the first 5 years of the plan to improve tank turnover. All of the reservoirs are scheduled to be inspected regularly.

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Pumping and Storage				
Longview Reservoir and Gatehouse	1928, 1990	88, 26	50	Regular inspections of the storage tank and gatehouse are addressed in the plan.
Ridge Road Reservoir	1989	27	50	Regular inspections of the storage tank are addressed in the plan. The tank has some exterior cracking which will need to be addressed in the first 5 years.
Lawton Hill Reservoir	1972	44	50	The tank and tank isolation valves need to be inspected and are scheduled in the plan.
Dean Estates Pump Station	2012	4	50	The pump station has been fully rehabilitated. The Garden Hills and Dean Estates pressure zones were combined into a single pressure zone which is now served by the Dean Estates pump station, which allowed for the abandonment of the Garden Hills Pump Station. The station is equipped with new VFD turbine pumps, the instrumentation and electrical systems have been upgraded, a new emergency generator was installed, and architectural improvements were conducted.
Fruit Hill Pump Station	1989	27	5	The pump station is in fair condition, and will need upgrading as addressed in the first 5 years of the plan.
Atwood Ave. Pump Station	1999	17	5	The station requires upgrading and is addressed in the first 5 years of the plan.
Bath Street Pump Station				The pump station is in good condition. Complete rehabilitation of the pump station was completed in 1999 which included replacement of the pumps, suction and discharge piping, instrumentation and electrical system upgrades, architectural/structural improvements, and installation of an emergency power generator. In the first 5 years of the plan the VFD drives will need to be replaced, and subsequent upgrades to the station are required later in the plan.
Building	1928	88	50	
Pumps	1999	17	20	

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Pumping and Storage				
Neutaconkanut Pump Station Building Pumps	 1935 1999	 81 17	 50 20	The pump station is in good condition. Complete rehabilitation of the pump station was completed in 1999 which included replacement of the pumps, suction and discharge piping, instrumentation and electrical system upgrades, architectural/structural improvements, and installation of an emergency power generator. In the first 5 years of the plan the VFD drives will need to be replaced, and subsequent upgrades to the station are required later in the plan.
Greenville Ave. Pump Station Building Pumps	 1994 1994	 22 22	 50 25	The pump station is in good condition. It is anticipated that various mechanical, electrical, and architectural improvements may be needed at some time.
Aqueduct Pump Station Building Pumps	 1972 2006	 44 10	 50 25	The pump station is fairly new and is in excellent condition. VFD drives need to be added to the pumps in the first 5 years of the plan to facilitate operation during scheduled maintenance and for emergency shutdowns at the Lawton Hill Reservoir.
Alpine Estates Pump Station	1988	28	N/A	The station needs upgrading, however the station is currently inactive. Upgrades are being deferred until future plans for the station are determined.
Ashby Street Pump Station	1999	17	10	This pump station is in excellent condition. It is anticipated that pumps will be needed as addressed in the plan.
Cranston Commons Pump Station	1996	20	15	The pump station is in good condition. Long-term plans may be to replace the below grade pump station with an above ground pre-engineered packaged-unit with its own emergency back-up generator. Future consideration to this station will depend on future overall improvements in Western Cranston. VFD drives are being installed in the first 5 years of the plan.

Principal Components by Category	Installation Date(s)	Age of Component	Approximate Practical Remaining Life (years)	Assessment
Support Systems & Facilities				
Forestry Garage	1962	54	25	Various rehabilitative work has been conducted on the facility. The building will require various architectural and mechanical improvements on an ongoing basis.
Academy Ave. Administration Building	1954	62	5	Various rehabilitative work has been conducted on the facility. The building is old and will require architectural and mechanical improvements. We are moving the administration and operations functions of the organization to one central facility. For this reason, continued improvements to this facility is phased out of the plan.
Aqueduct Reservoir Administration Building	1997	19	15	The building is a one level office building constructed in 1998. We are moving the administration and operations functions of the organization to one central facility. For this reason, continued improvements to this facility is phased out of the plan.
Watershed Storage Facility	2009	7	50	The building is a pre-engineered metal frame storage building constructed in 2009. The facility is in excellent condition and does not require rehabilitative work.

The Providence Grays

The Providence Grays were a Major League Baseball team based in Providence, Rhode Island who played in the National League from 1878 through 1885. The Grays played at the Messer Street Grounds in the Olneyville neighborhood of Providence.

FIGURE 1 1884 WORLD SERIES CHAMPION PROVIDENCE GRAYS

When the Providence Baseball Association formed in 1878, the team directors began scouting around the city for a good location for a baseball park. They visited the old Josiah Chapin farm on city's west side and decided that it fit all the requirements for a park. The site was close to being level, it was raised up a few feet from the surrounding roads, and it was easily accessible by street car. Construction of the Messer Street Grounds began on April 1 and took exactly one month to complete. The park opened on May 1, 1878.

FIGURE 2 DISTRIBUTION SYSTEM IN 1884

The grandstands of the Messer Street Grounds seated about 1200 fans with other seating arranged around the field. Just like Wrigley Field today, fans would watch the games on the roof of the Tourtellot House, which was behind short left field fence, for the discounted rate of 25 cents. One source estimates that the dimensions of the park were: LF pole 281', LF corner angle 403', LCF 356', CF 318', RCF 356', and RF pole 431', with fences 12 feet high. One reference, maps out the approximate footprint of the ballpark and main grandstand. The park was located between what is now Willow Street to the north, Ellery Street to the west, Wood Street to the south, and Messer Street to the east.

FIGURE 3 DISTRIBUTION SYSTEM PRESENT DAY

The Providence Grays won the National League pennant twice; 1879 and 1884. In their 8 year history, 4 players; Jim O'Rourke, Charles Radbourn, John Montgomery Ward, and George Wright were later elected to the Hall of Fame.

According to the Baseball Encyclopedia, the Grays won the National League Championship in 1884 with a record of 84 wins and 28 losses. They went on to defeat the New York Metropolitans, 3 games to 0, winning their first and only World Series Championship.

Section II

IFR Program Accomplishments

II. IFR PROGRAM ACCOMPLISHMENTS

Summary of IFR Program Accomplishments (Fiscal Years 1996 through 2015)

Exhibit 7 – IFR Expenditures for Fiscal Years 1996 - 2015 by Facility (Pie Chart)

Exhibit 8 – IFR Expenditures for Fiscal Years 1996 - 2015 by Year (Bar Graph)

Summary of IFR Program Accomplishments FY 1996 - 2015

Providence Water supplies drinking water and fire protection to four (4) retail customer communities of Providence, Cranston, North Providence, and Johnston and to nine (9) wholesale customer water systems representing approximately 60 percent of the State's population. The source water comes from the Scituate Reservoir complex and is treated to meet and exceed current and projected drinking water regulations as administered by the Rhode Island Department of Health consistent with federal drinking water laws. The water supply is distributed through a complex system of transmission mains, distribution reservoirs, and pumping stations into the various communities. The utility and its workforce operate and maintain a vast system of mains, hydrants, service connections, and meters with a multitude of appurtenances.

In 1990, Providence Water initiated an Infrastructure Replacement Program with limited funds. In 1993, the State legislature, recognizing the need for establishing a funding mechanism with the intention of staving off deterioration and obsolescence of the State's water infrastructure systems, adopted the Comprehensive Clean Water Infrastructure Act in accordance with Chapter 46-15.6 of the General Laws of the State of Rhode Island. The law set aside portions of water revenues for long-term planned infrastructure replacement programs.

In accordance with the requirements of the legislation, a water supplier subject to Chapter 46-15.6 is required to develop and maintain an infrastructure replacement plan to be submitted to the Rhode Island Department of Health once every five years for review and approval. In accordance with the legislation, Providence Water prepared and submitted its first 20-year Infrastructure Replacement Plan in 1996. Subsequent 5-year plan updates were submitted thereafter in 2001, 2006, 2010, with this being our fifth plan submission on December 1, 2015.

Since adoption of the Act requiring submission of our first plan in 1996, we have made substantial improvements to our infrastructure, having reinvested approximately $305 million into system improvements, with $143.5 million in improvements in the distribution system,

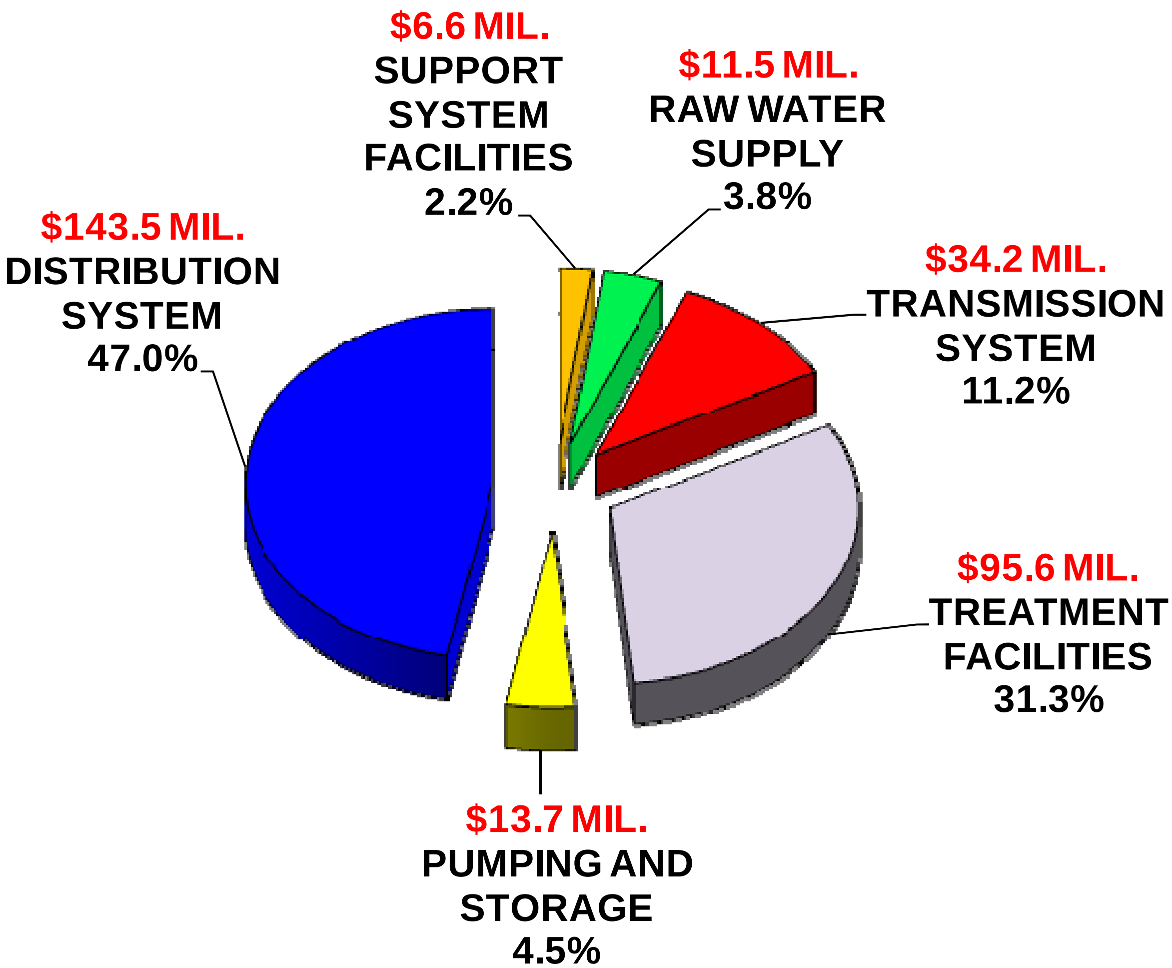
$95.6 million into our water treatment facilities, $34.2 million into the transmission system, $13.7 million into pumping and storage facilities, $11.5 million into raw water supply facility structures, and $6.6 million into support facilities.

Every six months, Providence Water submits a project status report of its ongoing IFR/CIP program to the Rhode Island Public Utilities Commission. The plan contains source of funds, expenditures, project narratives and schedules, for each of our IFR projects since the legislative induction of the IFR program in 1996. The latest project status report, submitted in September 2015, detailing our IFR and CIP accomplishments by specific projects from July 1, 1996 through the end of June 2015, is included for reference in the Appendix section of this report.

These improvements, along with the ongoing planned and future improvements outlined in this 2015 plan submission, address our needs for the integrity and reliability of our water supply for future generations of the State of Rhode Island.

IFR Expenditures from FY 1996 - 2015 by Facility - Exhibit 7

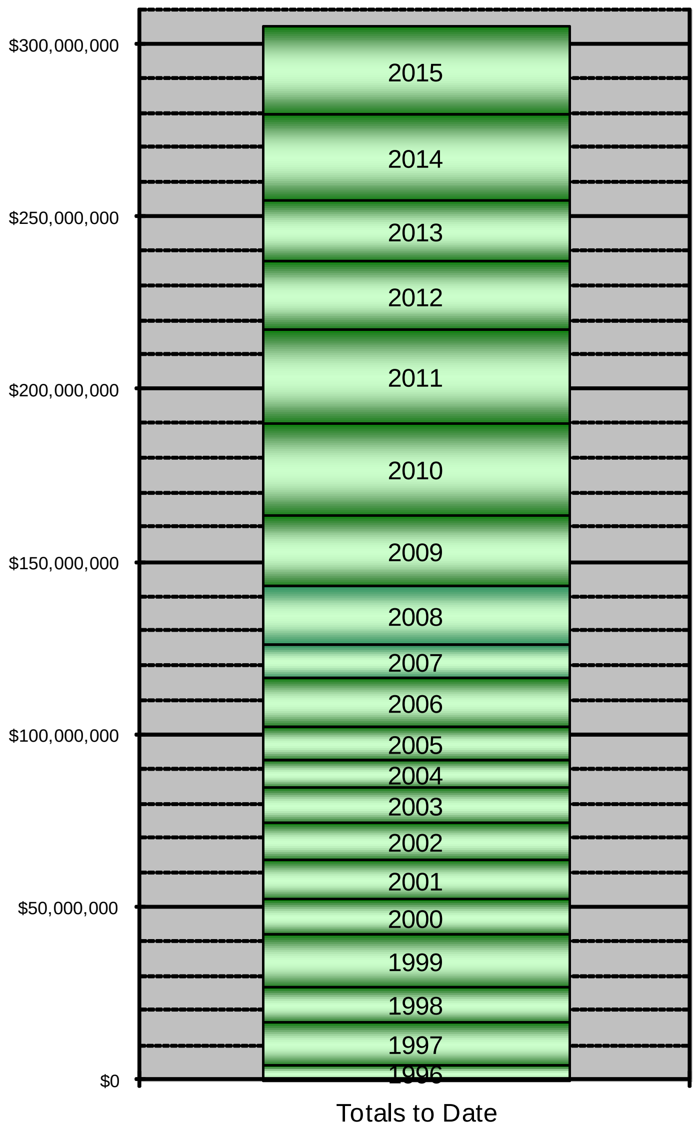
Providence Water



Total Investment Into System $305 MIL.

IFR Expenditures from FY 1996 - 2015 by Year Bar Graph - Exhibit 8

Providence Water



Fiscal Year	TOTAL
1996	$4,380,022
1997	$12,612,265
1998	$10,248,978
1999	$14,864,327
2000	$10,175,318
2001	$11,551,726
2002	$10,915,284
2003	$10,054,569
2004	$7,864,982
2005	$9,856,233
2006	$13,996,118
2007	$9,746,919
2008	$16,854,654
2009	$20,622,218
2010	$26,790,595
2011	$26,850,302
2012	$19,731,159
2013	$17,903,196
2014	$24,705,871
2015	$25,388,286
Totals to Date	**$305,113,024**

Section III

IFR Expenditure Plan

III. IFR EXPENDITURE PLAN

Background – IFR Expenditure Plan

Exhibit 9 – Water Main Rehabilitation Plan and Schedule

This exhibit describes Providence Water's main rehabilitation program and set of criteria to determine the areas for the replacement or rehabilitation of the unlined cast iron water pipe in the system. Included with the exhibit are two GIS maps. The first map is the 20-year plan showing the highest priority mains for rehabilitation over that period. The second map, also from the GIS database, shows the priority areas in the system for the next 5-year period. Also included is the list of proposed streets from 2016 through 2020 and the approximate length of mains targeted for rehabilitation.

Exhibit 10 – How the Project Expenditures Are Calculated

Design and construction management services are estimated as a percent of the construction cost for determining the project budget estimate. The exhibit displays the percent of design and construction management in two individual graphs. There are limitations when using graphs to estimate a project budget. The scope of work, the complexity of the project, the quantity of plan sheets and submittals, all contribute to the cost of the project. Despite their limitations, these graphs serve a useful purpose as a uniform standard for approximating costs.

Exhibit 1 – 20-Year IFR Expenditure Plan – FY's 2016 through 2035 – The twenty year infrastructure replacement expenditure plan is a summary of forecasted expenditure needs for the next twenty years, from fiscal year 2016 (commencing July 1, 2015) through FY 2035 (ending June 30, 2035) aggregated by major categories into four separate five year plan increments. Management staff at Providence Water assessed our facilities consistent with the definitions of the regulations and developed a twenty-year project plan. Project needs were determined based on factors such as age, condition, level of priority, and use of engineering and practical judgment by staff.

Project needs are based on the best available information and assessments at this time and will be adjusted and/or modified as changing needs, priorities, or regulatory requirements necessitate. We consider this plan to be a living document subject to amendments as may be required to match changing State and Federal regulations and changing field conditions. The system's needs have been and will continue to be reevaluated by Providence Water's staff on an ongoing basis. Our schedule of proposed facility replacements is consistent with deterioration or obsolescence, as we know conditions to be now. The plan's focus is on replacement of facilities necessary to continue to deliver a reliable and healthy water supply to all our customers consistent with drinking water standards and regulations as they presently exist.

Exhibit 2 – 20-Year IFR Expenditure Plan – FY's 2016 through 2035 – Pie chart for 20 Year IFR Expenditure Plan.

Exhibit 11 – 5-Year IFR Expenditure Plan for FY's 2016 through 2020 – Pie chart for 5 Year IFR Expenditure Plan

Exhibit 12 –5-Year IFR Expenditure Plan FY's 2016 through 2020 – The Five Year Expenditure Plan is a detail of the planned infrastructure replacement program over the five year period from FY 2016 through FY 2020. The plan is detailed by project within functional categories in the system. Project needs are based on the best available information and assessments available at this time. The plan will be adjusted and/or modified with changing needs and priorities.

Exhibit 13 – Source of Estimated Project Expenditures – FY's 2016 through 2020

The exhibit shows the source for the project expenditures. Some budget amounts are known values, some are budget allowances based on historical estimates, and some are derived using estimates for design and construction services as a percent of construction cost. A factor of 2.5% per year inflation is used when applicable.

Exhibit 14 – 5-Year IFR Project Overview FY's 2016 through 2020 – A brief narrative overview of the scope of each project for the 5 Year IFR Expenditure Plan.

Exhibit 15 – 15-Year IFR Expenditure Plan – FY's 2021 through 2035 – The Fifteen Year Expenditure Plan is a spreadsheet of the planned infrastructure replacement needs for each year of the plan from FY 2021 through FY 2035. Project expenditures over this time frame may be less precise than those of the first five years of the plan. Project needs are based on historical costs and anticipated needs over the last 15 years of the plan, and are based on the best information and assessments available this point in time. Projects will be reevaluated 5 years from now when the next formal plan is due, or at any time as needs and priorities change.

Exhibit 16 – Source of Estimated Project Expenditures – FY's 2021 through 2035

The exhibit shows the source for the project expenditures. Some budget amounts are known values, some are budget allowances based on historical data, and some are derived using estimates for design and construction services as a percent of construction cost. An inflation factor of 2.5% per year is used when applicable.

Exhibit 17 – 15-Year IFR Project Overview FY's 2021 through 2035 – A brief narrative explanation of the scope of anticipated replacement work for each project for the 15 Year IFR Expenditure Plan.

Background - IFR Expenditure Plan - FY 2016 - FY 2035

The Infrastructure Replacement Expenditure Plan consists of the five (5), fifteen (15), and twenty (20) year forecasts of project needs and expenditures. The 20 year plan is organized by individual projects for the 20 year period for each fiscal year from FY 2016 through FY 2035.

In January 1993 the Rhode Island State Legislature enacted the Comprehensive Clean Water Infrastructure Act. The intent of the legislation was for water suppliers to develop long-term infrastructure replacement programs which would ensure the continued integrity of their systems and provide for funding of this program from water rates.

Pursuant to the enactment of the legislation, the Rhode Island Department of Health, Division of Drinking Water Quality, promulgated Rules and Regulations governing infrastructure replacements for water suppliers. The Rules and Regulations for Clean Water Infrastructure Plans were enacted in January 1995.

Since our last plan in 2010, Providence Water's engineering staff has continued to assess the major components of our water system and provide recommendations for restoring their useful lives. Our new plan continues to address improvements to all areas of the system in accordance with the Regulations of the Act, intending to provide for a continued program of scheduled upgrades of system components as they reach the end of their useful lives to ensure the continued reliability of the water system into the future.

Our current plan addresses $779 million of needed improvements over the next twenty-year period, with $395 million or 50 percent of the expenditures concentrated in the distribution system. The oldest portion of the distribution system is 145 years old, with approximately 25 percent of the mains having been installed in the 1800's. To insure the integrity and reliability of the distribution system into the future, the upgrading and replacement of distribution mains and their appurtenances is one of the major concentrations of the Infrastructure Replacement Program.

This is our fifth IFR plan submission to the Rhode Island Department of Health. The four previous plans were submitted on, February 29, 1996, March 30, 2001, March 23, 2006, and December 1, 2010. On various occasions, the plans were amended to address changing needs and priorities. Since FY 1996 through June 30, 2015, $305.1 million has been reinvested back into the system; with $143.5 million of improvements in the distribution system, $95.6 million in water treatment facilities, $34.2 million in the transmission system, $13.7 million on pumping and storage facilities, $11.5 million on reservoirs and dams, and $6.6 million on support facilities.

Water Main Rehabilitation Plan and Schedule - Exhibit 9

Providence Water

The following is Providence Water's Water Main Rehabilitation Program for our 20-Year IFR plan for the period from fiscal years 2016 (beginning July 1, 2015) to fiscal year 2035 (ending June 30, 2035).

Included with this section is a more specific plan for the next 5-year period. The 5-year plan targets the highest priority areas taking into consideration such factors as road moratoriums, paving programs, and other factors described in the criteria for ranking the rehabilitation of water mains.

Our water system consists of approximately 1000 miles of transmission and distribution mains. Unlined cast iron main comprises about 550 miles of the system and was installed up until about 1950. Since we aggressively began rehabilitating water mains in 2013, we have cleaned/lined or replaced about 24.8 miles of water mains which is approximately 4.5 percent of the unlined cast iron water mains in the distribution system.

The 20-year main rehabilitation program was determined by defining an evaluation criteria and creating a ranking system for the criteria. The criteria are ranked from what we determine to be the most significant factors (5) to the least significant factors (1). The criteria and rankings were then combined with the GIS database as explained later. The criteria and rankings were created in-house by individuals with extensive experience and knowledge of the Providence Water distribution system. The criteria and rating system are listed as follows.

Criteria	Ranking	Criteria	Ranking
Water Quality	5	Special Considerations	3
Condition	5	Age	3
Flow	5	Dead End	2
Cast Iron	4	Bleeder	2
Model	4	Lead Services	1
UDF	4	Soil	1
		Leaks	1

An explanation of each of the criteria items are as follows.

Water Quality, are confirmed water quality problems mostly originating through customer complaints because of discolored water. The origin of the water quality complaints and all follow-up actions are tracked and maintained in a GIS database to include each action taken in the process to verify that the complaint is valid.

Condition, are mains where there are either, (1) known structural issues with the main caused by deterioration of the pipe's exterior or, (2) where the interior of the main is known to be encrusted with heavy tuberculation or corrosion. In March 2013, Providence Water began a program; that when every time a main is opened, for example, because of a water main break or a valve replacement, the interior and exterior of the main is photographed to document the pipe's condition. Also, if a condition assessment of the main is performed using nondestructive testing, such as, electromagnetic testing, ultrasonic testing, and/or acoustic soundings, etc., the results are thus noted in this category. The main is ranked as a high priority when it is in less than satisfactory condition and a candidate for replacement or rehabilitation.

Flow, is when a hydrant flow test is conducted on a main to determine the available flow on what a hydrant can provide. When the results do not meet acceptable industry standards as defined by the National Fire Protection Association the main is noted in the database.

Cast Iron, are distribution mains that are unlined cast iron pipe ranging in size from 6 to 12 inches in diameter installed between 1871 and 1950. Beginning around 1950, the interior of cast iron water mains began to be coated with a protective cement lining. Almost all of the water mains installed in the Providence Water System up until 1950 were of the unlined variety, and today approximately 55% or 550 miles of the water mains in the system are unlined cast iron. These mains have become problematic in terms of both water quality and delivery capacity.

Model, are mains identified by the hydraulic model, where computer model generated main pressures and flow data are compared to actual hydrant flow field test results. The mains are identified when hydraulic issues are identified.

UDF, are mains identified from the Unidirectional Flushing Program, where the main is run under stress conditions in the field and main pressures and flow data are acquired at the time. The field data is then compared against the hydraulic model simulation. Mains are identified when hydraulic issues are identified.

Special Consideration, are mains that supply special customers such as hospitals, dialysis centers, hotels, restaurants, laundry mats, etc. By definition alone, even though the main supplies these "special" customers, the main may be in very good condition and does not require replacement. However combined with other essential criteria, the main may become a candidate for replacement.

Age, is the age of the water main from when the main was first installed to the present year date (2015). Age is graduated on a linear scale from the oldest mains in the system to the most recently installed mains with the oldest mains receiving the highest ranking.

Dead Ends, are mains that are not looped that receive a supply of water from only one source. Dead end mains are not always located on dead end streets. Because these mains are not tied in, the flow velocities for these mains are sometimes low which leads to these mains having a higher degree of water quality complaints and flow issues than mains that are tied in.

Bleeders, are mains installed with a small diameter bleeder pipe at the end section of a dead end main, that continuously runs water-to-waste. A bleeder pipe can also exist on both sides of a divisional valve connecting the two segments of pipe. A divisional valve is an intentionally closed valve in the system that separates two distinct pressure zones which in effect causes two dead end mains. The general purpose of bleeders is to alleviate discolored water complaints resulting from dead-end conditions of unlined cast iron pipes.

Lead Services, are main segments containing active lead service connections.

Soil, are soil corrosivity ratings for areas in the Providence Water system. The soil ratings are based on soil corrosivity for two common structural materials, uncoated steel and concrete, as determined by the US Department of Agriculture, National Resource Conservation Service (Soil Properties and Qualities).

Leaks, are mains where a high rate of leaks have occurred in the system. Generally leaks are not currently problematic in the Providence Water system. There are no areas in the system with a high frequency of leaks.

Planned construction and planned paving projects are considered part of the criteria for main replacements and when relevant we will address these mains separately and evaluate these mains on a case by case basis taking into consideration all of the other criteria for the replacement / relining of water mains. Related to this, we also take into consideration streets that have recently been repaved within our service area to address the respective moratoriums by the Cities and Towns on street openings.

Providence Water took the criteria from the table and created a field for each piece of criteria in the GIS database water main layer. The water main layer is one part of a dataset that contains all of the information for Providence Water's GIS water assets. The layers inside the dataset are linked together as part of a spatial mapping network. The network defines the relationship between the layers and allows Providence Water to use GIS's spatial and database tools to determine and assign values for each piece of criteria to each GIS main segment. The data is then exported from GIS to Microsoft Access where a rating for each main segment is calculated. The calculated rating is then linked back into the GIS water main layer to create a map of each main segment where a color is applied based on its calculated rating.

At some point, and addressed in our overall IFR plan, Providence Water plans on performing a condition assessment using available technologies and applications accepted by the water industry for small and large diameter pipe. This condition assessment ranking will be rated in the "**Condition"** criteria database field, as described above in the definitions. During the present time, mains are assessed during construction by direct observation of the exterior of the pipe when the main is excavated, and / or inspection of the interior of the main when the main is exposed. In addition, hydraulic modeling and the results from the unidirectional flushing program are used to assess the condition of the main, and locations where water quality complaints and flow issues are documented.

Overall, Providence Water uses this tool and utilizes engineering judgment and institutional knowledge for assessing and analyzing the mains for replacement / cleaning and lining for its infrastructure replacement program.

Two GIS maps are included in this exhibit. The first GIS map shows the overall conceptual priority of our water main rehabilitation program over the next 20-year period. It shows approximately 250 miles of 550 unlined cast iron mains. The second GIS map is our 5-year plan which shows approximately 70 miles of mains. Realistically over that period, we will rehabilitate approximately 50 to 60 miles of mains. However, the intent of the GIS map for the 5-year plan is to globally identify areas having the highest priority and probability for replacement. In all likelihood, most of these mains will be replaced, however factors and conditions routinely change, and for that reason we identify 70 miles. Included with the map is the projected list of streets targeted for rehabilitation. The GIS maps and the plan are conceptual and subject to changing criteria and conditions in the system as they occur.

The GIS color maps are not the sole tools and guidelines for determining our water main replacement schedule. For example, a cast iron main may qualify as a candidate for replacement because it may be unlined cast iron, and located within an area, or in close proximity to an area, of other water mains scheduled for replacement. Furthermore, to minimize costs, we may choose mains to take advantage of the logistics of where a contractor is mobilized. We may also choose lower priority areas to replace cast iron mains on primary and secondary roads scheduled for resurfacing, or in areas where other utility contractors are performing their rehabilitation work. The color maps are one factor in prioritizing main replacements in collaboration with human assessment, institutional knowledge, and engineering judgment.

The infrastructure replacement plan is a living document, and as specific planning, design, and implementation are in process, we intend to modify the plan to adjust to changing field conditions. Our main replacement plan is based on the best available information we have at this current time.

