Capital Improvement Program

Proposed FISCAL YEAR 2018

MASSACHUSETTS WATER RESOURCES AUTHORITY

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February 2017

Louis M. Taverna, Chairman
MWRA Advisory Board
100 First Avenue
Boston, MA 02129

Dear Chairman Taverna:

This letter transmits to the Advisory Board the MWRA's Proposed Capital Improvement Program (CIP) for Fiscal Year 2018. The MWRA's Board of Directors approved the transmittal of the Proposed CIP at its December 14, 2016 meeting. The FY18 Proposed CIP represents an update to the FY17 CIP approved by the Board in June 2016 and includes the latest cost estimates, revised schedules, and new projects.

The FY18 Proposed Capital Improvement Program projects $169.5 million spending for FY18, of which $83.2 million supports Wastewater System Improvements, $76.1 million supports Waterworks System Improvements, and $10.2 million is for Business and Operations Support. The projects with significant spending include Chelsea Creek Headworks Upgrades, the new Wachusett Aqueduct Pump Station, Northern Intermediate High Redundancy projects, Alewife Brook Pump Station Rehabilitation, and a series of Deer Island asset protection projects.

The Program continues to address critical redundancy improvements for the Metropolitan Tunnel System. The FY18 CIP includes approximately $1.4 billion, the same as in the FY17 budget.

The FY18 Proposed Capital Program reaffirms MWRA's commitment to the community financing assistance programs on both the water and wastewater side. Local Water System Assistance Program Phase 3 Loans in the amount of $210 million were added in this budget cycle.

A copy of the CIP document is available on-line at www.mwra.com. Questions or comments on this document should be directed to the MWRA Budget Department at (617)788-2268.

Thank you for your continued support, comments and recommendations on the capital budget.

Sincerely,

Frederick A. Laskey
Executive Director

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MWRA AT A GLANCE

Purpose

Provide wholesale water and sewer services to customer communities, funded primarily through rates and charges

Legal Status

Massachusetts public authority established by an enabling act in 1984 – Chapter 372 of the Acts of 1984 as amended August 2010

Management

- 11-member Board of Directors (3 Governor appointees, 3 Mayor of Boston appointees, 2 Quincy and Winthrop appointees, and 3 Advisory Board appointees)
- 1 Executive Director (5 divisions: Office of the Executive Director, Operations, Finance, Administrative, Law)

Advisory Board

Established by the enabling act to make recommendations to the MWRA on the MWRA budget and programs and to serve as liaison to the customer communities.

Service Area

- 61 customer communities (43 sewerage, 51 water)
- 2.8 million people (43% of MA population)
- 5,500 businesses (major industries served: healthcare, education, biotech, financial)

FY17 Operating Budget ($ in millions)

Direct Expenses	$226.5
Indirect Expenses	$38.0
Debt Service	$455.1
Total Operating Budget	$719.6
Revenues*	$719.6

**96.6% of Revenues rate related*

Bond Ratings 2016D General Revenue Bonds

Moody's -	Aa1
S&P -	AA+
Fitch -	AA+

Capital Improvement Program

- Total CIP spending: $8.0 billion since 1984
- Total Current Indebtedness $5.2 billion
- FY17 CIP Budget: $155.7 million
- FY18 Proposed CIP Budget: $169.5 million

Water System

- 2 protected reservoirs
  - Quabbin
  - Wachusett
- 2 water treatment facilities
  - John J. Carroll
  - William A. Brutsch
- 350 miles of distribution infrastructure including aqueducts, deep rock tunnels, and pipeline
- 11 active storage reservoirs (5 covered)
- 10 active pumping stations

- Average Daily flow: 200 mgd
- Safe yield: 300 mgd
- Treatment Capacity: 405 mgd
- Percentage of capacity utilized: 67%*

  **based on safe yield*

Wastewater System

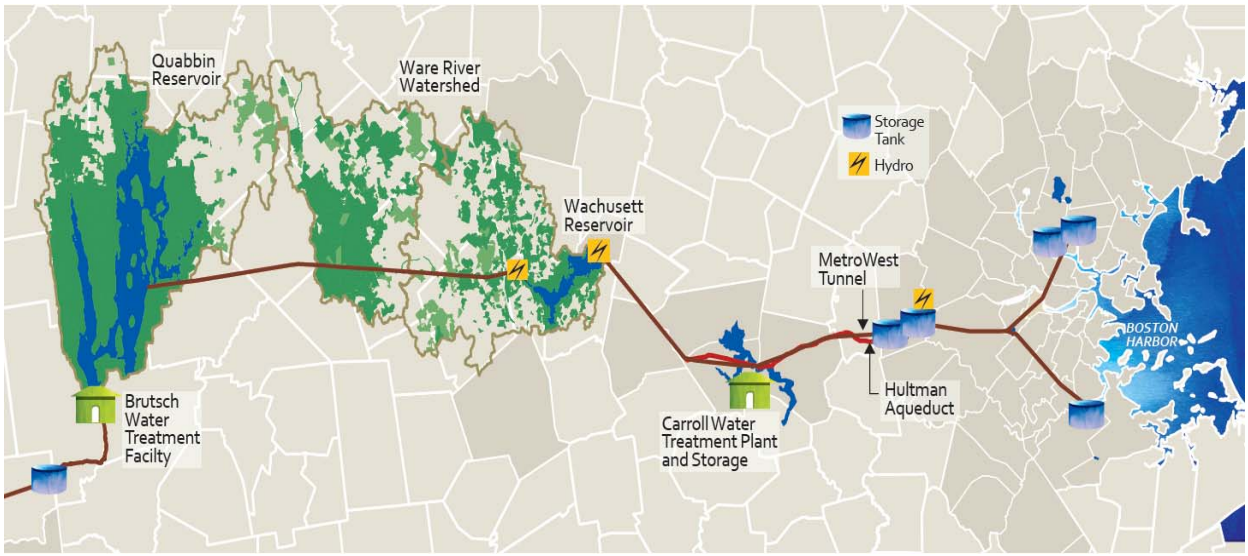
- 274 miles of sewer pipelines and cross-harbor tunnels
- 13 pump stations
- 1 screening facility
- 6 CSO treatment/storage facilities
- 2 wastewater treatment plants
  - Deer Island Treatment Plant
  - Clinton Advanced Wastewater Treatment Plant
- 4 remote headworks
- 1 Pellet Plant residuals processing

- Average daily flow: 365 mgd
- Peak wet weather capacity: 1,270 mgd
- Percentage of capacity utilized on average: 30%

Renewable Energy

31% of MWRA's energy requirement is self-generated from renewable sources (biomass, hydro, wind, & solar assets)

MWRA AT A GLANCE



MWRA's water comes from the Quabbin Reservoir, 65 miles west of Boston, and the Wachusett Reservoir, 35 miles west of Boston. The Quabbin alone holds a 4-year supply of water.

The reservoirs are filled naturally. Rain and snow fall onto watersheds (protected land around the reservoirs) and eventually turn into streams that flow into the reservoirs. This water comes into contact with soil, rock, plants and other material as it follows its path. This process helps to clean the water.

The Quabbin and Wachusett Reservoirs are protected. Over 85% of the watershed lands that surround the reservoirs are covered in forest and wetlands. About 75% of the total watershed land cannot be built on. The natural undeveloped watersheds help to keep MWRA water clean and clear. Because they are well-protected, the water in the Quabbin and Wachusett Reservoirs is of very high quality. The MWRA has won numerous awards for quality, taste, and sustainability.

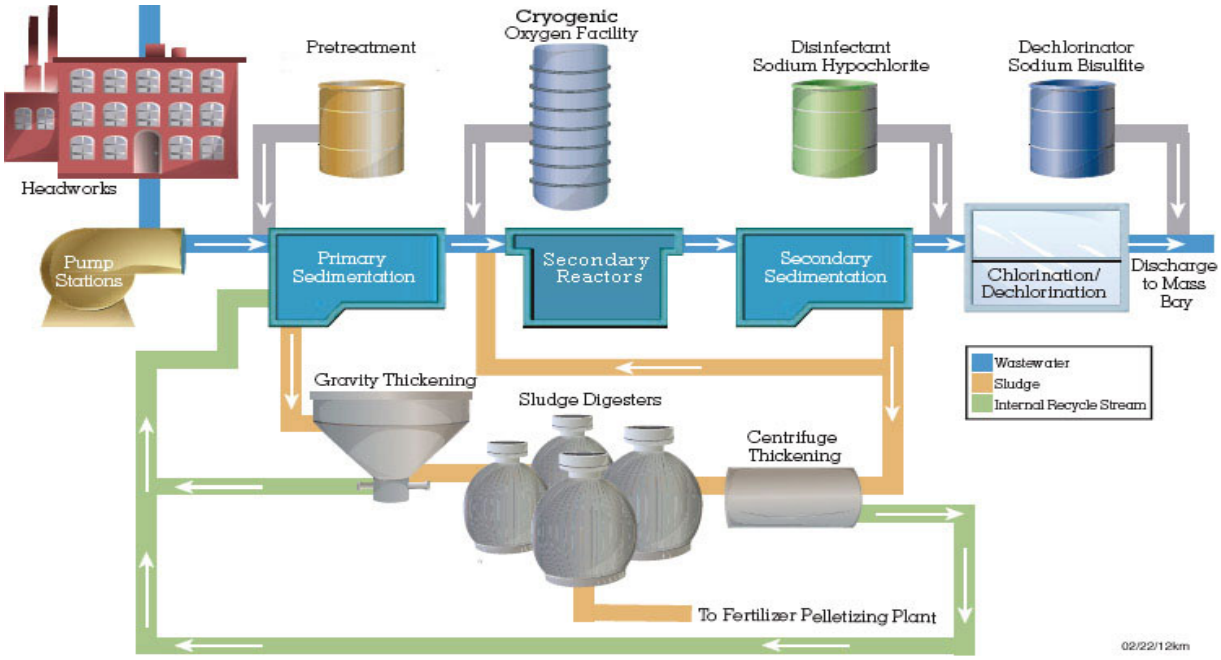
Water for most MWRA communities is treated at the Carroll Water Treatment Plant in Marlborough, Massachusetts. Water from the Quabbin and Wachusett Reservoirs enters the plant through the Cosgrove or Wachusett Aqueduct. The treated water leaves the plant through the MetroWest Water Supply Tunnel and the Hultman Aqueduct. Water from the Quabbin Reservoir for Chicopee, South Hadley Fire District #1 and Wilbraham is treated at the Brutsch Water Treatment Facility in Ware, Massachusetts, and leaves the plant through the Chicopee Valley Aqueduct.

