



***FY19 Proposed
Capital Improvement Budget***

December 20, 2017



FY19 Proposed CIP

- Establish five-year spending Cap for FY19-23
- Establish FY19 Proposed CIP

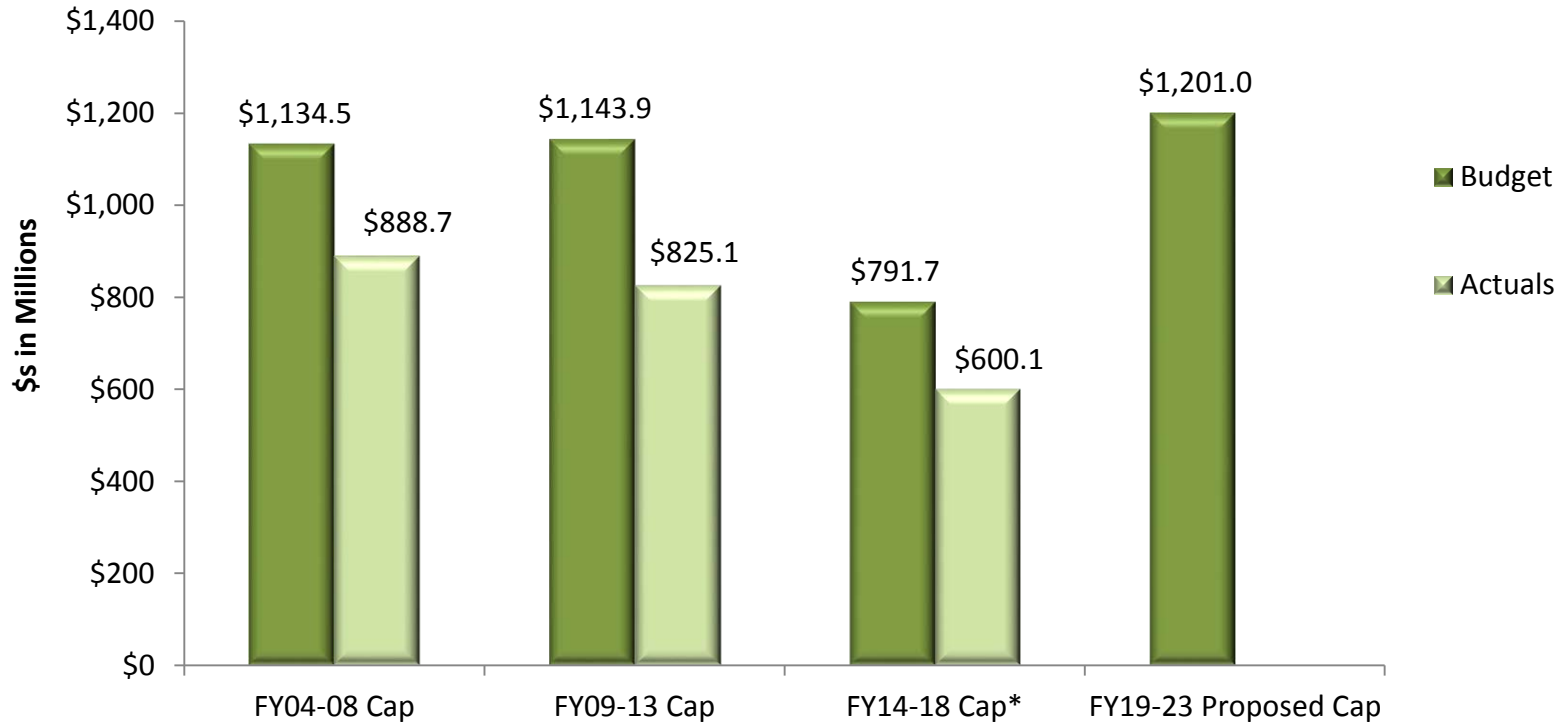


FY19 Proposed CIP – Key Statistics

- Total CIP Spending since 1986: \$8.2 billion
- Future CIP Spending: \$3.3 billion from FY18-FY46
- New Projects added to CIP: \$235 million from FY19-29
 - New Phases 11 and 12 of local I/I grant/loan program



Cap History, Actual Spending and Proposed FY19-23 CAP



*FY18 Projected



Cap History, Actual Spending and Proposed FY19-23 Cap

- FY04 – 08 Cap \$1,134.5 million
Actual Spending: \$888.7 million (78.3%)
- FY09-13 Cap \$1,143.9 million
Actual Spending: \$825.1 million (72.1%)
- FY14-18 Cap \$791.7 million
Estimated Spending: \$600.1 million (75.8%)
- FY19-23 Proposed Cap \$1,201.0 million

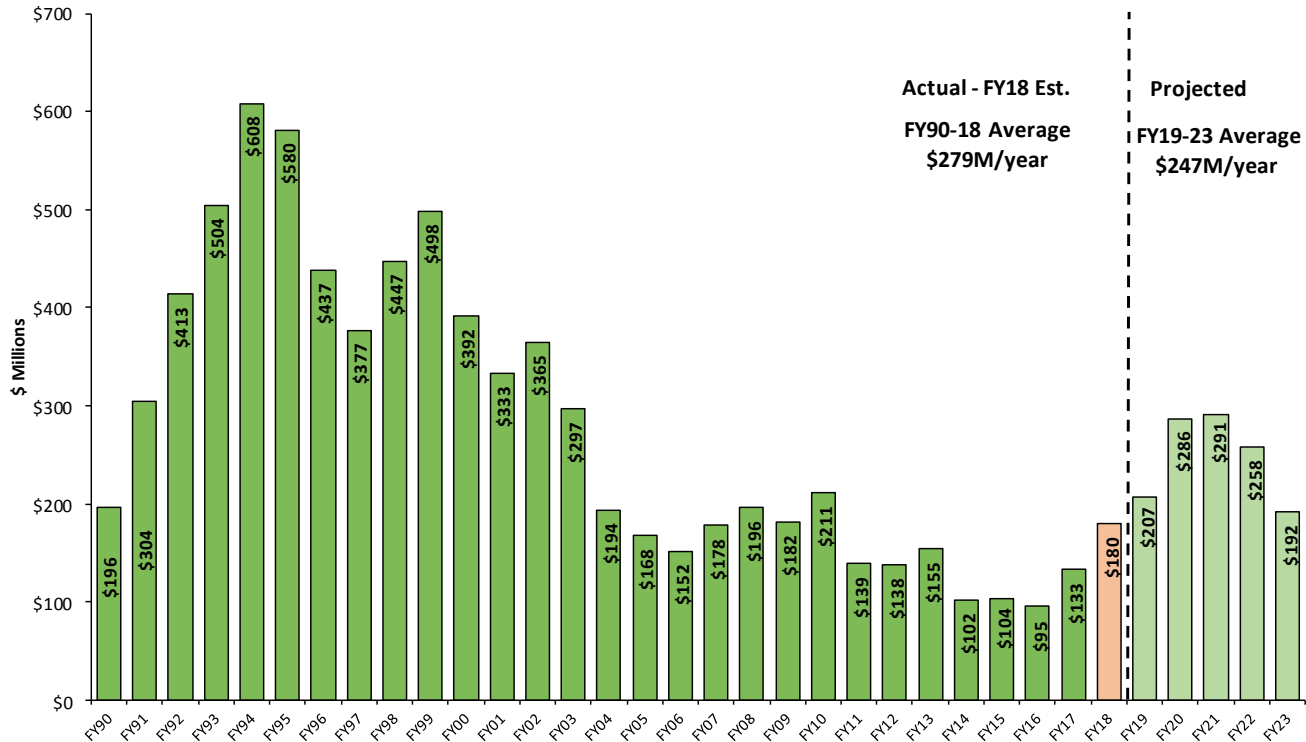


FY19 Proposed CIP – Key Statistics

- FY19-23 Spending: \$1.2 billion
- FY19 Spending: \$207.2 million
 - 52.9% of FY19 spending awarded
- FY19 Contract Awards: 46 awards totaling \$266 million