Water Main Rehabilitation
Projected 20 Year Plan (2016 - 2035)

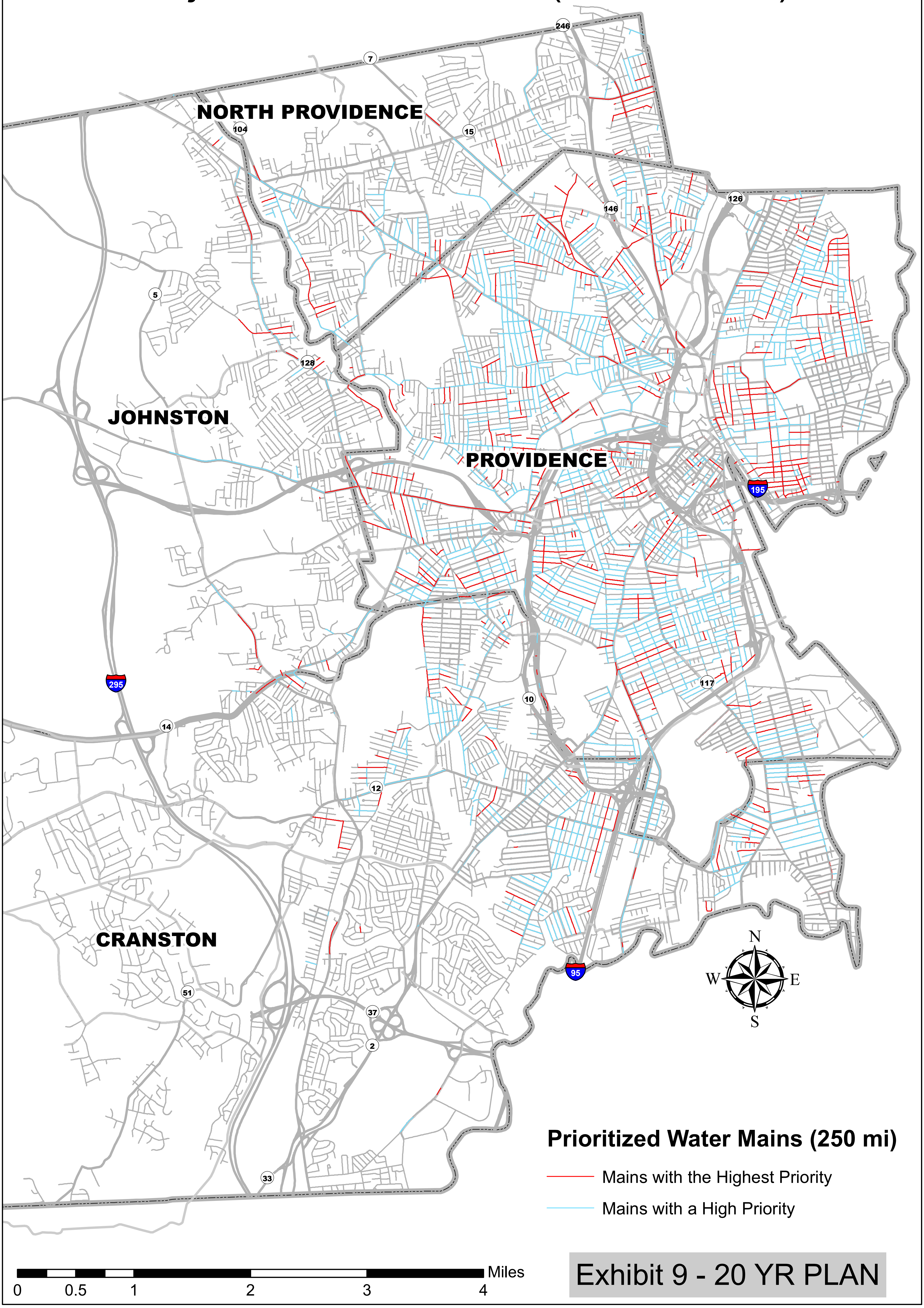


Exhibit 9 - 20 YR PLAN

Water Main Rehabilitation
Projected 5 Year Plan (2016-2020)

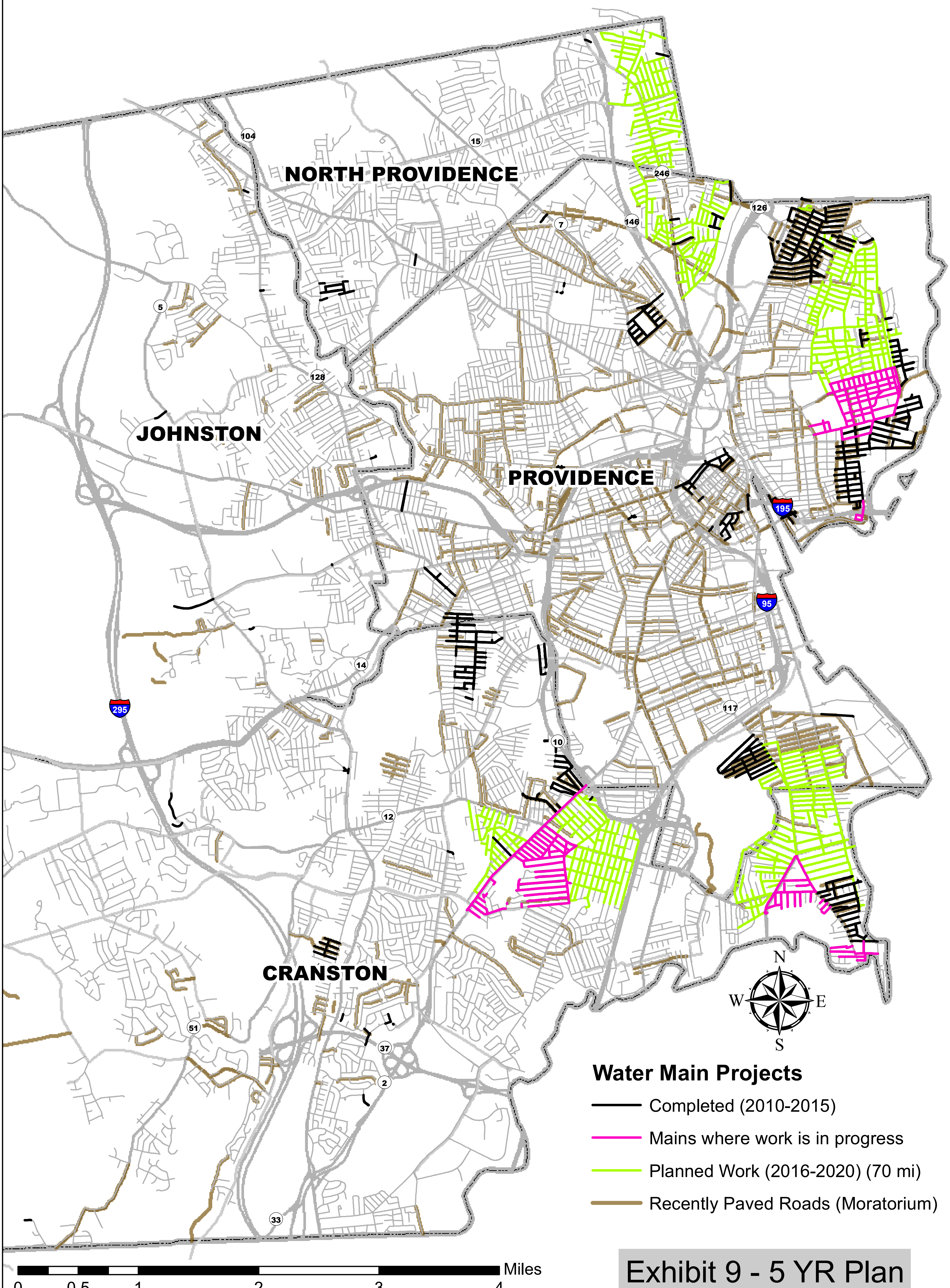


Exhibit 9 - 5 YR Plan

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
AAA WY, CR	213
ABBOTSFORD CT, PR	341
ADA ST, NP	232
ADAMS ST, NP	1,513
ALABAMA AV, PR	2,369
ALASKA ST, PR	257
ALBERT AV, CR	1,005
ALBERT AV, NP	1,002
ALDRICH TE, PR	199
ALUMNI AV, PR	366
AMBROSE ST, NP	1,152
AMORY ST, PR	619
ANDERTON AV, NP	710
ANGELO AV, NP	606
ANN ST, NP	167
ANN ST, PR	374
ARGOL ST, PR	1,152
ARLINGTON AV, PR	1,086
ARMINGTON AV, PR	1,240
ARMINGTON ST, CR	700
ARNOLD AV, CR	2,506
ASCHAM ST, PR	666
ASHTON ST, PR	988
ASTRAL AV, PR	377
ATWOOD AV, NP	703
AUBURN ST, CR	2,182
AUSDALE RD, CR	2,070
AVENTINE AV, PR	671
BAIRD AV, NP	1,573
BALTON RD, PR	594
BARBERRY HL, PR	521
BARTLETT AV, CR	1,817
BASSETT ST, NP	159
BAYARD ST, PR	349
BAYVIEW AV, CR	1,870
BEACHMONT AV, CR	386
BEACON CI, CR	1,248
BECKWITH ST, CR	3,098
BENEDICT ST, PR	675

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
BETSY WILLIAMS DR, CR	1,690
BETSY WILLIAMS DR, PR	865
BISMARK ST, PR	627
BLACKSTONE BV, PR	7,351
BLAINE ST, PR	660
BORAH ST, NP	1,068
BRAMAN ST, PR	365
BRANCH AV, PR	302
BREWSTER ST, PR	244
BRIAR HILL RD, NP	572
BRIGHTSIDE AV, CR	198
BROAD ST, CR	3,259
BROAD ST, PR	2,566
BROOKWOOD RD, CR	1,032
BROWN AV, NP	386
BROWN ST, NP	11
BURLINGTON ST, PR	666
BURNSIDE ST, CR	1,109
CALAMAN RD, CR	2,717
CALIFORNIA AV, PR	2,665
CAMPBELL AV, NP	1,121
CAROVILLI ST, NP	1,060
CENTRAL ST, CR	459
CHACE AV, PR	591
CHARLES ST, NP	4,494
CHARLES ST, PR	214
CHARLOTTE ST, NP	1,171
CHATHAM ST, PR	1,602
CHESTNUT AV, CR	35
CLARENCE ST, CR	2,258
CLARENCE ST, NP	145
CLARENDON AV, PR	948
CLEVELAND ST, NP	1,542
CLIFDEN AV, CR	221
CLIFFDALE AV, CR	1,323
COLE AV, PR	6,968
COLUMBIA AV, CR	1,913
COLUMBUS BV, CR	1,498
COMMODORE ST, PR	1,361

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
COMO ST, PR	135
CONCA ST, NP	253
COOPER ST, NP	1,106
CROTHERS AV, CR	1,638
CYR ST, PR	227
DENISON ST, PR	346
DENNIS AV, CR	799
DENVER AV, CR	790
DEPINEDO ST, PR	1,072
DICKINSON AV, NP	1,566
DIXON ST, NP	376
DOANE AV, PR	407
DODGE ST, NP	286
DORA ST, NP	252
DORIC AV, CR	3,174
DOYLE AV, PR	1,458
DUNHAM AV, CR	209
EAMES ST, PR	594
EDDY ST, PR	1,616
EDGE ST, CR	377
EDGEWOOD AV, CR	1,657
EDGEWOOD BV, PR	2,034
EDGEWORTH AV, PR	645
EDWARDS ST, PR	312
ELDRIDGE ST, CR	2,103
ELGIN ST, PR	293
ELMGROVE AV, PR	6,341
ELMWAY ST, PR	545
ELSIE ST, CR	1,176
EMELINE ST, PR	1,858
ERNEST ST, PR	248
EVERETT AV, PR	1,380
FARRAGUT AV, PR	976
FC GREENE MEMORIAL BV, PR	930
FERNCREST AV, CR	842
FIFTH ST, PR	705
FISHER ST, PR	351
FLORA ST, PR	1,197
FLORENCE ST, PR	902

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
FOREST ST, PR	383
FOSDYKE ST, PR	1,538
FOURTH ST, PR	1,321
FRANCIS AV, NP	725
FRANKLIN ST, NP	441
FRANKLIN ST, PR	255
FRED GREEN MEMORIAL BV, CR	386
FREEMAN PW, PR	3,046
GAIL AV, CR	199
GANGWAY A ST, NP	194
GARDEN ST, CR	4,098
GARFIELD ST, NP	1,869
GARLAND AV, CR	797
GILLEN AV, NP	1,514
GOLDSMITH ST, PR	686
GORTON ST, PR	587
GRACE ST, CR	2,591
GRAFTON ST, PR	633
GRAND AV, CR	2,123
GREATON DR, PR	322
GREELEY ST, PR	1,432
GREENWOOD ST, CR	3,102
GREYLOCK AV, CR	720
GRISWOLD AV, CR	400
GROSVENOR AV, NP	908
GROTTO AV, PR	212
HADDON HILL RD, CR	446
HAGAN ST, PR	384
HALL ST, PR	1,055
HAMPTON ST, PR	579
HART ST, PR	309
HARWICH RD, PR	872
HAZARD AV, PR	1,473
HEMALIN RD, CR	430
HENRY ST, CR	428
HIGH ST, NP	106
HODSELL ST, CR	422
HOLLY ST, PR	959
HOPE ST, PR	1,875

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
HORTON ST, PR	479
HUMBERT AV, CR	872
HURDIS ST, NP	862
IANTHE ST, PR	283
INDIAN RD, CR	229
INDIANA AV, PR	2,552
INGLESIDE AV, CR	1,042
INTERVALE RD, PR	1,193
IVY AV, CR	1,277
JANE ST, NP	1,903
JILLSON ST, PR	667
JOB ST, PR	1,361
JOSEPHINE ST, NP	14
JULIA ST, CR	881
JUNE ST, NP	541
KNOLLWOOD AV, CR	3,307
LAMBERT ST, CR	576
LANGDON ST, NP	405
LANGDON ST, PR	3,271
LANGHAM RD, PR	382
LARCH ST, PR	432
LAUREL AV, PR	2,777
LAUREL CT, PR	347
LAURENS ST, CR	1,493
LAURISTON ST, PR	700
LEDGE ST, PR	1,753
LEGION WY, CR	1,649
LENA ST, NP	630
LEWIS ST, PR	351
LILLIAN ST, NP	864
LINCOLN AV, NP	566
LINCOLN AV, PR	899
LINDEN DR, PR	330
LOCKMERE RD, CR	605
LOJAI BV, NP	974
LOMBARDI ST, PR	240
LONG MEADOW DR, NP	424
LOOKOFF RD, CR	530
LORETO ST, PR	431

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
LORIMER AV, PR	1,697
LORRAINE AV, PR	678
LUNA ST, PR	780
LUZON AV, PR	490
LYNDON RD, CR	885
MAC GREGOR ST, PR	633
MACLAINE DR, NP	281
MAGNOLIA ST, CR	995
MAGNOLIA ST, PR	1,575
MALVERN ST, PR	490
MANHATTAN ST, PR	482
MARCY ST, CR	660
MARIETTA ST, PR	951
MARION AV, CR	504
MARION AV, PR	458
MARK DR, NP	451
MASSACHUSETTS AV, PR	2,538
MAURAN ST, CR	1,328
MAY ST, NP	969
MAYFLOWER ST, PR	370
MC MILLEN ST, PR	693
MEADOW AV, NP	2,091
METCALF ST, PR	1,052
MINERAL SPRING AV, NP	3,439
MONITOR ST, NP	105
MONTGOMERY AV, CR	350
MONTGOMERY AV, PR	2,193
MONTICELLO ST, PR	798
MORRIS AV, PR	3,658
MORRISON ST, PR	334
MOUNT AV, PR	731
MUTUAL ST, PR	278
NAHANT ST, PR	537
NARRAGANSETT BV, CR	6,451
NARRAGANSETT BV, PR	909
NARRAGANSETT ST, CR	2,643
NELLIE ST, PR	197
NEW YORK AV, PR	1,055
NEWBERRY ST, PR	434

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
NORMAN DR, NP	190
NORTH CLARENDON ST, CR	888
NORTHUP AV, PR	1,059
NORTHUP ST, CR	1,846
NORWOOD AV, CR	6,140
NOWELL RD, CR	88
OBED AV, NP	2,058
OCEAN AV, CR	877
OCHIL PL, CR	18
OHIO AV, PR	2,565
OLIVER ST, NP	448
OPPER ST, PR	1,251
ORCHARD DR, CR	427
ORCHARD ST, CR	1,608
ORCHARD ST, NP	534
ORLANDO AV, CR	437
ORLANDO DR, NP	1,979
PARK AV, CR	3,762
PAUL ST, PR	200
PAWTUXET AV, CR	2,258
PIAVE ST, NP	64
POND ST, CR	685
PONTIAC AV, CR	1,764
POPLAR ST, PR	406
POTTER ST, CR	2,332
PRESTON DR, CR	1,728
PROSPER ST, PR	665
RANDALL RD, NP	751
RAPHAEL AV, PR	498
RAY ST, PR	315
REMINGTON ST, NP	196
RESERVOIR AV, CR	33
RHODES AV, CR	648
RICHARD ST, CR	2,687
RICHLAND RD, CR	1,328
ROCHAMBEAU AV, PR	1,352
ROGER WILLIAMS PW, PR	183
ROLFE SQ, CR	1,647
ROOSEVELT ST, PR	421

Water Main Rehabilitation

Projected 5-Year Plan Streets (2016-2020)

Street	FT
ROSE CT, PR	382
ROSE ST, NP	910
ROSELAND AV, CR	320
ROSLYN AV, CR	585
ROSLYN AV, PR	689
ROYAL LITTLE DR, PR	202
RUSSO ST, PR	1,144
RUTHVEN ST, PR	248
SARAH ST, PR	293
SARGENT AV, PR	963
SAVOY ST, PR	1,335
SEFTON DR, CR	191
SESSIONS ST, PR	2,149
SHAW AV, CR	1,791
SILVER SPRING ST, PR	4,738
SIXTH ST, PR	1,340
SLATER AV, PR	3,233
SMITH ST, CR	1,853
SMITHFIELD AV, PR	95
SOCIAL ST, PR	622
SOUTH CLARENDON ST, CR	1,491
SPENSTONE RD, CR	416
SPRING ST, NP	391
STADIUM RD, PR	551
STANHOPE ST, PR	766
STEVENS RD, CR	932
STONE ST, PR	574
SULLIVAN ST, NP	77
SWIFT ST, PR	809
TABER AV, PR	3,833
TAFT AV, PR	625
TAFT ST, CR	513
TALBOT MN, CR	758
TOP HILL RD, NP	1,206
TOURO ST, PR	1,271
UPTON AV, PR	1,304
URBAN AV, NP	1,862
VALE AV, CR	327
VASSAR AV, PR	936

Water Main Rehabilitation

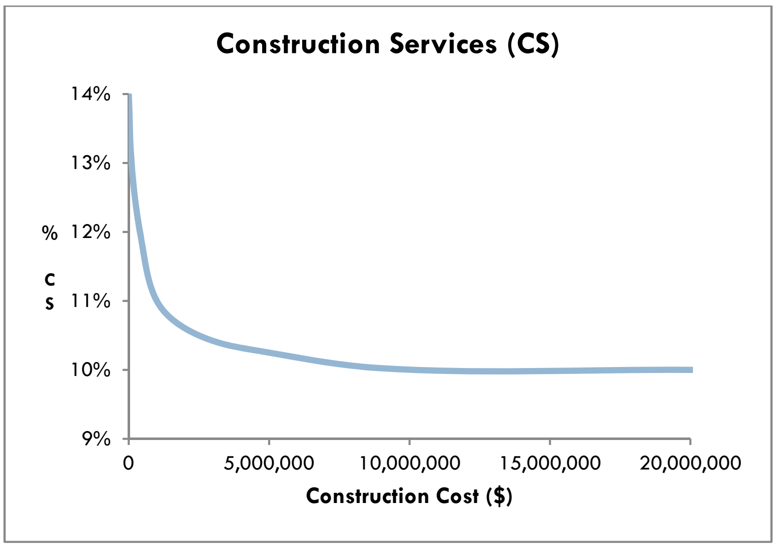
Projected 5-Year Plan Streets (2016-2020)

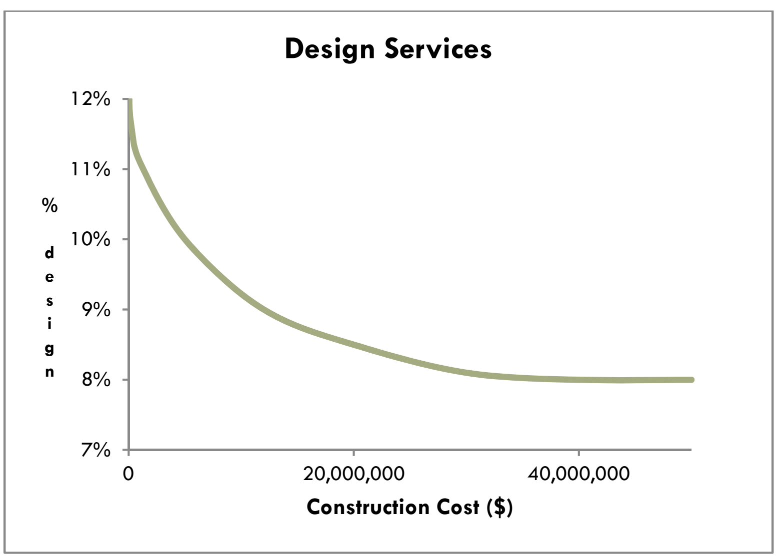
Street	FT
VAUGHN ST, PR	201
VERMONT AV, PR	1,813
VILLA AV, CR	798
VINCENT AV, NP	1,919
VIVIAN AV, NP	614
VOLTURNO ST, NP	1,769
WAITE AV, CR	1,268
WANDA CT, NP	225
WARD AV, NP	1,344
WARWICK AV, CR	488
WASHINGTON AV, PR	1,918
WESTERN PROMENADE ST, CR	1,136
WESTFORD RD, PR	852
WESTWOOD AV, CR	1,041
WEYMOUTH ST, PR	1,033
WHEELER AV, CR	2,337
WHITING ST, PR	345
WINDMILL ST, PR	184
WINGATE RD, PR	926
WOODBINE ST, CR	3,610
WOODBURY ST, PR	1,840
TOTAL	**372,999 ft**
	(70.64 mi)

How the Project Expenditures Are Calculated - Exhibit 10

Providence Water

The project amounts in the IFR plan include estimated costs for design services and construction services to capture the total estimated project expenditures. The source of the estimates for design and construction services is based on PW historical cost data, general industry standards, and engineering reference source data. The tables below illustrate the percent of construction and design services to construction cost.





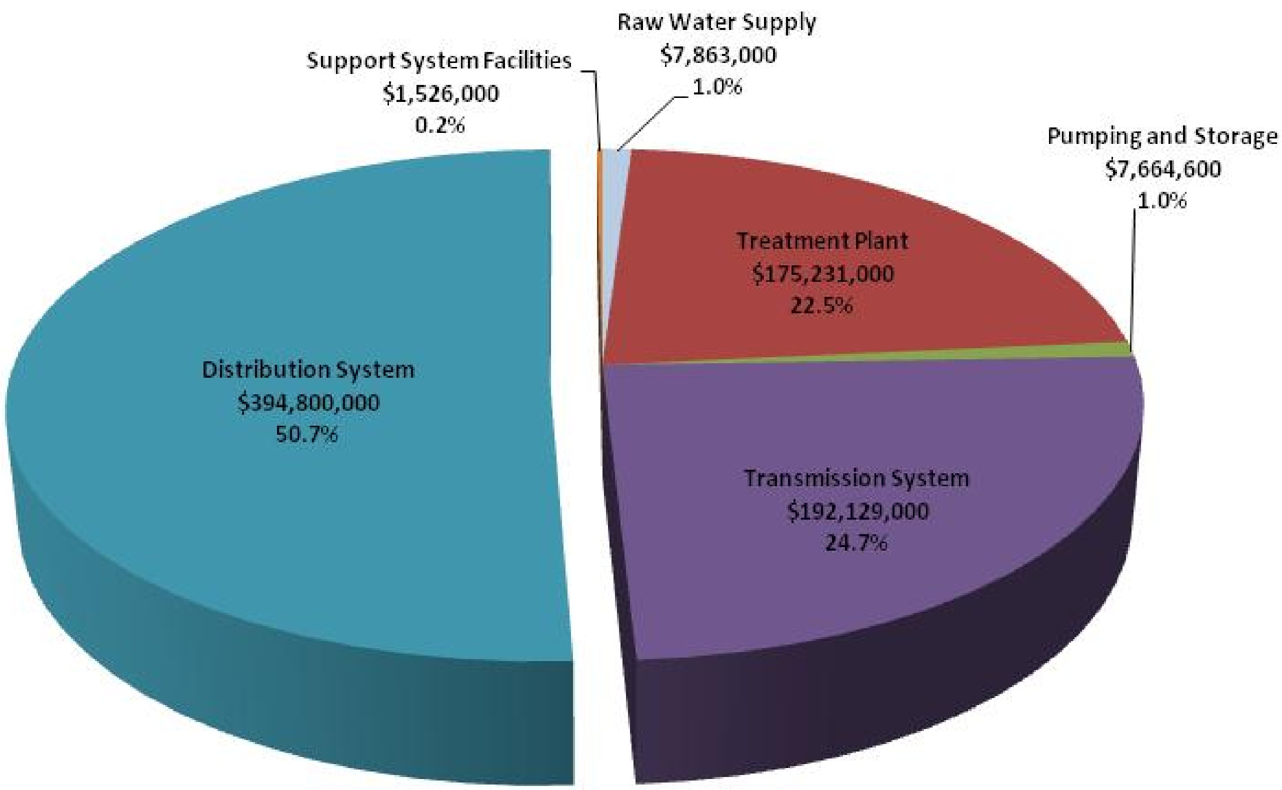
20-Year IFR Expenditure Plan - FY 2016 - 2035 - Exhibit 1

Providence Water

	Total Amount	Budget 2016-2020	Budget 2021-2025	Budget 2026-2030	Budget 2031-2035
Raw Water Supply	7,863,000	1,105,000	4,351,000	2,040,000	367,000
Treatment Plant	175,231,000	66,745,300	103,693,152	724,545	4,068,003
Pumping and Storage	7,664,600	4,334,000	320,600	300,000	2,710,000
Transmission System	192,129,000	7,454,000	12,925,000	17,225,000	154,525,000
Distribution System	394,800,000	88,100,000	97,500,000	103,700,000	105,500,000
Support Systems Facilities	1,526,000	551,000	325,000	325,000	325,000
Total	**779,213,600**	**168,289,300**	**219,114,752**	**124,314,545**	**267,495,003**

20-Year IFR Expenditure Plan - FY 2016 - 2035 Pie Chart - Exhibit 2

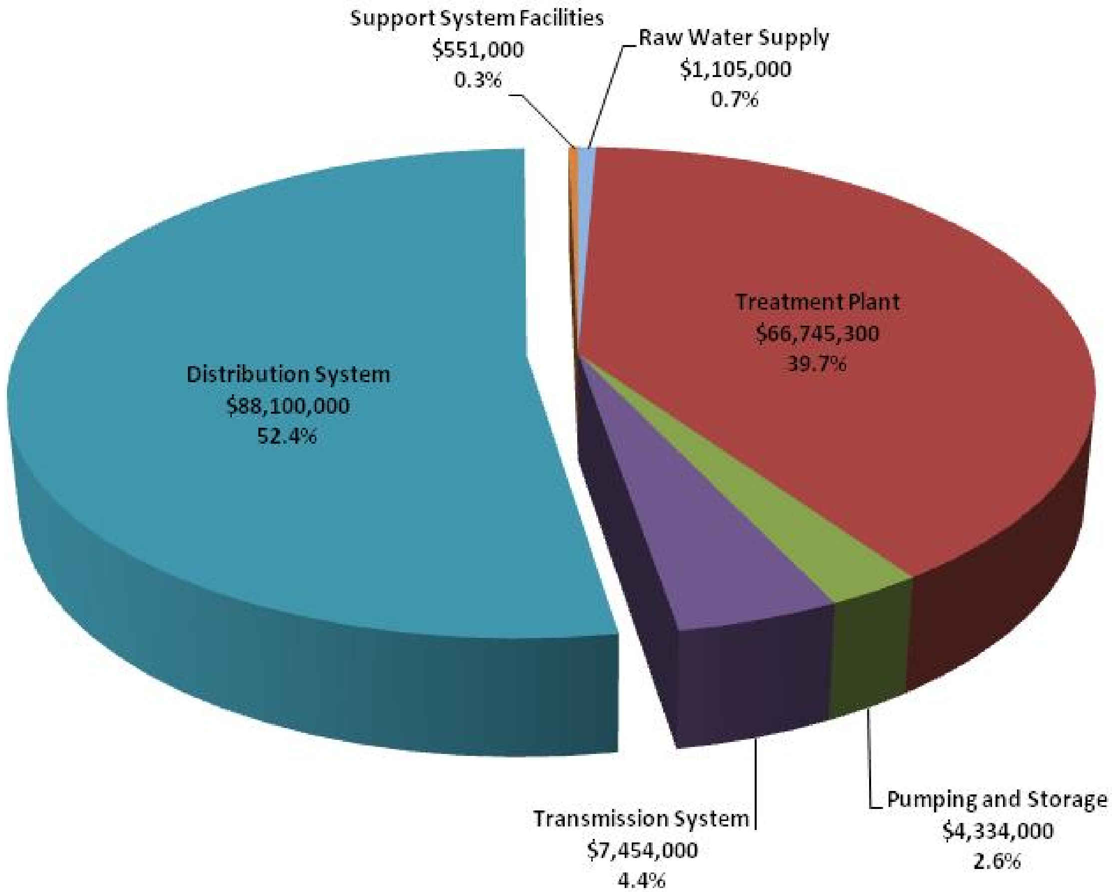
Providence Water



20-Year Investment - $779 Million

5-Year IFR Expenditure Plan - FY 2016 - 2020 Pie Chart - Exhibit 11

Providence Water



5-Year Investment - $168 Million

5-Year IFR Expenditure Plan - FY 2016 - 2020 - Exhibit 12

Providence Water

		Total Amount	Budget 2016	Budget 2017	Budget 2018	Budget 2019	Budget 2020
	RAW WATER SUPPLY						
1	Various Large dam improvements	**80,000**		20,000	20,000	20,000	20,000
2	Watershed fencing, fire lanes, property rehabilitation	**50,000**	10,000	10,000	10,000	10,000	10,000
3	Raw Water B. P. S. - generator upgrades	**310,000**			310,000		
4	Coomer dam rehabilitation	**550,000**				550,000	
5	60" influent conduits - inspection	**15,000**		15,000			
6	90" influent conduit inspection / rehabilitation	**100,000**	100,000				
	Raw Water Supply Total	**$1,105,000**	**$110,000**	**$45,000**	**$340,000**	**$580,000**	**$30,000**
	TREATMENT PLANT						
7	Plant Influent and Aerator, and Conduits	**2,400,000**	2,000,000	400,000			
8	Ferric system upgrades	**65,000**	65,000				
9	Lime feed system upgrades	**650,000**	250,000	400,000			
10	Lime transfer system upgrades	**25,500**	11,200				14,300
11	Chlorine loading dock rehabilitation	**10,000**	10,000				
12	Chlorine room monorail and scales replacement	**171,000**		171,000			
13	Fluoride feed system improvements	**8,800**					8,800
14	Filtration system improvements	**8,700,000**	8,700,000				
15	Pilot of sedimentation / clarification processes	**1,700,000**	1,000,000	700,000			
16	Sedimentation / Clarification system improvements	**50,200,000**			5,000,000	5,200,000	40,000,000
17	Washwater tank inspection	**10,000**					10,000

		Total Amount	Budget 2016	Budget 2017	Budget 2018	Budget 2019	Budget 2020
18	Service Water tank inspection	**10,000**					10,000
19	Clearwell tank inspection	**10,000**					10,000
20	Treatment process and water quality studies	**1,495,000**	520,000	375,000	600,000		
21	Treatment plant building rehabilitation	**100,000**	20,000	20,000	20,000	20,000	20,000
22	PW lab / equipment Improvements	**90,000**	50,000	10,000	10,000	10,000	10,000
23	SCADA / Control system upgrades	**100,000**	20,000	20,000	20,000	20,000	20,000
24	Sludge removal and disposal	**1,000,000**	1,000,000				
	Treatment Plant Total	**$66,745,300**	**$13,646,200**	**$2,096,000**	**$5,650,000**	**$5,250,000**	**$40,103,100**

PUMPING AND STORAGE

		Total Amount	Budget 2016	Budget 2017	Budget 2018	Budget 2019	Budget 2020
25	Neutaconkanut reservoir inspection	**50,000**		50,000			
26	Longview reservoir inspection	**50,000**		50,000			
27	Lawton Hill reservoir inspection	**25,000**			25,000		
28	Ridge road tank reservoir inspection and rehabilitation	**278,000**			278,000		
29	Neutaconkanut reservoir WQ modifications	**795,000**			795,000		
30	Aqueduct reservoir WQ modifications	**2,098,000**					2,098,000
31	Neutaconkanut P.S. - VFD drives	**115,000**				115,000	
32	Bath St. P.S. - VFD drives	**101,000**				101,000	
33	Aqueduct P.S. - VFD drives	**65,000**		65,000			
34	Cranston Commons - VFD drive pumps	**26,000**		26,000			
35	Fruit Hill pump station - VFD drives, replace motors and generator	**311,000**		92,000			219,000
36	Atwood Ave pump station upgrades	**263,000**		263,000			

		Total Amount	Budget 2016	Budget 2017	Budget 2018	Budget 2019	Budget 2020
37	Neutaconkanut PS, Aqueduct GH - rehabilitate roofs	**67,000**		67,000			
38	Various pump station improvements	**90,000**	10,000	20,000	20,000	20,000	20,000
	Pumping and Storage Total	**$4,334,000**	**$10,000**	**$633,000**	**$1,118,000**	**$236,000**	**$2,337,000**