For MetroWest and Metro Boston communities**,** treated water is sent through the MetroWest Water Supply Tunnel and the Hultman Aqueduct and is stored in covered tanks. From there it is drawn into distribution mains and many smaller community pipes. For Chicopee Valley Area Communities, treated water is sent through the Chicopee Valley Aqueduct to the local distribution mains and smaller community pipes. Water meters log the water entering each community.

Local pipes serve each street in the customer communities and eventually carry water into buildings. Meters installed by the local communities measure the amount of water delivered to each home or business.

To maintain and measure water quality, MWRA tests over 1,600 water samples per month, from the reservoirs all the way to household taps.

MWRA AT A GLANCE – Wastewater System



Water is flushed through a building's pipes into customer community sewers. These 5,100 miles of local sewers transport the wastewater into 227 miles of MWRA interceptor sewers. The interceptor sewers, ranging from 8 inches to 11 feet in diameter, carry the region's wastewater to two MWRA treatment plants. Most communities' wastewater flows to the Deer Island Treatment Plant with the Clinton Wastewater Treatment Plant serving the town of Clinton and the Lancaster Sewer District.

The following describes the Deer Island treatment process:

Collection and Pumping: Sewage is piped to headworks where bricks, logs and other large objects are screened out. Pumps draw the screened sewage through deep-rock tunnels under Boston Harbor to Deer Island.

Preliminary Treatment: Mud and sand settle in a tank called a grit chamber. This material, known as grit and screenings, is taken to a landfill for environmentally safe disposal.

Primary Treatment: The sewage then flows to primary settling tanks where up to 60% of the solids in the waste stream settle out as a mixture of sludge and water.

Secondary Treatment: Plant oxygen is added to the wastewater to speed up the growth of micro-organisms. These microbes then consume the wastes and settle to the bottom of the secondary settling tanks. After secondary treatment, 80-90% of human waste and other solids have been removed.

The treated wastewater is disinfected before it is discharged to the Massachusetts Bay. The treated wastewater, known as effluent, travels through a 9.5-mile Outfall Tunnel bored through solid rock more than 250 feet below the ocean floor. The tunnel's last mile and a quarter include 55 separate release points known as "diffusers." With water depths up to 120 feet, this outfall provides a much higher rate of mixing and/or dilution than possible with discharges into the shallow waters of Boston Harbor.

Sludge from primary and secondary treatment is processed further in sludge digesters, where it is mixed and heated to reduce its volume and kill disease-causing bacteria. It is then transported through the Inter-Island Tunnel to the pelletizing plant in Quincy, Massachusetts where it is dewatered, heat-dried and converted to a pellet fertilizer for use in agriculture, forestry and land reclamation.

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MWRA Capital Improvement Program Overview

In 1984, legislation was enacted to create the Massachusetts Water Resources Authority, an independent agency with the ability to raise its revenues from ratepayers, bond sales and grants. The primary mission was to modernize the area's water and sewer systems and clean up Boston Harbor. Since its establishment, the MWRA has invested over $8.0 billion to improve the wastewater and waterworks systems serving its 61 customer communities. The system serves 2.8 million people and more than 5,500 businesses.

Since 1985, MWRA has been subject to a Clean Water Act enforcement action to end years of wastewater pollution of Boston Harbor and its tributaries from the old Deer Island and Nut Island treatment plants and combined sewer overflows (CSOs).

The enforcement case was initiated by the Conservation Law Foundation in 1983 and taken up by the U.S. Environmental Protection Agency in 1985. The Commonwealth of Massachusetts, the Boston Water and Sewer Commission, the City of Quincy and the Town of Winthrop are also parties to the case.

The Orders of the Court set forth the schedules of activities to be undertaken to achieve compliance with the law. Since 1985, MWRA has complied with 420 milestones which include the completion of extensive new wastewater treatment facilities at Deer Island in Boston and Nut Island in Quincy, a residuals facility in Quincy, and 35 CSO control projects in Boston, Cambridge, Chelsea and Somerville which comprise long-term CSO control plan, the last of which were completed in December 2015.

As part of compliance with the Court's Orders, MWRA was required to file monthly compliance and progress reports on its ongoing activities thru December 15, 2000 and quarterly compliance and progress reports thru December 2016. MWRA is currently required to submit bi-annual compliance and progress reports through December 2020.

During the same time, MWRA also complied with regulatory mandates to improve waterworks facilities. The mandated waterworks projects included the MetroWest Water Supply Tunnel, the Carroll Water Treatment Plant, and several covered water storage facilities.

The mandated projects account for most of the Capital Improvement Program (CIP) spending. The five initiatives below account for over $6.0 billion or 76% of spending to date:

- Boston Harbor Project - $3.8 billion
- Combined Sewer Overflow - $904 million*
- MetroWest Tunnel - $697 million
- Carroll Water Treatment Plant - $419 million
- Covered Storage Facilities - $239 million

* (total CSO spending, of which $897 million is the Federal mandate)

As the MWRA reaches maturity as an agency, the infrastructure modernization and new facilities construction phase is nearing completion, and, barring new mandates, most of the Authority's future capital budget will be designated for Asset Protection, Water System Redundancy, Pipeline Replacement and Rehabilitation, and Business System Support.

Asset Protection focuses on the preservation of the Authority's capital assets. Water System Redundancy aims to reduce the risks of service interruption and allow for planned maintenance of the water system assets. Long-term water redundancy will be the largest future CIP initiative with estimated spending in excess of $1.4 billion over 17 years. Pipeline Replacement and Rehabilitation focuses on the maintenance and replacement of water and sewer pipelines. Business System Support provides for the continuing improvement and modernization of technology and security systems.

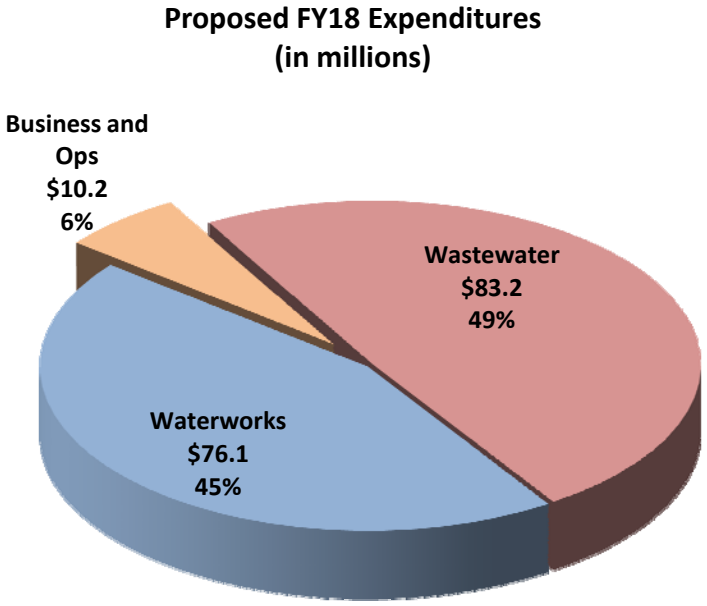
Capital initiatives to date have been primarily funded through long-term borrowings, and the debt service on these outstanding bonds represents a significant and growing portion of the Authority's operating budget. As of December 31, 2016, MWRA's total debt was $5.2 billion. The Authority's debt service obligation as a percent of total expenses has increased from 36% in 1990 to over 63% in the FY17 Final Current Expense Budget.

The MWRA's credit ratings of Aa1 from Moody's, AA+ from S&P, and AA+ from Fitch, reflect strong management of financial performance, application of operating surpluses to early debt defeasance, satisfactory debt service coverage ratios, well maintained facilities, comprehensive long-term planning of both operating and capital needs, and the strong credit quality of its member service communities.

To arrive at the FY18 Proposed CIP, the Authority identified the needs of the programs taking into account the recommendations of the Master Plan. The long-term strategy for capital work is identified in the Authority's Master Plan which was published in 2006, updated in 2013, and serves as a road map for inclusion of projects in the CIP in every budget cycle. The CIP will be updated again in Fiscal Year 2019, as the Authority will be establishing the next five year spending cap.

The FY18 Proposed CIP represents an update to the program approved by the Board of Directors in June 2016 for FY17. The spending projections put forth are the result of prioritizing the projects, establishing realistic estimates based on the latest information, striking a balance between maintenance and infrastructure improvements, and ensuring that there is adequate support for MWRA's core operations to meet all regulatory operating permit requirements.