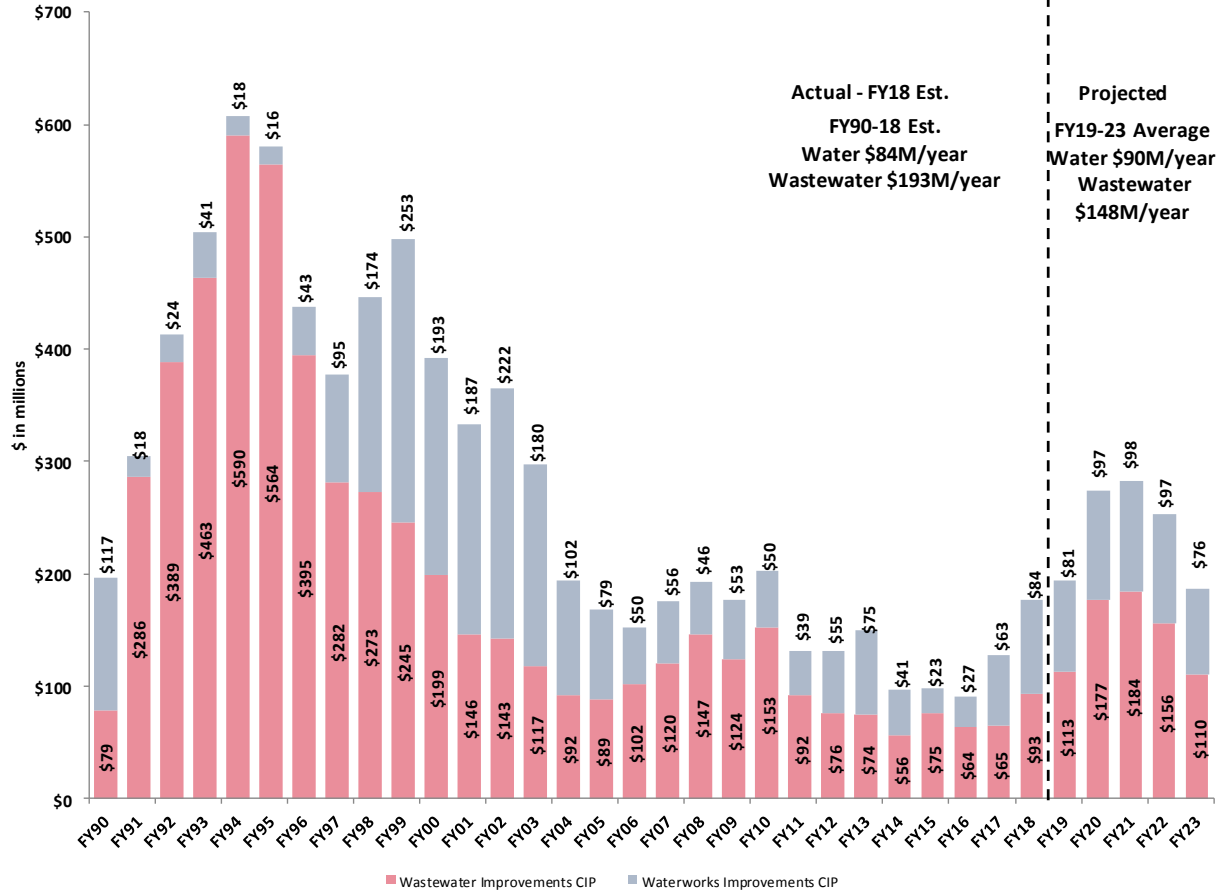


Historic and Projected Capital Improvement Spending





Historic and Projected Capital Improvement Spending by Utility





FY19-23 Proposed Cap

	FY19	FY20	FY21	FY22	FY23	Total FY19-23
Projected Expenditures	\$207.2	\$285.8	\$290.8	\$258.0	\$192.3	\$1,234.1
I/I Program	(14.0)	(23.2)	(27.2)	(22.4)	(25.0)	(111.8)
Water Loan Program	(13.3)	(14.0)	(10.7)	(8.7)	(5.5)	(52.3)
MWRA Spending	179.9	248.6	252.9	226.9	161.8	\$1,070.1
Contingency	12.5	17.2	17.5	15.9	11.3	74.2
Inflation on Unawarded Construction	0.0	8.2	15.1	18.9	15.7	58.0
Chicopee Valley Aqueduct Projects	0.0	0.0	0.0	(0.3)	(1.0)	(1.3)
FY19 Proposed FY19-23 Spending	\$192.4	\$274.0	\$285.4	\$261.4	\$187.7	\$1,201.0



Drivers of FY19-23 Spending

- Drivers of FY19-23 Spending: Asset Protection and Interim Water System Redundancy
- Start of Long-Term Water System Redundancy



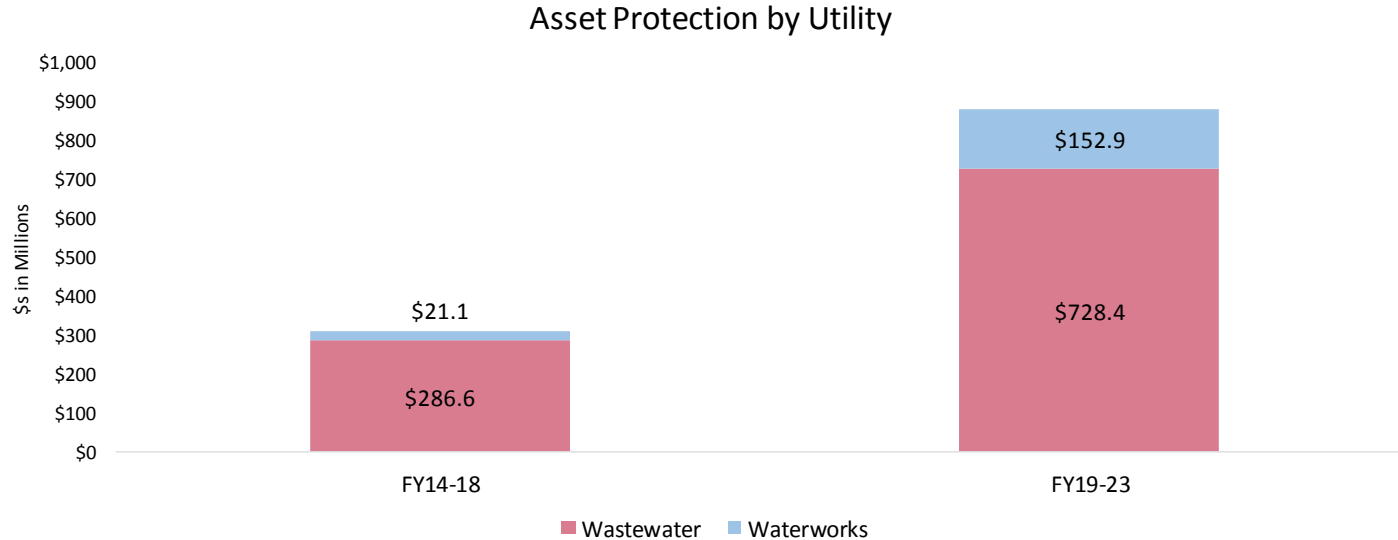
Asset Protection

Elements of major plant assets are aging

- Deer Island - \$3.8 billion (1995-2001)
- Carroll Water -\$420 million (2005)
- Nut Island -\$248 million (1998)
- Residuals Plant - \$172 million (2001)
- Chelsea Creek Headworks (built 1967 – rehabilitated 1987)
- Ward Street Headworks (built 1967 – rehabilitated 1987)
- Columbus Park Headworks (built 1967 – rehabilitated 1987)
- Prison Point Pump Station and CSO (built 1980 – rehabilitated 1999)