TRANSMISSION SYSTEM

		Total Amount	Budget 2016	Budget 2017	Budget 2018	Budget 2019	Budget 2020
39	102" aqueduct inspection / rehabilitation	**1,970,000**	1,970,000				
40	102" aqueduct fiber optic monitoring	**550,000**	110,000	110,000	110,000	110,000	110,000
41	78" aqueduct inspection / rehabilitation	**1,784,000**		1,784,000			
42	Feasibility assessment of 102" / 78" aqueducts	**750,000**			750,000		
43	90" aqueduct inspection / rehabilitation	**900,000**				900,000	
44	Condition assessment transmission mains	**500,000**		125,000	125,000	125,000	125,000
45	16" and larger valves replacements	**1,000,000**	200,000	200,000	200,000	200,000	200,000
	Transmission System Total	**$7,454,000**	**$2,280,000**	**$2,219,000**	**$1,185,000**	**$1,335,000**	**$435,000**

DISTRIBUTION SYSTEM

		Total Amount	Budget 2016	Budget 2017	Budget 2018	Budget 2019	Budget 2020
46	Replace / Upgrade water mains	**82,600,000**	14,800,000	15,800,000	17,000,000	17,000,000	18,000,000
47	Replace Distribution Valves	**1,000,000**	200,000	200,000	200,000	200,000	200,000
48	Replace lead services	**2,500,000**	500,000	500,000	500,000	500,000	500,000
49	Replace fire hydrants	**1,500,000**	300,000	300,000	300,000	300,000	300,000
50	Replace blowoffs	**500,000**	100,000	100,000	100,000	100,000	100,000
	Distribution System Total	**$88,100,000**	**$15,900,000**	**$16,900,000**	**$18,100,000**	**$18,100,000**	**$19,100,000**

	SUPPORT SYSTEM FACILITIES	Total Amount	Budget 2016	Budget 2017	Budget 2018	Budget 2019	Budget 2020
51	Building and facilities rehabilitation	**200,000**	75,000	50,000	25,000	25,000	25,000
52	Forestry garage, Old transformer building - Rehabilitate roofs	**211,000**		211,000			
53	Records Management (GIS) upgrades	**60,000**			20,000	20,000	20,000
54	Facilities fencing and roads rehabilitation	**80,000**		20,000	20,000	20,000	20,000
	Support System Facilities Total	**$551,000**	**$75,000**	**$281,000**	**$65,000**	**$65,000**	**$65,000**
	TOTAL	**$168,289,300**	**$32,021,200**	**$22,174,000**	**$26,458,000**	**$25,566,000**	**$62,070,100**

Source of Estimated Project Expenditures - FY 2016 - 2020 - Exhibit 13
Providence Water
(5 Year Plan)

54 records

		Construction Estimate	Year of estimate	Year scheduled	Construction Cost Adjusted for Inflation	Design (%)	PM / CM (%)	Design Cost ($)	PM / CM Cost ($)	Total Cost
1	Various large dam improvements				*Budget Estimate*					**$80,000**
2	Watershed fencing, fire lanes, property rehabilitation				*Budget Estimate*					**$50,000**
3	Raw Water B.P.S. - generator upgrades	240,000	2015	2017	252,150	11%	12%	27,737	30,258	**$310,145**
4	Coomer reservoir dam rehabilitation	405,000	2015	2019	447,044	11%	12%	49,175	53,645	**$549,864**
5	60" influent conduits - inspection				*Budget Estimate*					**$15,000**
6	90" influent conduits inspection / rehabilitation				*Cost is a known value*					**$100,000**
7	Plant Influent and Aerator, and Conduits				*Cost is a known value*					**$2,400,000**
8	Ferric system upgrades	50,374	2015	2016	51,633	12%	13%	6,196	6,712	**$64,542**
9	Lime feed system upgrades				*Cost is a known value*					**$650,000**
10a	Lime transfer system upgrades (pipe bends)	8,645	2015	2016	8,861	12%	14%	1,063	1,241	**$11,165**
10b	Lime transfer system upgrades (rotary valve)	10,055	2015	2020	11,376	12%	14%	1,365	1,593	**$14,334**
11	Chlorine loading dock rehabilitation				*Cost is a known value*					**$10,000**
12	Chlorine room monorail and scales replacement	130,000	2015	2017	136,581	12%	13%	16,390	17,756	**$170,727**
13	Fluoride feed system improvements	6,162	2015	2020	6,972	12%	14%	837	976	**$8,784**
14	Filtration system improvements				*Cost is a known value*					**$8,700,000**
15	Pilot of sedimentation / clarification processes				*Cost is a known value*					**$1,700,000**
16	Sedimentation / Clarification system improvements	104,212,242	2015	2022	123,875,607	8%	10%	9,910,049	12,387,561	**$146,173,217**
17	Washwater tank inspection				*Budget Estimate*					**$10,000**
18	Service water tank inspection				*Budget Estimate*					**$10,000**
19	Clearwell tank inspection				*Budget Estimate*					**$10,000**
20	Treatment process and water quality studies				*Budget Estimate*					**$1,495,000**
21	Treatment plant building rehabilitation				*Budget Estimate*					**$100,000**
22	PW lab / equipment Improvements				*Budget Estimate*					**$90,000**
23	SCADA / Control system upgrades				*Budget Estimate*					**$100,000**
24	Sludge removal and disposal				*Cost is a known value*					**$1,000,000**
25	Neutaconkanut reservoir inspection				*Budget Estimate*					**$50,000**
26	Longview reservoir inspection				*Budget Estimate*					**$50,000**
27	Lawton Hill reservoir inspection				*Budget Estimate*					**$25,000**
28	Ridge road tank reservoir inspection and rehabilitation	201,250	2015	2019	222,142	12%	13%	26,657	28,879	**$277,678**
29	Neutaconkanut reservoir WQ modifications	600,000	2015	2018	646,134	11%	12%	71,075	77,536	**$794,745**
30	Aqueduct reservoir WQ modifications	1,557,675	2015	2019	1,719,382	11%	11%	189,132	189,132	**$2,097,646**
31	Neutaconkanut P.S. - VFD drives	83,299	2015	2019	91,947	12%	13%	11,034	11,953	**$114,933**
32	Bath St. P.S. - VFD drives	73,034	2015	2019	80,616	12%	13%	9,674	10,480	**$100,770**

		Construction Estimate	Year of estimate	Year scheduled	Construction Cost Adjusted for Inflation	Design (%)	PM / CM (%)	Design Cost ($)	PM / CM Cost ($)	Total Cost
33	Aqueduct P.S. - VFD drives	49,516	2015	2017	52,023	12%	13%	6,243	6,763	**$65,029**
34	Cranston Commons - VFD drives	20,000	2015	2017	21,013	12%	14%	2,522	2,942	**$26,476**
35a	Fruit Hill P.S. - VFD drives, replace motors	70,000	2015	2017	73,544	12%	13%	8,825	9,561	**$91,930**
35b	Fruit Hill P.S. - Rebuild pumps, replace generator	155,000	2015	2020	175,368	12%	13%	21,044	22,798	**$219,210**
36	Atwood Ave pump station upgrades	200,000	2015	2017	210,125	12%	13%	25,215	27,316	**$262,656**
37	Neutaconkanut PS, Aqueduct GH - rehabilitate roofs	51,300	2015	2017	53,897	12%	13%	6,468	7,007	**$67,371**
38	Various pump station improvements				*Budget Estimate*					**$90,000**
39	102" aqueduct inspection / rehabilitation				*Cost is an estimated value*					**$1,969,900**
40	102" aqueduct fiber optic monitoring				*Cost is a known value*					**$550,000**
41	78" aqueduct inspection / rehabilitation				*Cost is an estimated value*					**$1,784,400**
42	Feasibility assessment of 102" / 78" aqueducts				*Cost is an estimated value*					**$750,000**
43	90" aqueduct inspection / rehabilitation				*Budget Estimate*					**$900,000**
44	Condition assessment transmission mains				*Budget Estimate*					**$500,000**
45	16" and larger valves replacements				*Budget Estimate*					**$1,000,000**
46	Replace / Upgrade water mains				*Cost is a known value*					**$82,600,000**
47	Replace distribution valves				*Budget Estimate*					**$1,000,000**
48	Replace lead services				*Budget Estimate*					**$2,500,000**
49	Replace fire hydrants				*Budget Estimate*					**$1,500,000**
50	Replace blowoffs				*Budget Estimate*					**$500,000**
51	Building and facilities rehabilitation				*Budget Estimate*					**$200,000**
52	Forestry garage, old transformer building - Rehab roofs	160,500	2015	2017	168,625	12%	13%	20,235	21,921	**$210,782**
53	Records Management (GIS) upgrades				*Budget Estimate*					**$60,000**
54	Facilities fencing and roads rehabilitation				*Budget Estimate*					**$80,000**

Estimated Rate of inflation (per / year) **2.50%**

5-Year IFR Project Overview - FY 2016 - 2020 - Exhibit 14

1. Various Large Dam Improvements

Six dams are part of the Scituate Reservoir water complex: Gainer Memorial Dam and its five tributary reservoir dams, Barden Reservoir Dam, Westconnaug Reservoir Dam, Moswansicut Pond Dam, Ponaganset Reservoir Dam, and Regulating Reservoir (Horseshoe) Dam. Work under this project is to address minor deficiencies as identified through continuing inspections that are conducted on a quarterly basis.

2. Watershed Fencing, Fire Lanes, Property Rehabilitation

Many of the fences and access roads date back to their original construction in the 1920's. The fencing and road improvements are selected by priority as determined by condition assessments and need.

3. Raw Water Booster Pump Station – Generator Upgrades

The 2000kW generator at Raw Water Booster Pump Station has the capacity to power the treatment plant and raw water pumps in the event of an emergency power outage. Plans are to install a load bank for the generator to place an artificial load on the unit during scheduled testing to ensure that the generator runs at its full kilowatt output rating.

4. Coomer Reservoir Dam Rehabilitation

Coomer Reservoir Dam, built in 1858, is a 21 foot high earthen embankment located in Glocester RI on Snake Hill Road, north of the Scituate Reservoir. The dam is in poor condition. Plans are to repair the embankment depressions and the potential breeches, to stabilize the dam crest and embankment slopes, and to recondition the masonry stone walls that line both ends of the spillway.

5. 60" Influent Inspection

The 60 inch steel riveted conduits which carry raw water from the gatehouse to the junction chamber 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 are to inspect the exposed piping inside the meter chamber.

6. 90" Influent Inspection

The 90 inch conduit is a 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. Plans are to internally inspect the conduit.

7. Plant Influent Aerator and Conduits

Construction is in progress to rehabilitate the influent structure, the aeration basins, and the major conduits at the treatment plant. The details for the entire project are described in the Infrastructure/Capital Program Report in the Appendix section of this report. Funds are estimated in the 5 year plan to complete the project.

8. Ferric System Upgrades

Two chemical feeder pumps are old and need to be replaced and plans are to replace the units.

9. Lime Feed 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. Plans are to replace the two old slakers and feeders with new units.

10. Lime Transfer System Upgrades

Because of the abrasive nature of lime, sections of the transfer piping will need to be replaced.

11. Chlorine Loading Dock Rehabilitation

The loading dock leveler for the chlorine platform is old and in need of replacement. Plans are to replace the unit.

12. 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 have outlived their useful lives and parts have become obsolete. Plans are to replace the monorail system. The two weight scales for the chlorine system are also need in need of replacement.

13. Fluoride Feed System Improvements

Plans are to replace the magmeter for the fluoride system. The existing magmeter is in need of replacement.

14. Filtration System Improvements

The filtration system project will be completed in fiscal year 2016. The project consisted of reconstructing all 18 filters by providing new filter drains, raising the filter backwash troughs to provide greater filter media depth, and replacing the existing underground concrete roof slab structures covering the filters with a new concrete above-ground protective structure. All effluent and washwater piping has been replaced, new filter-to-waste piping has been installed to enhance turbidity and water quality, and a new duel filter media comprised of sand and anthracite coal has been installed for each new filter. Also, part of this project was the replacement of the existing antiquated proprietary SCADA system (Supervisory Control and Data Acquisition System) with a new state-of-the-art system which monitors and controls the processes of the filters and other plant operating systems. Expenditures in the 5 year plan are to complete the project.

15. Pilot of Sedimentation / Clarification Processes

A study that will evaluate alternative pre-treatment chemical and clarification processes has commenced. This study includes initial bench scale and desktop analyses followed by the operation of a year-long pilot plant consisting of various treatment trains. The treatment trains consist 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 will be compared against data from the current pre-treatment and clarification process at the plant. Results from the study will be presented in a final report and will be incorporated into a future project.

16. Sedimentation / Clarification System Improvements

This project will be based on the results of PW's Pilot of Sedimentation/Clarification Processes Project. Under the pilot project, a final report will be produced containing a recommendation for a final treatment train. This recommendation will be based on pilot-scale water quality data as well as constructability and cost information. The final treatment train will be chosen from one of the following pilot-scale trains: 1) MIEX/Direct Filtration, 2) Ozone/High Rate Plate Settlers, 3) Potassium Permanganate/High Rate Plate Settlers, and 4) Chlorine Dioxide/Dissolved Air Flotation.

17. Washwater Tank Inspection

The 400,000 gallon washwater tank which provides backwashing water to the treatment plant's filters is a circular reinforced concrete underground tank. Plans are to internally inspect the tank.

18. Service Water Tank Inspection

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 plant. Plans are to perform a structural evaluation of the tank and to inspect the tank's interior. As part of the scope, the current cathodic protection system will be evaluated and replaced if needed.

19. Clearwater Tank Inspection

Water is collected in a 260,000 gallon clearwell, and is the last structure in the treatment train, where finished water from the plant enters the clearwell and exits the structure under gravity to the transmission system. The structure is 13 feet wide by 8 feet tall by the length of the building (333 Feet long). Plans are to inspect the clearwell.

20. Treatment Process Studies

In accordance with a RI Department of Health requirement, a lead pipe loop study is being conducted as part of PW's holistic approach to optimize corrosion control within the distribution system. This study consists of experimental lead pipe loops installed at the treatment plant to determine the effectiveness of orthophosphate as a lead corrosion inhibitor in treated water at our current pH. In addition to the HEALTH mandated lead pipe loop study, PW intends to conduct added investigations aimed at optimizing corrosion control. These additional studies are based on the results of the lead pipe loop study to date, and are recommended by the Expert Advisory Panel. These studies include:

1. Extended sampling at two previously installed monitoring rigs along with continued monitoring of water quality parameters throughout our entire system.

2. A study to demonstrate the effectiveness of an intentional high-velocity flushing operation on household premise plumbing as an element in a remediation strategy for high lead concentrations.

3. A bench-scale study to evaluate the effect of orthophosphate on iron.

4. A full-scale/demonstration orthophosphate pilot. The exact scope of this study is contingent upon on the results of the pipe loop study as well as the bench-scale orthophosphate study. The intent is to isolate a small section of PW's distribution system to monitor the effect of orthophosphate on corrosion control.

In addition, 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 studies and/or treatment adjustments needed, to achieve the lead action level while optimizing corrosion control within the distribution system. This expert advisory panel meets a few times a year to review the data from the various treatment process studies and make recommendations as appropriate.

21. Treatment Plant Building Rehabilitation

The plant will be in need of ongoing improvements on a regular basis. Funds are budgeted for office reconditioning, architectural and structural improvements, rehabilitation of the electrical, plumbing, and mechanical systems, security and fire system upgrades, and site improvements as needed.

22. PW Lab / Equipment Improvements

Extensive testing of the raw and treated water is required on a regularly scheduled basis. The testing and monitoring equipment utilized has various lives depending on the type of equipment and frequency of use. Plans are to replace this equipment as it becomes necessary. In fiscal year 2016 a TOC analyzer and a UV analyzer will be purchased for analyzing organics in the water.

23. SCADA Control System Upgrades

Because computer technology is ever-changing and upgrades are routinely needed, 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.

24. Sludge Removal and Disposal

The three lagoons (1A, 1B, & 2) were constructed in 1924 during the construction of the treatment plant to receive periodic sludge discharges resulting from filter backwash and sedimentation operations at the plant. All sludge accumulation that had been previously allowed to accumulate since the plant was originally placed in operation has now been removed from all three lagoons restoring them to their original design intent of providing adequate storage and serving as a buffer that will maintain an acceptable standard of water quality discharged to the Pawtuxet River. Remaining work for sludge removal consists of transport and disposal of the previously stockpiled sludge that was dredged from Lagoon 2. The last payment for this work is in fiscal year 2016 in accordance with contractual requirements.

25. Neutaconkanut Reservoir Inspection

Neutaconkanut Reservoir, constructed in 1928, has a storage capacity of 42.1 MG. The facility feeds the gravity-fed low service system and the Neutaconkanut Pump Station. Plans are to perform an interior inspection of the reservoir.

26. Longview Reservoir Inspection

The Longview Reservoir has a storage capacity of 24.8 MG. The facility provides operational, emergency, and fire storage to the High Service area of the distribution system. Plans are to perform an interior inspection of the reservoir.

27. Lawton Hill Reservoir Inspection

The Lawton Hill Reservoir has a storage capacity of 5.0 MG and provides operational storage for the Western Cranston area of the distribution system. Plans are to perform an interior inspection of the reservoir.

28. Ridge Road Tank Reservoir Inspection and Rehabilitation

The Ridge Road Reservoir has a capacity of 3.5 MG and provides operational, emergency, and fire storage for the Extra-High Service area of the distribution system. The exterior of the tank has some exterior cracking. Plans are to inspect the interior of the tank and to perform remedial work on the exterior of the tank.

29. Neutaconkanut Reservoir Water Quality Modification

Neutaconkanut Reservoir, constructed in 1928, has a storage capacity of 42.1 MG. The facility feeds the gravity-fed low service system and the Neutaconkanut Pump Station. The project consists of piping and valve modifications to optimize system pressure, storage usability, and water quality.

30. Aqueduct Reservoir Water Quality Modification

The Aqueduct Reservoir has a storage capacity of 43.4 MG. The facility is gravity fed and provides operational storage for the Low Service area of the distribution system. The project consists of piping and valve modifications to optimize system pressure, storage usability, and water quality. The construction joint along the ceiling of the reservoir has deteriorated and needs to be rehabilitated.

31. Neutaconkanut Pump Station – VFD Drives

The Neutaconkanut Pump Station contains four pumps with a pumping capacity of approximately 6,700 GPM each. All of the pumps are in good condition. Plans are to replace the VFD drives.

32. Bath Street Pump Station – VFD Drives

The Bath Street Pump Station contains three pumps with a pumping capacity of approximately 6,700 GPM each. All of the pumps are in good condition. Plans are to replace the VFD drives.

33. Aqueduct Pump Station – VFD Drives

The Aqueduct Pump Station contains four vertical turbine pumps with a pumping capacity of approximately 2,000 GPM each. Plans are to retrofit the pumps with VFD drives. This will provide operational flexibility during shutdowns in the western Cranston system.

34. Cranston Commons – VFD Drives

The Cranston Commons Pump Station contains two 130 GPM jockey pumps and three 800 GPM domestic pumps. Plans are to install VFD drives on the domestic pumps to stabilize discharge pressure during periods of high demand in that pressure zone.

35. Fruit Hill Pump Station – VFD Drives, Replace Motors, and Generator

The Fruit Hill Pump Station contains two 1,500 GPM pumps and provides water to the Extra High Service area. Emergency power is provided by a 150 KW natural gas generator. The pump station was constructed in 1989. Plans are to install VFD drives and new motors for the two pumps, and to replace the emergency generator.

36. Atwood Avenue Pump Station Upgrades

The Atwood Avenue pump station was taken over by Providence Water from the Town of Johnston in 2010. The Atwood Avenue pump station contains one 45 GPM jockey pump, two 170 gpm domestic pumps, and one 750 gpm high flow pump. The station is in poor condition and is in need of major upgrading. Plans are to replace both the suction and discharge manifolds, to replace both duty pumps, and to install a SCADA connection.

37. Neutaconkanut Pump Station, Aqueduct Pump Station – Rehabilitate Roofs

The roofs for both buildings are in poor condition. Plans are to replace the roofs.

38. Various Pump Station Improvements

Plans are to periodically inspect all mechanical, electrical, architectural, and structural components of each pump station. Funds have been budgeted for anticipated improvements to remedy deficiencies as identified.

39. 102" Aqueduct Inspection / Rehabilitation

The 102 inch pipeline is 27,325 feet long (5.18 miles). It was constructed in the 1960's and consists of prestressed 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.

40. 102" 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 prestressed wires. Funds are budgeted to continuously monitor and analyze the digital data to identify potential problem areas with the pipeline.

41. 78" Aqueduct Inspection / Rehabilitation

The 78" aqueduct transmission line, consists of 20,131 feet of pipeline (3.81 miles), and two sections of concrete lined tunnel consisting of 3,046 feet (0.58 miles). The pipeline was constructed in the 1960's and consists of prestressed concrete cylinder pipe (PCCP). The 78" aqueduct has undergone significant rehabilitation as extensive corrosive damage had been discovered in previous inspections. 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.

42. Feasibility Assessment of 102" / 78" Aqueducts

Sections of both the 102" and 78" PCCP pipelines have continually been problematic. In November of 1996, in the area of Oaklawn Avenue, Cranston, a section of the 102" aqueduct ruptured. Since then to the present we have inspected this pipeline at about 5 year intervals. Each time, we have discovered deficiencies in the pipe which necessitated rehabilitation of the pipeline.

Beginning in 2008 the 78" PCCP was inspected. Similar to the 102" aqueduct, the type of deficiencies that were found to be common in the 102" aqueduct were also present in the

78” pipeline. This pipeline is also now inspected at 5 year intervals. The 78” has also required rehabilitative work following each inspection.

Generally, the common problem with both PCCP pipelines is with cracking or deterioration of the mortar exterior coating which allows groundwater to seep through the concrete and / or mortar coating. This in turn can cause corrosion to and breakage of high tension reinforcing wires which weakens the pipeline. There may be other instances where the reinforced pre-stressed wires have broken on their own.

A feasibility assessment is needed for the 102”/78” aqueducts to assess the remaining life of the aqueducts and to analyze the engineering alternatives available for replacement or rehabilitation of these critical and necessary pipelines.

43. 90” Aqueduct Inspection / 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. In 2004 this 90" aqueduct was inspected and rehabilitated as corrosive damage was discovered during the inspection. During the inspection of the tunnel section, it was discovered that the contact grouting that was to have taken place during the original construction of the aqueduct was never performed, or performed inadequately. 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, which will occur in the 15 year plan.

44. 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. Plans are to perform a condition assessment on some of these mains. Nondestructive testing methods will be performed using available technologies and applications accepted by the water industry, such as electromagnetic testing, ultrasonic testing, and/or acoustic soundings.

45. 16" and Larger Valves Replacements

Oftentimes during shutdowns valves are found defective or are broken during valve operation. An amount has been budgeted to anticipate the replacement of defective larger valves.

46. Replace / Upgrade Water Mains

Of the approximate 550 miles of unlined cast iron water mains in the system, about 25 miles have been replaced to the end of fiscal year 2015. Depending on construction bid costs for cleaning and lining, or main replacements, it is estimated that we will replace or rehabilitate approximately 10 to 12 miles of water mains per year.

47. Replace Distribution Valves

There are over 13,000 distribution valves in the system. Plans are to replace these valves in conjunction with the water main rehabilitation program. Valves in the system that are found to be defective will also be replaced.

48. Replace Lead Services

There are approximately 13,800 lead services remaining to be replaced in the system. Plans are to replace these services in conjunction with the water main rehabilitation program. Lead services in the system that are found to be defective will also be replaced.

49. Replace Fire Hydrants

There are over 6,000 hydrants in system. Plans are to replace these hydrants in conjunction with the water main rehabilitation program. Hydrants in the system that are found to be defective will also be replaced.

50. 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.

51. Building and Facility Rehabilitation

The Forestry Maintenance Garage, the Academy Avenue Administration Building, and the Aqueduct Reservoir Office Building in Cranston are in need of ongoing improvements. Funds are budgeted for reconditioning the offices, architectural and structural improvements, rehabilitation of the electrical, plumbing, and mechanical systems, security and fire system upgrades, and site improvements. In the first year of the 5 year plan all the underground and aboveground storage tanks will be inspected system wide to comply with RIDEM SPCC (Spill Prevention, Control, and Countermeasure) plan and reporting requirements.

During 2015, a property became available that met organizational needs. An offer was made and accepted and a Purchase & Sales Agreement has been signed to purchase a 180,000 SF building situated on a 16.5 acre site in Providence. The facility will accommodate both the administration and operations divisions of Providence Water. For this reason, continued improvements to both the Academy Avenue and the Cranston facilities will be discontinued. Funds are annually budgeted for ongoing improvements to the Forestry Maintenance Garage and the new Central Operations Facility.

52. Forestry Garage, Old Transformer Building – Rehabilitate Roofs

The roofs for both buildings are in poor condition. Plans are to replace the roofs.

53. Records Management (GIS) Upgrades

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.

54. Facility Fencing and Road Rehabilitation

Plans are to replace damaged fencing and rehabilitate deteriorated roads at some of the various distribution reservoirs, pump stations, and facilities. The fencing and road improvements are selected by priority as determined by condition assessment.

Note: Some of these projects are in progress and the cost shown for the project in the expenditure plan may be a partial cost for the remainder of the project. Therefore, in these instances the expenditure does not represent the entire cost of the project. The balance that makes up the full project cost was identified and reported prior to fiscal year 2016.

15 Year IFR Expenditure Plan- FY 2021 - FY 2035 - Exhibit 15

Providence Water

Years 2021 - 2035 (15 Year Plan)

	PROJECTS	Total 2021-2035	2021	2022	2023	2024	2025	2021-2025	2026	2027	2028	2029	2030	2026-2030	2031	2032	2033	2034	2035	2031-2035	Total 2021-2035
	Raw Water Supply																				
1	Scituate Reservoir - Gainer Dam spillway	**403,000**				403,000		**403,000**						**0**						**0**	**403,000**
2	Regulating Reservoir	**1,673,000**						**0**			836,500	836,500		**1,673,000**						**0**	**1,673,000**
3	Various Large Dam Improvements	**300,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**300,000**
4	Secondary Dam Improvements	**150,000**	10,000	10,000	10,000	10,000	10,000	**50,000**	10,000	10,000	10,000	10,000	10,000	**50,000**	10,000	10,000	10,000	10,000	10,000	**50,000**	**150,000**
5	Harrisdale/Peeptoad, Jordan Pond	**1,116,000**			1,116,000			**1,116,000**						**0**						**0**	**1,116,000**
6	Raw Water Booster Pump Station	**600,000**			600,000			**600,000**						**0**						**0**	**600,000**
7	Gainer Dam Gatehouse	**1,524,000**				1,524,000		**1,524,000**						**0**						**0**	**1,524,000**
8	60" Influent Conduits (internal inspection in 2028)	**150,000**			16,000			**16,000**			117,000			**117,000**			17,000			**17,000**	**150,000**
9	90" Influent Conduit	**100,000**						**0**						**0**			100,000			**100,000**	**100,000**
10	2 Raw Water - 60" north and south aqueduct valves	**391,000**		391,000				**391,000**						**0**						**0**	**391,000**
11	36" blowoff meter chamber valve	**51,000**	51,000					**51,000**						**0**						**0**	**51,000**
12	Watershed Fence and Road Rehabilitation	**300,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**300,000**
	Total	**$6,758,000**	**101,000**	**441,000**	**1,782,000**	**1,977,000**	**50,000**	**$4,351,000**	**50,000**	**50,000**	**1,003,500**	**886,500**	**50,000**	**$2,040,000**	**50,000**	**50,000**	**167,000**	**50,000**	**50,000**	**$367,000**	**$6,758,000**
	Treatment Plant																				
13	Central Control System (SCADA) Upgrades	**300,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**300,000**
14	Conduits	**20,000**						**0**					20,000	**20,000**						**0**	**20,000**
15	Inspect Washwater Tank	**30,000**					10,000	**10,000**					10,000	**10,000**					10,000	**10,000**	**30,000**
16	Replace Washwater Tank Pumps	**146,000**						**0**		146,000				**146,000**						**0**	**146,000**
17	Inspect Service Water Tank	**30,000**					10,000	**10,000**					10,000	**10,000**					10,000	**10,000**	**30,000**
18	Rehabilitate Service Water Tank and Replace Pumps	**158,000**						**0**		158,000				**158,000**						**0**	**158,000**
19	Inspect Clearwell	**30,000**					10,000	**10,000**					10,000	**10,000**					10,000	**10,000**	**30,000**
20	Clarification system improvements	**96,000,000**	56,000,000	40,000,000				**96,000,000**						**0**						**0**	**96,000,000**
21	Chlorine Storage / Transfer / Feed System	**18,400**						**0**		18,400				**18,400**						**0**	**18,400**
22	Ferric Storage / Transfer / Feed System	**123,400**	8,800					**8,800**	9,900					**9,900**	104,700					**104,700**	**123,400**
23	Fluoride Storage / Transfer / Feed System	**60,800**					21,752	**21,752**					11,245	**11,245**					27,803	**27,803**	**60,800**
24	Lime Storage / Transfer / Feed System	**79,100**	12,600					**12,600**	31,000					**31,000**	16,200	19,300				**35,500**	**79,100**
25	Filters - Improvements	**3,570,000**						**0**						**0**					3,570,000	**3,570,000**	**3,570,000**
26	Treatment Plant Laboratory Improvements	**300,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**300,000**
27	Treatment Plant roofs	**128,000**		128,000				**128,000**						**0**						**0**	**128,000**
28	Treatment Plant Building Improvements	**7,492,000**	484,000	6,748,000	20,000	20,000	20,000	**7,292,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**7,492,000**
	Total	**$108,485,700**	**56,545,400**	**46,916,000**	**60,000**	**60,000**	**111,752**	**$103,693,152**	**100,900**	**382,400**	**60,000**	**60,000**	**121,245**	**$724,545**	**180,900**	**79,300**	**60,000**	**60,000**	**3,687,803**	**$4,068,003**	**$108,485,700**
	Pumping and Storage																				
29	Ashby Street Pump Station - VFD drive pumps	**20,600**					20,600	**20,600**						**0**						**0**	**20,600**
30	Bath Street P.S. - VFD drive pumps and generator	**1,132,000**						**0**						**0**				1,132,000		**1,132,000**	**1,132,000**
31	Neutaconkanut P.S. - VFD drive pumps and generator	**1,278,000**						**0**						**0**					1,278,000	**1,278,000**	**1,278,000**
32	Various Pump Station Improvements	**300,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**300,000**
33	Aqueduct Reservoir and Gatehouse	**150,000**					50,000	**50,000**					50,000	**50,000**					50,000	**50,000**	**150,000**
34	Neutaconkanut Reservoir and Gatehouse	**150,000**		50,000				**50,000**		50,000				**50,000**		50,000				**50,000**	**150,000**
35	Longview Reservoir and Gatehouse	**150,000**		50,000				**50,000**		50,000				**50,000**		50,000				**50,000**	**150,000**
36	Ridge Road Reservoir	**75,000**			25,000			**25,000**			25,000			**25,000**			25,000			**25,000**	**75,000**
37	Lawton Hill Reservoir	**75,000**			25,000			**25,000**			25,000			**25,000**			25,000			**25,000**	**75,000**
	Total	**$3,330,600**	**20,000**	**120,000**	**70,000**	**20,000**	**90,600**	**$320,600**	**20,000**	**120,000**	**70,000**	**20,000**	**70,000**	**$300,000**	**20,000**	**120,000**	**70,000**	**1,152,000**	**1,348,000**	**$2,710,000**	**$3,330,600**

15 Year IFR Expenditure Plan- FY 2021 - FY 2035 - Exhibit 15

Providence Water

Years 2021 - 2035 (15 Year Plan)