Proposed Spending For FY18



The FY18 Proposed CIP forecasts $169.5 million in spending in FY18, of which $83.2 million supports Wastewater System Improvements, $76.1 million supports Waterworks System Improvements, and $10.2 million is for Business and Operations Support. There are 195 active contracts in FY18 of which 66 are for design of Wastewater and Waterworks Systems Improvements and 49 are for construction, with projected spending of $26.8 million for design and $104.5 million for construction. The FY18 Proposed CIP includes $26.5 million for community assistance programs, which are a combination of loan and partial grant programs, with net expenditures of $19.0 million on the wastewater side for local Infiltration/Inflow programs and net expenditures of $7.5 million for local water pipeline programs. Beginning in FY18, the CIP funds a new Phase 3 for the local water pipeline program in the amount of $210 million over 10 years.

Metropolitan Tunnels Water Service Redundancy

The largest remaining challenge facing the MWRA's infrastructure is water service redundancy for its aging metropolitan tunnels that serve Boston and several surrounding communities. The FY18 Proposed CIP continues to include $1.4 billion to address critical redundancy improvements for the City Tunnel, the City Tunnel Extension and the Dorchester Tunnel. The MWRA has made a series of presentations to the Board of Directors on project need, evaluation of alternatives, affordability, and recommended a preferred option for consideration. The MWRA also made a presentation to the Advisory Board with community and other shareholder participation. The decision reached regarding this project will have a significant impact in

shaping the capital program in the next 17-20 years. At the February 2017 meeting, MWRA's Board voted on staff's preferred alternative to construct northern and southern deep rock tunnels and approved that staff proceed with the conceptual preliminary design.

Large Projects with FY18 Spending

The projects with the highest spending in FY18 account for over 47% the total FY18 proposed spending and include expenditures for Chelsea Creek Headworks Upgrades Construction, the new Wachusett Aqueduct Pump Station Construction, Northern Intermediate High Section 89 & 29 Water Redundancy Pipeline Construction, Southern Extra High Water Redundancy Pipeline Section 111 Construction, Alewife Brook Water Pump Station Rehabilitation Construction, and three Deer Island Wastewater Treatment Plant projects for HVAC Equipment Replacement, North Main Pump Station & Winthrop Terminal Facility Butterfly Valve Replacement, and Variable Frequency Drives Replacement. These projects all focus on Asset Protection or Water System Redundancy.

Project	Subphase	FY18 Proposed Spending
Facility Asset Protection	Chelsea Creek Headworks Upgrades - Const.	$18,215
Cosgrove Tunnel Redundancy	Wachusett Aqueduct Pump Station - Const.	$15,896
NIH Redundancy & Storage	Section 89 & 29 Redundancy Phase 1C and Phase 2 - Const.	$15,448
SEH Redundancy & Storage	Redundancy Pipeline Section 111 Phase 1, 2 and 3 - Const.	$13,146
Facility Asset Protection	Alewife Brook Pump Stn Rehab - Const.	$5,795
DI Treatment Plant Asset Protection	HVAC Equipment Replacement - Const.	$4,978
DI Treatment Plant Asset Protection	NMPS & WTF Butterfly Valve Replacement	$3,499
DI Treatment Plant Asset Protection	WTF VFD Replacement - Const.	$3,085
Total		**$80,062**
% of Total FY 18 proposed MWRA Spending		**47.2%**

Chelsea Creek Headworks Upgrade Construction - $18.2 million FY18 spending ($72.9 million total construction cost). This major rehabilitation project includes replacement/upgrade to the screens, grit collection system, grit and handling systems, odor control systems, HVAC, mechanical, plumbing and instrumentation. Solids handling systems will be automated and the building's egress and fire suppressions systems will also be upgraded.

Wachusett Aqueduct Pump Station Design and Construction - $15.9 million FY18 spending ($53.0 million total construction cost). This is a redundancy project for construction of a 240 million gallons per day emergency pump station which will provide redundancy for the Cosgrove Tunnel by pumping raw water from the Wachusett Aqueduct to the Carroll Water Treatment Plant. This project, along with the completed Hultman Aqueduct rehabilitation and interconnections project, will provide fully treated water transmission redundancy from the Wachusett Reservoir to the beginning of the metropolitan distribution system in Weston.

Northern Intermediate High (NIH) Section 89 & 29 Redundancy Construction Phases 1C & 2 - $15.4 million FY18 spending ($48.9 million total construction cost). This is a redundancy project for the MWRA's Northern Intermediate High pressure water service area. Currently, this area is primarily supplied by a single 48-inch diameter pipeline, the Gillis Pump Station, and water distribution storage from the Bear Hill Tank. This project proposes a new seven mile redundant pipeline under four construction phases and will provide uninterrupted water supply to the service area in the event of a failure of the existing single supply pipe and to allow the existing pipe to be removed from service for inspection, maintenance, and repair. Phase 1A was completed; Phase 1B began in January 2016. Phase 1C was awarded in November 2016 and Phase 2 is anticipated to be awarded in April 2017.

Southern Extra High (SEH) Redundancy Section 111 Phase 1, 2 & 3 Construction - $13.1 million FY18 spending ($35.5 million total construction cost). This is a redundancy project for MWRA's Southern Extra High pressure water service area. This project will provide redundancy to Section 77 and 88 serving Boston, Norwood, Stoughton, and Dedham-Westwood, through construction of a redundant pipeline.

Alewife Brook Sewer Pump Station Rehabilitation - $5.8 million FY18 spending ($12.6 million total construction cost). This is a rehabilitation project that includes replacing the three wet weather pumps, motors, and piping, replacing the influent screens and grinders, updating the HVAC system, updating the electrical system, remediating PCB-containing paints, and modifying the building interior to meet current building codes, energy efficiency improvements, flood protection measures, and security improvements.

Deer Island Wastewater Treatment Plant Asset Protection:

HVAC Equipment Replacement Construction - $5.0 million FY18 spending ($29.5 million total construction cost). This project will replace two obsolete HVAC control systems and one manufacturer's system, reducing replacement parts and improving automation.

North Main Pump Station and Winthrop Terminal Facility Butterfly Valve Replacement - $3.5 million FY18 spending ($17.5 million total construction cost). This project will replace butterfly valves in the NMPS and eight 36-inch plug valves in the Winthrop Terminal Facility, for isolating the pumps when maintenance is required. Also includes replacement of primary sludge piping and eight hydraulic actuators for the South System Pump Station check valves.

Winthrop Terminal Facility VFD Replacement Construction - $3.1 million FY18 spending ($11.9 million total construction cost). This project will replace obsolete variable frequency drives in the Winthrop Terminal Facility.

Future CIP Spending and New Projects

The FY18 proposed capital budget projects total MWRA future CIP spending of $3.3 billion beginning with FY17, an increase of $177.2 million over the FY17 CIP approved by the Board of Directors in June 2016. This includes $123 million in new projects, updated cost estimate and inflation adjustments, with most of the additional spending in years beyond FY18. New Wastewater projects added in the FY18 Proposed CIP total $38 million, while Waterworks total $85 million.

New projects with expenditures of $10 million or more for Wastewater are:

Nut Island Odor Control and HVAC Replacement - $10 million for long-term improvements following the January 25-26, 2016 fire and following the Odor Control, HVAC and Energy Management System Evaluation completed in October 2016. Failure of the odor control system would result in odors being released to surrounding areas and possible violation of the discharge limits of the facility's air permit.

Effluent Shaft Rehabilitation - $12.2 million evaluation and improvement of the condition of the effluent shafts from the Chelsea Creek Headworks, Columbus Park Headworks, Ward Street Headworks and Nut Island Headworks. Evaluation and rehabilitation of the shafts is critical to maintaining wastewater flows through the remote Headworks facilities to Deer Island for treatment.

New projects with expenditures of $10 million or more for Waterworks are:

Chestnut Hill Emergency Pump Station Improvements – $18.3 million for improvements to piping and pumping systems at the Chestnut Hill Emergency Pump Station to reduce surge loads on the suction and discharge piping during emergency operation if the Dorchester Tunnel is out of service.

Metropolitan Redundancy Interim Improvements Design and Engineering Services During Construction - $10.4 million for engineering services for four construction contracts. The construction contracts include the Top of Shafts Interim Improvements, Chestnut Hill Emergency Pump Station improvements, Chestnut Hill Emergency Generator and WASM/SPSM PRV Improvements. These four construction contracts are for critical interim improvements to the existing Metropolitan water supply tunnels and to provide back-up means of water supply should one of the components of the Metropolitan tunnels fail.

Watershed Improvements - $15 million for rehabilitation and improvements to the Quabbin Administration Building Complex. While the Quabbin Administration Building Complex is owned by the Commonwealth, it is important to the preservation of the Quabbin Reservoir Watershed. The funding included in the FY18 Proposed CIP will address existing code or operational deficiencies, energy efficiency, employee and public access.

Please refer to Appendix 3 for a complete listing of new projects in the FY18 Proposed CIP.