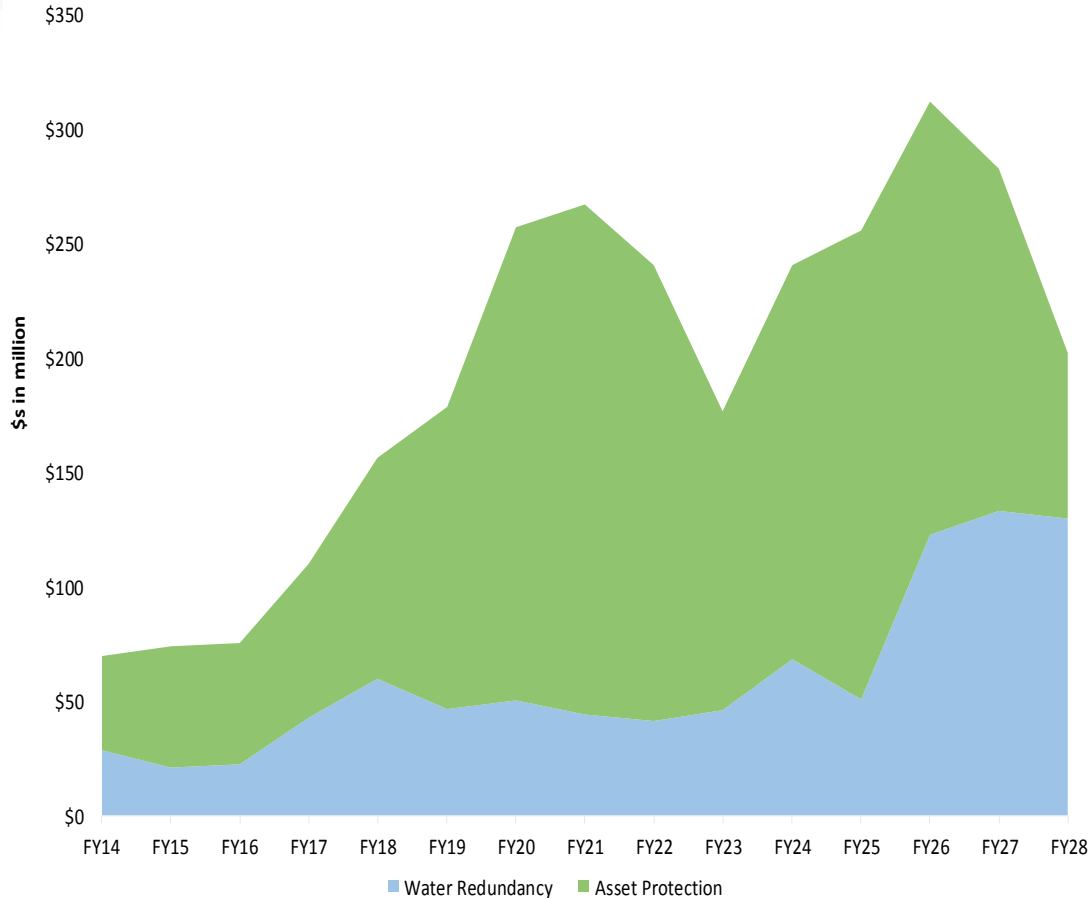
Asset Protection Current and Proposed Cap



- Asset Protection accounts for the largest share of capital expenditures for the FY19-23 period.
- Deer Island accounts for over \$366 million in spending in FY19-23 period.



Asset Protection and Water Redundancy



Asset Protection and Water Redundancy represent the next two waves of capital expenditures with spending for FY19-23 total \$892 million and \$229 million, respectively.



Top Asset Protection Contracts FY19-23

Contract	Projected FY19-23 Expenditures
Deer Island Clarifier Rehabilitation Phase 2 - Construction	\$129.9
Chelsea Creek Headworks Upgrades - Construction	42.7
Deer Island HVAC Equipment Replacement - Construction	38.8
Nut Island Odor Control HVAC Improvement Construction Phase 2	38.5
Prison Point Rehabilitation - Construction	34.1
NIH Sec 50 & 57 Water & 21/20/19 Sew Rehab Construction	25.5
Deer Island Fire Alarm System Replacement - Construction	20.0
Deer Island SSPS VFD Replacement Construction	19.6
Deer Island Gravity Thickener Rehab	18.0
Deer Island Digester & Storage Tank Rehab - Construction	12.9
Waterworks Facility Steel Tank/Improvement Construction	12.0
NHS Section 53 Connections - Construction	11.5
Deer Island MCC & Switchgear Replacement Construction	10.6
Total Contracts > \$10 million	\$414.2
% of Asset Protection	46.4%
Total FY19-23 Asset Protection	\$891.8

Asset Protection contracts > \$ 10 million total \$414.2 million or 46.4% of total projected Asset Protection expenditures for FY19-23.



Top Water Redundancy Contracts FY19-23

Contract	Projected FY19-23 Expenditures
Interim Redundancy - WASM 3 - Construction 1	\$19.8
SEH Redundancy - Pipeline Sect 111 - Construction 3	17.3
NIH Redundancy Section 89 & 29 Rehabilitation - Construction	16.0
NIH Section 89 & 29 Redundancy Construction 2	15.3
Interim Redundancy - WASM/Spot Pond Supply Mains West PRV Construction	15.2
SEH Redundancy Pipeline Sect 111 - Construction 2	13.8
Interim Redundancy - Section 101/Waltham Section - Construction	11.2
Long-Term Redundancy Conceptual Design Environmental Impact Report	10.6
Total Contracts > \$10 million	\$119.2
% of Water Redundancy	51.9%
Total FY19-23 Water Redundancy	\$229.5

Water Redundancy contracts > \$ 10 million total \$119.2 million or 51.9% of total projected Water Redundancy expenditures for FY19-23.



New Projects

Total New Projects added to CIP: \$234.7 million

Division	Total Contract Amount	FY19 Spending	FY19-23 Spending
Wastewater	\$105.0	\$5.8	\$77.0
Waterworks	\$125.2	\$1.1	\$27.7
Business and Ops Support	\$4.5	\$0.8	\$4.5
Total New Projects	\$234.7	\$7.7	\$109.2



New Projects

(\$s in millions)

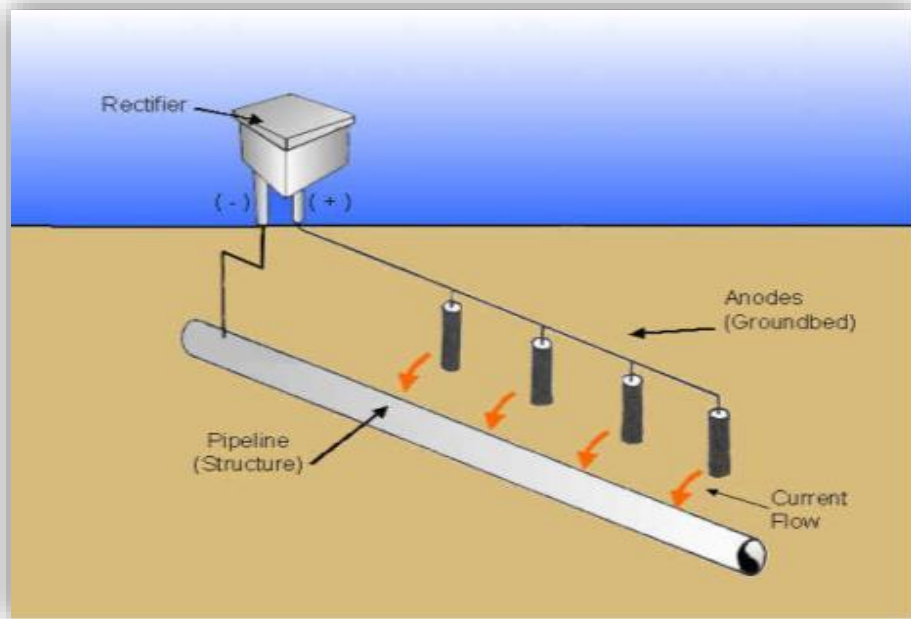
Project	Total Contract Amount	FY19-23 Spending
I/I Local Financial Assistance Program	\$90.0	\$63.7
Deer Island Asset Protection	\$15.0	\$13.3
Cathodic Protection	\$62.2	\$18.1
Carroll Water Treatment Plant Asset Protection	\$38.3	\$2.3
NHS Revere & Malden Pipeline Improvements	\$12.9	\$0.0
Watershed Land	\$5.0	\$5.0
Sudbury/Weston Aqueduct Repairs	\$3.9	\$0.0
Dam Projects	\$1.8	\$1.8
Waterworks Facility Asset Protection	\$0.6	\$0.0
Distribution System Facilities Mapping	\$0.5	\$0.5
Capital Maintenance Planning & Support	\$4.5	\$4.5
Total New Projects	\$234.7	\$109.2
Total New MWRA Capital Projects (excludes Loan Programs)	\$144.7	\$45.5



Cathodic Protection - \$62 million

Metro System Cathodic Protection - \$57 million

Western System Cathodic Protection - \$5.4 million



Needed to maintain pipe and steel storage tanks integrity in order to provide reliable water delivery