	PROJECTS	Total 2021-2035	2021	2022	2023	2024	2025	2021-2025	2026	2027	2028	2029	2030	2026-2030	2031	2032	2033	2034	2035	2031-2035	Total 2021-2035
	Transmission																				
38	102" Aqueduct Inspection	**6,300,000**	2,000,000					**2,000,000**	2,100,000					**2,100,000**	2,200,000					**2,200,000**	**6,300,000**
39	78" Aqueduct Inspection	**5,700,000**		1,800,000				**1,800,000**		1,900,000				**1,900,000**		2,000,000				**2,000,000**	**5,700,000**
40	90" Aqueduct rehabilitation	**7,000,000**		7,000,000				**7,000,000**						**0**						**0**	**7,000,000**
41	90" Aqueduct inspection	**2,000,000**						**0**				1,000,000		**1,000,000**				1,000,000		**1,000,000**	**2,000,000**
42	102" fiber optic monitoring	**2,175,000**	125,000	125,000	125,000	125,000	125,000	**625,000**	145,000	145,000	145,000	145,000	145,000	**725,000**	165,000	165,000	165,000	165,000	165,000	**825,000**	**2,175,000**
43	Slip lining / replacement of 102" and 78" aqueducts	**155,000,000**						**0**					10,000,000	**10,000,000**	29,000,000	29,000,000	29,000,000	29,000,000	29,000,000	**145,000,000**	**155,000,000**
44	Condition assessment transmission mains	**1,500,000**	100,000	100,000	100,000	100,000	100,000	**500,000**	100,000	100,000	100,000	100,000	100,000	**500,000**	100,000	100,000	100,000	100,000	100,000	**500,000**	**1,500,000**
45	16" and Larger Valve Replacements	**5,000,000**	200,000	200,000	200,000	200,000	200,000	**1,000,000**	200,000	200,000	200,000	200,000	200,000	**1,000,000**	200,000	1,200,000	1,200,000	200,000	200,000	**3,000,000**	**5,000,000**
	Total	**$184,675,000**	2,425,000	9,225,000	425,000	425,000	425,000	**$12,925,000**	2,545,000	2,345,000	445,000	1,445,000	10,445,000	**$17,225,000**	31,665,000	32,465,000	30,465,000	30,465,000	29,465,000	**$154,525,000**	**$184,675,000**
	Distribution																				
46	Distribution Main Upgrades	**290,000,000**	18,000,000	18,000,000	18,000,000	19,000,000	19,000,000	**92,000,000**	19,000,000	19,000,000	20,000,000	20,000,000	20,000,000	**98,000,000**	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	**100,000,000**	**290,000,000**
47	Distribution Valve Replacements	**3,000,000**	200,000	200,000	200,000	200,000	200,000	**1,000,000**	200,000	200,000	200,000	200,000	200,000	**1,000,000**	200,000	200,000	200,000	200,000	200,000	**1,000,000**	**3,000,000**
48	Lead Service Replacements	**7,500,000**	500,000	500,000	500,000	500,000	500,000	**2,500,000**	500,000	500,000	500,000	500,000	500,000	**2,500,000**	500,000	500,000	500,000	500,000	500,000	**2,500,000**	**7,500,000**
49	Hydrant Replacements	**4,500,000**	300,000	300,000	300,000	300,000	300,000	**1,500,000**	300,000	300,000	300,000	300,000	300,000	**1,500,000**	300,000	300,000	300,000	300,000	300,000	**1,500,000**	**4,500,000**
50	Blowoff Replacements	**1,500,000**	100,000	100,000	100,000	100,000	100,000	**500,000**	100,000	100,000	100,000	100,000	100,000	**500,000**	100,000	100,000	100,000	100,000	100,000	**500,000**	**1,500,000**
51	Leak Detection	**200,000**						**0**	200,000					**200,000**						**0**	**200,000**
	Total	**$306,700,000**	19,100,000	19,100,000	19,100,000	20,100,000	20,100,000	**$97,500,000**	20,300,000	20,100,000	21,100,000	21,100,000	21,100,000	**$103,700,000**	21,100,000	21,100,000	21,100,000	21,100,000	21,100,000	**$105,500,000**	**$306,700,000**
	Support Systems																				
52	Building and Facilities Improvements	**375,000**	25,000	25,000	25,000	25,000	25,000	**125,000**	25,000	25,000	25,000	25,000	25,000	**125,000**	25,000	25,000	25,000	25,000	25,000	**125,000**	**375,000**
53	Records Management (GIS) Upgrades	**300,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**300,000**
54	Facility Fence and Road Rehabilitation	**300,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	20,000	20,000	20,000	20,000	20,000	**100,000**	**300,000**
	Total	**$975,000**	**65,000**	**65,000**	**65,000**	**65,000**	**65,000**	**$325,000**	**65,000**	**65,000**	**65,000**	**65,000**	**65,000**	**$325,000**	**65,000**	**65,000**	**65,000**	**65,000**	**65,000**	**$325,000**	**$975,000**
	Total	**$610,924,300**	**78,256,400**	**75,867,000**	**21,502,000**	**22,647,000**	**20,842,352**	**$219,114,752**	**23,080,900**	**23,062,400**	**22,743,500**	**23,576,500**	**31,851,245**	**$124,314,545**	**53,080,900**	**53,879,300**	**51,927,000**	**52,892,000**	**55,715,803**	**$267,495,003**	**$610,924,300**

Source of Estimated Project Expenditures - FY 2021 - 2035 - Exhibit 16
Providence Water
(15 Year Plan)

54 records

		Construction Estimate	Year of estimate	Year scheduled	Construction Cost Adjusted for Inflation	Design (%)	PM / CM (%)	Design Cost ($)	PM / CM Cost ($)	Total Cost
1	Scituate Reservoir - Gainer Dam spillway	190,198	2002	2024	327,439	11%	12%	36,018	39,293	**$402,751**
2	Regulating Reservoir	837,000	2008	2028	1,371,522	11%	11%	150,867	150,867	**$1,673,257**
3	Various Large Dam Improvements				*Budget Estimate*					**$300,000**
4	Secondary Dam Improvements				*Budget Estimate*					**$150,000**
5	Harrisdale/Peeptoad, Jordan Pond	745,000	2015	2023	907,710	11%	12%	99,848	108,925	**$1,116,483**
6	Raw Water Booster Pump Station	400,000	2015	2023	487,361	11%	12%	53,610	58,483	**$599,454**
7	Gainer Dam Gatehouse	1,000,000	2015	2024	1,248,863	11%	11%	137,375	137,375	**$1,523,613**
8	60" Influent Conduits				*Budget Estimate*					**$150,000**
9	90" Influent Conduit				*Budget Estimate*					**$100,000**
10	2 Raw Water - 60" north and south aqueduct valves	267,500	2015	2022	317,973	11%	12%	34,977	38,157	**$391,107**
11	36" blowoff meter chamber valve	25,792	2003	2021	40,227	12%	14%	4,827	5,632	**$50,686**
12	Watershed Fence and Road Rehabilitation				*Budget Estimate*					**$300,000**
13	Central Control System (SCADA) Upgrades				*Budget Estimate*					**$300,000**
14	Conduits				*Budget Estimate*					**$20,000**
15	Inspect washwater tank				*Budget Estimate*					**$30,000**
16	Replace washwater tank pumps	66,000	2004	2027	116,464	12%	13%	13,976	15,140	**$145,580**
17	Inspect service water tank				*Budget Estimate*					**$30,000**
18	Rehabilitate service water tank and replace pumps	71,600	2004	2027	126,346	12%	13%	15,162	16,425	**$157,933**
19	Clearwell				*Budget Estimate*					**$30,000**
20	Clarification system improvements	Project amounts carry over to fiscal years 2021 and 2022 - See line item number 16 in the 5 year plan								
21	Chlorine S/T/F System - chlorinators	10,875	2015	2027	14,626	12%	14%	1,755	2,048	**$18,428**
22a	Ferric S/T/F System - magmeter	6,000	2015	2021	6,958	12%	14%	835	974	**$8,767**
22b	Ferric S/T/F System - magmeter	6,000	2015	2026	7,873	12%	14%	945	1,102	**$9,919**
22c	Ferric S/T/F System - magmeter	6,000	2015	2031	8,907	12%	14%	1,069	1,247	**$11,223**
22d	Ferric S/T/F System - metering pump and motor	50,374	2015	2031	74,780	12%	13%	8,974	9,721	**$93,476**
23a	Fluoride S/T/F System - metering pump and motor	7,324	2015	2025	9,375	12%	14%	1,125	1,313	**$11,813**
23b	Fluoride S/T/F System - magmeter	6,162	2015	2025	7,888	12%	14%	947	1,104	**$9,939**
23c	Fluoride S/T/F System - magmeter	6,162	2015	2030	8,924	12%	14%	1,071	1,249	**$11,245**
23d	Fluoride S/T/F System - metering pump and motor	7,324	2015	2035	12,001	12%	14%	1,440	1,680	**$15,122**
23e	Fluoride S/T/F System - magmeter	6,162	2015	2035	10,097	12%	14%	1,212	1,414	**$12,722**
24a	Lime Transfer fittings	8,645	2015	2021	10,026	12%	14%	1,203	1,404	**$12,632**
24b	Lime Transfer fittings and rotary valve	18,700	2015	2026	24,536	12%	14%	2,944	3,435	**$30,915**
24c	Lime Transfer fittings	8,645	2015	2031	12,834	12%	14%	1,540	1,797	**$16,170**
24d	Lime Transfer (rotary valve)	10,055	2015	2032	15,300	12%	14%	1,836	2,142	**$19,278**

		Construction Estimate	Year of estimate	Year scheduled	Construction Cost Adjusted for Inflation	Design (%)	PM / CM (%)	Design Cost ($)	PM / CM Cost ($)	Total Cost
25	Filters - Improvements	1,800,000	2015	2035	2,949,510	10%	11%	294,951	324,446	**$3,568,907**
26	Treatment Plant Laboratory Improvements				*Budget Estimate*					**$300,000**
27	Treatment Plant roofs	86,060	2015	2022	102,298	12%	13%	12,276	13,299	**$127,873**
28a	Treatment Plant Building Improvements				*Budget Estimate*					**$300,000**
28b	Treatment Plant - arch. improvements - siding and windows	4,379,846	2015	2025	5,606,573	10%	10%	560,657	560,657	**$6,727,887**
28c	Treatment Plant - modernize passenger and freight elevators	325,000	2015	2021	376,900	11%	12%	41,459	45,228	**$463,587**
29	Ashby Street Pump Station - VFD drive pumps	12,764	2015	2025	16,339	12%	14%	1,961	2,288	**$20,588**
30	Bath Street P.S. - VFD drive pumps and generator	575,836	2015	2034	920,560	11%	12%	101,262	110,467	**$1,132,289**
31	Neutaconkanut P.S. - VFD drive pumps and generator	639,204	2015	2035	1,047,410	11%	11%	115,215	115,215	**$1,277,840**
32	Various Pump Station Improvements				*Budget Estimate*					**$300,000**
33	Aqueduct Reservoir and Gatehouse				*Budget Estimate*					**$150,000**
34	Neutaconkanut Reservoir and Gatehouse				*Budget Estimate*					**$150,000**
35	Longview Reservoir and Gatehouse				*Budget Estimate*					**$150,000**
36	Ridge Road Reservoir				*Budget Estimate*					**$75,000**
37	Lawton Hill Reservoir				*Budget Estimate*					**$75,000**
38	102" Aqueduct Inspection				*Budget Estimate*					**$6,300,000**
39	78" Aqueduct Inspection				*Budget Estimate*					**$5,700,000**
40	90" Aqueduct rehabilitation	3,642,549	2003	2022	5,823,162	10%	10%	582,316	582,316	**$6,987,794**
41	90" Aqueduct Inspection				*Budget Estimate*					**$2,000,000**
42	102" fiber optic monitoring				*Budget Estimate*					**$2,175,000**
43	Slip lining / replacement of 102" and 78" aqueducts	72,566,418	2008	2032	131,252,763	8%	10%	10,500,221	13,125,276	**$154,878,261**
44	Condition assessment transmission mains				*Budget Estimate*					**$1,500,000**
45	16" and Larger Valve Replacements				*Budget Estimate*					**$5,000,000**
46	Distribution Main Upgrades				*Cost is a known value*					**$290,000,000**
47	Distribution Valve Replacements				*Budget Estimate*					**$3,000,000**
48	Lead Service Replacements				*Budget Estimate*					**$7,500,000**
49	Hydrant Replacements				*Budget Estimate*					**$4,500,000**
50	Blowoff Replacements				*Budget Estimate*					**$1,500,000**
51	Leak Detection				*Budget Estimate*					**$200,000**
52	Building and Facilities Improvements				*Budget Estimate*					**$375,000**
53	Records Management (GIS) Upgrades				*Budget Estimate*					**$300,000**
54	Facility Fence and Road Rehabilitation				*Budget Estimate*					**$300,000**

Estimated Rate of inflation (per / year) **2.50%**

15-Year IFR Project Overview - FY 2021 - 2035 - Exhibit 17

1. Scituate Reservoir – Gainer Dam Spillway

The upstream face of the spillway is showing signs of wear. Plans are to completely replace all of the old unsound concrete along the upstream face of the spillway with a new concrete surface.

2. Regulating Reservoir

Upgrades to the dam will be needed consisting of regrading and providing armor protection along both the upstream and downstream slopes, rehabilitating/replacing the existing stone walls along both the upstream and downstream slopes, rehabilitating the concrete spillway, rehabilitating the concrete outlet structure, and rehabilitating the current drainage system along the length of the dam.

3. Various Large Dam Improvements

Plans are to inspect all 6 dams and structures and to conduct remedial work as required to extend their useful lives. Amounts are budgeted for ongoing needed improvements.

4. Secondary Dam Improvements

Several small secondary dams are located throughout the watershed. These secondary dams were constructed primarily for mill purposes in the mid to late 1800's prior to the development of the Scituate Reservoir. Plans are to inspect all secondary dams and structures and to conduct remedial work as required to extend their useful lives. Amounts are budgeted for needed improvements for the continual upkeep of all 6 dams and appurtenant structures.

5. Harrisdale/Peeptoad, Jordan Pond Dams

Improvements at Harrisdale/Peeptoad Pond Dam consists of rehabilitating the cracking on the crest of the dam, rehabilitating areas of erosion on the upstream embankment slope, removing vegetation from the dam crest and downstream and upstream areas, restoration of spalled and cracked concrete at the spillway headwalls and wingwalls, and restoring the downstream wall.

At Jordan Pond Dam rehabilitation consists of rebuilding the masonry wall along the dam, restoration of the primary and auxiliary spillways, and replacing the low level outlet structure.

6. Raw Water Booster Pump Station

Plans are to architecturally improve the Raw Water Booster Pump Station consisting of replacing the tile floor and restoring the pump pedestals, replacing the garage doors, replacing and relining the brick chimney, replacing the 12,200 sf roof, restoring the front terrace, replacing the driveway, replacing the interior lights to the building, remodeling the bathroom, and replacing all the single glaze windows.

7. Gainer Dam Gatehouse

Plans are to architecturally improve the gatehouse consisting of replacing the overhead cranes, repointing the granite block walls, installing safety handrails, replacing the interior lights to the building, replacing all of the windows, and replacing the wood floor coverings with lightweight floor grates. Plans are to also replace the two old plug valves.

8. 60" Influent Conduits

Plans are to inspect the exterior of the twin 60 inch influent conduits every 5 year by inspecting the exposed piping inside the meter chamber, and to excavate a test pit of the buried section to assess the condition of the exterior coating. Additional inspection of the underground pipeline will also consist of soil resistivity testing, and evaluating and testing the existing cathodic protection system. The interior of the pipeline is scheduled to be inspected once in the 15 year plan.

9. 90" Influent Conduit

The 90 inch conduit is a mortar lined steel pipe encased in concrete which runs from the junction chamber to the treatment plant. Plans are to internally inspect the conduit. 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. An internal inspection will be conducted in the 5 year plan. Plans are to internally inspect the pipe again in the 15 year plan.

10. 2 Raw Water 60" North and South Aqueduct Valves

The 2 electrically actuated valves that divert water into the RWBPS can still be operated, however, they are scheduled to be replaced in the 15 year plan because intermittent problems occur due to their age.

11. 36" Blowoff Valve

One of the valves that is used to allow discharge of raw water down the northern branch of the Pawtuxet River, is defective and needs to be replaced. Plans are to replace the valve.

12. Watershed Fence and Road Rehabilitation

The fences and access roads, much of which are in poor condition, date back to their original construction in the 1920's. The fencing and road improvements are selected by priority as determined by condition assessments. Amounts are budgeted to perform ongoing rehabilitative work as needed.

13. Central Control System SCADA Upgrades

Given that the nature of computer technology is ever changing, funds have been budgeted in the plan to address continued upgrade needs for the SCADA system. Needs will consist of hardware replacements, software upgrades, and new hardware and software additions to the SCADA system.

14. Conduits

Plans are to internally inspect the major conduits at the plant consisting of the influent and effluent aerator conduits, the aerated water conduit (the lower tunnel), the settled water conduit (the upper tunnel), and the filter conduit.

15. Inspect Washwater Tank

In the 15 year plan, plans are to inspect the interior of the washwater tank every 5 years.

16. Replace the Washwater Pumps

The two (2) 5600 GPM pumps which supply the backwash water for the treatment plant's filters are scheduled for replacement in the 15 year plan.

17. Inspect Service Water Tank

In the 15 year plan, plans are to perform a structural evaluation of the tank and to inspect the tank's interior every 5 years. As part of the scope, the current cathodic protection system will be evaluated and replaced if needed.

18. Rehabilitate Service Water Tank and Replace Pumps

The two (2) 1750 GPM pumps for the service water system which provides process water at the treatment plant are scheduled for replacement in the 15 year plan. Plans are also to perform various structural improvements to the tank.

19. Clearwell

In the 15 year plan, plans are to inspect the interior of the clearwell every 5 years.

20. Clarification System Improvements

To complete the project, the expenditures are for the continuation of the project listed in the 5 year plan.

21. Chlorine Storage/Transfer/Feed System

In the 15 year plan, plans are to replace the 3 chlorinators.

22. Ferric Storage/Transfer/Feed System

In the 15 year plan there will be a need to replace the 2 magmeters on a recurring schedule and the 3 metering pumps and motors once. See the “Source of Estimated Expenditures” for replacement plan and schedule.

23. Fluoride Storage/Transfer/Feed System

On a recurring schedule, plans are to replace the 2 metering pumps and motors, and the 2 magmeters. See the “Source of Estimated Expenditures” for replacement plan and schedule.

24. Lime Storage/Transfer/Feed System

Due to the abrasive nature of lime, sections of the transfer pipe will need to be replaced at regular intervals. See the “Source of Estimated Expenditures” for replacement plan and schedule.

25. Filters – Improvements

In the plan, the filter media made up of anthracite coal and sand will need to be replaced for all 18 of the filters.

26. Treatment Plant Laboratory Improvements

The plan is to replace laboratory equipment and provide architectural upgrades as they become necessary. The budget amounts shown in the plan are for anticipated needs.

27. Treatment Plant Roofs

The treatment plant chemical building roof and the storage building roof are expected to need replacement.

28. Treatment Plant Building Improvements

Architectural improvements are planned to the treatment plant building consisting of replacing the old exterior siding with a new exterior cover and replacing the windows with new energy efficient windows. In addition, the freight and passenger elevators at the treatment plant are old, and parts have become obsolete. Plans are to modernize the elevators consisting of replacing all electrical, mechanical, emergency, and fire protection components. The electrical service for both elevators will be converted from the old 600 volt electrical system to the standard 480 volt service. Funds are budgeted for various other rehabilitative work because the building requires ongoing structural, architectural, and mechanical upgrades.

29. Ashby Street Pump Station – VFD Drive Pumps

It is anticipated that the two existing pumps and motors will need to be replaced with new VFD pumps and motors.

30. Bath Street Pump Station – VFD Drive Pumps and Generator

It is anticipated that in the latter stage of the plan that the 3 pumps and motors, and that the emergency generator will need to be replaced at the station.

31. Neutaconkanut Pump Station and Generator – VFD Drive Pumps and Generator

It is anticipated that in the latter stage of the plan that the 4 pumps and motors, and that the emergency generator will need to be replaced at the station.

32. Various Pump Station Improvements

Plans are to periodically inspect all mechanical, electrical, architectural, and structural components of each pump station. Funds have been budgeted for anticipated improvements, and to remedy deficiencies as they are identified through inspections.

33. Aqueduct Reservoir and Gatehouse

Plans are to visually inspect the interior of the reservoirs at regular intervals to check for any structural deficiencies or anomalies.

34. Neutaconkanut Reservoir and Gatehouse

Plans are to visually inspect the interior of the reservoirs at regular intervals to check for any structural deficiencies or anomalies.

35. Longview Reservoir and Gatehouse

Plans are to visually inspect the interior of the reservoirs at regular intervals to check for any structural deficiencies or anomalies.

36. Ridge Road Reservoir

Plans are to visually inspect the interior of the reservoirs at regular intervals to check for any structural deficiencies or anomalies.

37. Lawton Hill Reservoir

Plans are to visually inspect the interior of the reservoirs at regular intervals to check for any structural deficiencies or anomalies.

38. 102" Aqueduct Inspection

The 102 inch pipeline is 27,325 feet long (5.18 miles). It was constructed in the 1960's and consists of prestressed 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.

39. 78" Aqueduct Inspection

The 78" aqueduct transmission lines, consists of 20,131 feet of pipeline (3.81 miles), and two sections of concrete lined tunnel consisting of 3,046 feet (0.58 miles). The pipeline was constructed in the 1960's and consists of prestressed concrete cylinder pipe (PCCP). The 78" aqueduct has undergone significant rehabilitation as extensive corrosive damage has been discovered in previous inspections. 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.

40. 90" Aqueduct 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. In 2004 this 90" aqueduct was last inspected and rehabilitated as corrosive damage was discovered during the inspection. During the inspection of the tunnel section, it was discovered that the contact grouting that was to have taken place during the original construction of the aqueduct was never performed, or performed inadequately. In the 5 year plan, the 90 inch aqueduct will be again inspected. An amount has been budgeted for anticipated remedial work from the results of the inspection that was conducted in 2004.

41. 90" Aqueduct Inspection

In accordance with our plan to inspect our aqueducts at regularly scheduled intervals, the 90 inch aqueduct will be inspected twice in the 15 year plan.

42. 102" 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 to monitor the sounds being transmitted through the pipeline to detect the acoustic events associated with the failure and break of prestressed wires. Funds are budgeted to continuously monitor and analyze the digital data to identify potential problem areas with the pipeline.

43. Slip Lining / Replacement of 102" and 78" Aqueducts

Sections of both the 102" and 78" PCCP pipelines have continually been problematic. In November of 1996, in the area of Oaklawn Avenue, Cranston, a section of the 102" aqueduct ruptured. Since then to the present we have inspected this pipeline at about 5 year intervals.

Each time, we have discovered deficiencies in the pipe which necessitated rehabilitation of the pipeline.

Beginning in 2008 the 78" PCCP was inspected. Similar to the 102" aqueduct, the type of deficiencies that were found to be common in the 102" aqueduct were also present in the 78" pipeline. This pipeline is also now inspected at 5 year intervals. The 78" has also required rehabilitative work following each inspection.

Generally, the common problem with both PCCP pipelines is with cracking or deterioration of the mortar exterior coating which allows groundwater to seep through the concrete and / or mortar coating. This in turn can cause corrosion to and breakage of high tension reinforcing wires which weakens the pipeline. There may be other instances where the reinforced pre-stressed wires have broken on their own.

Providence Water needs to evaluate whether these pipelines are now reaching the end of their useful lives, taking into consideration the repeated frequency and costs associated with inspecting and restoring both these aqueducts. The feasibility assessment, in the 5 year plan, will define the scope of work and restoration methods for this project.

A project to essentially replace these structures is in the 15 year plan. The budget estimate in the plan is rudimentary consisting of such remedial methods as slip-lining, and replacing or rehabilitating sections of the pipeline.

44. 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. Plans are to perform a condition assessment on some of these mains. Nondestructive testing methods will be performed using available technologies and applications accepted by the water industry, such as electromagnetic testing, ultrasonic testing, and/or acoustic soundings. This will aid us to assess the condition of our mains and to identify future replacement work.

45. 16" and Larger Valves Replacements

At times during shutdowns valves are found defective or are broken during valve operation. An amount has been budgeted to anticipate the replacement of defective larger valves. It is also anticipated in the 15 year plan that about 40 valves will need to be replaced due to age.

46. Distribution Main Upgrades

Of the approximate 550 miles of unlined cast iron water mains in the system, about 25 miles have been replaced to the end of fiscal year 2015. Depending on construction bid costs for cleaning and lining, or main replacements, it is estimated that we will replace or rehabilitate approximately 10 to 12 miles of water mains per year.

47. Distribution Valve Replacements

There are over 13,000 distribution valves in the system. Plans are to replace these valves in conjunction with the water main rehabilitation program. Valves in the system that are found to be defective will also be replaced.

48. Lead Service Replacements

There are approximately 13,800 lead services remaining to be replaced in the system. Plans are to replace these services in conjunction with the water main rehabilitation program. Lead services in the system that are found to be leaking will also be replaced.

49. Hydrant Replacements

There are over 6,000 hydrants in system. Plans are to replace these hydrants in conjunction with the water main rehabilitation program. Hydrants in the system that are found to be defective will also be replaced.

50. Blowoff Replacements

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.

51. Leak Detection

The system is comprised of approximately 874 miles of distribution mains, 131 miles of transmission mains (16” to 66”), 774 transmission valves, 13,120 distribution valves, 74,869 services, and 6,086 hydrants. A system-wide leak detection project was completed in 2010. The plan is to perform a leak detection survey in the 15 year plan.

52. Building and Facility Improvements

Funds are budgeted for unforeseen ongoing improvements for reconditioning the offices, architectural and structural improvements, rehabilitation of the electrical, plumbing, and mechanical systems, security and fire system upgrades, and site improvements.

53. Records Management (GIS) Upgrades

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.

54. Facility Fence and Roads Rehabilitation

It is anticipated in the 15 year plan that various facility access roads will need to be resurfaced. Fences will also be in need of replacement or rehabilitation.

Section IV

Revenue Requirements

IV. REVENUE REQUIREMENTS

Overview of Revenue Plan

Exhibit 3 – 20-Year Sources and Uses of Funds – FY's 2016 through 2035 – Providence Water has developed a Sources and Uses of Funds Plan based on planned replacement needs, current authorized funding, and minimal proposed new funding. The Exhibit lists the projected Sources and Uses of Funds in four five-year phases. The plan is subject to change as it is implemented. Any additional funding or borrowing will be addressed as we move forward.

Overview of Revenue Plan

Providence Water has developed a Sources and Uses of Funds Plan using current authorized funds based on our anticipated replacement needs within our system. EXHIBIT – 3 lists the projected Sources and Uses of Funds in four (4) five-year phases. The current authorized funding amount is $24 million per year. Additional funding and borrowing will be required to balance the projected expenditures.

Sources of Funds

Providence Water began funding a restricted Infrastructure Replacement Fund (IFR) in 1996. At that time, the RI Public Utilities Commission (RIPUC) granted Providence Water a phased-in funding approach to begin its IFR program. Over the years, Providence Water has requested and the RIPUC has approved several increases to the funding level consistent with our plan and accomplishments.

Providence Water has a short-term revolving line of credit with Century Bank that provides access to funds in case of an emergency or cash flow fluctuations. Providence Water does plan to issue bonds for some of the projects in this IFR plan. The plan is also balanced by projecting a number of additional increases in the funding level authorized by the PUC. Please see EXHIBIT – 3. Over the 20 year period, current funding is $480 million, available funds from prior years is $13.2 million and there are no available bond proceeds from earlier issues. A combination of additional rate revenue and bond proceeds of $672.5 million will be needed to balance the plan.

Uses of Funds

Providence Water has cash funded projects totaling $779,213,600 over the 20 year period. This amount includes capitalized labor and benefits authorized by the Public Utilities Commission to be reimbursed to Providence Water's Operating Fund from the IFR Fund.

Debt service as well as applied overhead are included as a use of funds in this plan. Existing debt service obligations totals $85,113,063, new debt service obligations could be potentially $248,684,560 and applied overhead is estimated at $51,136,085.

To recap, total cash funded construction projects are $779.2 million, current debt service is approximately $85.1 million, additional debt service is projected at $248.7 million and applied overhead is estimated at 51.1 million for total uses of funds of $1.2 billion. Total sources of funds are projected to at $1.2 billion resulting in a potential $0.4 million cumulative surplus over the 20 year period. This IFR plan is subject to change and PWSB will invariably have to make amendments to this plan to match changing State and Federal regulations as well as changing field conditions. This replacement plan and the projected funding of this plan is based on the best information available at this time.

20-Year Sources and Uses of Funds - FY 2016 - 2035 - Exhibit 3

	2016 - 2020	2021 - 2025	2026 - 2030	2031 - 2035	2016 - 2035
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Total**
Sources of Funding					
Current Authorized Funding	120,000,000	120,000,000	120,000,000	120,000,000	480,000,000
Current Bond Proceeds	-				
Funds Available from Prior Years	13,197,215	(1,724,384)	220,903	349,802	12,043,536
Additional Rate Revenue	15,500,841	60,928,000	94,285,000	118,285,000	288,998,841
Additional Bond Proceeds	63,000,000	136,500,000	31,000,000	153,000,000	383,500,000
Total Sources of Funds	211,698,056	315,703,616	245,505,903	391,634,802	1,164,542,377
Uses of Funding					
Cash Funded Construction Projects	168,289,300	219,114,752	124,314,545	267,495,003	779,213,600
Existing Debt Service	24,884,444	24,850,532	24,755,538	10,622,550	85,113,063
Applied Overhead	10,983,936	12,082,829	13,340,419	14,728,901	51,136,085
Additional Debt Service	9,264,760	59,434,600	82,745,600	97,239,600	248,684,560
Total Uses of Funds	213,422,440	315,482,713	245,156,102	390,086,054	1,164,147,308
IFR Program Surplus / (Deficit)	(1,724,384)	220,903	349,802	1,548,748	395,069

Appendix

A. APPENDIX

The Comprehensive Clean Water Infrastructure Act of 1993 - Chapter 46-15.6 of the General Laws of Rhode Island

Rules and Regulations for Clean Water Infrastructure Plans

Infrastructure / Capital Program Report - FY 1996 - 2015 (September 2015 Report)

The Comprehensive Clean Water Infrastructure Act of 1993
Chapter 46-15.6 of the General Laws of Rhode Island

TITLE 46
Waters and Navigation
CHAPTER 46-15.6 - Clean Water Infrastructure

Index of Sections

§ 46-15.6-1 Short title. - This chapter shall be referred to as the "Comprehensive Clean Water Infrastructure Act of 1993".

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1.)

§ 46-15.6-2 Legislative findings, intent, and objectives. - (a) The general assembly hereby recognizes and declares that:

(1) Water is vital to life and comprises an invaluable natural resource which is not to be abused by any segment of the state's population or its economy. It is the policy of this state to restore, enhance, and maintain the chemical, physical, and biological integrity of its waters to protect health.

(2) The waters of this state are a critical renewable resource which must be protected to insure the availability of safe and potable drinking water for present and future needs.

(3) It is a paramount policy of the state to protect the purity of present and future drinking water supplies by protecting the infrastructure of potable water, including treatment plants, pipes, valves, pumping stations, storage facilities, interconnections, and water mains.

(4) It is imperative to provide a uniform and valid mechanism to base assistance for the construction, repair, protection, and/or improvement of potable water infrastructure replacement.

(5) The decay of infrastructure and related construction due to deterioration or functional obsolescence can threaten the quality of supplies and, therefore, can endanger public health; thus it is necessary to take immediate and continuing steps to repair and replace the infrastructure used to deliver water supplies in order to restore water system facilities.

(6) Failure to replace the infrastructure used to deliver water supplies may cause and probably will continue to degrade the quality of public drinking water.

(7) Protection of water quality is necessary from the collection source through the point of delivery to the ultimate consumer.

(8) The potable threat to public health caused by unsafe drinking water far outweighs the economic costs for the construction of the potable water infrastructure replacement.

(b) That the objectives of this chapter are:

(1) To establish a funding mechanism to insure that infrastructure replacement programs are carried out by each municipality and by each municipal department, agency, district, authority,

or other entity engaged in or authorized to engage in the supply, treatment, transmission, or distribution of drinking water, and,

(2) That the plans and their execution achieve and insure that the investment of the public in such facilities is not eroded.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1; P.L. 2007, ch. 340, § 53.)

§ 46-15.6-3 Infrastructure replacement program. - All municipalities, municipal departments and agencies, districts, authorities or other entities engaged in or authorized to engage in the supply, transmission, distribution of drinking water on a wholesale or retail basis, and which obtain, transport, purchase, or sell more than fifty million (50,000,000) gallons of water per year, shall be referred to as "water suppliers" for the purpose of this chapter. All water suppliers shall prepare, maintain, and carry out an infrastructure replacement program as described in this chapter.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1.)