The table below breaks down MWRA's future CIP by major spending categories:

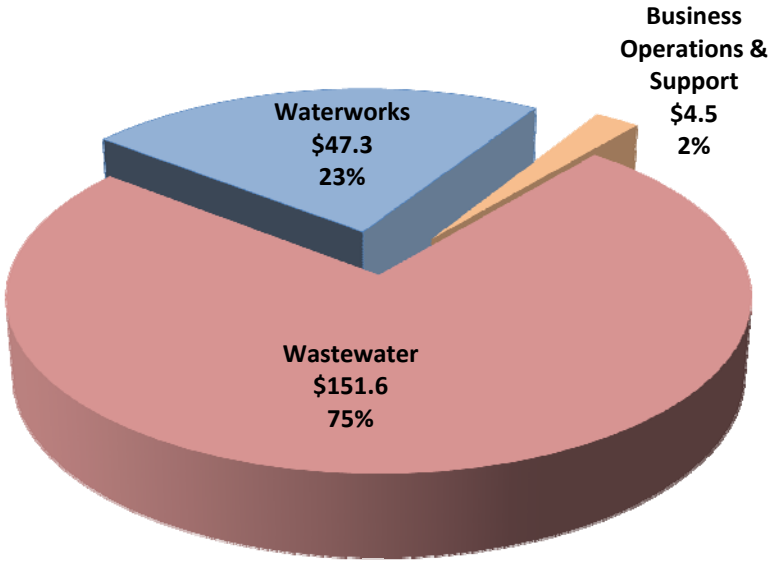
	Total Contract Amount	Payments Thru FY16	FY 18 CIP Future Projected Spending
Wastewater System Improvements	**$3,172.5**	**$1,931.3**	**$1,241.2**
Interception & Pumping	980.6	542.6	438.0
Treatment	871.8	266.8	605.0
Residuals	167.6	64.6	103.0
CSO	909.5	893.5	16.0
Other Wastewater	242.9	163.7	79.2
Waterworks System Improvements	**$3,992.5**	**$1,965.1**	**$2,027.5**
Drinking Water Quality Improvements	666.0	644.9	21.1
Transmission	2,223.3	770.1	1,453.2
Distribution & Pumping	1,033.8	401.4	632.4
Other Waterworks	69.4	148.6	(79.2)
Business & Operations Support	131.5	92.8	38.8
Total MWRA	**$7,296.5**	**$3,989.1**	**$3,307.5**

It should be noted that Other Waterworks is comprised of the local water system assistance loans (including the lead loan program), the loan repayments, as well as miscellaneous waterworks projects such as repainting of water storage tanks, covered storage tank rehabilitation, and waterworks SCADA system upgrades. Net repayments of local water system assistance loans are currently anticipated to exceed future expenditures by $79.2 million.

Planned Contract Awards

Future CIP spending is dependent on current and future contract awards. 49 contracts totaling $203.5 million are projected to be awarded in FY18, of which $151.6 million are for Wastewater Improvements, $47.3 million for Waterworks improvements and $4.5 million for Business Operations & Support.

FY18 Planned Contract Awards
($s in millions)



The largest ten budgeted contract awards total $144.6 million and are listed below, accounting for over 71% of expected awards:

Project	Subphase	Anticipated Contract Amount
DI Treatment Plant Asset Protection	Clarifier Rehabilitation Phase 2 - Construction	$80.0
DI Treatment Plant Asset Protection	Gravity Thickener Rehabilitation	$14.5
Metropolitan Redundancy Interim Improvements	Metropolitan Redundancy Interim Design Construction Administration/Resident Inspection	$10.4
DI Treatment Plant Asset Protection	Switchgear Replacement - Construction	$8.0
Metropolitan Tunnel Redundancy	Conceptual Design Environmental Impact Report	$7.5
Wastewater Central Monitoring	Wastewater Supervisory Control and Data Acquisition System (SCADA)/Program Logic Controller (PLC) Upgrades	$7.0
Northern Low Service Rehab Section 8	Sec 57 Water & 21/20/19 Sewer Design/Engineering Services During Construction/Resident Inspection	$4.8
DI Treatment Plant Asset Protection	Future South System Pump Station Variable Frequency Drives Replacements - Design	$4.8
Application Improvements Program	Enterprise Content Management	$4.0
Winsor Station Pipeline Improvements	Winsor Power Station/Quabbin Buildings Final Design/Construction Administration/Resident Inspection	$3.6
Top Ten Awards for FY18		**$144.6**
49 Contract Awards Planned for FY18		**$203.5**

Please refer to Appendix 1 for a complete table of proposed FY18 contract awards.

The Five-Year Spending Cap

MWRA established its first five-year Spending Cap in FY03 covering the FY04-08 period. The intent of the Cap was to create a ceiling or not-to-exceed amount for spending over a five-year period. The goal of the Cap is to control spending while still ensuring an adequate level of investment to support the core operational needs of the Authority. Each year, actual spending is compared to the Base-Line Cap.

The FY14-18 Base-Line Cap

The FY14 Final CIP established the FY14-18 Base-Line Cap at $791.7 million with the following breakdown.

FY14-18 Base-Line Cap		FY14	FY15	FY16	FY17	FY18	Total FY14-18
	Projected Expenditures	$142.5	$147.6	$149.3	$141.8	$136.8	$718.0
	Contingency	7.6	9.5	10.1	9.8	9.3	46.1
	Inflation on Unawarded Construction	0.8	4.2	8.4	11.1	13.5	37.9
	Less: Chicopee Valley Aqueduct Projects	(5.0)	(2.2)	(1.4)	(1.3)	(0.4)	(10.3)
	FY14-18 Base-Line Cap	**$145.8**	**$159.1**	**$166.4**	**$161.3**	**$159.1**	**$791.7**

In FY15, at the recommendation of the Advisory Board, the Base-Line Cap was modified to exclude Community Assistance Programs from the Cap calculation. Based on the FY18 Proposed CIP, the five-year spending is now at $648.0 million, which is $143.7 million or 18.1% below the base-line cap and is attributable to exclusion of the Community Assistance Programs, cash flow changes between the years based on the latest cost estimates, and updated schedules. The exclusion of the Community Assistance Programs from the Cap calculation accounts for a reduction of approximately $65.0 million.

FY14-18 Cap Comparison

FY18 Proposed		FY14	FY15	FY16	FY17	FY18	Total FY14-18
	Projected Expenditures	$102.2	$103.6	$95.1	$142.9	$169.5	$613.3
	Contingency	0.0	0.0	0.0	7.6	9.8	17.4
	Inflation on Unawarded Construction	0.0	0.0	0.0	0.0	1.1	1.1
	Less: I/I Program	0.0	(17.5)	(13.6)	(18.8)	(19.0)	(69.0)
	Less: Water Loan Program	0.0	1.4	5.3	(3.3)	(7.5)	(4.0)
	Less: Chicopee Valley Aqueduct Projects	(5.6)	(1.2)	(0.4)	(0.1)	(0.7)	(8.0)
	FY18 Proposed FY14-18 Spending	**$96.6**	**$86.3**	**$86.4**	**$128.2**	**$153.3**	**$550.8**

FY18 Proposed vs. FY14-18 Base-Line Cap		FY14	FY15	FY16	FY17	FY18	Total FY14-18
	Projected Expenditures	($40.3)	($43.9)	($54.2)	$1.1	$32.7	($104.7)
	Contingency	(7.6)	(9.5)	(10.1)	(2.2)	0.6	(28.7)
	Inflation on Unawarded Construction	(0.8)	(4.2)	(8.4)	(11.1)	(12.4)	(36.8)
	Less: I/I Program	0.0	(17.5)	(13.6)	(18.8)	(19.0)	(69.0)
	Less: Water Loan Program	0.0	1.4	5.3	(3.3)	(7.5)	(4.0)
	Less: Chicopee Valley Aqueduct Projects	(0.6)	0.9	1.0	1.2	(0.2)	2.3
	FY14-18 Cap ($ Change)	**($49.2)**	**($72.7)**	**($80.0)**	**($33.1)**	**($5.9)**	**($240.9)**

FY14-18 spending based on the FY18 Proposed CIP is projected to drop by $47.9 million to $613.3 million and complies with the 5-year spending limit.

FY18 Proposed CIP Compared to the Final FY17 CIP

The FY18 Proposed CIP projects total MWRA future spending of $3.3 billion beginning with FY17. As stated earlier, this is an increase of $177.2 million over the FY17 CIP approved by the Board of Directors in June 2016, with most of the additional spending in years beyond FY18.

The chart below shows the incremental change between the FY18 Proposed CIP and the Final FY17 CIP for the Future CIP and for the FY14-18 Cap period.

	FY17 Final Remaining Balance	FY18 Proposed Remaining Balance	$ Change	% Change		FY17 Final FY14-18	FY18 Proposed FY14-18	FY14-18 $ Change	FY14-18 % Change
Total Wastewater	$ 1,216.6	$ 1,241.2	$ 24.6	2.0%		$ 363.8	$ 351.5	$ (12.3)	-3.4%
Total Waterworks	$ 1,867.9	$ 2,027.5	$ 159.6	8.5%		$ 258.4	$ 227.5	$ (30.9)	-12.0%
Business & Operations Support	$ 45.6	$ 38.8	$ (6.8)	-14.9%		$ 39.0	$ 34.2	$ (4.8)	-12.2%
Total MWRA	$ 3,130.2	$ 3,307.4	$ 177.2	5.7%		$ 661.2	$ 613.3	$ (47.9)	-7.2%

Please refer to Appendix 4 for detailed changes at the project level for the FY14-18 Cap and potential spending beyond FY18.

FY14-18 CIP Expenditures Based on FY18 Proposed CIP

The FY18 Proposed projects total CIP spending of $3.3 billion starting in FY16 with spending during the FY14-18 timeframe projected to be $613.3 million.