John Carroll Treatment Plant Asset Protection - \$38 million

Ultra Violet
Reactor
Replacement -
\$10 million



*Needed to maintain
water quality for safe
water supply*



Ozone Generator
Replacement - \$20
million



Deer Island Asset Protection - \$15.0 million

Hydroturbine Replacement \$12.0 million



*Continue to capture hydropower from
Outfall Tunnel*

Peak generation: 6.4 million kWh

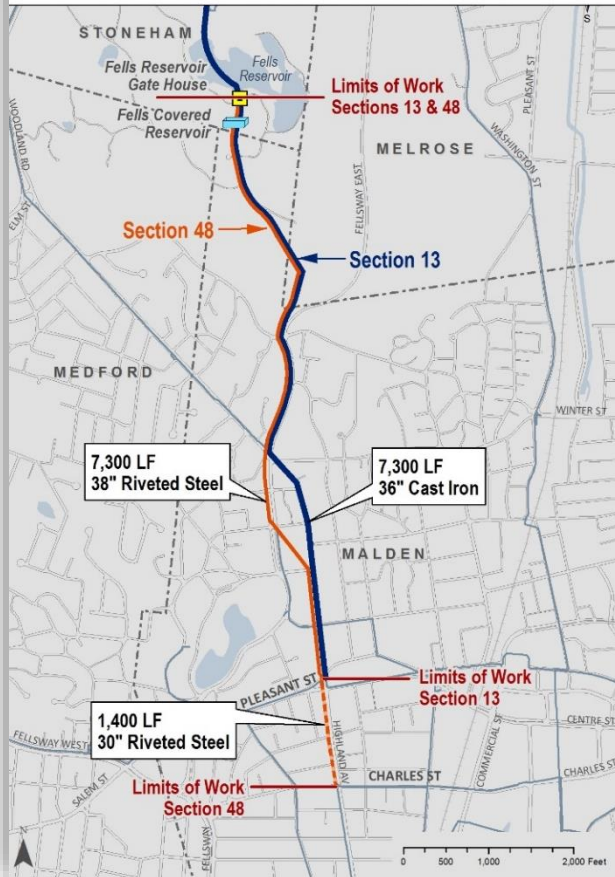
Annual revenues > \$600,000





NHS – Revere and Malden Pipeline Improvements \$12.9 million

Section 13 & Section 48 Rehabilitation



Total Contract: \$12.9 million
(design and construction)
Sections 13 & 48 Rehabilitation

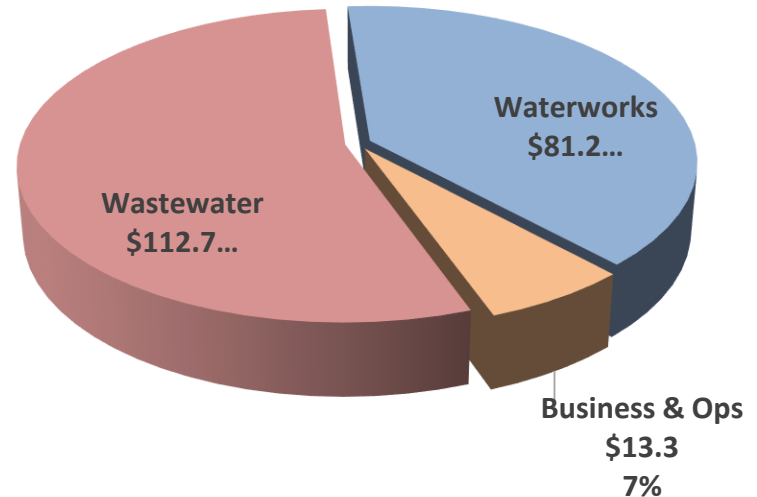
Approx. 7,300 lf of Section 13
Approx. 7,300 lf of Section 48

To improve hydraulic and water quality problems, and to meet the Safe Drinking Water Act requirements



FY19 Expenditures by Program

- Total Proposed FY19 Expenditures: \$207.2 million
 - Wastewater: \$112.7 million
 - Waterworks: \$81.2 million
 - Business and Operations: \$13.3 million





Top Spending FY19 Contracts

Contract	Projected FY19 Expenditures \$s in millions
Chelsea Creek Headworks Upgrades - Construction	\$25.8
LWSAP Phase 2 Distributions	20.3
Deer Island Clarifier Rehabilitation Phase 2 - Construction	16.2
NIH Section 89 & 29 Redundancy Construction Phase 2	11.0
LWSAP Phase 3 Distributions	10.0
SEH Redundancy Pipeline Section 111 - Construction 2	8.4
Deer Island HVAC Equipment Replacement - Construction	7.8
I/I Local Financial Assistance - Phase 9 Grants	7.5
SEH Redundancy Pipeline Section 111 - Construction 3	7.1
NI Odor Control HVAC Improvement - Construction 2	6.5
Steel Tank Painting Deer Island, Bellevue 2 & Turkey Hill	5.5
Lead Service Line Replacement Loans	5.0
Total Contracts > \$5.0 million	\$131.1
% of FY19 Spending	63.3%
Excluding Community Loan Programs	\$88.3
% of FY19 Spending	42.6%
Total projected FY19 Spending	\$207.2



Major FY19 Spenders – Chelsea Creek Headworks

Total Contract: \$77.5 million
FY19 Spending: \$25.8 million





Major FY19 Spenders – Deer Island Clarifier Rehabilitation

Total Contract: \$129.9 million
FY19 Spending: \$16.2 million





Major FY19 Spenders – SEH Redundancy



Total Contract: \$47.1 million
FY19 Spending: \$15.5 million

Contract 1 - \$12.5 million

Approx. 11,000 LF

Substantially Complete in FY18

Contract 2 - \$17.2 million

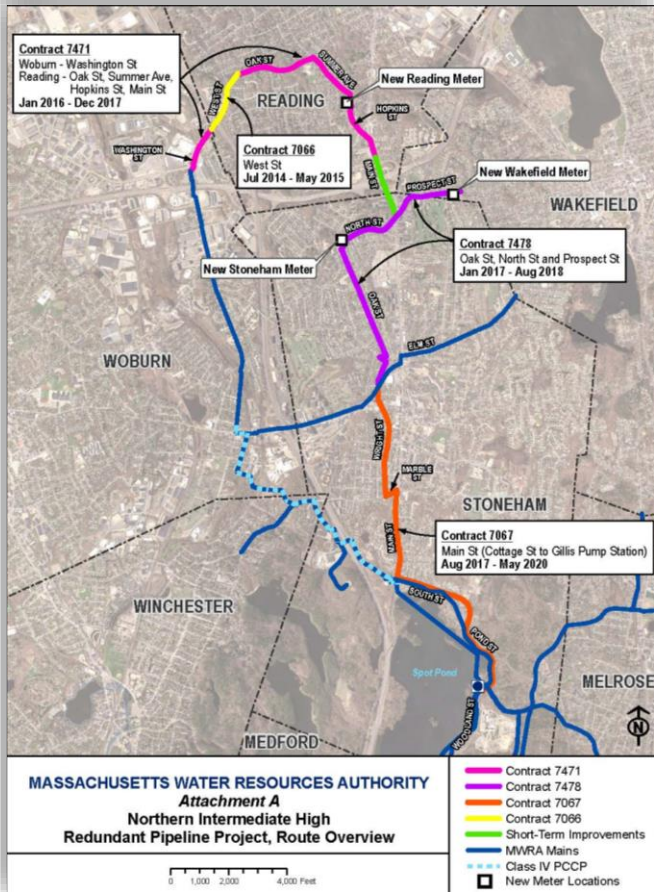
Approx. 10,000 LF

Contract 3 - \$17.3 million

Approx. 6,800 LF



Major FY19 Spenders – NIH Redundancy and Storage



Total Contract: \$55.4 million
FY 19 Spending: \$13.7 million

-  Contract 1A - \$1.9 million
Approx. 2,400 lf
Completed in FY16
-  Contract 1B - \$12.2 million
Approx. 8,800 lf
Completed in FY18
-  Contract 1C - \$18.6 million
Approx. 10,400 lf
2 revenue meters
-  Contract 2 - \$22.7 million
Approx. 14,000 lf