§ 46-15.6-4 Content of infrastructure replacement component. - (a) The infrastructure replacement component (hereinafter referred to as "component") shall include without limitation:

(1) A detailed financial forecast of facility replacement improvement requirements for the next twenty (20) years including, but not limited to, the principal components of the water system such as reservoirs, dams, treatment plants, pipes, valves, fire hydrants, pumping stations, storage facilities, pumping and well equipment, interconnections and water mains. Each financial forecast shall analyze the condition and life expectancy of the existing facilities, prioritize needed repairs and replacements and amortize such improvement requirements on an annual basis over the next twenty (20) years in accordance with rules and regulations promulgated herein. Water suppliers which have in effect infrastructure improvement or rehabilitation programs and mechanisms for funding approved by their appropriate governing bodies may submit their existing programs for complete or partial compliance with the provisions of this section.

(2) A method that establishes and maintains fiscal controls and accounting depreciation standards sufficient to ensure proper accounting for evaluation of facility requirements necessitated by this chapter in accordance with rules and regulations promulgated herein.

(b) Components shall be consistent with applicable local comprehensive plans in which the service areas are or are planned to be located.

(c) Proceeds from the watershed protection fund shall be usable for reimbursement of water suppliers for preparation of their infrastructure replacement components as described in this chapter up to fifty percent (50%) of the cost of the component.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1.)

§ 46-15.6-5 Completion, filing, approval and implementation of infrastructure component. - (a) Each water supplier required by this chapter to prepare and maintain an infrastructure replacement component shall complete and adopt a component two (2) years subsequent to the date each party's water supply management plan per § 46-15.3-7.5 is due.

(b) Water suppliers subject to the requirements of § 46-15.6-3 shall file a copy of all components, only to the extent the components differ from plans filed under § 46-15.3-5.1 thereto with the following: the division of drinking water quality of the department of health (hereinafter referred to as "the department").

(c) A water supplier subject to § 46-15.6-3 shall review their components at least once every five (5) years and shall modify or replace their components as necessary.

(d) The department shall coordinate expeditious review of components prepared by water suppliers subject to this chapter. Upon receipt of components prepared by water suppliers under this chapter, water resources board, and the division of public utilities and carriers (for those water suppliers within their jurisdiction) shall have one hundred and twenty (120) days to review the components and submit comments thereon to the department. Upon consideration of written comments by all agencies designated herein the department shall determine whether the component complies with the requirements of this chapter. This determination shall be made within eight (8) months of the initial submission. A thirty (30) day public comment period shall be included in this eight (8) month review period. Failure by the department to notify water suppliers of its determination within the prescribed time limit shall constitute approval.

(e) Each water supplier shall implement the requirements of its infrastructure replacement program and component, including its infrastructure replacement fund, as mandated by this chapter in accordance to rules and regulations promulgated per § 46-15.6-7.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1; P.L. 1995, ch. 103, § 1; P.L. 1997, ch. 37, § 1; P.L. 1998, ch. 340, § 1; P.L. 2009, ch. 288, § 9; P.L. 2009, ch. 341, § 9.)

§ 46-15.6-6 Financing infrastructure replacement. - The cost of infrastructure replacement programs and indemnification as required by this chapter shall be financed as follows:

(1) The cost of programs to implement infrastructure replacement shall be paid by the water users. The charges shall be limited to those necessary and reasonable to undertake the actions required by this chapter. These charges shall be based upon the annual funding requirements of the facility improvements necessitated over each successive twenty (20) year period. Interest earned on money in this infrastructure replacement fund shall be credited to this infrastructure replacement fund.

(2) Each water supplier designated in § 46-15.6-3 shall establish a special account designated as the infrastructure replacement fund to be held as a restricted receipt account and to be administered by the water supplier solely to implement and carry out the replacement of infrastructure as required by this chapter.

(3) Any money which may accumulate in the infrastructure replacement fund in excess of that needed to implement the annual infrastructure replacement program or in excess of that exclusively pledged to repayment of outstanding bonds or notes or loan repayments to implement the infrastructure replacement program shall revert to the rate payers of that particular system on a biannual basis.

(4) Each water supplier designated in § 46-15.6-3 may, as a complete or partial alternative to direct funding of its infrastructure replacement program, finance its infrastructure replacement program through bonding. The annual debt service of each bond or bonds shall be applied and credited towards the annual requirement of the infrastructure replacement program's annual funding requirements.

(5) The Rhode Island public utilities commission, as to water suppliers within its jurisdiction, shall permit an increase for just and reasonable infrastructure replacement in the portion of the water suppliers' rate structure to comply with this chapter and shall allow the water supplier to add this required funding to its rate base in accordance with this chapter.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1; P.L. 2009, ch. 288, § 9; P.L. 2009, ch. 341, § 9.)

§ 46-15.6-7 Rules governing content of programs, components, review, evaluation, funding, and implementation. - The department with the concurrence of the water resource board, and the Rhode Island public utilities commission, as to water suppliers within its jurisdiction, shall forthwith promulgate rules and regulations for the review of components as pertains to financial forecasts of facility replacement, improvement requirements and fiscal controls and accounting depreciation standards per § 46-15.6-4(a)(1) and (a)(2). The department with the concurrence of the water resource board, and the Rhode Island public utilities commission, as to water suppliers within its jurisdiction, shall promulgate the criteria or standards which it will use to evaluate the implementation of approved components, programs and funding mechanisms.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1; P.L. 1997, ch. 37, § 1; P.L. 2009, ch. 288, § 9; P.L. 2009, ch. 341, § 9.)

§ 46-15.6-8 Severability. - If any provision of this chapter or of any rule, regulation or determination made thereunder, or the application thereof to any person, agency or circumstances, is held invalid by a court of competent jurisdiction, the remainder of the chapter, rule, regulation, or determination and the application of such provisions to other persons, agencies, or circumstances shall not be affected thereby. The invalidity of any section or sections of this chapter shall not affect the validity of the remainder of this chapter.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1.)

§ 46-15.6-9 Excluding requirement of state mandated cost. - The provisions of §§ 45-13-7 - 45-13-10 shall not apply to §§ 46-15.6-1 - 46-15.6-8.

History of Section.

(P.L. 1993, ch. 312, § 1; P.L. 1993, ch. 438, § 1.)

RULES AND REGULATIONS FOR CLEAN WATER INFRASTRUCTURE PLANS

[R46-15.6-INFRA]

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATION

Department of Health

October 1994

AS AMENDED
January 1995
January 2002 (re-filing in accordance with the provisions of section 42-35-4.1 of the Rhode Island General Laws, as amended)

INTRODUCTION

The waters of this state are a critical renewable resource which must be protected to insure the continued availability of safe and potable drinking water for present and future needs. It is a paramount policy of the state to protect the purity of present and future drinking water supplies by protecting the infrastructure of potable water, including sources, treatment plants and distribution systems. The decay of water supply infrastructure due to deterioration or functional obsolescence can threaten the quality of water supplies and therefore can endanger public health. Therefore, it is necessary to take timely and continuing steps to repair and replace the infrastructure used to treat and deliver drinking water from public water suppliers. By planning and funding for future infrastructure replacement, unexpected large capital expenditures causing sudden increases in water rates can hopefully be avoided. The intent of this Infrastructure Replacement Plan is to provide a planning and funding mechanism to insure that infrastructure replacement programs are carried out by each municipality, district, agency, authority, or other entity engaged in the supply, treatment, transmission, and/or distribution of drinking water. Goals of the plan include the justification of a facility replacement program, the provision of a dedicated and sufficient funding mechanism, the prioritization of infrastructure replacement, and the prevention of the erosion of drinking water infrastructure.

These rules and regulations are promulgated pursuant to the requirements and provisions of RIGL Chapter 46-15.6 Clean Water Infrastructure of the General Laws of Rhode Island, as amended.

The terms and provisions of the rules and regulations shall be liberally construed to allow the Department of Health to effectuate the purposes of the state law, goals and policies consistent with the Clean Water Infrastructure Act, Chapter 46-15.6 of the General Laws of Rhode Island, as amended.

TABLE OF CONTENTS

SECTION 1.0 DEFINITIONS

Wherever used in these rules and regulations the following terms shall be construed as follows:

1.1 Audit--the annual formal examination of the water supplier's financial statements including all investments, interest, expenditures, and operating costs.

1.2 Commission--the Public Utilities Commission (PUC) of the State of Rhode Island.

1.3 Comprehensive Plan--the Comprehensive Plan adopted and approved in accordance with RIGL Chapter 45-22.2, the RI Comprehensive Planning and Land Use Regulation Act. A document prepared by each local municipality which contains the planning and implementation program for land use, housing, economic development, natural and cultural resources, services and facilities, open space and recreation, and circulation.

1.4 Department--the Department of Health (DOH), Division of Drinking Water Quality.

1.5 Distribution facilities--the pipes and appurtenant facilities employed specifically to deliver, to dispense, to render or to circulate potable water directly to the consumer.

1.6 Drinking Water--potable water served to the public.

1.7 Economic life--the expected financial lifespan of a component of a public water system which is used to depreciate the capital expense of the component.

1.8 Eligible expenditures--those costs and expenses necessary to fund, manage, and implement the infrastructure replacement plan, only. This may include associated accounting fees, consulting fees, replacement construction, etc.

1.9 Infrastructure--the permanent underlying framework of the public water system, including but not limited to, supplies, transmission, storage, distribution, pumping, and treatment facilities.

1.10 Life expectancy--the expected physical lifespan of a component of a public water system.

1.11 Maintenance--a planned program of inspection, adjustment, exercise, lubrication, etc. which allows the maximum continuous service of the equipment in the system at the lowest possible cost to the utility as required in the Department of Environmental Management's Water Supply Management Planning Section 8.07(c). Routine maintenance expenditures are not eligible for funding from the Infrastructure Replacement Plan.

1.12 Rate fee--the charge per unit for public water based upon a ratio, scale, or standard relative to the cost of supplying potable drinking water.

1.13 Rehabilitation--rehabilitation which restores existing facilities or components to a condition which extends the physical and economic life of the component. Rehabilitation is an eligible expenditure under the Infrastructure Replacement Plan.

1.14 Repair--expenditures to return into service a component of the infrastructure that has failed is not an eligible expenditure under the Infrastructure Replacement Plan.

1.15 Replacement--new construction to substitute for existing facilities or components which can not be rehabilitated or repaired cost effectively is an eligible expenditure under the Infrastructure Replacement Plan.

1.16 Special account--an account established by physically opening an account designated as the "Infrastructure Replacement Fund" that is acceptable under this Act. This account shall be self-contained in that deposits and withdrawals are recorded by the financial institution through a fiduciary relationship with the utility. This special account shall be a restricted receipt account dedicated solely for funding of eligible expenditures from the infrastructure replacement program and be administered by the general manager of the water supplier or his designee. All receipts, income, and interest earned on these funds shall be accrued within this special account.

1.17 Surcharge--a fee charged in addition to normal system rate fees which is used to fund extraordinary or special conditions of the water system.

1.18 Transmission facilities--shall mean the pipes, pumping stations, and storage facilities required to carry raw and/or potable water from a water source to or throughout an area served or to be served by a water supply system for the specific purpose of supplying water to support a general population.

1.19 Water supplier--any municipality, municipal department, agency, district, authority, or other entity engaged in or authorized to engage in the supply, treatment, transmission, or distribution of drinking water on a wholesale or retail sales basis.

1.20 Water supply sources--are Department of Health approved sources of supply connected to a water supply system and available for distribution. These sources may be surface waters or groundwater wells.

1.21 Water supply management plan--a plan prepared by applicable public water suppliers which plans and implements effective and efficient conservation, development, utilization, and protection of water supply resources consistent with the present and future needs of the State and its people as defined in RIGL 46-15.4.

SECTION 2.0 APPLICABILITY - PREPARATION OF PLANS

2.1 All water suppliers which supply, obtain, transport, distribute, purchase, and/or sell on a wholesale or retail basis, more than fifty million (50,000,000) gallons of water per year shall be required to prepare, maintain, and carry out a clean water infrastructure replacement plan as described in these regulations.

SECTION 3.0 CONFORMITY WITH OTHER LEGISLATION

3.1 The clean water infrastructure replacement plans shall be in conformity with all applicable provisions of state and federal laws including the federal Safe Drinking Water Act (42 USC Section 300f et seq.); Chapter 46-13 of the General Laws of Rhode Island, Public Drinking Water Supply. Infrastructure replacement plans must be consistent with the Comprehensive

Plan for the community or communities associated with the water system. Infrastructure replacement plans shall also be consistent with the Water Supply Management plans required under Chapter 46-15.4.

SECTION 4.0 CONTENTS OF PLANS

4.1 Clean water infrastructure replacement plans shall be prepared in the format, and shall address each of the topics listed in this section, to the extent that each is relevant to the water supplier, the water source, the water system, and the transmission/distribution/storage system. Systems which currently have an infrastructure replacement plan may review the existing plan and utilize existing information to the extent that it is consistent with the intent of the infrastructure replacement plan outlined below. The initial plan may include a schedule for the completion of the evaluation of major components or items which require detailed investigation. The schedule must demonstrate an expeditious, responsible, and reasonable time period for compliance.

4.2 All principal components of the water system such as sources, reservoirs, dams, spillways, intakes, treatment plants, pump stations, storage facilities, pumping and well equipment, shall be listed and evaluated. Relatively small and numerous components of the system such as water mains, distribution piping, valves, hydrants, and interconnections may be evaluated as a group. This evaluation shall consider the following:

a. A brief description of the system with a schematic of the process flow will be included in the plan. This description of the system may be taken directly from the Water Supply Management Plan where relevant and is not intended as a duplicate effort but to facilitate the evaluation of individual components. Age and condition of the existing component and the necessity for replacement of the component within a twenty (20) year time frame shall be evaluated. Specific components may be in need of immediate replacement while others may extend well beyond the twenty year time frame. Replacement should be evaluated and prioritized over a minimum of five (5) year intervals. The level of detail in the analysis of the component should reflect the priority of the component to the proper operation of the system as well as the age and known condition of the component. A detailed schedule for the initial five year interval must be included. No infrastructure replacement construction is required to take place within any time interval if demonstrated to not be necessary.

b. Life expectancy of the component shall be determined. Life expectancy shall be determined by design criteria, specific site conditions, maintenance records, manufacturer's documentation, engineering evaluation, physical inspection, invasive and/or non-destructive integrity testing, or a combination of all of the above. Records of inspection and maintenance may be reviewed when determining the life expectancy of the component. The attached Guideline, Appendix 1, is intended to serve as a general rule of thumb for component life expectancy and actual life expectancy within an individual system may be demonstrated to be significantly more or less than the Guideline value.

c. Consideration shall be given to the public water system's ability to meet current and future requirements of the Safe Drinking Water Act. Treatment requirements should be analyzed to the extent possible to insure that infrastructure replacement and/or rehabilitation will comply with mandated requirements consistent with the Safe Drinking

Water Act.

d. A financial forecast shall be based on the analysis of the condition and life expectancy of the existing facilities, prioritized needed repairs and replacements and amortize proportionally such improvement requirements on an annual basis over the next twenty years consistent with their respective life expectancy. The forecast shall include contingency costs, range of construction costs, and/or confidence limits of the financial forecast.

e. Infrastructure replacement shall meet the needs of the water suppliers, however priority of anticipated replacement and grouping of replacement projects by time of replacement, similarity of projects, and importance of the component to the system shall be considered when establishing the schedule. Priority should be given to components which have a known need for replacement and less detailed analysis given to relatively new infrastructure items.

4.3 When planning infrastructure replacement, the water supplier shall consider sizing facilities to meet the approved local comprehensive plans for existing or proposed service areas. The existing or proposed service area shall be defined consistent with that described in the supplier's most recent Water Supply Management Plan. Funding for proposed expansion shall come from the capital improvement program utilizing new capital rather than from replacement funding. It is intended that the infrastructure replacement plan evolve from the Water Supply Management Plan and expand the concepts of capital improvement planning initiated in the Water Supply Management Plan. The infrastructure replacement plan shall be consistent with sound waterworks practice.

4.4 The infrastructure replacement plan must recognize and maintain existing fiscal controls and accounting standards in accordance with Generally Accepted Government Accounting Principles sufficient to ensure fiscal responsibility for the evaluation and implementation of the infrastructure replacement. These fiscal controls and accounting standards must be established where none currently exist. The financial requirements of the plan shall conform to those outlined in Section 6.0 of these regulations.

4.5 Funds from the watershed protection fund may be used for the preparation of clean water infrastructure replacement plans up to fifty (50) percent of the cost of the plan. Disbursements from the fund shall be in accordance with Chapter 46-15.3-11 of the Public Drinking Water Resources Board Operating Fund. The remaining costs are eligible for funding through the Safe Drinking Water Revolving Loan Fund. The plan shall incorporate the proposed rate structure impacts, schedule of proposed rate changes, and schedule for full funding consistent with the funding requirements for scheduled infrastructure replacement.

SECTION 5.0 REVIEW OF PLANS

5.1 Water suppliers subject to the requirements of this chapter shall file six copies of the clean water infrastructure plan with the Division of Drinking Water Quality of the Department of Health (the Department). Plans must be submitted no later than one year subsequent to the date the system's water supply management plan is due in accordance with RIGL Section 46-15.4-4.

5.2 The Department shall coordinate review of the plan with the Department of Environmental Management's Division of Water Supply Management, the Department of Administration's Division of Planning, the Water Resources Board, and the Public Utilities Commission. The PUC shall only review Plans for those systems which are regulated by the PUC. Each Department shall have 120 days to review the plan and submit comments to the Department of Health. Upon consideration of the comments, the Department shall determine if the plan complies with the requirements of these regulations within two hundred forty days (240) of the initial submission. A thirty day public comment period is inclusive in this two hundred forty day (240) review period.

5.3 Water suppliers shall review and update their infrastructure replacement plans at a minimum frequency of every five years. Major modifications or revisions to the infrastructure replacement plan shall be submitted for review more frequently as necessary.

5.4 Water suppliers shall implement the infrastructure replacement plan according to the approved plan. On-site review of facility components may be conducted by the Department when appropriate and/or applicable. The responsible official of the water supply system shall be required to verify that construction expenditures are consistent with the plan.

SECTION 6.0 FINANCING INFRASTRUCTURE IMPROVEMENTS

6.1 Each water supplier subject to the requirements of this chapter shall establish a separate special account designated as the Infrastructure Replacement Fund to be held as a restricted receipt account and to be administered by the water supplier solely to implement and carry out the replacement or rehabilitation of infrastructure in accordance with the approved plan. The dedicated account should be invested in accordance with the standards established for the agency, municipality, or water supplier.

6.2 The costs of programs to implement infrastructure replacement shall be paid by the users of the water system at a rate directly proportional to the users' consumption of water. Charges shall be limited to those necessary and reasonable for implementation of the plan. These charges shall be based upon the annual funding requirements of the facility improvements necessitated over each successive twenty year period.

6.3 Interest earned on this account shall be credited to this account only. Accumulated funds in excess of that estimated to be necessary to implement the plan shall revert to the rate payers of the system on a biannual basis. Funds will be allowed to accumulate with the intent to build sufficient capital to finance the estimated costs of major projects. It is understood that annual investments may be necessary over many years to fund major projects. Funds accumulated that are in excess of that estimated to implement the plan will cause the water supplier to reduce the future charges for infrastructure replacement.

6.4 Water suppliers may alternatively fund the infrastructure replacement program through partial or complete external funding at the option of the water supply system. Debt service and debt service issuance costs for any and all funding shall be an eligible expense as part of the program's funding requirements.

6.5 The Public Utilities Commission, as to water suppliers within its jurisdiction, shall permit an increase for just and reasonable infrastructure replacement in the portion of the water suppliers' rate structure to comply with this chapter and shall allow the water supplier to add this required funding to its rate base in accordance with this chapter. Proposed increases in rates by regulated water utilities to finance infrastructure improvements shall be filed and reviewed in conformance with Chapter 39 of the RI General Laws.

6.6 The applicable section of the water supplier's annual audit shall be submitted to the Department to verify compliance with the funding intentions of the infrastructure replacement plan. The dedicated fund for infrastructure replacement will be a separate line item in the audit. Financial and summary status reports shall be submitted for each on-going project which outlines funds spent on the project, funds remaining, percentage of completion, and a brief description of work completed and work remaining. Project expenditures must be consistent with the plan and be eligible expenditures under the plan. Audits shall be submitted within 180 days from the end of the water suppliers fiscal year. Extensions will be allowed for reasonable cause.

SECTION 7.0 SEVERABILITY

7.1 If any provision of these rules and regulations or the application thereof to any person or circumstance is held invalid by a court of competent jurisdiction, the remainder of the rules and regulations shall not be affected thereby. The invalidity of any section or sections or parts of any section or sections shall not affect the validity of the remainder of these rules and regulations.

APPENDIX 1

TYPICAL LIFE EXPECTANCY

EQUIPMENT	YEARS
Source of supply plant	
Structures and improvements	35-40
Collecting/impounding reservoirs	50-75
Intake structures	35-45
Wells and springs	25-35
Galleries and tunnels	25-50
Supply mains	50-75
Pumping plant	
Structures	35-40
Pumping equipment	10-15
Other pumping plant	20
Water treatment plant	
Structures	35-40
Water treatment equipment	15-20
Transmission/Distribution	
Structures	35-40
Reservoirs and tanks	30-60
Mains	50-75
Services	30-50
Meters	15
Hydrants	40-60
General plant	
Structures	35-40
Furniture/equipment	15-20
Transportation equipment	7
Stores equipment	10
Tools, shop equipment	7-10
Laboratory equipment	10-15
Power operated equipment	10
Communication equipment	10

PROVIDENCE WATER

Infrastructure/Capital Program Report 1996 - 2015

SEPTEMBER 2015

PROVIDENCE WATER

PROVIDENCE WATER SUPPLY BOARD

INFRASTRUCTURE/CAPITAL PROGRAM REPORT
For July 1, 1995 Through June 30, 2015

Project Management
Roger Biron, Leo Fontaine, Christopher Labossiere,
Gary Marino, Richard Razza, Norman Ripstein

Project Inspection
Andrew Pion, Ed Cabral, Robert Greene, Jason Hindley,
Len Lanoie, Peter McDougall, Seth O'Connor, Steven Shaw

Finance Department Support
Mary Deignan-White, Ingrid Fernandez, Idowu Kuti
Thomas Massaro, Nancy Parrillo

Manager of IFR/CIP
Steven D. Santaniello

Senior Manager of Engineering
Peter R. LePage

Deputy General Manager of Operations
Gregg M. Giasson, P.E.

General Manager
Ricky Caruolo

September 2015

TABLE OF CONTENTS

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, and 2010 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 $342 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.

PROVIDENCE WATER

Source of Funds *

	CIP & Infrastructure Replacement Funds	Meter AMR Fund	Water Operating Fund	RI Water Resources Board Bond	RICWFA Bonds '94, '99, '01, '02, '03, '08, '09, '13, '14	Total IFR / CIP Expenditures
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

* Provided by Providence Water Finance Department

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

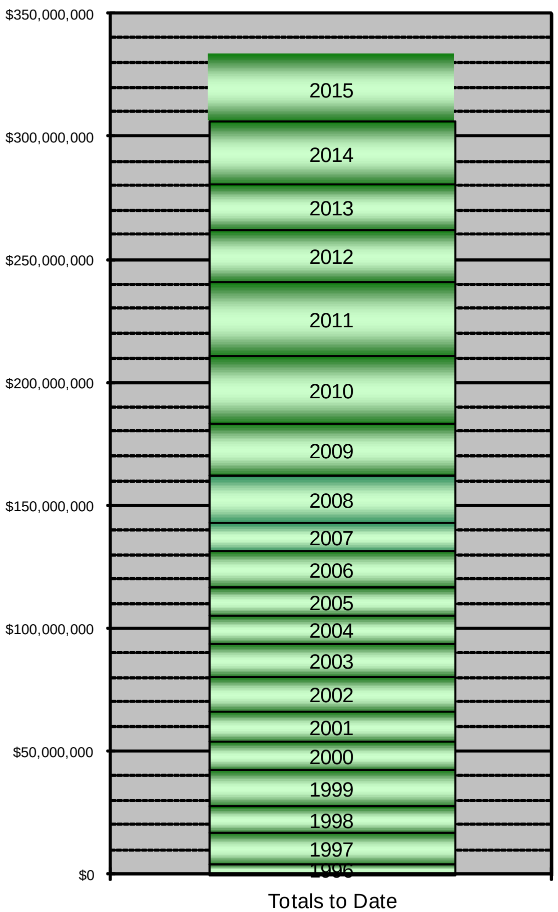
*** $12,435,056.81 of RICWFA Bond proceeds reimbursed CIP/IFR Funds for expenses incurred in FY 08

**** During January 2015 - June 2015 IFR Fund reimbursed $1,065,502.33 to Operating Fund per the RI PUC order.

PROVIDENCE WATER

Summary Of Expenditures

Fiscal Years 1996 To 2015

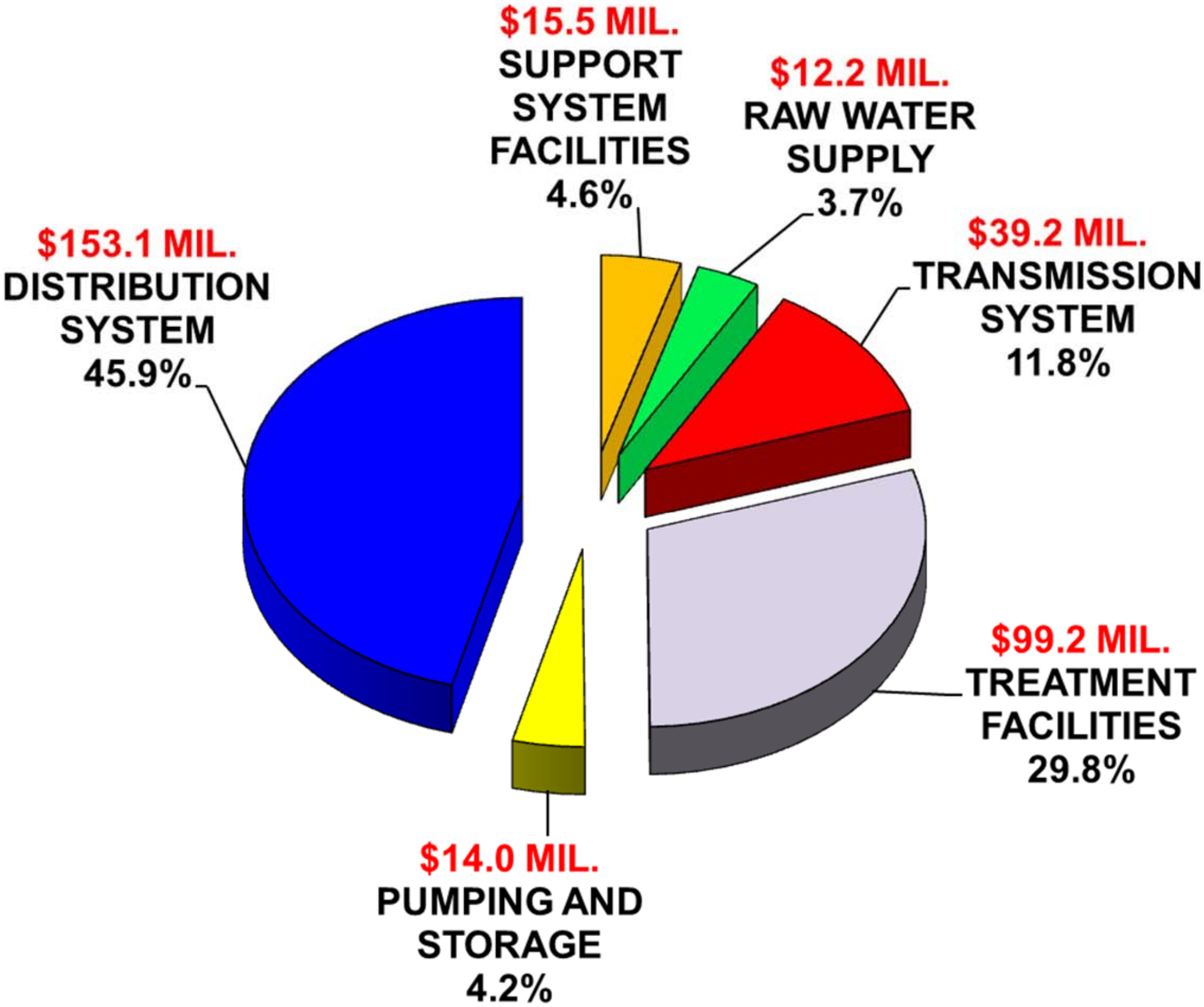


	Expenditures		
Fiscal Year	**IFR**	**CIP**	**TOTAL**
1996	$4,380,022	$188,374	**$4,568,396**
1997	$12,612,265	$160,310	**$12,772,575**
1998	$10,248,978	$224,644	**$10,473,622**
1999	$14,864,327	$280,190	**$15,144,517**
2000	$10,175,318	$794,924	**$10,970,242**
2001	$11,551,726	$1,019,863	**$12,571,589**
2002	$10,915,284	$3,210,653	**$14,125,937**
2003	$10,054,569	$3,350,699	**$13,405,268**
2004	$7,864,982	$3,721,139	**$11,586,121**
2005	$9,856,233	$1,177,402	**$11,033,635**
2006	$13,996,118	$1,276,139	**$15,272,258**
2007	$9,746,919	$1,563,255	**$11,310,174**
2008	$16,854,654	$1,977,873	**$18,832,526**
2009	$20,622,218	$851,518	**$21,473,736**
2010	$26,790,595	$455,383	**$27,245,978**
2011	$26,850,302	$3,738,298	**$30,588,600**
2012	$19,731,159	$1,241,371	**$20,972,530**
2013	$17,903,196	$474,308	**$18,377,504**
2014	$24,705,871	$609,513	**$25,315,384**
2015	$25,388,286	$1,731,606	**$27,119,892**
Totals to Date	**$305,113,024**	**$28,047,461**	**$333,160,485**

PROVIDENCE WATER

IFR / CIP Expenditures

Fiscal Years 1996 Through 2015*



Total Investment Into System $333.2 MIL.

*Expenditures Through June 30, 2015

IFR PROJECT STATUS REPORT

PROJECT NARRATIVES

Raw Water Supply

Rehabilitate Large Dams (Gainer Dam/Regulating Dam)

Construction has been completed to rehabilitate the 400 feet long Gainer Dam concrete spillway, the blowoff structure, and the meter chamber. Also completed was work to correct undermining of the Regulating Dam spillway structure footing.

400 foot Gainer Dam spillway showing new concrete facing

Rehabilitate Large Dams (Ponaganset Reservoir)

Construction is complete for the rehabilitation of Ponaganset Reservoir. Work included repair of dam erosion and placement of riprap, construction of a downstream buttress, restoration of the gate structure and outlet works, improvements to the discharge channel, and reconstruction of the road and drainage system over the dam

Ponaganset Reservoir before rehabilitation

Ponaganset Reservoir after rehabilitation

Burton Pond Dam Rehabilitation

The project has been completed. The breached area of the earth/masonry dam has been reconditioned. Riprap was installed along the top upstream face of the dam to provide continued slope protection.

Burton Pond Dam

Gainer Dam Stonewall Rehabilitation

Construction has been completed to reconstruct 5800 feet of the dry masonry type stonewall located on the north and south sides of RI Route 12 along the length of Gainer Dam.

60" Influent Conduits - Corrosion Protection

Corrosion on 60 inch main prior to rehabilitation

Construction was completed to rehabilitate and recoat the 900 feet long exposed portions of the twin 60 inch riveted steel transmission mains in the meter chamber. Rust was removed, the pipes sandblasted, and protective coatings applied. The exposed portion of twin 60 inch mains inside the junction chamber structure were sandblasted and protective coatings applied to protect against corrosion. In the process two lead joints that were found leaking were resealed. Construction has been completed to provide cathodic protection to 1000 feet of the underground portion of the twin mains. Four impressed current anode beds have been installed to complete the protection system.