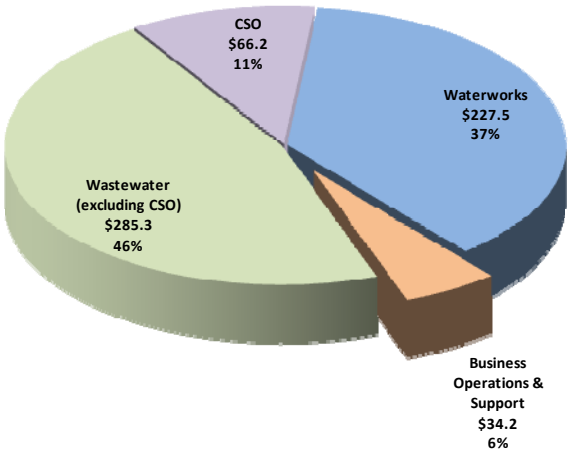
	Total Contract Amount	Spending Thru FY16	Projected Future Spending	Total FY14-18	Total FY19-23
Wastewater System Improvements	$3,172.5	$1,931.3	$1,241.2	$351.5	$775.7
Waterworks System Improvements	$3,992.5	$1,965.1	$2,027.5	$227.5	$610.8
Business & Operations Suppport	131.5	92.7	38.8	34.2	19.8
Total MWRA	**$7,296.5**	**$3,989.0**	**$3,307.4**	**$613.3**	**$1,406.3**

Please refer to Appendix 2 for a more detailed project listing and projected cash flows.

For the FY14-18 Cap period, yearly cash-flows are shown below by program and project level:

	FY14	FY15	FY16	FY17	FY18	Total FY14-18
Wastewater System Improvements	**$55.7**	**$75.4**	**$64.2**	**$73.1**	**$83.2**	**$351.5**
Interception & Pumping	6.9	8.6	6.6	21.5	36.7	80.3
Treatment	29.1	25.7	27.3	22.5	24.4	128.9
Residuals	0.1	-	-	-	2.8	2.9
CSO	15.6	23.6	16.7	10.2	0.2	66.2
Other Wastewater	4.0	17.5	13.6	18.8	19.0	73.1
Waterworks System Improvements	**$41.0**	**$22.7**	**$26.7**	**$61.0**	**$76.1**	**$227.5**
Drinking Water Quality Improvements	30.2	12.4	7.1	1.6	4.0	55.3
Transmission	4.5	2.5	8.1	28.0	22.5	65.6
Distribution & Pumping	4.8	8.9	15.0	23.7	39.6	92.0
Other Waterworks	1.5	(1.1)	(3.4)	7.7	10.1	14.7
Business & Operations Suppport	**5.5**	**5.5**	**4.2**	**8.8**	**10.2**	**34.2**
Total MWRA	**$102.2**	**$103.6**	**$95.1**	**$142.9**	**$169.5**	**$613.3**

The graph below illustrates the breakdown of spending by major program for the FY14-18 timeframe and highlights MWRA's accomplishment in reaching substantial completion by December 2015 in accordance with Schedule Seven of the Federal District Court Order for the construction of the court-mandated CSO program at a total cost since 1986 of $907 million. During the FY14-18 Cap period, the last two components of the CSO Control Program were completed: the Boston Reserve Channel and Cambridge Sewer Separation – respectively accounting for $10.6 million and $54.0 million of spending during the FY14-18 Cap period. Final restoration work will continue through 2017. Going forward, MWRA will move to a monitoring, reporting, and evaluation phase for the program.



While MWRA is currently updating its Master Plan which will prioritize projects and provide information for establishing the next CIP five-year Cap. It is anticipated that Asset Protection and Water System Redundancy, which accounted for 70% of the CIP Spending for the FY14-18 Cap period will account for 90% of the CIP spending over the next five-year Cap period covering FY19-23.

CIP Category	Total Contract	FY14-18	FY19-23
Asset Protection	$2,470.8	$314.0	$879.4
Carroll WTP	$439.0	12.3	5.1
Water Redundancy	$2,874.1	123.2	395.7
CSO	$884.9	66.2	5.6
Other	$627.7	97.7	120.5
Total	$7,296.5	$613.3	$1,406.3
Asset Protection	33.9%	51.2%	62.5%
Carroll WTP	6.0%	2.0%	0.4%
Water Redundancy	39.4%	20.1%	28.1%
CSO	12.1%	10.8%	0.4%
Other	8.6%	15.9%	8.6%
Total	100.0%	100.0%	100.0%

As the Authority's Capital Improvement Program advances over time, it is expected that Water System Redundancy will be achieved and that Asset Protection will remain a significant spending initiative.

Community Water and Sewer Assistance Programs

The Infiltration/Inflow (I/I) Local Financial Assistance Program provides funding assistance in the form of grants and loans for communities to rehabilitate their sewerage collection systems with the goal of structurally reducing I/I flow. The loan distribution portion of the program is repaid back to the MWRA interest free. Presently, $73.1 million is forecasted to be spent in the FY14-18 CAP period which is net of all repayments during this time frame. During the FY15 CIP development, Phases 9 and 10 were added to the CIP at $80 million each to be distributed as 75% grants and 25% interest-free loans. By comparison Phases 1 and 2 were 25% grants and 75% interest-free loans. The grant/loan ratio was revised for phases 3 through 8 to 45% grants and 55% interest-free loans. Payback periods for Phases 9 and 10 were also extended from 5 years to 10 years. Distribution of funds is authorized through FY2025.

The Local Water System Assistance Program provides financial assistance in the form of 10-year, interest-free loans for communities to rehabilitate, either by relining or replacement, each

community's proportional share of total unlined pipe miles. Presently, $5.5 million is forecasted to be spent in the FY14-18 CAP period which is net of all repayments during this time frame. During the FY17 CIP development, the program was expanded to include $100 million in interest-free loans to communities solely for efforts to fully replace lead service lines. The Lead Service Line Replacement Loan Program is budgeted over twenty years, but the pace of spending for the program will depend on the level of participation by the communities, the communities' ability to work with individual homeowners and future regulatory requirements. During the FY18 Proposed CIP development, the community assistance program was further expanded to include $210 million in interest-free loans to communities for Phase 3 of the Local Water System Assistance Program. Distributions from this program are scheduled to be made from FY18 through FY30 with repayments scheduled for FY19 through FY40.

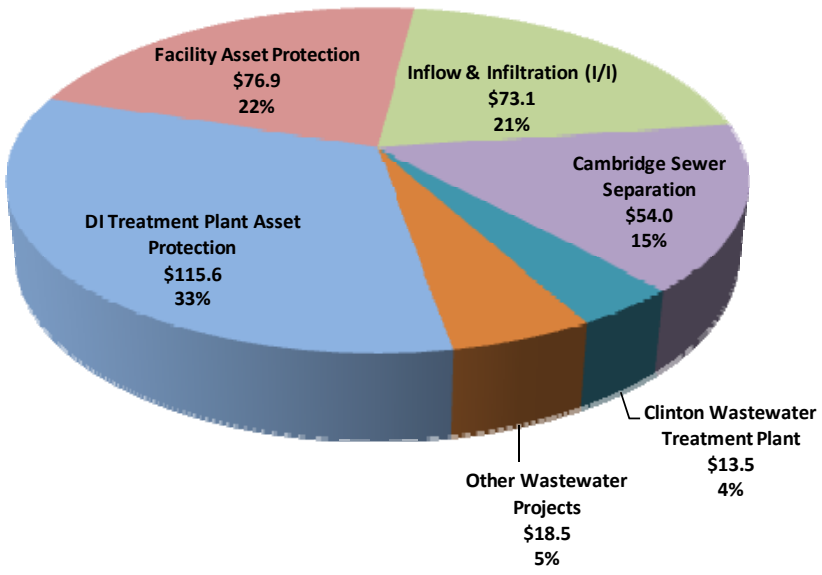
FY14-18 Large Projects

It is important to emphasize that the majority of spending within the Wastewater and Waterworks programs is concentrated in several larger projects with significant spending in the FY14-18 timeframe. These projects are either currently under construction or soon to be presented for award. The top 5 projects for the Wastewater program total $351.5 million for FY14-18 period and represent 94.7% of the $351.5 million total program.

Wastewater Program

The breakdown of the $351.5 million Wastewater program by major project is illustrated below:

Top 5 Wastewater Projects
FY14-18 Spending ($ in millions)



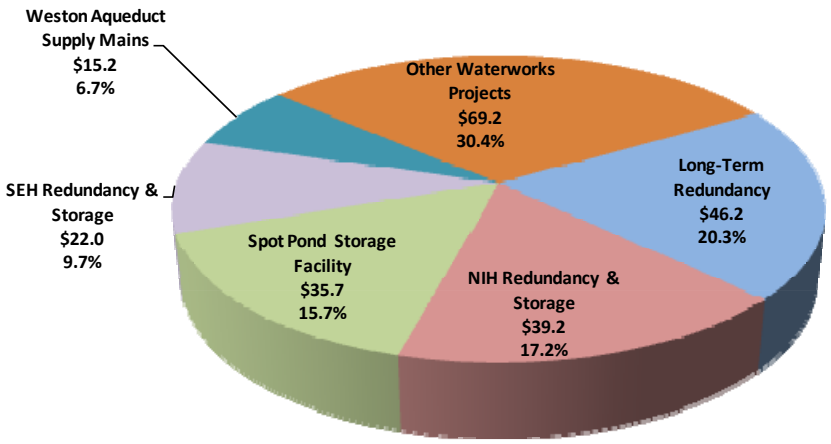
Project	FY14-18 Spending	% of Program
DI Treatment Plant Asset Protection	$115.6	32.9%
Facility Asset Protection	$76.9	21.9%
Inflow & Infiltration (I/I)	$73.1	20.8%
Cambridge Sewer Separation	$54.0	15.4%
Clinton Wastewater Treatment Plant	$13.5	3.8%
Total Top 5 Wastewater Projects	**$333.0**	**94.7%**
Other Wastewater Projects	$18.5	5.3%
Total Wastewater	**$351.5**	**100.0%**

Water Program

Similarly, the top 5 projects for the Waterworks program total $158.4 million for FY14-18 and represent 69.6% of the $227.5 million total program.