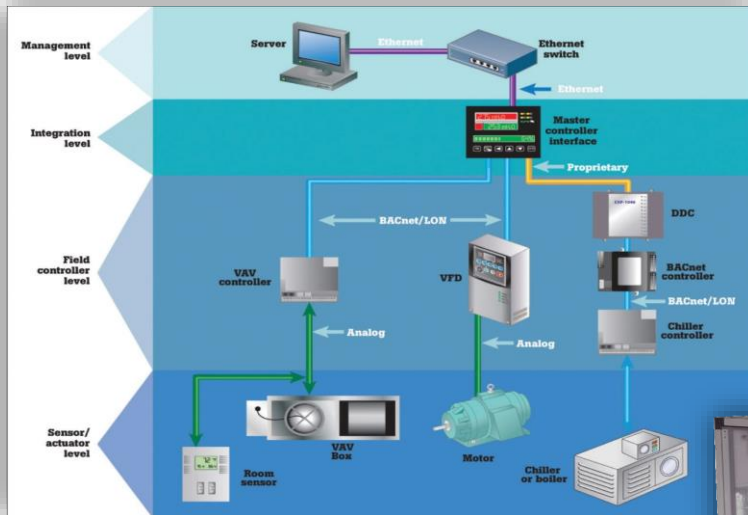


Major FY19 Spenders – Deer Island HVAC

Total Contract: \$38.8 million
FY19: \$7.8 million



Air Cooled Condensing Compressor Units



Chiller

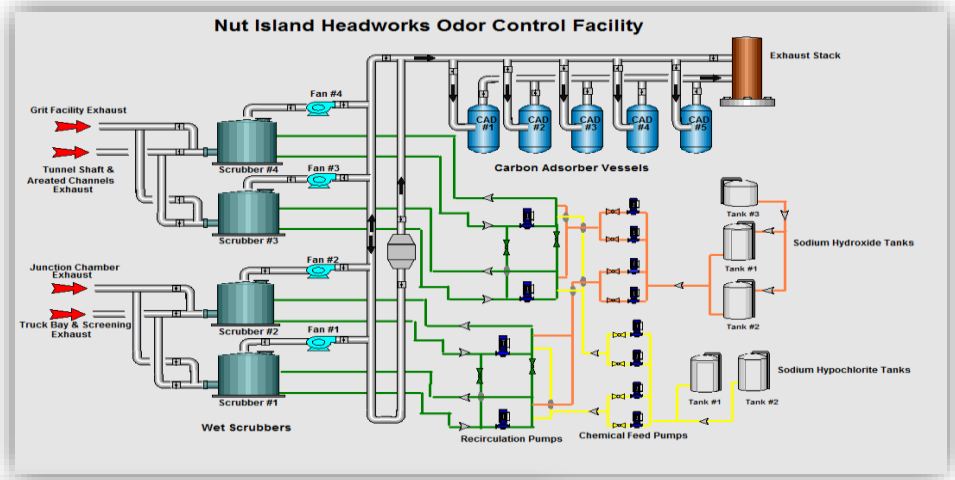
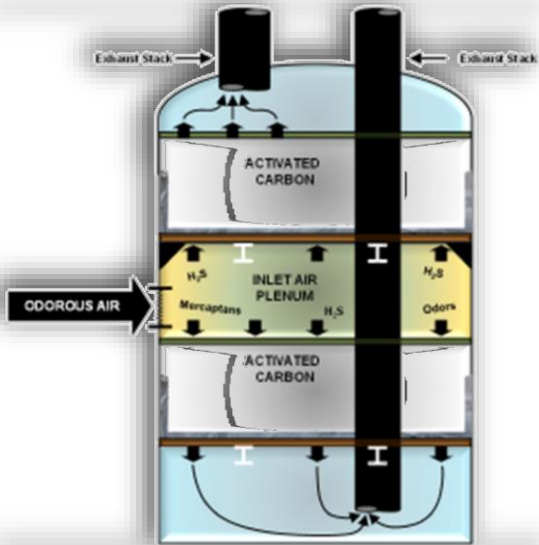


Air Handler



Major FY19 Spenders – Nut Island Odor Control and HVAC

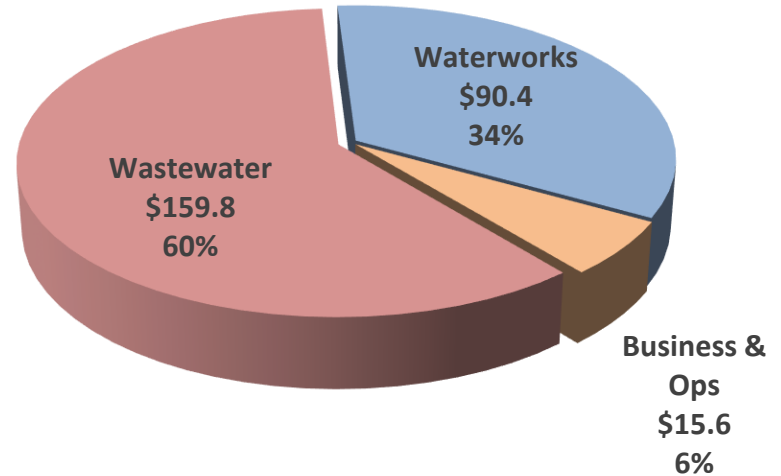
Total Contract: \$38.5 million
FY19 Spending: \$6.5 million





Proposed FY19 Contract Awards by Program

- 46 Contract Awards Planned for FY19
- Total Contract Value: \$266 million
 - Wastewater: \$159.8 million
 - Waterworks: \$90.4 million
 - Business and Operations: \$15.6 million



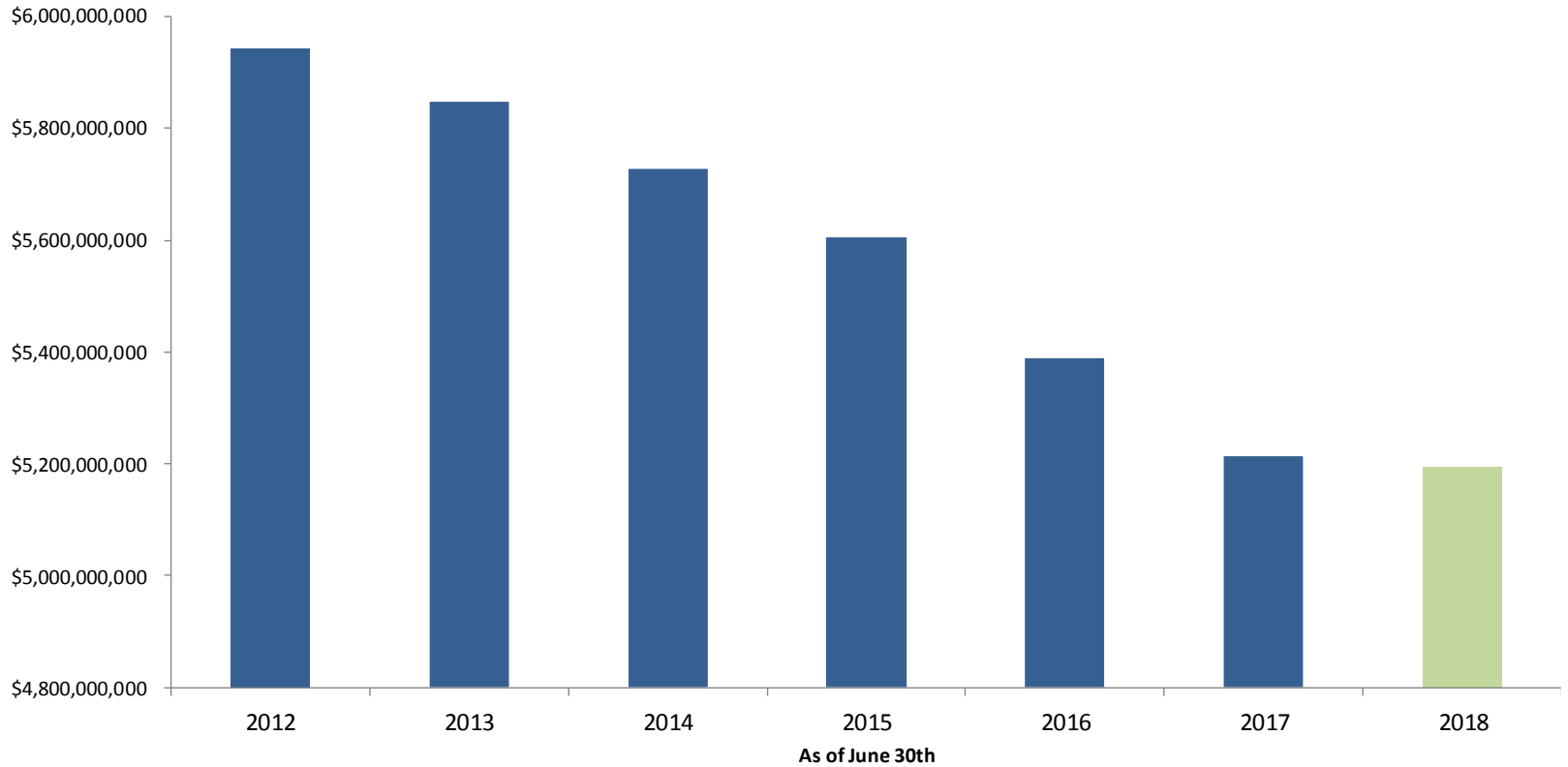


Top 10 Projected Contract Awards (in millions)