Raw Water Booster Pump Station - Replace Generator

New Raw Water Booster Pump Station generator for backup power to treatment plant

In March 1996, the engine of the old diesel generator failed and became inoperable. The unit was obsolete and the cost made it unfeasible to further repair the generator. In December 1996 a new 2000 kW generator was installed to replace the old 1750 kW generator. This generator has the capacity to power the entire treatment plant and raw water pumps in the event of an emergency power outage.

Installation of Level Measuring Equipment

New sonar equipment was installed at Gainer Dam to replace older float style equipment in order to monitor reservoir elevations.

Raw Water Booster Pump Station – Replace Valves

All eight (8) of the suction and discharge valves for the booster pumps in the pump station failed to provide a complete seal when closed. Construction has been completed in which all eight (8) valves and the four (4) actuators for the discharge valves were replaced.

Installation of spool piece after valve installation


New 30” butterfly valve with actuator

Rehabilitate Large Dams (Barden Reservoir)

Construction is complete at Barden Reservoir. Work consisted of improvements to the inlet/outlet structures (including replacement of the gates at the inlet structure), the discharge channels, the spillway area, the crest of the dam to accommodate design flood flows, erosion protection along the upstream slope, and stabilizing the dam by flattening the downstream slope of the dam.


Repairs to the downstream slope of the dam


Repairs to upstream wall at Barden Dam

Raw Water Booster Pump Station Pump Rehabilitation

The rehabilitation of two 50 MGD pumps and two 30 MGD pumps were completed. The scope of work for the project included removing and machining the impellers and shafts, replacing the bearings, laser alignment, vibration analysis, and testing the pumps.

Rehabilitate Large Dams (Westconnaug Reservoir)

Construction is complete at Westconnaug Reservoir Dam consisting of improvements to the spillway to accommodate design flood flows, rehabilitation of the spillway base, and improvements to the upstream slope, the downstream face, the crest of the dam, and the access road. The existing 16-inch discharge control valve has been replaced with a new 20-inch valve. The vault that houses the discharge control valve was in poor condition and has also been replaced with a new pre-cast concrete vault.

Rehabilitation work for the smaller Jordan Pond Dam was also included with this project because of its close proximity to the Westconnaug dam. The dam was in poor condition and in need of numerous improvements to the spillway area, the outlet masonry structures, and the discharge pipe.

Rehabilitate Large Dams (Moswansicut Reservoir)

Construction is complete that improved the slope stability of the dam and corrected localized seepage including the start of a sand boil in the vicinity of the Dam's left abutment. Work included installation of a toe drain system and flattening the downstream slope of the dam with the addition of a gravel buttress.

Concrete remediation at the outlet structure

Regrading the access road on the crest of the dam

Construction is complete consisting of regrading and armoring the upstream slope of the dam, miscellaneous concrete repairs to the outlet structure, regrading the crest of the dam, clearing and grubbing both the outlet and emergency spillway discharge channels, and regrading the access road to the dam.

Large Dam Study

The last official report of record for the Gainer Dam and its five tributary dams was the 1990 Phase II Dam Investigation Report. The report was outdated and listed several deficiencies for dams that have since been corrected or are in the process of being addressed. In spite of the many improvements that were performed, insurance companies still viewed the 1990 Phase II Report as the official report of record.

A new Large Dam Study was therefore commissioned and has been completed. The scope of work for the Large Dam Study included visual inspections of the six large dams, reviewing existing data for the recently rehabilitated dams, conducting stability analyses for the dams that have yet to be rehabilitated, conducting hydrologic and hydraulic analyses for each dam, and updating Providence Water's Emergency Action Plan. The Large Dam Study now replaces the 1990 Phase II Report as the report of record.

The Large Dam Study concluded that all major issues identified in the 1990 Phase II Dam Investigation Report have been addressed and that no immediate repairs were required at any of the six dams.

Gainer Dam Gatehouse - Replace Valve Shafts, Sluice Gates and Stop Shutters

This project moved up in priority and schedule since it had to be completed to allow inspection of the 90" influent conduit in order to be able to safely isolate the conduit for inspection. Construction is complete for replacing all nine (9) sluice gates, all seventy (70) stop shutters, and two (2) drain valves. Nine (9) new electric actuators were installed to operate the sluice gates. The bar grating and trash racks were also replaced under this project.

Installation of new sluice gate

Raw Water Booster Pump Station – Replace Boiler and Heating System

The old boiler, which dated back to the original construction of the pump station in 1966 experienced electrical problems, leaks, and required continual maintenance. A construction contract has been completed for needed improvements to the heating system.

Raw Water Booster Pump Station Electrical Upgrades

The project to replace the motor control center at the RWBPS is complete. The motor control center dated back to the original construction of the pump station in 1966 and needed to be replaced as parts have become obsolete. The project consisted of new 2300-volt switchgear, pump starters and controllers, new feeders to the motor controls, and a new incoming service feeder. The new motor control center will provide reliable pump control during low reservoir levels and power outages.

Installation of new motor control center

Various Dam Improvements

Work under this project is to address deficiencies as identified through continuing inspections and studies. At Westconnaug Reservoir a new security gate has been installed at the main entrance of the dam. At Barden Reservoir the downstream slope of the dam was regraded and reseeded, and the riprap along the spillway channel was reconstructed. Work also included installation of a safety handrail along the west bank of the spillway.

Evaluation of Secondary Dams

A study to assess the risks to, and the need for improvements to the smaller secondary dams within the watershed has been completed. These secondary dams include the Coomer Reservoir Dam, the Kimball Reservoir Dam, and the Peeptoad (Harrisdale) Pond Dam. The study included a visual inspection, geotechnical evaluation, and hydraulic and hydrologic analyses. A scope of work is being identified from this study for future rehabilitation work.

Raw Water Generator Replacement

The Raw Water Booster Pump Station's 2000-KW 2400-volt generator failed in December 2010 and required replacement. Providence Water reached an agreement with our insurance company in accordance with the terms and conditions of our policy against loss of property to help cover the cost of a new replacement generator. The generator's primary function is to provide power to the Raw Water Booster pumps in the event of low reservoir elevation. A generator has been purchased, installed, tested, and placed into service.

Fencing, Fire Lanes and Property Rehabilitation

Fencing was installed along sections of watershed property to replace deteriorated fencing and new concrete fence posts were installed to replace old posts that had weathered or were otherwise deteriorated. Some of the old gates at the fire lanes that lead into our property have been replaced to create a wider and more secure entrance for vehicles and materials. Fencing improvements are conducted by priority as determined by previously conducted inventories and evaluations. Construction for the rehabilitation of the access road and drainage system along the perimeter of Rockland Cemetery has been completed.

Meter and Junction Chambers Rehabilitation


Concrete Improvements

The contract for improvements to the meter chamber structure at the base of the dam is completed. The replacement of the exterior waterproof roof membrane, replacement of the roof ventilator, removing and replacing the damaged sections of fence along the roof, and injecting construction joints to stop leakage of groundwater into the tunnel, have all been completed. Also completed were installation of a new breaker in the 480V panelboard in the Gainer Dam Gatehouse for connecting the existing feeders into the new breaker, replacement of the existing 600V/120-230V transformer with a new 480V/120V-230V transformer, and installation of additional lighting along the entire length of the chamber tunnel running under the dam.

The rehabilitation of the exterior coating of the 60" influent conduits has been completed. Replacement of the security fence at the entrance of the meter chamber has been completed. Rehabilitation of the south influent conduit sluice gate operating stem and stem guides has been completed.

Improvements to the junction chamber have been completed. A new aluminum staircase to allow access from the entry platform to the lower portion of the structure, cleaning and painting the outside steel access doors, exterior rip-rap improvements, replacing the air release valves, installing new lighting to improve lighting conditions inside the structure, and rehabilitation of the exterior coating of the surfaces of the 60-inch supply mains have all been completed. A new climb resistant fence has been installed above the access door.

Rehabilitation of the 12" blow-off from the north conduit has been completed.

Treatment Plant Facilities

Process Control / Data Acquisition System - (Central Control Board Replacement)

Installation of a new computerized control, instrumentation, and data acquisition system at the treatment plant is complete. The system monitors and controls the operation of the entire treatment plant and remote facilities. Construction of the new control room has been completed, process control equipment has been installed, all remote pump stations and reservoirs are on-line, and all of the in-plant points have been tied into the new control system. Wholesale facilities have been tied into the SCADA (Supervisory Control and Data Acquisition) system. Certification for Y2K compliance has been received from the prime contractor. Logs and reports are fully operational.

Replace Electronic Process Monitoring Equipment

A residual chlorine meter was installed in the clearwell to replace a failed unit. New sonar elevation equipment was installed for the filters to replace the old, unreliable elevation equipment.

Chlorine Room Rehabilitation

Construction is complete for enlarging the chlorine storage room and providing outside access only to the room. Chlorine feeders and storage equipment were replaced and a new emergency ventilation system has been installed in both the chlorine feed and storage areas.

The contractor for the project has filed for arbitration for the resolution of outstanding claims. PW has provided Discovery Documents in response to the contractor being sued by one of his subcontractors. Neither the contractor nor the subcontractor has pursued this further.

Replace Lime Feed Equipment

The old lime feeders at the plant have been replaced with 4 new feeders. New injection piping has been installed to provide for an additional lime injection point prior to raw water aeration for corrosion control optimization purposes. The corrosion control optimization measures are necessary as a result of the lead and copper rule.

The old tile floor of the room was removed and replaced with a new chemical resistant non-skid epoxy floor.

Two of four new lime feeders installed at treatment plant

New sulfate feeder equipment and day tanks for liquid ferric sulfate coagulant injection

Replace Ferric Feed Equipment

Installation of a new liquid feed system consisting of new chemical storage tanks, new feeder pumps, controls and piping has been completed. The system replaces the old problem-ridden dry feed system.

Service Water / Wash Water System Controls Upgrade

Work was completed to replace elevation monitoring and control equipment for the service water tank and to install a new remote terminal unit (RTU) for transmitting service water data to the new centralized control system.

Wash Water Tank - Replace Check Valves

Two 18" check valves on the washwater pump suction lines were replaced. The old check valves experienced leakage and were not capable of holding prime to the pumps.

48" Washwater Main Rehabilitation - Corrosion Protection

Recoating of the 48" dia. filter backwash washwater pipe and associated lateral piping, located in the Pipe Gallery of the treatment plant was completed. The old coating system was considerably deteriorated, threatening the integrity of the pipe. The coating was mechanically removed and a new moisture cured two-coat urethane paint system was applied.

Painting of 48” Washwater Main

Auxiliary Wash and Blower System for Filters

Installation of the new air blowers and piping for providing the capacity to air backwash the filters has been completed.

New air blowers

Replace Effluent Valve Actuators

All of the actuators for all of the plant’s filters have been replaced with new internally programmable actuators that will provide improved effluent flow control and compatibility with the new control board system.

Filter Gallery Rehabilitation

A project was completed in March 1996 in which a portion of the east and west walls of the filter gallery were reconditioned. The work was needed because tiles were loosening from the wall and falling in the filters.

Treatment Plant - Replace Boilers and Water Heaters

Replacement of the old deteriorating water heaters and boilers at the treatment plant has been completed. The water heaters and boilers provide heat for the building, and hot water for domestic use and for the treatment process.

Interior of the clearwell

Concrete reconstruction and installation of new instrumentation in treatment plant's 72" x 42" effluent venturi meter

Rehabilitate Interior of Clearwell

Construction is complete to rehabilitate the interior of the clearwell. Work consisted of rehabilitating eroded concrete surfaces and cracks, and leaking construction joints inside the interior of the structure. Also included in the scope of work was the structural rehabilitation of two cast-in place concrete 72" x 42" effluent venturi meters. The instrumentation has been fully restored with a new pressure sensing diaphragm type system replacing the annular rings. New process piping and signal wiring has been installed to carry the signal flow to the SCADA system.

New access hatches and instrumentation panel installed over the opening of the venturi meters

Effluent Clearwell Yard - Concrete Repairs

Construction is complete for the rehabilitation of the area of the effluent yard located directly over the clearwell. The scope of work for the project consisted of installation of a new protective structure directly above the clearwell to eliminate the possibility of rainwater or contaminants from entering. Also included were rehabilitation of the existing drainage system and replacement of deteriorated concrete slabs.

Completed clearwell protective structure

Emergency Bypass - Rehabilitation

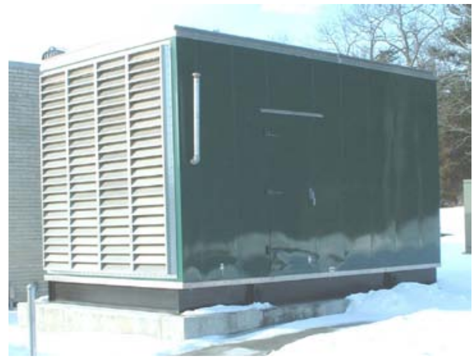
The rehabilitation of the emergency bypass structure located at the treatment plant has been completed. The project consisted of replacement of the sluice gates and access ladders and restoration of the concrete surfaces of the structure. In addition, a new crack-bridging cementitious coating was applied to the exterior of the emergency bypass structure.

Emergency Bypass Structure

Treatment Plant - Electrical Supply System Upgrade

Construction has been completed for replacement of the old 1920's vintage antiquated substation that fed the treatment plant, rehabilitation of the high voltage sub-transmission line from the Hope Substation to the new substation, replacement of the underground electrical feeders to the treatment plant with new above ground feeders, and provision of a 480 volt transformer and feed line into the plant. This essentially provides a completely new and reliable electrical feed service system to the plant.

Treatment Plant – Convert Secondary Voltage - 550V to 480V



New treatment plant emergency generator

A project to phase-over the treatment plant from the current antiquated 550 volt service to a standard 480 volt service has been completed. The scope of work included construction of a new electrical room dedicated solely to electrical panelboards and switchgear, the replacement of the existing 175KW emergency power generator with a new 600 KW generator, and the installation of new power and control wiring to each filter influent and drain actuator. The scope of work was expanded to include replacement of the dehumidification system located in the Pipe Gallery due to frequent breakdowns of the existing unit. Due to the condition of the equipment, it was determined to be more economical and effective to replace the system with a new 480 volt dehumidification system than to expend funds running new electrical lines to the existing 550 volt equipment.

Treatment Plant – Roof / Insulation

The replacement of the entire roof at the treatment plant has been completed. Construction consisted of the removal of the existing roof to the concrete deck and installation of new roof insulation and a new rubber membrane roof.

Forestry Garage - Roof / Insulation

Included as part of the roof replacement for the treatment plant, the roof at the forestry garage building was replaced and completed during May 1997. The decision was made to move the project up in schedule because the roof was leaking in a number of locations. The construction consisted of removal of the existing roof to the concrete deck and replacement with rubber membrane roofing.

Ferric Sulfate Metering System

A project has been completed for the installation of a metering system for the ferric sulfate bulk storage system at the treatment plant. The flow meter is piped and manifolded to record the amount of ferric being dispensed into each tank.

Treatment Plant - Lab Improvements

Construction has been completed to upgrade the testing laboratory at the treatment plant. A new epoxy floor, electrical feeder lines, lighting and laboratory benches have been installed. Also installed were three rooftop HVAC units and a new chemical fume hood.

Installation of a new epoxy floor in the lab

Replace Wash Water Pumps

The two (2) 5600 GPM pumps which supply the backwash water for the treatment plant's filters were almost forty years old and had outlived their useful life. Construction to replace the pumps is complete.

Wiring new service water pump

Removal of existing Wash Water pump

Replace Service Water and Hydrant Pumps

The two (2) 1750 GPM pumps for the service water system which provides process water at the treatment plant and the 1200 GPM hydrant pump which provides water to the hydrants surrounding the sedimentation basins were almost forty years old and had outlived their useful life. Construction for the replacement of the two service water pumps and the hydrant pump is complete.

New Pumps following replacement

Access Road Drainage Improvements

A project to correct several drainage problems on the access road surrounding the sedimentation basins has been completed. The drainage system was cleaned, inspected and rehabilitated to provide proper drainage of the access road.

1,986 feet of 12" storm drain pipe was inspected with remotely operated closed circuit television equipment and cleaned through a water jetting process. The inspection identified several areas with blockages and cracks that required rehabilitation.
400 feet of 12" vitrified clay pipe was replaced with 12" pvc pipe to correct damaged, collapsed and blocked sections of pipe. Four (4) catch basins were rehabilitated.

A final inspection and cleaning was performed after the rehabilitative work was completed. The final inspection revealed areas with minor damage that will be addressed in the future.

Rehabilitate limestone and granite exterior blocks

Construction is complete for the rehabilitation of the limestone and granite facade at the Treatment Plant. The Treatment Plant's limestone and granite facade was constructed during the 1960's and had deteriorated over time as a result of weathering and exposure from freeze-thaw cycles. The scope of work also included repair of mortar joints and spalled areas, cleaning of the limestone panels, parapet wall, and the brick chimney. The granite terrace and stairs were rehabilitated by removing and resetting sections of stone.

Resetting sections of stone on the stairs

Various Treatment Plant Facilities Projects

Costs were associated with IFR projects that were in progress prior to the submission of the IFR plan commencing fiscal year 1996. These projects consisted of the elimination of the stormwater runoff from entering the filters; replacement of the fluoride feed equipment, and improvements to the pipe gallery wall.

Rehabilitate Lime Transfer System

The existing pneumatic lime transfer system at the treatment plant installed in the 1940's had outlived its useful life and was generally in poor condition and in need of replacement. The project consisted of replacing the mechanical equipment located in the lime silo, the steel transfer piping, and the mechanical pneumatic transfer equipment in the lime handling area inside the treatment plant. Work included construction of a new exterior building to house the new transfer equipment. The new transfer equipment consists of a pressure conveyance system that replaced the antiquated vacuum system. The silo once used for ferric storage was also rehabilitated and converted to a lime silo to allow for a redundant storage silo. The new lime transfer system was placed in operation in January 2005.

Lowering section of new blower building into

Footings for new access stairs to silos

Rehabilitate Fluoride Transfer System

The existing pneumatic fluoride transfer system dated back to its original installation in the 1960's and needed to be upgraded. Needed improvements to the ventilation system in the fluoride room combined with an increase in chemical costs associated with the former delivery mode of fluoride in 400 pound cylinders necessitated moving this project up in priority and schedule. Providence Water investigated modifications to the fluoride handling process as part of the overall project and it was determined that the best long-term solution was to convert to a liquid based, fluorosilic acid system. The new liquid fluoride system is in service and construction is complete.

New fluoride tanks in place

Bringing new Fluoride Storage Tank into the Treatment Plant

Treatment Plant - Office A/C and Ventilation Upgrades

The construction contract for the needed improvements to the administrative offices at the treatment plant is substantially complete. Improvements included heating, ventilation, and air conditioning upgrades to the office areas and to the auditorium. In addition, a new acoustical panel ceiling was installed in the offices on the basement level of the water treatment plant and ventilation equipment was installed in the lime and fluoride transfer area of the treatment plant.

Placing A/C unit on top of the Auditorium

Replace water heaters for process water

The construction contract to replace the two (2) water heaters at the treatment plant is complete. Both units had failed and were out of service. The process water was being heated inefficiently by one of the two large heating boilers. A new system consisting of a new small boiler and an additional heat exchanger has been installed to correct this situation. The system will provide more efficient operation as well as redundancy to the entire hot water system that is used for domestic hot water and process water for water treatment.

Treatment Plant - Heating System Upgrade

Upgrades were needed to the heating system at the treatment plant including replacing unit heaters, thermostats, and miscellaneous piping. The construction contract is complete for the upgrades to the various heating system components throughout the treatment plant.

Wash Water Tank - Structural Rehabilitation

The wash water tank, which provides backwashing water to the treatment plant's filters is a circular concrete underground tank. Concrete rehabilitation inside the tank and concrete rehabilitation of the valve chamber located adjacent to the tank and the replacement of the three access hatches for the tank has been completed. The replacement of the main 36" washwater valve has been replaced and the project is now complete.

Service Water Tank Inspection / Improvements

The service water tank located at the treatment plant has been inspected and was found to be in very good structural condition. The sacrificial zinc anodes were replaced as recommended in the inspection report.

Clarification Optimization (Pumped Flash Mixer System)

Providence Water began looking at optimization of the clarification process while investigating long term planning for the rehabilitation of the sedimentation basins and the tangential mixer at the treatment plant. Both projects are in Providence Water's IFR plan. The logistics of rehabilitating these structures is complicated, requiring that they are isolated offline for extended periods.

Providence Water therefore instituted a study in which various alternatives for rehabilitation were investigated, taking into consideration present regulatory requirements and issues which may impact the treatment processes in the foreseeable future. The study founded that the concrete open-air sedimentation basins are experiencing some short-circuiting of flows, resulting in significantly less detention time than might otherwise be possible. As a result, maximum optimization of the clarification process is not taking place. In addition to the various concrete repairs that are planned, a series of new baffles are being considered in both basins to improve the sedimentation process.

As part of the study, jar testing was also conducted which identified areas in our clarification process that could be improved to enhance coagulation/flocculation to obtain improved removal of organics. The results of the tests indicated that a significant increase in the coagulant dose would provide for improved removal of organic disinfection by-product precursors to assist Providence Water's efforts to comply with the Stage 1 Disinfectants and Disinfection By-Products Rule. The recommendations were implemented by significantly increasing the dosage of ferric sulfate. This increase in chemical dosing necessitated the replacement of the existing ferric sulfate metering pumps with new pumps properly sized to handle the increased capacity. A Total Organic Carbon (TOC) on-line meter was installed in the ferric pump room to comply with the treatment requirements of the Disinfectant / Disinfection By-

Product Regulation. A benchtop TOC analyzer has been installed in the lab to comply with the monitoring requirements of the Disinfectant / Disinfection By-Product Regulation.

The jar test results also indicate that the current coagulant rapid mix process, presently performed primarily by the aerators, is not occurring soon enough after the introduction of the ferric sulfate coagulant to result in optimal coagulation. As a result, a retrofit pump flash mix system was designed which will accomplish the desired flash mixing. This new pump flash mixer system replaces the ferric injection point from pre-aeration (where it takes approximately 40 seconds to mix) to a new post-aeration injection point which provides near instantaneous mixing. The project is complete and the new pump flash mixer system is operational.

Process Control and Control System Upgrades

Two new totalizers were installed at two wholesale metering facilities. The new totalizers display additional digits to register higher consumption for large water users.

Construction is complete to upgrade the central control system at the treatment plant with a new application workstation, two workstation processors, and a Windows XP workstation to provide increased speed, hard drive storage capacity, security, and expansion capabilities.

The pump control system at the Greenville Avenue pumping station was limited to controlling only two of the three domestic pumps, and a fire pump in the pumping sequence. This sometimes caused water pressure fluctuations in the distribution system within that pressure zone. Improvements were made to the remote telemetry unit (RTU) consisting of upgrades to the motherboard, memory card, software programming, and the keypad panel. This reduced the pressure fluctuations by incorporating the third pump into the pumping control sequence.

A study evaluating the existing SCADA communication system in terms of reliability, operating and maintenance costs, and alternative communication systems was completed. The study concluded that the existing dedicated digital service system meets the requirements for reliability and cost effectiveness when compared to other communication technologies.

A new water level transducer was installed at the Lawton Hill reservoir to replace the old transmitter. The old transmitter was sometimes affected by pressure fluctuations when the reservoir was filling which interfered with the proper control of pumping operations. The new transmitter will more reliably measure the water level in the reservoir.

A new water level transducer, transmitter, and radio telemetry equipment were installed at the outlet structure of Sludge Lagoon #2 to monitor the water discharge over the existing stop logs to the Pawtuxet River. Radio receiver equipment was installed at the Water Treatment plant and tied into the Master PLC (programmable logic controller) to receive the transmitted data. A new report was developed to log the flow data from the new transmitter. The new transmitter now allows the continuous monitoring of the discharge rate from the sludge lagoons.

A new PLC was installed at the new emergency pumping facility recently constructed at structure "D" in our transmission system. The new PLC will transmit pumping and flow data to the master PLC at the water treatment plant. Plans are to install distribution system monitoring equipment at structure '"D" to monitor pH, chlorine residual, conductivity, and fluoride.

Construction has been completed to upgrade the Autocon RTU at the Greenville Avenue pumping station to an Allen-Bradley PLC. These improvements are being conducted in conjunction with upgrades to the pumping station which consisted of installing variable frequency drive (VFD) controls on the three domestic pumps to stabilize water pressures within its service area. A new remote pressure monitoring station is being installed in the distribution system of the pumping zone of the Greenville Ave. pumping station to provide system operating pressure data to the station and the central control system at the treatment plant.

Thirty-Four (34) gage and differential pressure transmitters have been replaced at all of the 24 remote locations. All of the 24 remote telemetry units (RTU's) have been replaced with programmable logic controllers (PLC's) for increased security, more efficient data transmission, and lower operating and maintenance costs. Additionally, software and hardware modifications to the master PLC at the treatment plant to incorporate the modifications from the remote pump station PLC's are completed. A redundant master PLC was installed for added system reliability. The existing chart recorder and level transmitter have been replaced at the Gainer Dam gatehouse to ensure continued accuracy and reliability.

Process Meter Replacement

Several types of process metering equipment 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. A fluoride meter and two pH meters have been replaced.

Chlorine Room Upgrades

All three chlorinators located in the chlorine room were replaced with new units. The chloramatic valves on the old chlorinators needed frequent maintenance, the eductors had become obsolete, and the chlorinators needed to be frequently calibrated.

Lab Improvements

Since 1996 various laboratory equipment has been replaced at the lab as it became necessary.

Ferric System Upgrades

During internal inspection of the three 12,000 gallon liquid ferric storage tanks, a crack was found in one of the tanks. Based on the age and condition of the tanks, all three tanks were replaced with new 16,000 gallon fiberglass tanks. Work included replacement of all exterior piping, strainers, and insulation. The tank containment area and the floor in the bulk storage transfer building were also recoated.

Old 12,000 Gal Liquid Ferric Storage Tanks

New 16,000 Gal Liquid Ferric Storage Tanks

Transmission System

102" Aqueduct - Investigation/Rehabilitation

A portion of the 102" transmission aqueduct failed in November 1996. A failure analysis was conducted to determine the cause of the failure and corrective measures needed to prevent future failure. A risk assessment and internal inspection was performed between March 1998 and April 1998. The inspection and risk assessment resulted in recommendations to rehabilitate portions of the 102" main. In November 1998 work commenced on the 102" main consisting of exterior rehabilitation, internal reinforcing of sections of pipe with carbon fiber linings, installation of manholes for additional access points, and performing additional inspections of the main.

During January 2000, eleven sections of pipe were rehabilitated with carbon fiber linings, external restoration was conducted to seven sections of pipe through application of new mortar coatings, and three manholes were installed for additional access and de-watering points. A 60" butterfly valve was installed to replace a defective valve. Approximately 2.5 miles of the 5 mile long pipeline easement was cleared of trees and brush in order to have access to the pipeline for monitoring and maintenance. The entire 5 mile long pipeline route is now accessible by vehicle.

Aqueduct Siphon Chamber - Replace Roof

The project has been completed.

Roof Construction – Aqueduct Siphon Chamber

Completed Aqueduct Siphon Chamber

Cathodic Protection - Transmission Mains

In 1990, a preliminary corrosion evaluation was conducted on a section of 48" steel transmission main that recommended corrosion protection of the structure to arrest any further deterioration. In order to accomplish this, the main needed to be electrically isolated. Construction has been completed for the installation of four isolation couplings and the installation of an impressed current cathodic protection system. A final inspection was conducted and a report was prepared which indicated that the system is operating to protect the main. In addition to cathodic protection, approximately 1400 feet of the 48" steel water main was cleaned and relined with cement mortar to eliminate the leaks that were found on the main.

Cathodic Testing 30" Tee, Eddy St.

90" Effluent Finished Water Aqueduct – Inspection / Rehabilitation

Extensive concrete corrosion damage was discovered in the treatment plant's 90-inch effluent conduit during the rehabilitation of the plant's effluent venturi meters. Subsequently, a video inspection in November 1999 revealed further extensive concrete corrosion damage continuing along the 90" aqueduct as it leaves the plant.

Concrete corrosion damage to the lower half of the effluent conduit

Extensive concrete corrosion damage in vicinity of south venturi meter

Concrete repairs to the interior of the 90" pipeline

Multiple methodologies and approaches for the rehabilitation of the 90" aqueduct were investigated and a work plan was developed that included the installation of a 90" butterfly valve in the aqueduct just downstream of the 78" aqueduct connection in order to enable the 78"/102" aqueduct to continue to function during an event in which the 90" is out of service. The installation of this valve made it possible to conduct the rehabilitative work on the 90". The interior of the 90" aqueduct was rehabilitated for a distance of 1000 feet from the Effluent Chamber to the West Portal using fast curing, potable water-safe, cementitious products.

Sawcutting top of 90" pipeline to gain access for repairs and valve installation

Access into 90" aqueduct at new valve location

Removal of top of 90" pipeline

90" disc plug in place prior to rehabilitation and valve installation

Lowering the 90" valve into place

90" valve in place

Work also consisted of the inspection of the final 4 miles of aqueduct (from the West Portal to the Siphon Chamber). The inspection of the 4 miles of aqueduct indicated that portions of this stretch required rehabilitative work. A Design/Build team was awarded the project to rehab the entire 4 mile stretch of the aqueduct and construction on this project has been completed. Various concrete rehabilitative work has been completed including crack injections, spalled concrete repairs, and the investigation and repair of hollow sounding areas.

Pouring base slab of new valve enclosure

New 90" Valve Structure

A new access point was constructed adjacent to the old East Portal. The old east portal was placed out of service because it had become antiquated and was in need of repairs. A new concrete block building was constructed with a new venting mechanism, a security system, and a hoisting system.

Removal of old East Portal Structure

Opening into Aqueduct at New Access Structure

The existing Siphon Chamber needed replacement due to size constraints and deterioration of the building. The replacement of the structure moved up in priority and was added to the scope of work for this project when it became apparent that it would be more cost effective to replace the building than it would be to expend funds on the existing obsolete structure. Work on the construction of a new Siphon Chamber has been completed.

The 2 year anniversary inspection of the 90" aqueduct was conducted in January 2005. The inspection identified a few areas in need of repair. The contractor conducted the necessary repairs completing the project.

Supplemental Tunnel – inspection / rehabilitation

102″ Aqueduct - Inspection

A contract was awarded for inspection/design services for the 102" Aqueduct. Providence Water plans to inspect and rehabilitate this extremely important transmission aqueduct at 5-year intervals. In 2000, the aqueduct was rehabilitated and this inspection therefore represents the first follow-up 5-year inspection.

The inspection began in the fall of 2005. It utilized a new technique that involves electromagnetic imaging through the interior of the pipeline which can detect the presence of broken prestressed wires within the pipe, supplemented with a visual and structural inspection including acoustic sounding.

Based on the extensive inspection and the subsequent repair of 45 pipe sections completed in 2000, no significant additional deteriorated sections had been anticipated. The electromagnetic imaging, however, detected 71 pipe sections with potential wire breakage. The one area of greatest concern was near Oaklawn Avenue, directly opposite the street from the November 1996 break. Interior soundings confirmed areas of concrete delamination around the pipe. The pipe was excavated to further investigate its condition and was found to be deteriorated to the point of approaching failure, with numerous rusted out and broken prestressed wires. The inspection performed in 2000 had found no evidence of any deterioration or irregularities in this pipe section. The pipe section was reinforced through post-tensioning with the exterior diameter of the pipe being wrapped with steel tendons spaced 4-inches apart and covered with 3 inches of fiber reinforced concrete.

Given the rapid rate of deterioration of this pipe section in the same Oaklawn Avenue area within the five year period, a decision was made to reinforce the remaining seven pipe sections in this area that had not been previously done. These seven pipe sections were reinforced utilizing the same internal carbon fiber lining that was performed during the previous rehabilitation project that was completed in 2000.

More extensive hammer soundings were performed on the remaining 70 pipe sections that had suspected wire breaks. Results from the hammer soundings as well as results from the electromagnetic inspections led to the development of an excavation plan for further investigation. Several pipe sections were excavated and inspected with several minor deficiencies being corrected.