The breakdown of the $227.5 million program by major project is illustrated below:

Top 5 Waterworks Projects
FY14-18 Spending ($ in millions)



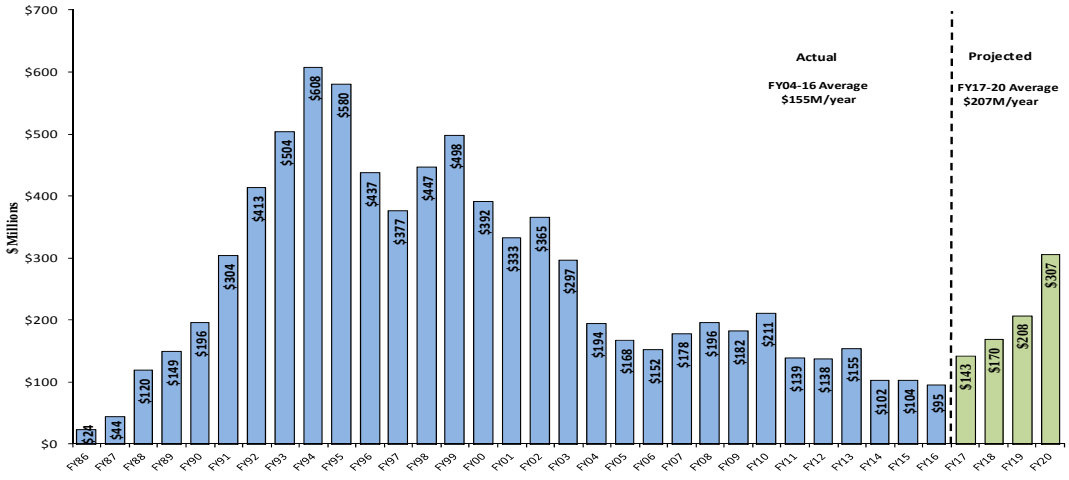
Project	FY14-18 Spending	% of Program
Long-Term Redundancy	$46.2	20.3%
NIH Redundancy & Storage	$39.2	17.2%
Spot Pond Storage Facility	$35.7	15.7%
SEH Redundancy & Storage	$22.0	9.7%
Weston Aqueduct Supply Mains	$15.2	6.7%
Total Top 5 Waterworks Projects	**$158.4**	**69.6%**
Other Waterworks Projects	$69.2	30.4%
Total Waterworks	**$227.5**	**100.0%**

FY18 – Final Year of the 5-Year Cap

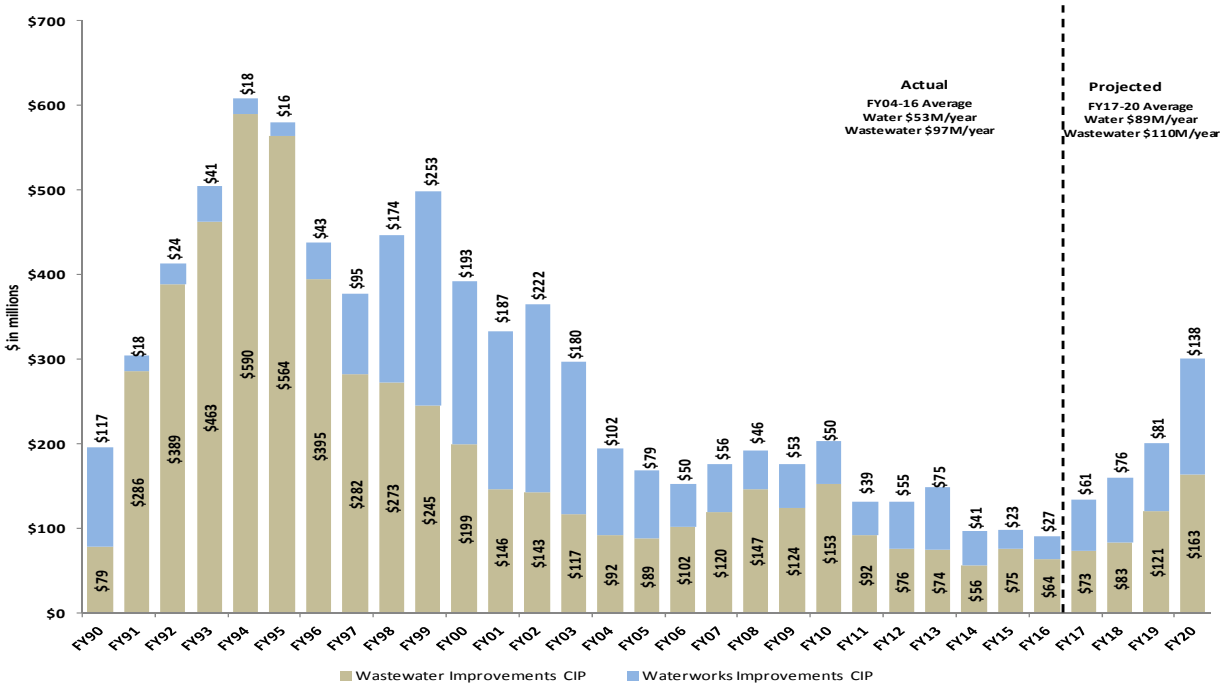
FY18 is the final year of the Authority's 5-year Cap for capital spending. The Authority has complied with the Cap and remains below the ceiling for spending. During the FY14-18 time frame, the Authority reached substantial completion of its court mandated CSO Control Plan, the last major milestone in the Clean Water Act case at an approximate total cost of $907 million. The Authority also reached substantial completion of the Spot Pond Storage Facility, providing distribution storage for the Northern Low Service area and achieving water redundancy to the Gillis Pump Station supplying the Northern High and Northern Intermediate High service areas. Several major projects including the Carroll Ultraviolet Disinfection Water Treatment, Brutsch Water Treatment Plant, and Deer Island Wastewater Treatment Plant North Main Pump Station Variable Frequency Drives Construction projects were also completed during this period.

Historical Spending

The chart below captures the historical CIP spending through FY16 and projects spending to FY20 based on the FY18 Proposed CIP.



The chart below shows the historical CIP spending from 1990 through FY16 by utility with projections through FY20.

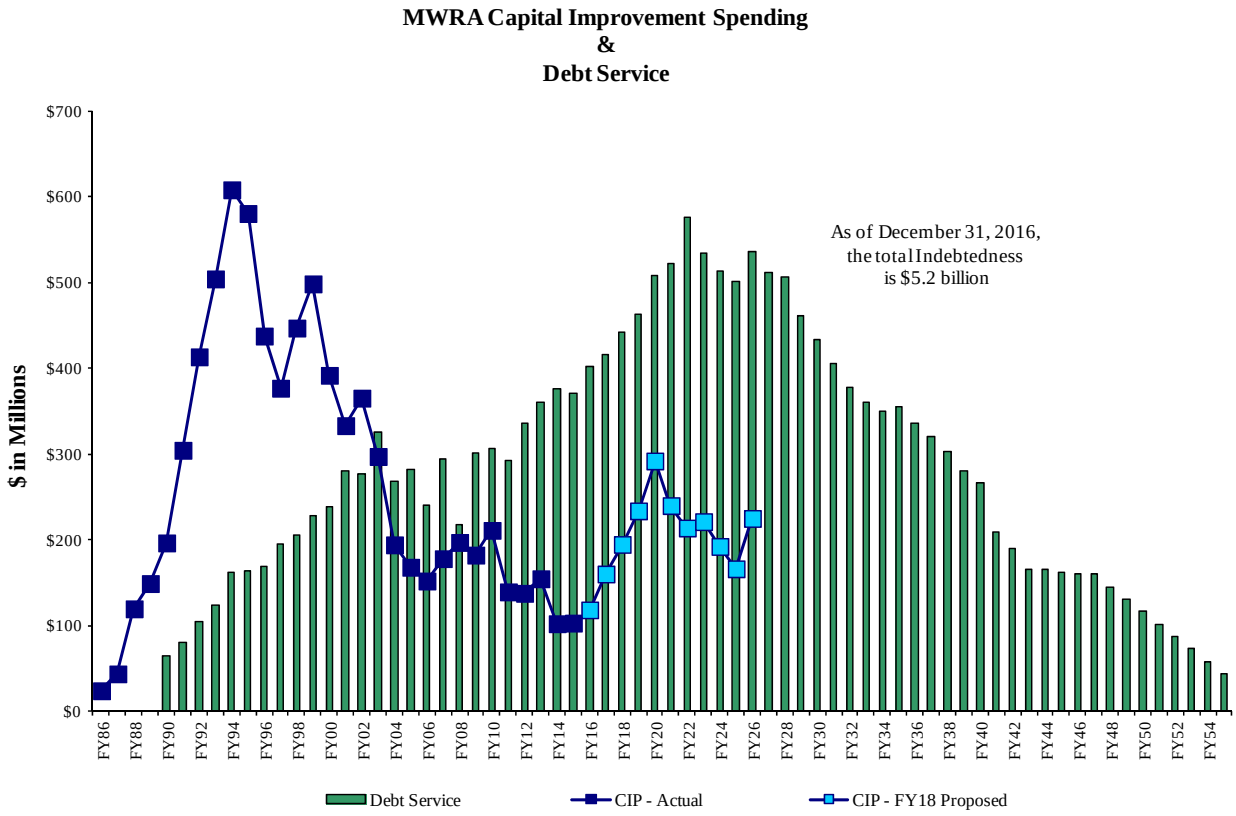


MWRA Capital Improvement Spending and Debt Service

The following graph was updated with the FY18 Proposed CIP spending and debt service projections to illustrate the relationship between the MWRA's CIP and debt service.