Contract	Contract Budget	FY19-23 Spending
	(\$s in millions)	
Nut Island Odor Control HVAC Improvement - Construction 2	\$38.5	\$38.5
Prison Point Rehabilitation - Construction	\$34.1	\$34.1
Northern Low Section 50 & 57 Water & 21/20/19 Sewer Rehab Construction	\$25.5	\$25.5
Deer Island Fire Alarm System Replacement - Construction	\$20.0	\$20.0
Ward Street & Columbus Park Headworks Des/CA/REI	\$12.0	\$6.4
Metro Tunnel Conceptual Design - Environmental Impact Review	\$10.6	\$10.6
Deer Island MCC & Switchgear Replacement Construction	\$10.6	\$10.6
Peabody Pipeline Construction	\$9.4	\$9.4
New Connecting Mains CP3-Sect 23,24,47 Rehabilitation	\$9.4	\$9.4
Switchgear Relay Replacement Construction	\$8.0	\$8.0
Top 10 Contract Awards FY19	\$178.0	\$172.4
% of Total Awards	67%	68%
Total 46 Contracts for FY19	\$265.7	\$253.5

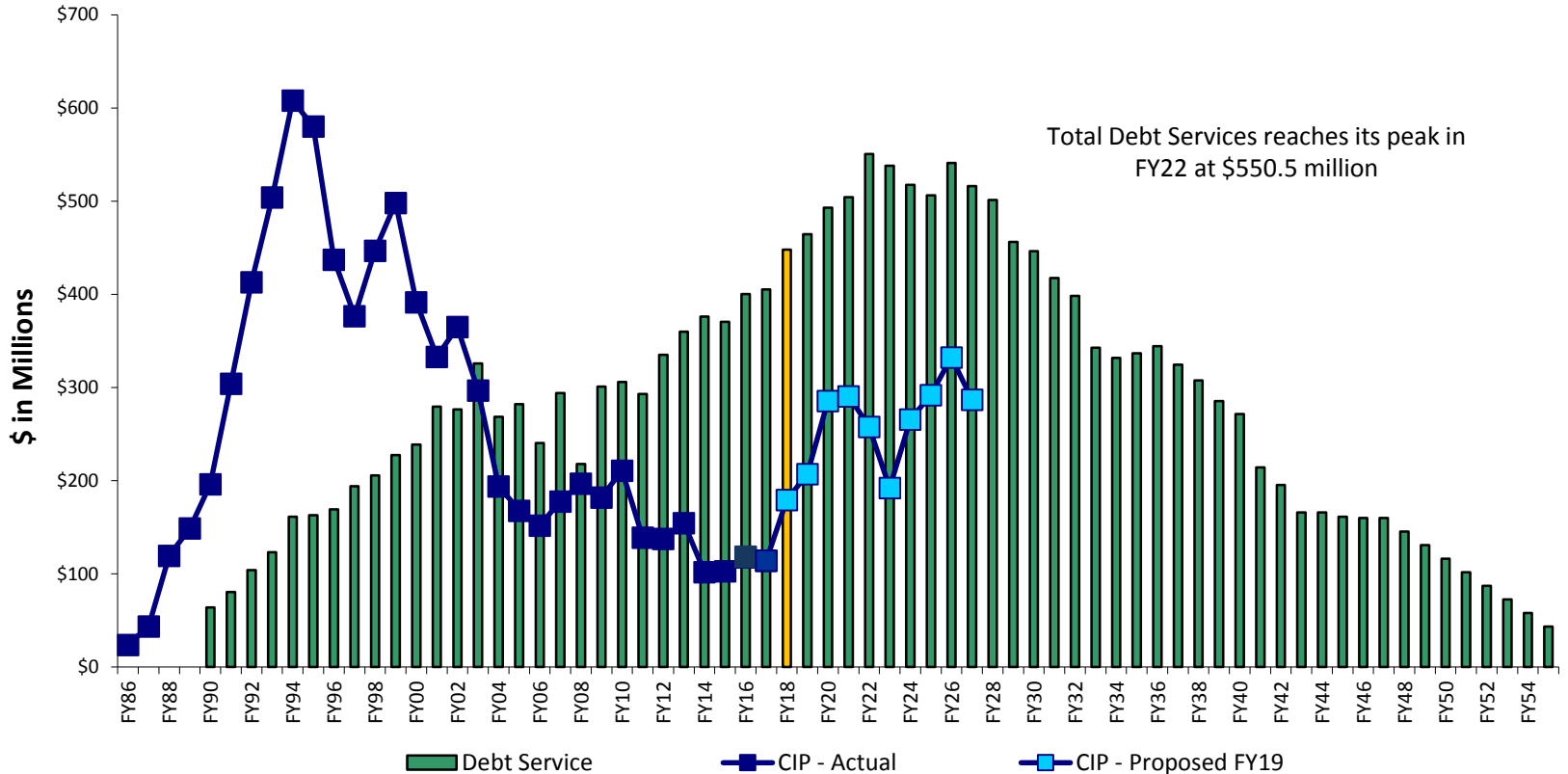


Outstanding Debt





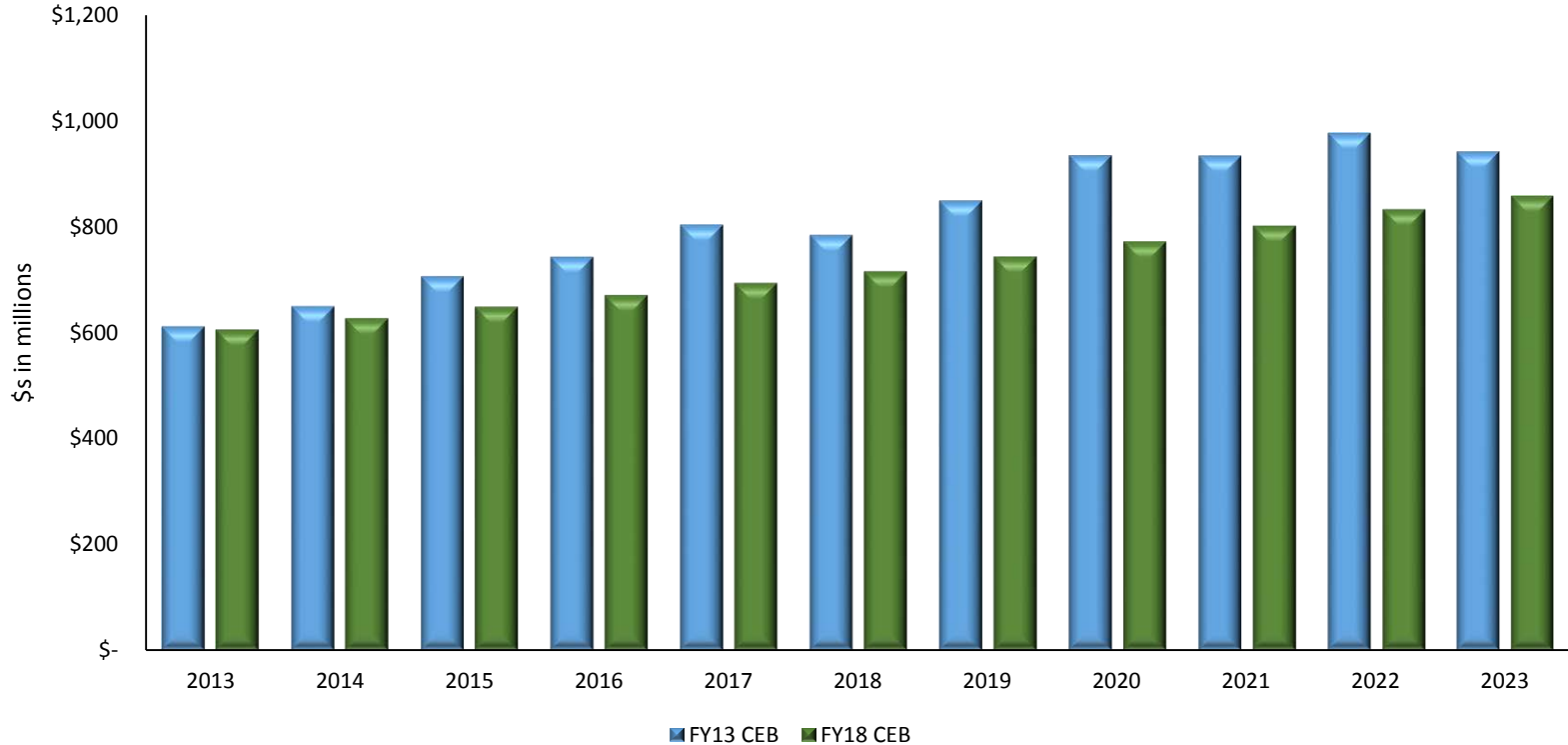
CIP Spending and Debt Service





Rate Revenue Requirement FY13 vs. FY18

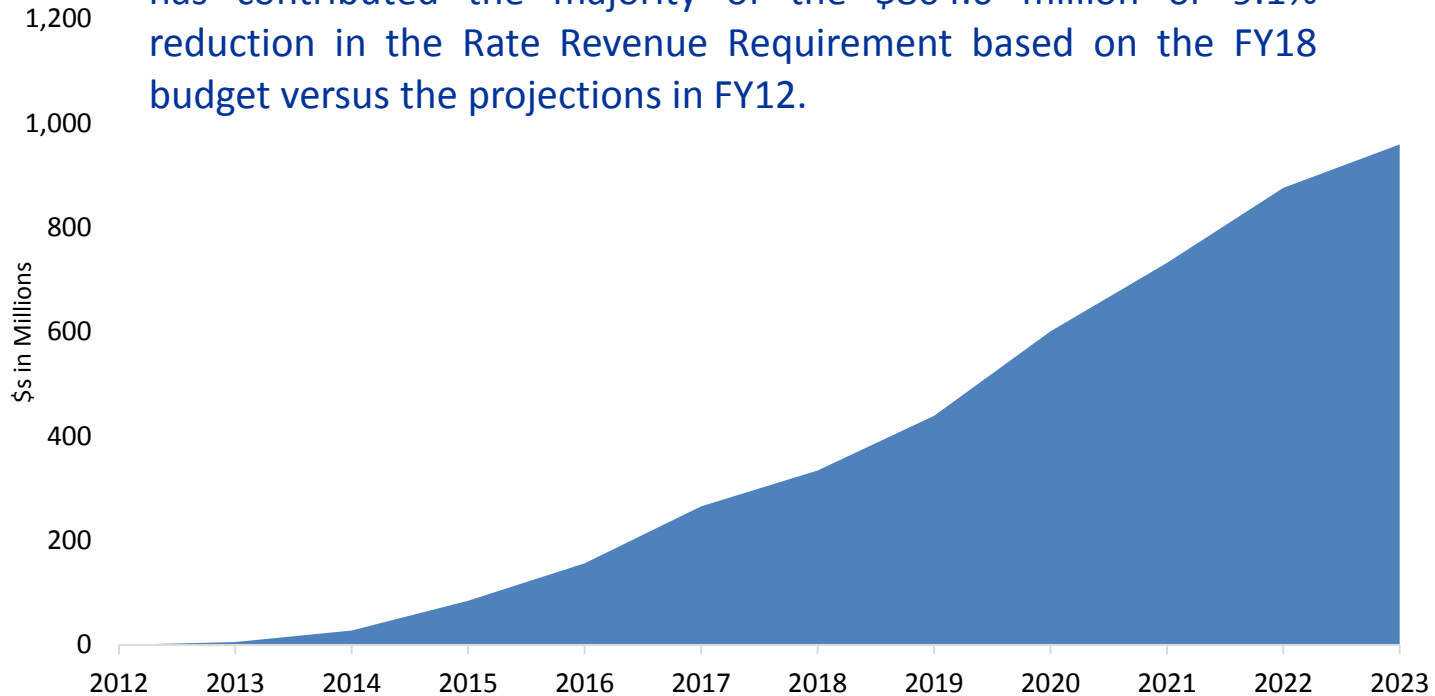
MWRA Rate Revenue Requirement





Cumulative Rate Revenue Savings

Debt service associated with the reduction in total indebtedness has contributed the majority of the \$804.0 million or 9.1% reduction in the Rate Revenue Requirement based on the FY18 budget versus the projections in FY12.





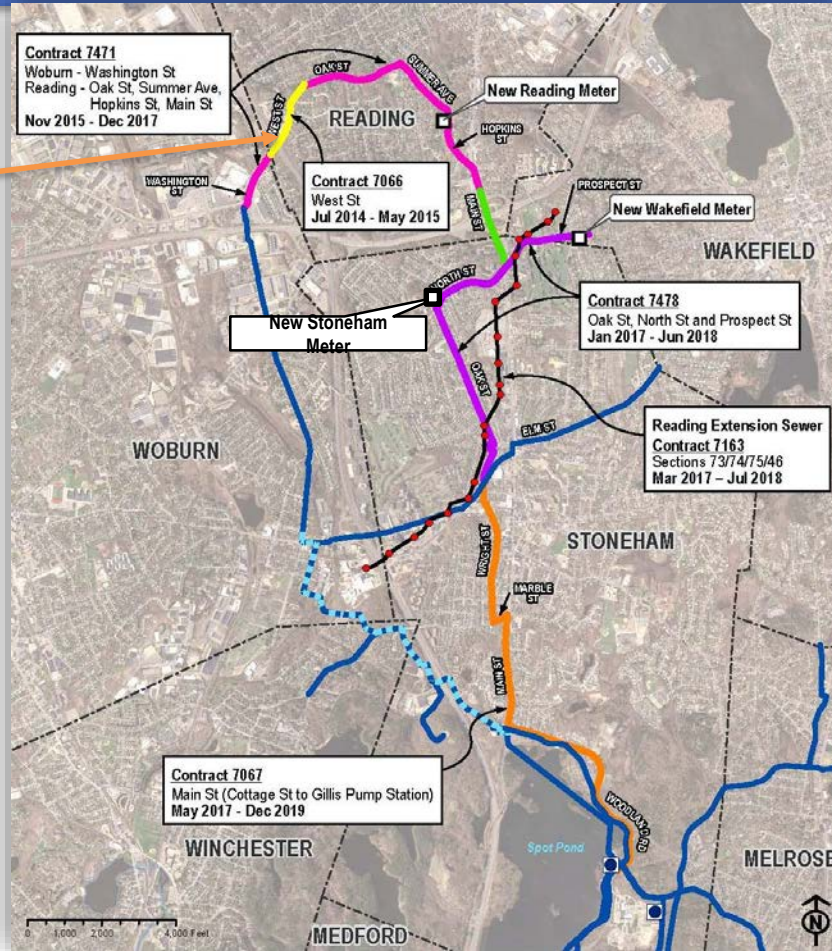
***Northern Intermediate High
Reading and Woburn
Contract 7471, Change Order 14***