Also as part of this project, a fiber optic data acquisition system and acoustic monitoring sensor line was installed in the pipeline. This system provides real-time monitoring on a continuous 24-hour per-day basis to acoustically detect and analyze reinforcing wire breaks as they occur. Since this fiber optic sensor line will continually monitor the sounds being transmitted through the pipeline to detect the acoustic events associated with the failure and break of prestressed wires, it is expected that there will not be the need to dewater and perform internal inspections of the pipeline as frequently as originally expected.

The pipeline was placed back in service prior to the start of the high demand season. During the fall of 2006, the remaining portion of the pipeline from the 102-inch butterfly valve to Structure E was inspected utilizing the same electromagnetic imaging performed on the first pipeline section. The electromagnetic imaging found no major problems, detecting only 19 pipe sections with a minor number of possible wire breaks. An interior structural walkthrough that included hammer sounding of the entire pipe section at various circumference positions also indicated no major areas of concern in this pipeline section. The acoustic monitoring sensor line was also extended from the 102-inch butterfly valve to Structure E, which will enable the entire 102-inch pipeline to be continually monitored.

78" Aqueduct - Inspection

The first time ever inspection of the 78 inch aqueduct has been completed and pipe sections found severely deteriorated have been repaired. Providence Water is in the process of reviewing the final report of the inspection findings and pipeline condition and risk assessments for both the 78" and 102" aqueducts.

In preparation of the inspection of the 78" pipeline, four existing access manholes and covers that had previously been buried well below grade were raised to the surface. In addition, to assist in the dewatering of the pipeline and to provide additional access, four additional manholes were installed along the pipeline.

The inspection began in the fall of 2007 utilizing the same technique that was used on the 102" inspection involving electromagnetic imaging through the interior of the pipeline which detects the presence of broken prestressed wires within the pipe, and a visual and structural inspection using acoustic hammer soundings. The inspection was performed in two phases.

During the first phase, the 78" pipeline was inspected from the treatment plant up to the newly installed 78" butterfly valve at Kent County's Clinton Avenue connection. Based on the results from both the electromagnetic testing and acoustic soundings, it was determined that four pipe sections warranted further investigation. These four pipe sections were excavated and found to have significant damage consisting of numerous wire breaks and significant hollow areas. Three of the four pipe sections were repaired utilizing a 3-sided reinforced concrete encasement structure. Due to the depth of cover (approximately 25'), the fourth pipe section was repaired utilizing post-tensioned tendons around the exterior of the pipe encased in reinforced concrete.

The second phase of the inspection was performed from the 78" butterfly valve to Structure D. Once again utilizing electromagnetic imaging and acoustic hammer soundings, five pipe sections of concern were identified. Three pipe sections were partially excavated and inspected from which it was determined that no repair work was needed. The two remaining pipe sections, located beneath a roadway, were excavated and found to have significant damage consisting of numerous wire breaks and significant hollow areas. Due to the extent of the damage to these pipe sections, the pipe sections were repaired utilizing post-tensioned tendons around the exterior of the pipe encased in reinforced concrete. One additional pipe section in this area was also excavated and although no wire breaks or significant hollow areas were found, areas of exposed reinforcing wires were observed. To further protect this pipe section it was encased in reinforced concrete. In addition, an access manhole was installed on this pipe section in anticipation of further repair work being required in this area in the future.

Improvements to Structure "D" and "E"

A contract was awarded for inspection/design services for Structures "D" and "E". The inspection of these structures was completed this past fall.

66" Transmission Main Inspection

The 66" main, approximately 8500 feet in length, installed in 1926, is a riveted steel pipeline. The inspection of this pipeline consisted of an over the line sight survey, soil resistivity testing, soil chemistry analyses, leak detection, and an internal inspection and select external excavations. The 66" transmission main inspection has been completed and the line was found to be in good structural condition with no major remedial work required. Cleaning and recoating the exposed exterior surfaces of the transmission main and valves located in one air release, one blowoff, and two access vaults were completed as recommended by the inspection report.

60" Transmission Main Inspection

The 60" main (Neutaconkanut Conduit), installed in 1926, is a 21,000 feet-long 60-inch reinforced concrete steel cylinder pipeline. The exterior inspection of the 60" transmission main has been completed consisting of an over the line sight survey, soil resistivity testing, soil chemistry analyses, and select excavations to inspect the main. Exterior and interior inspections were conducted on the transmission main that indicated that the conduit is in very good physical condition. A final condition assessment report was submitted with the results indicating that no follow-up work is needed on the concrete pipe.

102" Aqueduct - Investigation/Rehabilitation (2010 - 2011)

Inspection of the entire 102" aqueduct has been completed in accordance with Providence Water's continuing plan of inspecting and rehabilitating this extremely important transmission aqueduct at 5-year intervals. Similar to the previous inspections, the inspection included electromagnetic imaging through the interior of the pipeline that detects the presence of broken prestressed wires within the pipe, supplemented with a visual and structural inspection that included acoustic soundings.

The visual and structural inspection revealed various minor deficiencies, the majority of which were joints with missing/deteriorated mortar. Repairs that addressed these minor deficiencies have been completed. Based on the results from both the electromagnetic testing and acoustic soundings, it was determined that seven pipe sections warranted further inspection. Four of the pipe sections were excavated for further inspection. Upon further inspection it was determined that no repairs were warranted for three of these four pipe sections. However, excavation of the fourth pipe section confirmed the presence of broken wires. Due to the depth of the excavation, and the high ground water level, it was determined that carbon fiber lining this pipe section was the most cost effective method of repair.

Additionally, the three pipe remaining sections could not be easily excavated. It was determined that these sections would also be carbon fiber lined. Two locations are located at the entrance to Cranston West High School, and the third is located directly under I295 south. Carbon fiber lining is the same type of repair performed on various pipe sections resulting from the 2005 inspection.

A sluice gate has been installed at the entrance to the 78" aqueduct prior to the inspection of the aqueduct to replace the existing stop shutters. The sluice gate also allows for easier and tighter shutdowns of the 78" aqueduct when the structure needs to be isolated for inspection and repairs.

78″ Aqueduct Inspection

The 78" pipeline was first inspected in 2008. Major deficiencies were found and significant rehabilitative work became necessary. A program has been implemented for inspecting and rehabilitating (as necessary) this transmission line on a regular 5-year schedule.

In accordance with Providence Water's continuing plan of inspecting and rehabilitating this extremely important transmission aqueduct, the 78″ pipeline was inspected in April 2013. Similar to the previous inspections, the inspection consisted of electromagnetic imaging through the interior of the pipeline that detects the presence of broken prestressed wires within the pipe, supplemented with a visual and structural inspection that included acoustic soundings. In addition, a different technology was used to aid in the inspection. Both sonic and ultra-sonic testing methods were used to detect wall thicknesses of the pipe and to determine if there was proper bonding between the pipe layers.

The inspection identified numerous pipe sections that warranted investigation. Two pipe sections in the same area were excavated and found to have multiple wire breaks with over half the prestressed wires broken. These sections of pipe were rehabilitated. No further rehabilitative work was needed and the entire 78″ pipeline will be inspected again in the next five years.

__Pumping and Storage__

Bath Street Pump Station Upgrade

Delivery of new generator enclosure

Construction is complete. Rehabilitation of the facility included replacing pumps, replacing suction and discharge piping, instrumentation and electrical system upgrades, architectural and structural improvements, and installation of an emergency power generator. Final pump control programming has been completed.

Neutaconkanut Pump Station Upgrade

Construction is complete. Rehabilitation of the facility included replacing pumps, replacing suction and discharge piping, instrumentation and electrical system upgrades, and architectural and structural improvements. Final pump control programming has been completed.

Interior of Neutaconkanut Pump Station before rehabilitation

Interior of Neutaconkanut Pump Station after rehabilitation

Neutaconkanut Pump Station piping before rehabilitation

Neutaconkanut Pump Station piping after rehabilitation

Aqueduct Pump Station (electrical upgrade)

A project was completed to upgrade the electrical service for the pump station to 1200 amps. The old service was undersized and needed to be increased for additional capacity. The upgrade enables all five pumps to run simultaneously and provides extra capacity for future upgrades of the station.

Aqueduct Pump Station (pump upgrades)

A project was completed to increase the pumping capacity for the station from 4200 gpm to 5800 gpm. Due to the rapid development of housing in the western Cranston area of the system, the elevation at Lawton Hills Reservoir during high summer demand periods could not be properly maintained.

Dean Estates Pump Station - Replace Roof

The project has been completed.

Various Pump Stations - Electronic Equipment Upgrades

The equipment upgrades consist of modernizing and replacing electronic instrumentation equipment at various pump stations and distribution reservoirs in the system. To date, transmitters and other equipment have been replaced at Fruit Hill, Garden Hills, Neutaconkanut, Western Cranston, and Dean Estates pump stations, and the Lawton Hills reservoir.

Longview Reservoir - Structural Rehabilitation

Construction is complete for the rehabilitation of the original section of Longview Reservoir. The rehabilitation work consisted of the application of a hot-applied reinforced rubber membrane sealant over the entire roof surface of the reservoir, sealing of all cracks and construction joints on the walls and floor of the interior of the reservoir, replacement of the sluice gate, and replacement of the stop shutters.

Old Longview Reservoir sluice gate being removed

Aqueduct Reservoir - Inspection / Rehabilitation

Construction is complete to rehabilitate Aqueduct Reservoir. The work consisted of the application of a hot-applied reinforced rubber membrane sealant over the entire roof surface and the sealing of cracks and construction joints on the interior walls and floor of the reservoir.

Neutaconkanut Gate House - Replace Roof

The project has been completed.

Neutaconkanut Reservoir Gatehouse Rehabilitation

Construction has been completed to restore the northeast section of the building that had deteriorated. Work consisted of replacing bad sections of the foundation, replacing sections of the damaged brick wall, sealing the exterior masonry joints, and providing a ventilation system for the gatehouse structure.

Greenville Avenue Pump Station – Replace surge valve

A project has been completed in which a pump control valve was replaced inside the station that eliminates surges generated by the startup and shutdown of the booster pumps.

Ridge Road Reservoir - Inspection

The Ridge Road tank, constructed in 1989, is an above ground prestressed concrete tank with a storage capacity of 3.5 MG which provides operational and fire flow storage for the Extra-High Service area of North Providence. Inspection of the Ridge Road Reservoir tank has been completed. No corrective action was identified for the interior or exterior of the tank at this time. The tank will be inspected regularly in the future.

Aqueduct Pump Station Rehabilitation

Construction for rehabilitation of the pump station has been completed. The station was constructed in 1972 by the City of Cranston and was acquired in 1998 by Providence Water as part of the acquisition of the Western Cranston Water District. Rehabilitation of the facility included a modular addition to the existing building that houses new vertical turbine pumps, instrumentation and electrical system upgrades, replacement of the emergency generator, and architectural and structural improvements to the existing pump station building structure to convert its use to a storage facility.

Neutaconkanut Reservoir - Inspection / Rehabilitation

Neutaconkanut Reservoir, constructed in 1928, has a storage capacity of 42.1 MG. The facility feeds the gravity-fed low service system and the Neutaconkanut Pump Station. Work has been completed for concrete rehabilitation of the interior of the tank, installation of a new electric hoist in the gatehouse, rehabilitation of the existing stop shutters, and the installation of a 60" butterfly valve to functionally replace a 75-year-old gate valve. Also completed were the replacement of a sluice gate inside the reservoir and the installation of a 48" feed line adjacent to the tank to allow for improved water circulation inside the tank.

Cleaning the inside of the Reservoir

A leak was discovered on the new 48" circulation line in the vicinity of the reservoir when the reservoir was placed back in service in the spring and the line has been subsequently shut down. Excavation of the reservoir slope has been completed and the leak was located in the casting in the reservoir wall where the new pipe enters the reservoir. Repairs have been completed.

Various Pumping and Storage Improvements

The generator enclosure for the Bath Street pump station required remedial work to upgrade some of the sound attenuation insulation that had deteriorated.

Dean Estates Pump Station Upgrade

The Dean Estates Pump Station was built in 1982. The station draws its supply from the low service system and boosts the pressure in the Dean Estates neighborhood of Cranston. The scope of work included combining the Garden Hills and Dean Estates pressure zones into a single pressure zone, which is served by one pump station. Only the Dean Estates Pump Station was rehabilitated, which allowed for the abandonment of the Garden Hills Pump Station. To accomplish this, a new water main was installed at the Glen Hills Drive Bridge crossing RI 37. Construction is complete to rehabilitate the Dean Estates Pump Station. The rehabilitation of the station included installation of new variable frequency drive vertical turbine pumps, elimination of aged hydro pneumatic tanks, instrumentation and electrical system upgrades, installation of an emergency generator, and architectural improvements to the pump station building.

Aqueduct Reservoir – Replace 60" Valve

The Aqueduct reservoir 60-inch isolation butterfly was defective and has been replaced with a new butterfly valve.

Distribution System

Various Distribution System Improvements

Improvements have been completed in two particular sections of the distribution system. In the Port of Providence, meters have been installed in various industrial buildings to individually meter these accounts. The Port of Providence had previously been metered through old inaccurate master meters. At Harborside Blvd., new mains were installed to Providence Water standards to replace some of the older mains in this area, new fire hydrants were installed, and individual building meters were installed to replace the older inaccurate master meter serving the area.

In the western Cranston section of the system two pressure reducing valves have been rehabilitated, and two others have been replaced. The valves are now fully functional and regulate the static pressure to that area of the system.

On Interstate 95, in the northbound lane at the Branch Ave overpass, two 16 inch mains, one high service and the other low service, were internally rehabilitated by installing rubber seals at each pipe joint. Approximately 155 feet of the high service main and 160 feet of the low service line were reconditioned.

Replace Water Meters

In accordance with the Report and Order of Docket Number 3832, the funding for future water meter replacements is to be from a restricted Meter Replacement Account rather than from the IFR Account. All meter replacements, and all Automatic Meter

Reading (AMR) activities, are now funded from the same restricted account, the Meter Replacement Account. For this reason, meter replacements and AMR system program activities will no longer be reported on an on-going basis in the IFR / CIP Status Report.

Leak Detection

A leak detection survey has been completed of the entire distribution system and major transmission lines. The survey utilized sonic leak detection equipment to detect audio frequencies created by water leakage. When suspected water leaks were detected, a leak noise correlator was used to confirm and precisely identify where the leak was located along the pipe. A total of 187 leaks were detected and verified.

Valve and Hydrant Condition Assessment Program

The project consisted of performing an initial field assessment of the condition and operability of all valve assets and hydrants in the distribution system, testing and operating each valve and hydrant, documenting system data and conditions, and mapping with GPS to confirm location data. The program is now complete. Approximately 12,700 valves and 6,000 hydrants in the system were assessed over a two-year period.

Support System Facilities

Replace Telephone System

Construction that replaced the existing telephone system with a new system that is better able to handle the needs of the organization is complete. The new system provides additional capacity and is more responsive to customer service needs.

Academy Avenue Administration Building - Heating System

A project has been completed to replace the old malfunctioning boiler and controls with a new boiler. It was necessary to replace the existing boiler due to increasing maintenance and repair costs, and because of a number of leaks occurring on the unit.

Academy Avenue Administration Building - Ventilation Improvements

Construction has been completed to replace the 4 air conditioning roof units and supplemental controls at the Academy Avenue Service building. Replacement of the system increased the capacity by 120,000 BTU's. The work was needed because the old units were a constant source of problems, unreliable, and in need of numerous repairs. Additionally, the existing units were not adequate for the size of the building.

A study was conducted to evaluate the existing ventilation system for the Academy Avenue administration building, and to provide recommended improvements to the HVAC system that would improve air quality inside the building. The study served to identify and prioritize future work to the ventilation system.

Academy Avenue Administration Building - Roof/Insulation

Construction was completed to replace the roof at the Academy Avenue Administration Building. The project schedule was accelerated because the old roof had started leaking in a number of locations.

Academy Avenue Administration Building - Office Renovation

Rehabilitation of the customer service entrance at the administration building has been completed. Construction consisted of replacing the old customer service counter area with a more secure enclosed customer waiting area, a new service counter with glass partitions for security, and improved lighting.

Improvements were also made inside the stockroom at Academy Avenue in order to maximize and properly organize storage space for inventory.

A project was completed to increase the capacity of the electrical system at Academy Avenue because the old 400-amp electrical service could not meet the additional power demands for the new security system. A new 800-amp electrical service consisting of a new overhead primary feed line and a new transformer was installed to replace the old service. In addition, a new electrical room inside the administration building was constructed which includes a new main circuit breaker, a distribution panel, and appurtenant lighting, receptacles, wiring, and ventilation.

Remove / Replace Underground Storage Tanks

Underground fuel storage tanks (UST) have been removed and replaced with new above ground tanks at both the Raw Water Booster pump station at the base of Gainer Dam, and the Aqueduct pump station at Aqueduct Reservoir in Cranston. Leak monitoring equipment was installed on the Transformer Building fuel tank at the treatment plant, and modifications were made to the suction and return piping to comply with DEM regulations.

Delivery of new above ground fuel storage tank at the Aqueduct Pumping Station

A storage tank compliance assessment report has been completed and as a result, additional action is being taken to bring all our facilities into full compliance with regulatory requirements. Spill Prevention, Control and Countermeasure Plans have been developed, and record-keeping and inspection programs have been developed and implemented for all regulated tanks. Signage on several abovegound storage tanks (AST) has been upgraded, high level alarms added to the AST's at the Raw Water Booster Pump Station and Aqueduct Pump Station, and overfill prevention valves added to the AST at the Forestry/Maintenance Building. A heating oil underground storage tank at Academy Ave. has been closed in place. UST's for heating oil at the Raw Water Booster Pump Station, the Forestry/Maintenance Building, and the Purification Plant have been removed, and new AST's have been installed at those sites and at Academy Avenue.

Forestry Building - Heating System Upgrade

The original boiler for the forestry garage dated back to the 1960's and was in need of replacement. The boiler had pneumatic controls and drew power off of the 600V electrical service

Removal of Original Forestry Boiler

for the building. Replacement parts were difficult and expensive to maintain. The construction contract for the replacement of the heating system and a complete electrical upgrade of the service to a new 480V supply at the forestry building is complete.

Various Support System and Facility Improvements

The employee parking lot at the Academy Avenue Administration Building has been rehabilitated. Portions of the lot were repaved, parking areas were relined, additional parking spaces were created, and an area was allocated for outside access of inventory supplies.

Improvements were made to the fire supply line entering the Academy Ave. building by installing a backflow prevention device to protect the water system and correct fluctuations in water pressure that will prevent the fire alarm system from inadvertently activating.

Restoration of the masonry and brickwork at Academy Avenue in progress

Construction has been completed for the restoration of the masonry and brickwork for the administration building at Academy Ave. Areas of the building surface had cracked and deteriorated because of age and exposure to the external elements.

Safety improvements were made to the diesel and gasoline underground fuel storage tanks at the treatment plant with the installation of a leak monitoring system. The older system had stopped working and was obsolete. At Longview Reservoir, improvements were made to the existing radio system by installing a solar powered battery charging system that provides backup emergency power to the two-way radio repeater. In the event of a power loss, this system would provide backup power that would keep radio communications alive. At Academy Avenue, 85 lockers were purchased for operations personnel to address the lack of personal storage space at that facility. Also at Academy Avenue, the vehicle exhaust removal system in the garage was upgraded to improve the air quality for personnel.

Fire Safety System Improvements

Providence Water owns and operates 27 facilities throughout Providence, North Providence, Johnston, West Warwick, Cranston, and Scituate. A field inspection of each facility was conducted and completed by each local Fire Marshal having jurisdiction over the area. Compliance issues consist of upgrading fire sprinklers, municipal alarms, fire rated doors, fire rated wall separations, and safety rails. Construction is complete and all Providence Water facilities are now in compliance with the new Rhode Island Fire Safety Code that was adopted in February 2004.

New Egress from Forestry Garage

Watershed Storage Facility

Replacement of the 80-year-old Forestry Storage Building adjacent to the settling lagoons has been completed. The scope of work included asbestos abatement and demolition of the existing building, removal of an old abandoned underground fuel storage tank, design and construction of a new pre-engineered storage building, and a road sand granular storage shed. Associated site work included grading, paving, and security fencing.

Watershed Storage Facility

Rehabilitate Access Roads / Fencing - PW Property

Construction is complete for the restoration of the 2500 feet of access road leading into the Neutaconkanut pump station. The project consisted of removal of the badly deteriorated pavement and curbing, and installation of a new bituminous concrete surface over the entire length. Construction is complete for the restoration of the north and south access roads leading into the treatment plant. The projects consisted of removal of the deteriorated pavement and installation of a new bituminous concrete surface. Construction is complete for the restoration of the access road surrounding the storage tank at the Ridge Road site.

Construction is complete for replacing the fencing and relocating the entrance gate structure away from the street at the Engineering and Finance Department office building at the Aqueduct Reservoir site in Cranston in order to address traffic safety concerns associated with the prior entrance configuration.

The old wrought iron gates and fencing at the treatment plant were in poor condition and were reconditioned by sandblasting, priming, and painting the surface of the wrought iron. Masonry work was complete to restore the brick columns for the wrought iron gate at Raw Water Booster pump station, the brick staircase for the lower parking lot at the treatment plant, and the chimney at for forestry garage. Farm fencing was installed along the watershed to replace damaged fencing. Also, construction was conducted to replace existing concrete posts for watershed fencing with new concrete posts because the old posts had weathered or were damaged due to vehicular accidents. Construction is complete for replacing the existing slider gates at the Ridge Road tank and at Aqueduct Reservoir.

At Aqueduct Reservoir, the oldest sections of fence surrounding the tank have been targeted for replacement. To date, approximately 1500 feet of fence has been replaced with another 5000 feet of fence remaining. . At the treatment plant, two new main entrance gates are being installed at the west side of the plant to replace the two original older problematic units.

Raw Water Supply

90" Influent Conduit – Inspection

The 90" influent conduit that transports raw water from Gainer Dam to the treatment plant is approximately 85 years old. The project has been combined with the "Plant Influent and Aerator Rehabilitation". Construction of the project is in progress.

Various Dam Improvements

Work under this project is to address deficiencies as identified through continuing inspections and studies. At Westconnaug Reservoir a new security gate has been installed at the main entrance of the dam. At Barden Reservoir the downstream slope of the dam was regraded and reseeded, and the riprap along the spillway channel was reconstructed. Work also included installation of a safety handrail along the west bank of the spillway.

A study is being conducted to assess the conditions of all Providence Water owned dams. The study includes visual inspections of the dams as well as more detailed structural, hydraulic and hydrological analyses. Upon completion, the study will provide remedial recommendations.

Treatment Plant Facilities

Sludge Handling/Disposal

Construction has been completed for the removal, dewatering, and disposal of accumulated sludge from all of Lagoon #1 (1A and 1B) to replace lost storage capacity. Removal of sludge from Lagoon #1A began in June 1998 and was completed in July 1999. Approximately 23,000 dry tons of ferric sludge were dredged and disposed of. Under the continuing contract, all accumulated sludge in Lagoon #1B was removed and disposed of during the summer of 2000. Additional sludge which had accumulated in Lagoon #1A was also subsequently removed in 2001.

A new culvert and stop-log structure was installed under the division road between both sections of the lagoon to replace the existing damaged culvert and to provide better control of residual deposits. Construction has been completed on a new improved residual management system. New flow channels and control structures have been installed which will route the flow between alternate lagoons to allow for future alternate drying and removal operations.

Sludge Lagoon at the beginning of dredging operations

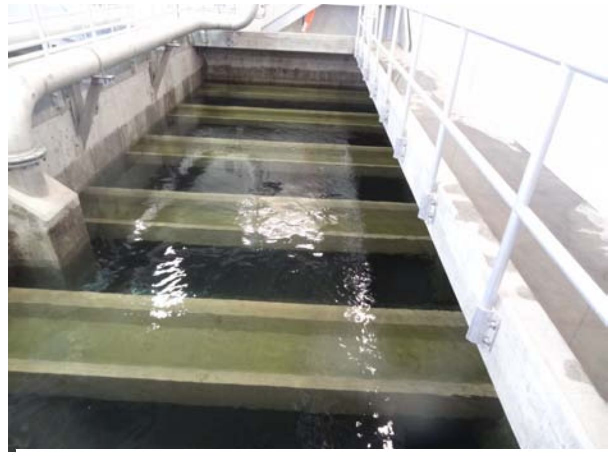
Unloading of culvert sections for residual management system

Construction has been completed for the removal, dewatering, and disposal of accumulated sludge from all of Lagoon 2. The lagoon was approximately at 70% capacity, and the removal of the accumulated sludge was necessary in order to restore the lagoon to its originally intended function of providing an adequate buffer to maintain an acceptable standard of water quality discharged to the Pawtuxet River. The sludge has been stockpiled and is being removed under the current contract.

Replace Sand Filters

Construction is in progress for the rehabilitation of all 18 filters at the treatment plant. The rehabilitative work will be performed in several phases and is expected to continue through 2016. Filters 1 through 12 have been completed and are operational.

Lower Effluent Gallery – Backwash Piping & Controls

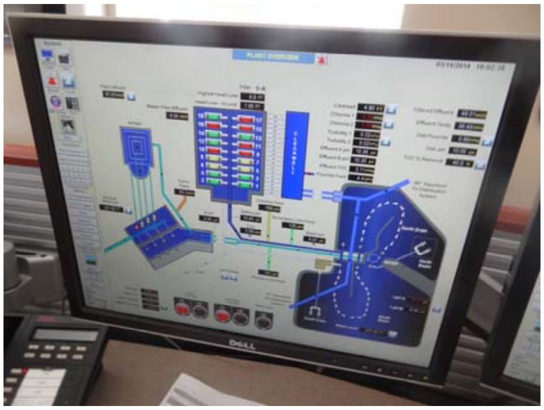


New Filter Beds - #1 through #4

Construction is in progress for filters 13 through 18 is in progress. The scope of work includes reconstructing all 18 filters by providing new filter drains, raising the filter backwash troughs to provide greater filter media depth, and completely removing the existing underground concrete roof slab structures covering the filters with a new concrete above-ground protective structure in their place. This will provide full visibility and access of the entire surface area of the filters. All effluent and washwater piping has been replaced, and new filter-to-waste piping has been installed to enhance turbidity and water quality, and a new duel filter media

Demolition of Existing Filter Bed #7

Air Scour – New Filter Beds



New SCADA system
(Supervisory Control and Data Acquisition System)

comprised of sand and anthracite coal has been installed for each new filter. Also, part of this project was the replacement of the existing antiquated proprietary SCADA system (Supervisory Control and Data Acquisition System) with a new state-of-the-art system which monitors and controls the processes of the filters and other plant operating systems.

Treatment Process Studies

The scope of work consists of conducting various studies on the treatment train process with the goal of optimizing the treatment process.

One study consisted of conducting bench scale piloting of four columns to determine treatment, operational, and maintenance impacts associated with converting to GAC filter media. The study has been completed.

Another study, utilizing pipe loops installed at the Bath Street pump station to evaluate potential corrosion control treatments for the purpose of reducing lead and iron corrosiveness and improving water quality in the system, has been completed.

Bath St Pump Station Experimental Iron Pipe Loops

Providence Water in conjunction with the Expert Panel conducted a study which provided recommendations for improving Providence Water's overall water quality. The study focused on the corrosion control treatment and water distribution system rehabilitation and cleanup. The study recommended that Providence Water maintain its current high pH treatment train to allow more time for chemistry change resulting from the higher pH change to become effective. The study also supported Providence Water's ongoing water main replacement and unidirectional flushing programs.

In accordance with a RI Department of Health requirement, additional studies are being conducted to monitor a recently implemented incremental increase in the pH treatment change. These studies include sequential sampling (lead service line sampling) and extended sampling at two previously installed monitoring rigs. The sequential sampling has been completed and the extended sampling is still ongoing.

In accordance with other RI Department of Health requirements, another study that explored the relationship between elevated iron concentrations and lead release has been completed and a report summarizing the findings was submitted to Providence Water. Additionally, 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 .

Experimental Lead Pipe Loops

Water Quality Study

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 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. In addition to the expert panel, by consent agreements, PW was required to contribute $875,000 to the Rhode Island Department of Health's lead abatement program over the last three years.

Plant Influent and Aerator Rehabilitation

Construction is in progress to rehabilitate the influent structure, the aeration basin, and the major concrete conduits at the treatment plant. The project is comprised of the following projects

Influent Structure Rehabilitation

The influent structure is a reinforced concrete structure which has been in service for over 85 years. The exterior above-grade portion of the structure is exposed to the weather and concrete deterioration is evident. Rehabilitation of the concrete structure and appurtenances are currently underway.

Existing Aeration Basin to be Reconstructed

The overflow weir in the influent structure has been raised to increase hydraulic capacity for water influent through the structure. A masonry structure will be constructed on top of the existing footprint of the structure to protect the new actuators and electrical equipment from the elements.

Aerator / Influent Actuators and Valves Replacement

Modulating the aerator/ influent valves, controls the raw water influent flow into the treatment plant. All 4 butterfly valves, electric actuators, valve stems, and guides have been replaced. New electrical ducts, including the installation of new power wiring, disconnects, and a new motor control system have been installed. New valve operators have been incorporated into the existing SCADA system.

Influent Structure - Replace Drain and Bypass Valves

The four 36-inch bypass gate valves allow diversion of influent water to bypass the aeration basin. Three 36-inch by 36-inch drain sluice gates are used to drain the aerator effluent conduit, influent control structure, influent tunnel, settled water conduit, and the mixer. A 72-inch by 72-inch influent venturi sluice gate is used during periods of extremely low influent flow for the purpose of diverting influent water through only a single venturi meter to maintain flow meter accuracy. The 4 bypass gate valves, the 3 drain sluice gates, the north influent venturi sluice gate, and all valve stems and guides have been replaced. A new 72-inch by 72-inch sluice gate has been installed at the south venturi meter entrance to provide the ability to isolate the influent control chamber from the downstream conduits. The existing manually operated valve actuators have been replaced with electric actuators with position and control signals that are incorporated into the existing SCADA system.

Influent / Effluent Aerator Conduits Inspect / Rehabilitate

An internal inspection of the steel and concrete influent and effluent aerator conduits, and an external inspection of the steel conduits, as well as structural evaluations of the steel and concrete conduits, revealed areas that require rehabilitation addressed under this project.

Aeration Basin Concrete Rehabilitation

The aeration basin is new and was relocated in a westerly direction from its original location. It is a reinforced concrete lined basin with cast in place concrete panels. The elevation of the basin's circular weir has been raised to increase the hydraulic capacity for gravity water flow through the plant.

Aeration Basin - Replace Piping, Nozzles, and Drain Valves

Aeration takes place through a series of aerator nozzles and jets supplied by a cast iron piping network. All the piping, fittings, nozzles, and the drain valve for the aeration basin have been replaced.

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

There is limited access to the upper settled water conduit as it is currently configured. An access hatch was installed in conjunction with the filter rehabilitation project. The hatch facilitates 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. A bypass chamber connects the lower conduit to the upper settled water conduit. 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. Located directly below the filter influent conduit is a rectangular washwater drain conduit that conveys water released from backwashing operations of the filters to the main washwater drain that eventually leads to the sludge lagoons. An internal inspection and structural evaluation of the concrete structures revealed deteriorated areas that will require concrete rehabilitation addressed under this project.

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 evaluation, performance evaluation, and plant operational considerations concluded that it is not cost effective to rehabilitate the existing venturi meters to original specifications.

This 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. The flow signals will be incorporated into the existing SCADA system..

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 became necessary to bypass the plant because of an emergency. A buildup of lime sludge currently occurs in the bypass tunnel due to its location downstream of the lime solution injection point in the lower conduit, which would be an impediment in the event that the bypass would need to be utilized. The lime sludge buildup in the tunnel has been removed. A flap gate will be installed at the entrance of the bypass tunnel to prevent the future buildup of lime sludge.

Pretreatment Pilot-Scale Evaluation – A study that will evaluate alternative pre-treatment chemical and clarification processes has commenced. This study includes initial bench scale and desktop analyses followed by the operation of a year-long pilot plant consisting of various treatment trains. The treatment trains consist 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 will be compared against data from the current pre-treatment and clarification process at the plant. Results from the study will be presented in a final report and will be incorporated into a future project.