As of December 31, 2016, MWRA's total debt was $5.2 billion, which is $0.2 billion less than the MWRA's total debt as of December 31, 2015. However, debt service obligations are projected to increase in coming years peaking in 2022. The Authority's debt service as a percent of total expenses has increased from 36% in 1990 to 63% in the Final FY17 Current Expense Budget. Peak debt service is currently projected to be 66% of total expenses in FY22.

The FY18 Proposed CIP reaffirms that the MWRA is reducing its total bonded indebtedness over the Cap period by paying off more principal on debt than annual CIP spending and resulting borrowing. This trend is expected to continue for the foreseeable future.



Contingency

Contingency for each fiscal year is incorporated into the CIP to fund the uncertainties inherent to construction. The contingency budget is calculated as a percentage of budgeted expenditure outlays. Specifically, contingency is 7% for non-tunnel construction and 15% for tunnel construction.

CIP Review and Adoption Process

The Advisory Board will have 60 days from the transmittal of the FY18 Proposed CIP to review the budget and prepare comments and recommendations. During the review period, Advisory Board and MWRA staff will continue to meet and discuss the changes to the capital budget. The Advisory Board will transmit its comments and recommendations to MWRA in the spring after their review. Staff will prepare draft responses to the Advisory Board's recommendations for discussion at the budget hearing. During the spring, MWRA will update the CIP to incorporate the latest information into the Final budget. In June, staff will present the FY18 Final CIP to the Board of Directors for adoption.

Capital Improvement Program

Proposed FISCAL YEAR 2018

APPENDICES

MASSACHUSETTS WATER RESOURCES AUTHORITY

APPENDIX 1

Project Budget Summaries and Detail of Changes

Project Budget Summaries and Detail of Changes
Project Index

Wastewater System Improvements

Project Budget Summaries and Detail of Changes
Project Index

* New or Restructured Projects for FY18

S. 104 Braintree-Weymouth Relief Facilities

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

In accordance with a DEP administrative consent order, construction of relief facilities and the resulting reduction in community infiltration and inflow will provide capacity for peak sewage flow from Braintree, Hingham, Holbrook, Randolph, Weymouth, and sections of Quincy. This project will reduce surcharging in Braintree and Weymouth, and reduce frequent overflows into the Weymouth Fore River during wet weather.

Project History and Background

The Braintree-Weymouth interceptor system and pump station serves Braintree, Hingham, Holbrook, Randolph, Weymouth, and sections of Quincy. Because of population increases, the sewerage system could not handle the volume of sewage received and sewage overflows were frequent along the Weymouth Fore River during wet weather.

Interim rehabilitation work was required to ensure continued operation of the existing Braintree-Weymouth Pump Station during the long-term design and construction period. After initially proceeding with a dual track design approach for part of this project, MWRA decided to construct a deep rock tunnel rather than a marine pipeline from the new pump station to the Nut Island shaft of the Inter-Island Tunnel to Deer Island. Construction of the Emergency Mill Cove Siphon was completed in June 1998. Construction of the deep rock tunnel was completed in September 2003, and the North Weymouth Relief Intercept was completed in June 2002. The Intermediate Pump Station and sludge pumping facilities at Deer Island were completed in April 2005. The Fore River Siphons construction contract was completed in May 2005. Construction of the Replacement Pump Station was completed in April 2008. Rehabilitation of Section 624 was completed in December 2010. Remaining phases include Braintree-Weymouth Improvements.

Scope

Sub-phase	Scope	Status
Design 1/CS/RI – Tunnel & IPS	Design of the tunnel and Intermediate Pump Station (IPS). Includes completion of design modifications for sludge pumping facilities at Deer Island and residuals filtrate facilities at Fore River.	Completed
Sediment Tests	Tests required as part of the evaluation of marine pipeline option.	Completed
Design 2/CS/RI – Surface	Design of remaining construction including siphons and replacement pump station.	Completed
Tunnel Construction & Rescue	Construction of a 2.9-mile, 12-feet diameter tunnel beginning at the Nut Island shaft of the Inter-Island Tunnel and ending at the Fore River Staging Area. Two 14-inch sludge pipelines within the tunnel will convey Deer Island sludge from the Inter-Island Tunnel to the pelletizing plant. 0.4 miles of twin 12-inch pipelines within the tunnel will convey filtrate from the pelletizing plant to the Intermediate Pump Station. 2.5 miles of 42-inch force main will carry flows and filtrate to the Inter-Island Tunnel. Also includes a MOA with Quincy, Braintree, and Weymouth for tunnel rescue and fire support services.	Completed

Sub-phase	Scope	Status
Intermediate Pump Station Construction	Construction of a 45-mgd pump station and headworks in North Weymouth. Also includes modifications to the sludge pumping facilities at Deer Island and the filtrate facilities at Fore River.	Completed
No. Weymouth Relief Interceptor Construction	Construction of 2,000 linear feet of 60-inch gravity sewer running from the Intermediate Pump Station and along the Exelon Energy site.	Completed
Fore River Siphons Construction	Construction of 36-inch, 3,900-feet long twin siphons beneath the Fore River from the Idlewell section of Weymouth to the southeast corner of the Exelon Energy site in North Weymouth. Constructing 1,000 linear feet of 36-inch to 54-inch new sewers in Idlewell.	Completed
B-W Replacement Pump Station	Construction of a new 28-mgd Braintree-Weymouth Pump Station which will handle flows from Hingham, Weymouth, and portions of Quincy.	Completed
Rehab Section 624	Rehabilitation of 2,000 feet of Section 624 in North Weymouth.	Completed
Mill Cove Siphon Construction	Installation of 1,700 linear feet of 42-inch siphon pipe between Newell Playground and Aspinwall Street in North Weymouth to act as second barrel of existing Mill Cove Siphon.	
Construction –Rehab	Interim rehabilitation of the existing Braintree-Weymouth Pump Station.	Completed
Community Tech Assistance	Technical assistance for the Town of Weymouth for hydraulic modeling of its sewer system, leak detection for the water system, and mitigation.	Completed
Geotechnical Consultant	Consulting services related to the tunnel shaft excavation.	Completed
Communication System	Radio systems for the intermediate and replacement pump stations.	Completed
Mill Cove Sluice Gates Design and Construction	Install gates which will allow staff to remotely flush out the site as needed, and will reduce odors.	Future
Braintree-Weymouth Improvements Design CS/RI and Construction	Several facility modifications are needed to improve facility safety, reliability, and performance. Design and construction improvements are required to address deficiencies in odor control, solids handling, and pumping operations.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$234,493	$227,705	$6,788	$0	$241	$242	$6,547	$0

Project Status 11/16	98.0%	Status as % is approximation based on project budget and expenditures. Work that is substantially complete includes the deep rock tunnel, N Weymouth Interceptor, Intermediate Pump Station, Fore River Siphons contract, and the Replacement Pump Station. Rehabilitation of Section 624 was completed in December 2010.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$232,455	$234,493	$2,038	Jun-21	Nov-22	17 mos.	$208	$242	$34

Explanation of Changes

- Project cost change due to updated cost estimate of $3.0M for Mill Cove Siphon Design and Construction contracts.

- Schedule and spending changes due to updated Notice-to-Proceed dates of six months for Braintree-Weymouth Improvement contracts.

CEB Impacts

- None identified at this time.

S. 130 Siphon Structure Rehabilitation

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2009 Priority Rating 2 (see Appendix 3)

Design and construction of improvements to headhouses and structures.

Project History and Background

Siphon chambers are located at the upstream and downstream ends of depressed sewers. Depressed sewers are constructed to avoid obstructions in sewer alignments such as rivers and subsurface utilities. Upstream siphon chambers allow attainment of proper water elevation so that the depressed sewer flows under pressure. Downstream chambers provide transitions between depressed sewers and downstream gravity sewers.

Connecting structures are facilities at which flows from sewers are redirected to converge with or receive flows from other sewers.

There are 92 siphon chambers and 111 connecting structures in the MWRA wastewater system. Hydraulic flows through many of these siphon chambers and connecting structures are below design capacities. The poor flow conditions, caused by irregular maintenance due to the inaccessibility of many structures, contribute to significant surcharges and overflows. Odor problems have been identified at some siphon chambers and connecting structures due to hydraulic transitions.

MWRA completed a study in 1998 to evaluate rehabilitation of these structures in order to permit greater accessibility to provide regular maintenance to alleviate the above problems. 83 siphon chambers and 63 connecting structures were included in the study which recommended rehabilitation and improvements to 127 of these structures. MWRA has prioritized the design and construction of improvements to these structures. Phase 1 will provide access improvements and rehabilitation of structures at 29 siphon locations that are most inaccessible or in greatest need of repair.

Scope

Sub-phase	Scope	Status
Planning	Identification of methods to improve accessibility and structures. Inspection of the siphon chambers and diversion structures along with recommendations for rehabilitation.	Completed
Design/CS/RI	Design, Construction Services and Resident Inspection for improvements at 29 siphon locations.	Future
Construction	Improvements at 29 siphon locations.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$6,881	$940	$5,941	$0	$0	$0	$5,941	$0

Project Status 6/16	13.7%	Status as % is approximation based on project budget and expenditures. Initial Planning subphase was completed in 1998. Design is expected to begin in July 2018.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$6,669	$6,881	$212	Jun-21	Jun-21	None	$0	$0	$0

Explanation of Changes

- Project cost change due to inflation adjustments on unawarded contracts.