December 20, 2017



NIH Redundant Pipeline Project

New Reading Meters





New 36-inch Pipe Installation



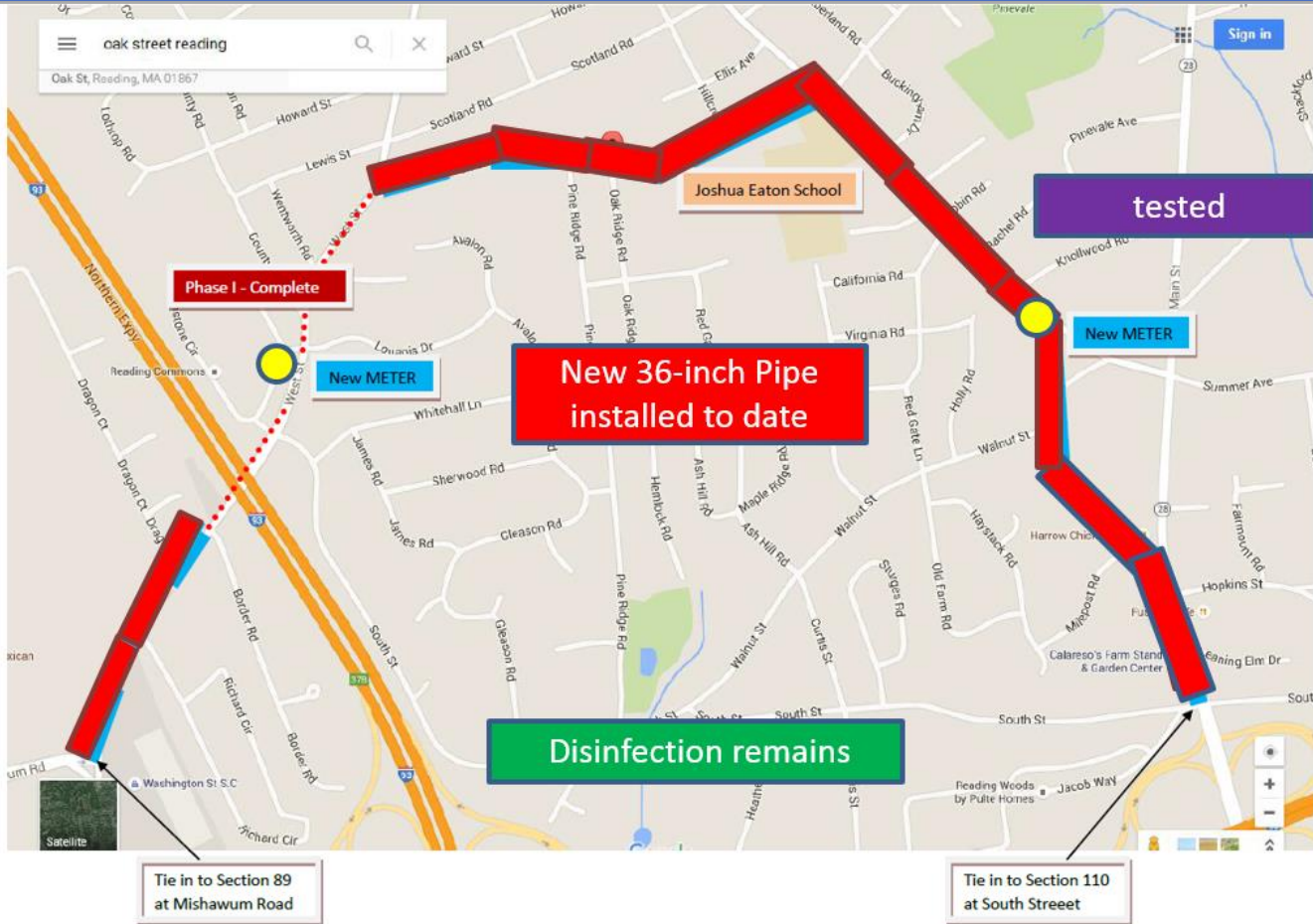
Installation of 36-inch DI pipe on Summer Ave



Hydraulic ramming of ledge



New 36-inch Pipe Installed to Date





Contract 7471 – Town of Reading Valve Vaults

- Pressure Transmitters
- Solenoid Valves
- Sump Pumps
- Exhaust Blowers
- Dehumidifiers
- Heaters
- Valve vault lighting
- Intrusion alarms
- Cabinet doors
- Exterior drywell
- Cabinet intrusion alarms



Town of Reading Valve Vault



Negotiations

- MWRA is negotiating costs with the contractor to perform this work



Above Ground Meter Cabinets



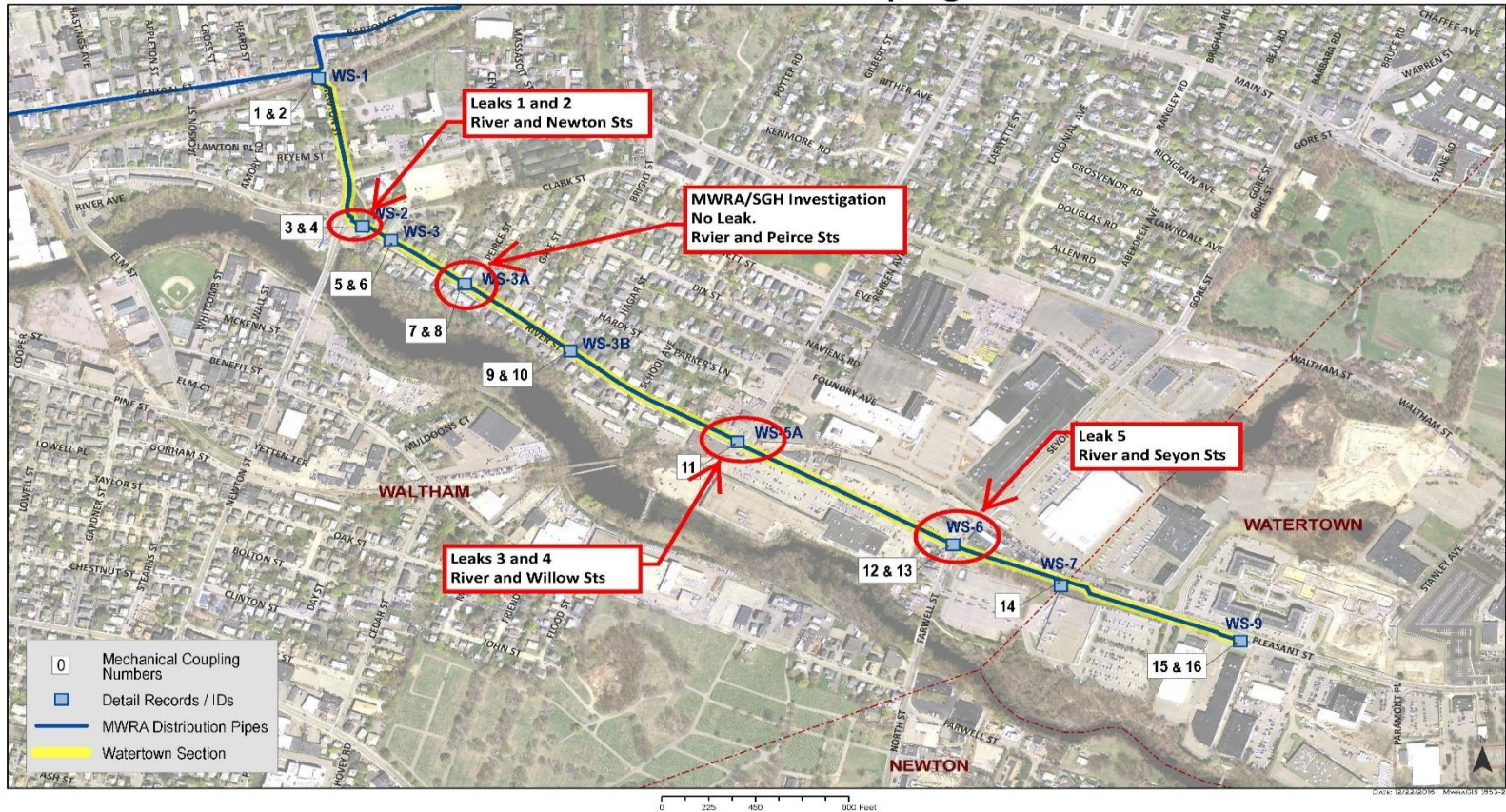
Watertown Section
Waltham and Watertown

December 20, 2017



Watertown Section Location Map

Contract 7222 – Mechanical Coupling Locations





River Street at Willow Street Sta. 31+05



Failed Joint



Repair

- Repair was designed by D'Amico/Green which included replacing one coupling with two couplings and spool piece with flex restraints and tie rods



Investigations by SGH - River Street & Willow Street



Joint excavated after leak



Fusion location of flex restraints on east side after 1st repair

- SGH's conclusion: The primary cause of joint failure was inadequate fusion of the flex restraints to the pipe. Insufficient surface preparation could have contributed to the lack of fusion



SGH Investigation – River and Peirce Streets

- 4 flex restraints on each side
- All flex restraints were load tested to a proof load 9,000 lbs
- 1 out of 4 on each side did not satisfy the proof load





New Flex Restraints and Couplings Installed at Peirce Street