Transmission System

Replace 16" and Larger Valves

Since 1996, 208 old and outmoded gate style transmission valves in the system were replaced with new butterfly valves. The valves were comprised of the following sizes: one hundred thirty-one (131) 16" valves, nine (9) 20" valves, forty-one (41) 24" valves, twenty-two (22) 30" valves, four (4) 42" valves, and one (1) 48" valve.

Removal of old 48 inch transmission gate valve

Distribution System

Replace Distribution Valves

Since 1996, 1,455 distribution valves have been replaced. Construction is ongoing to replace older distribution valves in the system.

Replace Fire Hydrants

Since 1996, 2,055 older and obsolete hydrants have been replaced. Construction is ongoing to replace fire hydrants in the system as they reach the end of their useful life.

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 and Providence Water has to date replaced 10,674 services under this program effort. Since the inception of our IFR program, 16,221 lead services have been replaced.

As a result of our aggressive replacement effort, which put us a year ahead of schedule, RIDOH allowed us to temporarily suspend mandated service replacements during the 2011 construction season. In accordance with a consent agreement between Providence Water and the RI Department of Health, in consideration of concerns that have been raised about the effectiveness of partial lead service line replacements, Health granted Providence Water a conditional stay since the 2012 construction season on its 7% lead service line replacement requirement.

Replace / Upgrade Water Mains

Since 1996, 249,559 feet of main have been rehabilitated. 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.

New Water Main Installation - Hope, Providence

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. Providence Water is evaluating various equipment options to upgrade the existing system.

Treatment Plant Facilities

Treatment Plant Architectural Improvements

Architectural improvements have been completed that included new ceiling tiles and lighting in the auditorium, lobby, and conference room; upgrading the audio-visual equipment in the auditorium; replacing handrails and stair treads; and various architectural improvements to personnel spaces. The public address system was replaced throughout the plant to replace the older obsolete unit. The Treatment Plant Chemical Building roof and the roof for the storage area have been replaced.

Three old doors are being replaced at the purification plant and one at the old transformer building located on the grounds of the treatment plant.

Planning is in progress to construct an additional conference meeting room at the treatment plant facility.

Pumping and Storage

Storage Tanks Inspections / Improvements

Aqueduct Reservoir has been inspected. Minor deficiencies were detected which will eventually need to be addressed. Plans to inspect the other distribution reservoirs are being developed. A study is in progress to examine the effects of storage capacity on the entire distribution system.

Raw Water Supply

Rehabilitate large dams (Regulating Reservoir Dam)

Due to the unavailability of funds, and after reassessing priorities, the rehabilitation of the dam has been moved back in the Infrastructure plan.

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED								
Raw Water Supply								
Rehabilitate Large Dams (Gainer/Regulating Dam)	Planning	In House	Jan 95	100%	Nov 95	NA	$1,803,960	NA
	Design	Dec 95	Jun 96	100%	Dec 96			
	Construction	Dec 95	Jun 96	100%	Oct 97			
Rehabilitate Large Dams (Ponaganset Reservoir)	Planning	In House	Feb 97	100%	Nov 97	NA	$862,563	NA
	Design	Jan 97	Nov 97	100%	Mar 98			
	Construction	Apr 98	Jul 98	100%	Oct 99			
Burton Pond Dam Rehabilitation	Planning	In House	Feb 93	100%	Mar 93	NA	$36,307	NA
	Design	In House	Mar 93	100%	Jun 95			
	Construction	Jul 95	Sep 95	100%	Oct 95			
Gainer Dam stonewall rehabilitation	Planning	In House	Jan 02	100%	Jun 02	NA	$596,636	NA
	Design	In House	Jun 02	100%	Apr 07			
	Construction	Apr 07	May 08	100%	Apr 10			
60" influent conduits - Corrosion protection	Planning	In House	May 94	100%	Oct 94	NA	$462,311	NA
	Design	In House	May 97	100%	Dec 97			
	Construction	Jan 98	May 98	100%	Jun 99			
Raw Water Booster Pump Station - replace generator	Planning	In House	Feb 96	100%	Mar 96	NA	$506,045	NA
	Design	In House	Mar 96	100%	Apr 96			
	Construction	Jun 96	Oct 96	100%	May 97			
Installation of Level Measuring Equipment	Planning					NA	$7,383	NA
	Design	Various Projects						
	Construction							
Raw Water Booster Pump Station - replace valves	Planning	In House	Dec 96	100%	Apr 98	NA	$160,083	NA
	Design	In House	Jan 99	100%	Apr 99			
	Construction	Jul 00	June 01	100%	Mar 02			
Rehabilitate large dams (Barden Reservoir)	Planning	In House	Apr 99	100%	May 00	NA	$1,602,216	NA
	Design	Apr 00	Jul 00	100%	Feb 01			
	Construction	Mar 01	Sep 01	100%	Sep 03			
Raw Water Booster Pump Station - pump rehabilitation	Planning	In House	Mar 02	100%	Mar 02	NA	$67,200	NA
	Design	NA	NA	NA	NA			
	Construction	In House	Mar 02	100%	Jun 03			
Rehabilitate large dams (Westconaug Reservoir)	Planning	In House	Jun 00	100%	Nov 00	NA	$1,288,836	NA
	Design	Dec 00	May 01	100%	Mar 02			
	Construction	Apr 02	Aug 02	100%	Jun 04			
Rehabilitate large dams (Moswansicut Reservoir)	Planning	In House	Jun 99	100%	Feb 00	NA	$395,964	NA
	Design	Jul 01	Oct 01	100%	Nov 02			
	Construction	Jan 03	Oct 03	100%	Sep 04			
Large Dam Study	Planning					NA	$47,485	NA
	Design	Study completed April 2005						
	Construction							
Gainer Dam gate house - replace valve shafts, sluice gates, stop shutters	Planning	In House	Sep 01	100%	Dec 01	NA	$747,134	NA
	Design	In House	Dec 01	100%	Jan 02			
	Construction	May 02	Jan 03	100%	Sep 05			
Raw Water Booster Pump Station - replace boiler & heating system	Planning	In House	May 01	100%	Dec 01	NA	$134,171	NA
	Design	Apr 02	May 02	100%	Jul 03			
	Construction	Jul 03	May 04	100%	Jun 06			

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED (cont)								
Raw Water Supply (cont)								
Raw Water Booster Pump Station Electrical Upgrades	Planning	In House	Jul 05	100%	Sep 05	NA	$783,064	NA
	Design	In House	Sep 05	100%	Mar 06			
	Construction	Apr 06	Jun 06	100%	Dec 07			
Large Dam Improvements	Planning	Various Projects				NA	$136,629	NA
	Design							
	Construction							
Evaluation of secondary dams	Planning	Study completed May 2009				NA	$72,830	NA
	Design							
	Construction							
Raw Water Generator Replacement	Planning	-----	-----	-----	-----	NA	$301,592	NA
	Design	-----	-----	-----	-----			
	Construction	Apr 11	Apr 11	100%	Dec 11			
Fencing, fire lanes, property rehabilitation	Planning	Work is Ongoing - Various Projects				NA	$8,100	NA
	Design							
	Construction							
Meter and Junction Chambers Rehabilitation	Planning	In House	Feb 08	100%	Sep 08	NA	$758,297	NA
	Design	Sep 08	Sep 08	100%	Jun 10			
	Construction	Jun 10	Oct 10	100%	Feb 13			
Treatment Plant Facilities								
Process Control / Data Aquisition 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			
Replace electronic process monitoring equipment	Planning	In House	Jan 96	100%	Mar 96	NA	$4,875	NA
	Design	In House	Apr 96	100%	May 96			
	Construction	In House	Jun 96	100%	Jul 97			
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			
Service water / wash water system controls upgrade	Planning	In House	May 95	100%	May 95	NA	$5,728	NA
	Design	In House	May 95	100%	May 95			
	Construction	In House	Jun 95	100%	Oct 95			
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			
Auxilary 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			

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED (cont)								
Treatment Plant Facilities (cont)								
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			
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	NA	NA	NA	NA			
	Construction	Jun 03	Jul 03	100%	Dec 03			

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED (cont)								
Treatment Plant Facilities (cont)								
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					NA	$98,097	NA
	Design	Work is Ongoing - Various Projects						
	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			
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	NA	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			
Process Control and Control System Upgrades	Planning					NA	$1,883,021	NA
	Design	Work is Ongoing - Various Upgrades						
	Construction							
Process meter replacement	Planning					NA	$87,969	NA
	Design	Work is Ongoing - Various Projects						
	Construction							
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			
Lab Improvements	Planning					NA	$123,380	NA
	Design	Work is Ongoing - Various Projects						
	Construction							
Ferric System Upgrades	Planning	In House	Feb 13	100%	Apr 13	NA	$375,956	NA
	Design	In House	Apr 13	100%	Sep 13			
	Construction	Aug 13	Jun 13	100%	Dec 13			

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED (cont)								
Transmission System								
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	NA	Dec 07	100%	Jan 08			
60" Transmission Main Inspection	Planning	In House	Sep 06	100%	Jan 08	NA	$48,530	NA
	Design	NA	NA	NA	NA			
	Construction	NA	NA	NA	NA			
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			
Pumping and Storage								
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			

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED (cont)								
Pumping and Storage (cont)								
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	NA	NA	NA	NA			
	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	NA	NA	NA	NA			
	Construction	NA	NA	NA	NA			
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			
Various Pumping and Storage Improvements	Planning					NA	$152,908	NA
	Design	Work is Ongoing - Various Projects						
	Construction							
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			
Aqueduct Reservoir - Replace 60" Valve	Planning	In House	Jan 13	100%	Jul 13	NA	$309,139	NA
	Design	In House	Jul 13	100%	Sep 13			
	Construction	In House	Aug 13	100%	Dec 14			
Distribution System								
Various Distribution System Improvements	Planning					NA	$5,870,938	NA
	Design	Work is Ongoing - Various Projects						
	Construction							
Replace water meters	Planning					NA	$13,841,637	NA
	Design	80,546 meters replaced						
	Construction							
Leak Detection	Planning	In House	May 01	100%	Jan 02	NA	$191,994	NA
	Design	In House	Jun 07	100%	May 08			
	Construction	May 08	Oct 08	100%	Sep 10			
Valve and Hydrant Condition Assessment Program	Planning	In House	Dec 04	100%	Aug 10	NA	$1,509,611	NA
	Design	- - - - -	- - - - -	- - - - -	- - - - -			
	Construction	Apr 10	Sep 10	100%	Sep 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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED (cont)								
Support System Facilities								
Replace telephone system	Planning	In House	Apr 97	100%	Jun 97	NA	$350,370	NA
	Design	In House	Jun 97	100%	Jul 97			
	Construction	Jul 97	Nov 97	100%	Nov 98			
Academy Avenue Administration Building - heating system	Planning	In House	May 97	100%	Jun 97	NA	$40,370	NA
	Design	In House	Jun 97	100%	Jul 97			
	Construction	Jul 97	Oct 97	100%	Oct 97			
Academy Avenue Administration Building - ventilation improvements	Planning	In House	Apr 97	100%	Apr 97	NA	$74,555	NA
	Design	In House	May 97	100%	May 97			
	Construction	May 97	Oct 97	100%	Oct 98			
Academy Avenue Administration Building - roof / insulation	Planning	In House	Mar 95	100%	Apr 95	NA	$69,208	NA
	Design	In House	Apr 95	100%	Mar 95			
	Construction	Jun 95	Oct 95	100%	Aug 96			
Academy Avenue Administration Building - office renovation	Planning	Various Projects				NA	$580,539	NA
	Design							
	Construction							
Remove / replace underground storage tanks	Planning	Various Projects				NA	$629,948	NA
	Design							
	Construction							
Forestry Building - heating system upgrade	Planning	In House	Aug 02	100%	Sep 02	NA	$299,568	NA
	Design	Oct 02	Oct 02	100%	Jul 03			
	Construction	Jul 03	May 04	100%	Jun 06			
Various Support System and Facility Improvements	Planning	Work is Ongoing - Various Projects				NA	$420,027	NA
	Design							
	Construction							
Fire Safety System Improvements	Planning	In House	Jul 04	100%	Jun 06	NA	$1,888,610	NA
	Design	In House	Apr 05	100%	Sep 06			
	Construction	In House	Apr 05	100%	Jul 07			
Watershed Storage Facility	Planning	In House	Jul 04	100%	Nov 05	NA	$934,141	NA
	Design	In House	Oct 05	100%	Feb 08			
	Construction	Feb 08	Jul 08	100%	Sep 09			
Rehabilitate Access Roads and Fencing - PW Property	Planning	Work is Ongoing - Various Projects				NA	$1,314,749	NA
	Design							
	Construction							

IFR STATUS REPORT PROJECT DESCRIPTION	SCHEDULE Project Stage	RFP's Issued	Start Date / or (Projected Date)	Percent of Project Complete	Completion Date / or (Projected Date)	COST Latest Cost Estimate	Expenditures to 06/30/15	Funds Needed to Complete
CONSTRUCTION								
Raw Water Supply								
90" influent conduit	Planning	In House	Aug 01	100%	Jun 06	$700,000	$606,491	$93,509
	Design	Jun 06	May 07	100%	Feb 13			
	Construction	Feb 13	Oct 13	25%	(Dec 17)			
Dam Inspections and Improvements	Planning	In House	Jan 14	100%	Mar 14	$200,000	$68,026	$131,974
	Design	- - - - -	- - - - -	- - - - -	- - - - -			
	Construction	Mar 14	Apr 14	70%	(Dec 15)			
Treatment Plant Facilities								
Sludge handling / disposal	Planning	In House	Jan 96	100%	Nov 02	$27,000,000	$25,571,835	$1,428,165
	Design	Jan 95	Feb 96	100%	Feb 03			
	Construction	Sep 97	Jun 98	95%	(Jul 16)			
Replace sand filters	Planning	In House	Jul 03	100%	Nov 04	$47,000,000	$40,751,483	$6,248,517
	Design	Feb 05	Oct 05	100%	Jan 09			
	Construction	Feb 09	Sep 09	85%	(Jun 16)			
Treatment Process Studies	Planning	Work is Ongoing - Various Projects				$2,100,000	$2,006,089	$93,911
	Design							
	Construction							
Water Quality Study	Planning	In House	Jan 12	100%	Jun 12	$1,250,000	$999,373	$250,627
	Design	- - - - -	- - - - -	- - - - -	- - - - -			
	Construction	In House	Jun 12	- - - - -	- - - - -			
Plant Influent and Aerator Rehabilitation	Planning	In House	May 01	100%	Jun 06	$6,100,000	$4,556,775	$1,543,225
	Design	Jun 06	May 07	100%	Feb 13			
	Construction	Feb 13	Oct 13	60%	(Dec 17)			
Aerated, Settled, and Filter Influent Conduits	Planning	In House	May 01	100%	Jun 06	$2,000,000	$908,597	$1,091,403
	Design	Jun 06	May 07	100%	Feb 13			
	Construction	Feb 13	Oct 13	60%	(Dec 17)			
Pretreatment Pilot-Scale Evaluation	Planning	Project is a Study - To Begin July 15				NA	$1,200	NA
	Design							
	Construction							
Transmission System								
Replace 16 inch & larger valves	Planning	Work is Ongoing - 208 large valves replaced				(1)	$6,147,249	NA
	Design							
	Construction							
Distribution System								
Replace distribution valves	Planning	Work is Ongoing - 1455 valves replaced				(1)	$2,986,938	NA
	Design							
	Construction							
Replace fire hydrants	Planning	Work is Ongoing - 2,055 fire hydrants replaced				(1)	$5,557,374	NA
	Design							
	Construction							
Replace lead services	Planning	Work is Ongoing - 16,221 lead services replaced				(1)	$55,614,291	NA
	Design							
	Construction							
Replace / upgrade water mains	Planning	Work is Ongoing - 249,559 feet of main replaced				(1)	$57,920,031	NA
	Design							
	Construction							

(1) Distribution work is ongoing and long term

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 06/30/15	Funds Needed to Complete
DESIGN								
Treatment Plant Facilities								
Lime System Upgrades	Planning	In House	Jan 13	100%	Dec 14	$900,000	$22,245	$877,755
	Design	In House	Jun 15	10%	(Dec 15)			
	Construction	- - - - -	- - - - -	- - - - -	- - - - -			
PLANNING								
Treatment Plant Facilities								
Treatment Plant Architectural Upgrades	Planning	Various Projects				$600,000	$540,038	$59,962
	Design							
	Construction							
Pumping and Storage								
Storage Tanks Inspections / Improvements	Planning	In House	Mar 14	50%	(Jun 16)	$150,000	$97,510	$52,490
	Design	- - - - -	- - - - -	- - - - -	- - - - -			
	Construction	In House	Sep 14	20%	- - - - -			
PENDING								
Raw Water Supply								
Rehabilitate large dams (Regulating Reservoir Dam)	Planning	In House	Jan 07	100%	Feb 07	$1,700,000	$86,554	$1,613,446
	Design	Feb 07	Oct 07	75%	- - - - -			
	Construction	- - - - -	- - - - -	- - - - -	- - - - -			
Total IFR Expenditures							**$305,113,024**	

CIP PROJECT STATUS REPORT

PROJECT NARRATIVES

Raw Water Supply

Alternate Source of Supply Study

In collaboration with the RIWRB, an initial phase of a study of potential alternate supply sources was completed. This initial phase involved a preliminary assessment of the potential feasibility of alternate redundant supply sources. The findings suggested that the best approach for obtaining supplemental water might be through the development of multiple relatively low yielding sources including new groundwater sources, abandoned municipal wells, abandoned industrial wells, and possible river sources. A supplemental source would reduce the vulnerability of a single supply source.

Providence Water continued to collaborate with the Rhode Island Water Resources Board on the next phase of this project. This phase involved a study to determine the need, feasibility, and reasonableness of developing the sources identified in the previous phase. The intent of this study was to determine which, if any sources could justifiably be developed as supplemental sources to the existing PW system. The study was awarded in June 2001, commenced in September 2001, and was completed in May 2004.

Treatment Facilities

Electronic Treatment Process Monitoring Equipment

Twenty (20) water quality monitoring particle counters have been purchased and installed. These particle counters have been installed to monitor each of the plant's eighteen filters and the influent and effluent water. Six (6) pH meters have been purchased and installed to monitor pH at various locations in the plant.

Treatment Plant - Install Pipes for Effluent Metering / Sampling

The installation of 12 stainless steel pipes along the length of the clearwell to be used as sampling points for water quality collection is complete.

Install New CO2 System

A new carbon dioxide (CO_2) bulk storage and chemical feed system has been installed at the treatment plant. The system is intended to increase both the level of dissolved inorganic carbon (DIC) and the alkalinity of the finished water with the intended objective of reducing lead levels. A study is being conducted to evaluate the treatment performance and the needed adjustment levels for the CO_2 and the lime dosing processes in order to achieve the optimum effectiveness of the new system.

Install dredge piping to bypass current lagoon system

Piping from the sedimentation basins to the sludge drying bed areas has been installed adjacent to the lagoons to minimize iron-content-discharge to the Pawtuxet River. This allows PW to bypass the current sludge lagoon system when cleaning the sedimentation basins. This will prevent ninety percent of the sludge residuals produced from the treatment plant from entering the sludge basins, better positioning PW to meet the new iron discharge limit. Construction of the piping system is substantially complete. Minor punch list items remain.

Installation of new piping system

Transmission System

Install Transmission Mains (Western Cranston)

Several transmission main extensions in this area of the system were installed in order to reinforce the transmission grid. Construction has been completed for the installation of 10,000 feet of 16-inch pipe along Pippin Orchard Road and 3,300 feet of 24-inch main along Wilbur and Conley Avenues. Construction has been completed to install 1000 feet of 20-inch water main to interconnect Paliotta Parkway and Independence Way in Cranston. This interconnection provides an important transmission loop for the Western Cranston Water District by connecting Plainfield Pike to the Scituate Ave mains.

Construction has been completed in which 3500 feet of 16-inch water main was installed along Scituate Avenue that closed a major transmission loop in the system and provided a secondary feed route to a large area of the system that had been dependent on a single feed main. The transmission main installation is part of the overall improvement plan for the Western Cranston area of the system. Permanent road restoration remains to complete the project.

Installation of 24" main on Conley Avenue

Installation of 24" tapping sleeve and valve

78" and 102" Valves for Wholesale Connections

A design/build services contract for the installation of flow controls for the 78"/102" Supplemental Tunnel & Aqueduct has been completed. Installation of the 102" flow controls, including the installation of a 102" butterfly valve and bypass piping, was completed in the fall of 2002. Construction of the 78" flow controls, which included a new 78" butterfly valve and bypass piping, was completed in the winter of 2007.

Installation of these controls enables redundant supply routes to the Kent County Water Authority and the Warwick Water Department wholesale connections. This provides the ability to maintain a continuous supply to these connections in the event of a failure in any section of the aqueduct and provides the ability to shutdown all sections of the aqueduct for inspection, maintenance, or repair without interrupting service to these connections.

Emergency Interconnection - Structure D

Construction of an emergency interconnection between Providence Water and the Kent County Water Authority (KCWA) was completed. This interconnection provides an important secondary feed source enabling Providence Water to supply Kent County in the event the Clinton Avenue connection or pump station were to become disabled, and also allowing Kent County to supply a quantity of water to the Providence Water system under certain emergency events. This interconnection also allowed the installation of the 78" aqueduct valve in the vicinity of Kent County's Clinton Avenue connection, providing the ability to isolate the aqueduct on either side of the connection, and the opportunity to shut down and drain the 78" aqueduct for conducting its first ever interior inspection and needed repairs. The connection consisted of the installation of submersible pumps within the aqueduct shaft at Structure D, along with the necessary suction and discharge piping to transfer the pumped water to the Kent County Water Authority System. Providence Water worked with Kent County to obtain partial funding reimbursement through the Rhode Island Water Resources Board's emergency interconnection grant program.

The project was virtually complete and the pumps operated trouble-free for the approximately 3 month period during the installation of the 78" valve and inspection of the aqueduct. During subsequent pump exercising runs, one of the pumps failed. The pump was removed and repaired under warranty by the manufacturer. Following this, the second of the two pumps experienced a similar type failure. This pump was also removed and repaired under warranty by the manufacturer. The pump station is now complete and fully operational.

Pumping and Storage

Neutaconkanut Hill Booster Pump Station

Construction is complete for the installation of a booster pump station in the Neutaconkanut Hill area of Johnston to boost the pressure in the area to Providence Water standards. This is a high elevation area of the system that had been tied into the system at the request of the Town of Johnston due to concerns about potential well contamination and previously experienced unacceptably low pressure during periods of high demands.

Distribution System

Various Main Extensions For System Improvements

A new ductile iron main was installed in the King Phillip Street area of Providence. The 1234 foot extension eliminated the need to repair a water main break under the eastbound lane of RI Route 6. The old cast iron main was abandoned in place.

AMR System

In accordance with the Report and Order of Docket Number 3832, the funding for future water meter replacements is to be from a restricted Meter Replacement Account rather than from the IFR Account. All meter replacements, and all Automatic Meter Reading (AMR) activities, are now funded from the same restricted account, the Meter Replacement Account. For this reason, meter replacements and AMR system program activities will no longer be reported on an on-going basis in the IFR / CIP Status Report.

MLOG Leak Detection

Providence Water has purchased and has installed an automated system-wide leak detection system throughout its distribution system. Approximately 9000 MLOGS have been installed in the system. MLOG leak detection sensors are installed on house service lines (on every 5 to 10 services in the distribution system depending on the distance between laterals) for recording and logging acoustic sounds generated by leaks on water mains, services, and appurtenances. The data is transmitted by radio and collected by drive-by radio-read controllers.

Hydrant Locks

Providence Water has purchased and installed hydrant locks in strategic areas of the distribution system to prevent the unauthorized use of hydrants. Providence Water has commonly experienced difficulty with street sweepers filling their trucks without authorization and with vandals opening hydrants on hot days during the summer. Hydrants opened by untrained individuals can cause a disruption in the flow of water resulting in pressure and water quality problems. In addition, the loss of unmetered treated water results in lost revenue.

Support System Facilities

Forestry Building - Office Construction

Offices have been constructed in the mezzanine area of the garage to house forestry support staff. Construction is complete.

New Fencing and Roads - PW Property

New security fencing was installed around 10 air vents and the east portal for the portion of the supplemental tunnel and aqueduct located between Scituate and Cranston. Additionally, a contract has been completed to install approximately 1500 feet of new fence along the Gainer Dam access road and spillway channel. The project was needed to limit access to the edge of the spillway channel for concerns over safety. Security fencing was installed along Route 116 across from the Purification Works to keep vehicular traffic from entering the area at the base of Gainer Dam. Construction is complete for the installation of a bar gate on Providence Water owned property off of Pontiac Ave. to prohibit unwarranted access.

Security Upgrade at Treatment Plant and Facilities

Construction is complete for security improvements to all Providence Water Facilities in conjunction with recommendations of a previously conducted system-wide security assessment. A security room has been constructed at the treatment plant to monitor all aspects of security at the plant and associated satellite facilities. A security room with monitoring consoles has been constructed at both the Cranston and Academy Avenue administration buildings to monitor activities at each facility. Construction at the plant, administration buildings, and remote facilities consisted of the addition of cameras, motion detectors, lighting, fencing, intrusion detection, and access control.

Underground and aerial fiber optic cable was installed from four Providence Water facilities west of RI Rt. 116 to the treatment plant. The fiber optic cable is being used for carrying video, security access, and SCADA to the treatment plant from the Gainer Dam gatehouse, the Raw Water Booster pumping station, the junction chamber, and the meter chamber.

Various Capital Projects

A project has been completed in which surge protectors were installed at all pump stations to help protect the instrumentation systems and pump station controls from damage caused by lightning strikes.

A water sampling station and security cabinet for the Bristol County Water Authority (BCWA) 30-inch connection has been installed. The station will be used as one of the points for obtaining samples in the system for water quality testing.

Lowering Communications Shed to Foundation

A new pre-engineered concrete communications shed was installed at the Longview Reservoir. The new communications shed provides a dedicated and secure location for the communication equipment that had been previously installed inside the Longview Reservoir gatehouse.

Distribution System

Unidirectional Flushing (UDF) Program Development

Providence Water is utilizing a new water model developed under the GIS project for creating flushing sequences for the UDF program for the entire distribution system. 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 under the pilot project. The design of approximately 200 miles of flushing sequences was completed in 2013 and an additional 200 miles was designed during calendar year 2014. The remaining portion of the distribution system will be designed through calendar year 2016. During the 2013 construction season we flushed approximately 55 miles of water mains. During the 2014 construction season, approximately 93 miles of mains were flushed as part of the planned flushing program. An additional 80 to 100 miles of mains are scheduled to be flushed during the 2015 construction season.

In addition to the planned flushing program, 6 miles of water quality flushing was performed and 16 miles of mains were flushed utilizing a closed-loop filter flushing system which we piloted to evaluate its effectiveness. There are no plans at this time to continue utilizing this alternative system.

Support System Facilities

GIS System and base mapping conversion system

A report consisting of a needs assessment, a feasibility study, and development of a Geographical Information System (GIS) implementation plan was performed, which allowed Providence Water to implement the development of the system. A large-scale plotter and plan-size document scanner/copier were purchased for mapping needs as part of the new GIS system. This equipment allowed for the creation of maps and plans, and scanning of existing plans for inclusion in the GIS. An upgrade to Providence Water's hydraulic modeling software was also purchased that allowed modeling to be integrated with the GIS.

Also completed was a project to gather asset location information in Western Cranston using Global Positioning System (GPS) technology. This project provided GIS mapping of facilities in the acquired Western Cranston portion of the system for which information was lacking. This project area served as part of a pilot program for the longer-term development of an overall GIS program for our entire system.

An aerial flight of the Providence Water service area was completed along with the subsequent creation of orthophotos and planimetrics used to create a base map for the distribution system in GIS.

The initial implementation of the full-scale system-wide enterprise GIS has been completed. The project consisted of the conversion of the existing distribution system asset records that resided in various software programs and paper records into one centralized database and mapping system. The project also included business process modeling to optimize and customize the design of the system, as well as the purchase and development of all computer hardware, software applications, and data needed to support a fully functional, customized GIS program. Also included was the development of a customized intranet viewer that provides easy access to the data for the entire organization.

Three GPS units were purchased to aid in collecting and updating locational data of assets within the system. This collected data converts to GIS data for display in the enterprise GIS. We have updated all of our earlier aerial photography associated with the system with the State of RI's newer 2008 flight photos which are of high quality.

A new hydraulic model has been developed by converting the existing GIS record data to a new water model database. The initial calibration of the model has been completed. Additional C-Factor testing in conjunction with the results obtained from the UDF pilot project will allow Providence Water to further calibrate and maintain the model to better simulate actual field conditions.

The integration of the Hansen asset data and CSTAR customer billing data has been completed. Scanning and indexing of older distribution system as-built drawings is complete. 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. Hardware and software upgrades to the GIS servers are in progress to allow for the creation of a complete development enviroment for the system. This enviroment will also serve as a backup to the existing production system.

A project is in planning 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. In addition this will improve the ability for field staff to gain access to our asset and work order data in the field.

Treatment Facilities

Security Improvements Treatment Plant

Design 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, and construction of a new visitor parking lot.

Support System Facilities

Central Operations Facility

A property became available that met organizational needs. An offer was made and accepted and a Purchase & Sales Agreement has been signed to purchase a 180,000 SF building situated on a 16.5 acre site in Providence. The closing is scheduled for December 29, 2015.

Design is currently in progress to accommodate our personnel and organizational needs. Construction to rehabilitate the building will commence following advertisement, award, and procurement of a construction management contract. The building is expected to be occupied during 2017. The facility will accommodate both the administration and operations divisions of Providence Water.

Transmission System

Western Cranston - Water System Improvements

This is a general planning category for improvements in the Western Cranston area of the system. This section of the system was acquired from Cranston in 1996. Various improvements are needed to bring this area of the system up to system standards. The improvements will consist of increased pumping and transmission capacity, expanded storage, and improvements in the transmission and distribution system. The improvements will be more specifically identified in this report as they take place.

CIP PROJECT STATUS REPORT

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED								
Raw Water Supply								
Alternate Source of Supply Study	Planning	Jul 96	May 97	100%	Jun 04	NA	$643,794	NA
	Design	NA	NA	NA	NA			
	Construction	NA	NA	NA	NA			
Treatment Facilities								
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			
Transmission System								
Install Transmission Mains (W. Cranston)	Planning	Various Projects				NA	$2,588,458	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			
Pumping and Storage								
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			
Distribution System								
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			
MLOG Leak Detection	Planning	In House	Jun 09	100%	Dec 09	NA	$1,145,043	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			

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 06/30/15	Funds Needed to Complete
PROJECTS COMPLETED (cont)								
Support System Facilities								
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	$153,833	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	Various Projects				NA	$245,162	NA
	Design							
	Construction							
CONSTRUCTION								
Distribution System								
Unidirectional Flushing (UDF) Program Development	Planning	In House	Aug 12	100%	Feb 13	$1,500,000	$1,050,523	$449,477
	Design	In House	Feb 13	60%	(Dec 16)			
	Construction	In House	Jun 13	100%	Dec 13			
Support System Facilities								
GIS System and base mapping conversion system	Planning	Jan 02	Feb 02	100%	Jun 03	$5,000,000	$3,722,561	$1,277,439
	Design	Jan 04	Apr 04	100%	Dec 06			
	Construction	Apr 05	Nov 05	80%	(Jun 17)			
DESIGN								
Treatment Facilities								
Security Improvements - Treatment Plant	Planning	In House	Feb 15	70%	(Dec 15)	$250,000	$10,550	$239,450
	Design	In House	Feb 15	30%				
	Construction							
Support System Facilities								
Central Operations Facility	Planning	In House	Jan 08	90%	(Feb 16)	$30,000,000	$578,734	$29,421,266
	Design	(Nov 15)	(Feb 16)					
	Construction							
PLANNING								
Transmission System								
Western Cranston - water system improvements	Planning	Various Projects				NA	$219,529	NA
	Design							
	Construction							

Total CIP Expenditures **$28,047,461**