CEB Impacts

- None identified at this time.

S. 132 Corrosion and Odor Control

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

High sulfide levels in the Framingham Extension System cause corrosion and odors in that system and downstream in the Wellesley Extension Sewer System and West Roxbury Tunnel. A study has identified the causes of corrosion and odors and recommended corrective measures. Completion of corrosion control measures will extend the useful life of these assets and minimize the impact on the existing wastewater conveyance infrastructure. Improved odor control will mitigate the impact on surrounding areas.

Project History and Background

Hydrogen sulfide produces sewer odors and is highly corrosive to pipes and pump stations. Collapses in the Framingham Extension Sewer (FES) have alerted MWRA to problems in that area. Odor complaints have been received from residents abutting both the Framingham Extension Relief Sewer (FERS) and the Wellesley Extension Sewer (WES) systems resulting in legal claims totaling several hundred thousand dollars. Severe corrosion has occurred in the West Roxbury Tunnel. This situation has prompted MWRA to add odor control chemicals at various points in the local systems and FES to try to reduce the hydrogen sulfide levels. The results have been mixed; not all of the chemicals were effective even over the short term, and none completely eliminated hydrogen sulfide.

While MWRA attempts to minimize odor and corrosion impacts through chemical intervention and sealing locations where odors escape, a more permanent solution is being sought. MWRA awarded a Planning/Study contract in January 1997. The consultant completed inspections in Ashland, Framingham, and Natick and drafted a report identifying, locating, and categorizing the sources and the extent of odor and corrosion problems. The Odor and Corrosion report indicated that significant levels of sulfides are discharged into the FES from Ashland and Framingham. These sulfide levels increase as the wastewater flows through the FES/FERS system. The report recommends a combination of MWRA and community actions, such as modifications to industrial discharge limits and municipal permits, chemical addition at community pump stations and the FES, and air treatment. The final planning/inspection report was completed in December 1998.

Interim Corrosion Control commenced in July 2000. The design for the modifications to the FERS pump station, FES Tunnel, and air treatment systems started in August 2002 and continued until June 2005.

Scope

Sub-phase	Scope	Status
Planning	Identification of causes and sources of odors; collection of local sewer system information in Ashland, Natick, and Framingham; recommendations for long-term corrective measures.	Completed
Design/CS/RI	Design, construction services, and resident inspection for FERS Pump Station, FES tunnel, and air treatment systems. By June 2005, the FERS Pump Station achieved 50% Design status, the FES tunnel achieved 30% Design status and the air treatment systems achieved 100% Design status.	Completed

Sub-phase	Scope	Status
Interim Corrosion Control	Implementation of chemical addition program at the FERS Pump Station. The program includes the addition of potassium permanganate, and monitoring of the wastewater flows and hydrogen sulfide levels downstream.	Completed
FES/FERS Biofilters Design & Construction	FES/FERS Corrosion Control (Biofilters) is a design and construction project to make improvements in the MWRA sewers. Three air treatment systems (biolfilters) are recommended to remove and treat hydrogen sulfide in the FES, FERS, WESR and WERS sewer systems. Rehabilitation of hydrogen sulfide meters will be included.	Future
Nut Island Mechanical and Electrical Upgrades Design CA/REI and Construction	Evaluation, design, and construction upgrades to the mechanical and systems and electrical equipment.	Future
System-wide Odor Control Study	The prevalence of Hydrogen Sulfide gas in the collection system has been responsible for system wide odor complaints and infrastructure deterioration. This project will evaluate the system, identify the critical needs, and provide solutions.	Future
NI Headworks Odor Control and HVAC Improvements Evaluation, Design, ESDC, REI and **Construction Phase 2**	Design ESDC/REI and construction for improvements for the Nut Island Headworks Odor Control and HVAC systems and energy management systems. This is the long term improvements project following the January 25-26, 2016 fire and following the Contract 7494 Odor Control, HVAC and Energy Management System Evaluation will be completed in February 2017. Failure of the odor control system would result in odors being released to surrounding areas and the discharge limits of the facility's air permit would be exceeded.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$27,879	$3,373	$24,507	$535	$1,093	$1,999	$22,879	$0

Project Status 6/16	12.1%	Status as % is approximation based on project budget and expenditures. NTP for the Odor Control Evaluation was issued in September 2015. NI Odor Control & HVAC Design CA/REI is expected to commence in February 2017.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$26,117	$27,879	$1,762	Dec-20	Jun-21	6 mos.	$2,139	$1,999	($140)

Explanation of Changes

- Project cost change primarily due to new contract for Nut Island Headworks Odor Control and HVAC Improvements Construction of $10.0M, and inflation adjustments on unawarded contracts. This increase was partially offset by deleting the Framingham Extension Sewer Tunnel Rehabilitation Design and Construction contracts of $8.5M.

- Schedule and spending change due to updated Notice-to-Proceed dates of three months for Nut Island Mechanical & Electrical and Nut Island Headworks Odor Control & HVAC Improvement contracts.

CEB Impacts

- None identified at this time.

S. 136 West Roxbury Tunnel

Project Purpose and Benefits

☑Contributes to improved public health ☑Provides environmental benefit ☑Extends current asset life ☑Improves system operability and reliability

Master Plan Project ☑Priority Rating 1 (See Appendix 3)

Investigation and rehabilitation of the West Roxbury Tunnel sewer. This sewer, built in 1964, transports flows from the Wellesley Extension Relief Sewer System through the West Roxbury portion of Boston to the High Level Sewer. A structural failure could result in surcharging and overflows.

Project History and Background

During construction of the Wellesley Extension Replacement Sewer and inspection of the tunnel in 1999, visual observations indicated that severe corrosion due to hydrogen sulfide had occurred in a portion of the sewer directly upstream of the West Roxbury Tunnel (WRT), and that the tunnel entrance structure had lost cement lining, exposing the reinforcing steel. Manholes and other structures had been affected more severely.

A structural failure of the WRT would affect the tributary communities of Ashland, Brookline, Dedham, Framingham, Natick, Needham, Newton, Wellesley, and the Hyde Park and West Roxbury portions of Boston. Local failure of the tunnel could result in the discharge of 53 to 128 mgd of raw sewage into the Charles River until emergency repairs could be made, back-up of sewage into local residences and businesses, and the interruption of service to as many as 125,000 people. Section 138 is immediately upstream of the tunnel and crosses beneath the VFW Parkway in West Roxbury. Structural failure beneath this major transportation corridor would result in a severe public safety hazard.

Design for structural repairs to Section 138 and the West Portal of the tunnel were completed in June 2001. Construction of these repairs, Contract 6569, repairs to Sections 137 & 138, including the slipline of Section 138, were completed in June 2002. The design contract to rehabilitate the tunnel was awarded in February 2009 and ended in June 2011. The tunnel was inspected in August 2010 and there has been negligible deterioration since the 1999 inspection. Based on these findings and the significant reduction in hydrogen sulfide levels in the tributary sewers over the past decade, it was determined that the tunnel is not in need of immediate repair. In lieu of immediate repair, a tunnel inspection program will be implemented to monitor the conditions of the tunnel.

Scope

Sub-phase	Scope	Status
Inspection	Inspection of Section 137 of the West Roxbury Tunnel, which includes 12,500 linear feet of 84-inch reinforced and unreinforced concrete tunnel. Initial inspection completed in 1999.	Completed
Design/CS/RI	Design, construction services, resident inspection for corrective actions to repair/rehabilitate 1,000 feet of Section 138 and the West Portal, and a conceptual design report for the rehabilitation of the tunnel. Design/construction completed in June 2002.	Completed
Construction	Rehabilitation of 1,000 feet of Section 138 and the West Portal. Completed in June 2002.	Completed

Tunnel Inspection	Inspection contract to monitor the conditions of the tunnel in 10 years	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$11,314	$10,314	$1,000	$0	$0	$0	$1,000	$0

Project Status 6/16	91.2%	Status as % is approximation based on project budget and expenditures. The design contract to rehabilitate the tunnel was awarded in February 2009 and ended in June 2011.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$11,314	$11,314	$0	Jun-20	Jun-20	None	$0	$0	$0

Explanation of Changes

- N/A

CEB Impacts

- None identified at this time.

S. 137 Wastewater Central Monitoring

Project Purpose and Benefits

☑ *Extends current asset life.*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

To study, define, design, and implement a centralized monitoring and control system most appropriate for MWRA's wastewater transport system. Through facility automation and remote monitoring and control, SCADA implementation will result in cost savings and improve wastewater system operation and maintenance.

Project History and Background

MWRA has already made substantial progress towards increased automation and central monitoring and control of its water and wastewater systems and facilities. Substantial investments have been made in implementing such systems for the Deer Island Treatment Plant and Nut Island Headworks, and Supervisory Control and Data Acquisition System (SCADA) implementation is ongoing within the water conveyance system. The recommended wastewater SCADA system and associated business practices will support a single philosophy for central monitoring and control of all MWRA facilities and systems.

The SCADA Master Plan, which was completed in July 1999, recommended expansion of the automated control concepts developed for water system operation and identified long-term savings related to staffing reductions and optimization of operations and maintenance. Following the master planning recommendations, a detailed scope of services was prepared to procure professional services contract to provide design, integration, training, construction administration and resident inspection services for various SCADA improvements. Camp Dresser & McKee, Inc. (CDM) was awarded this contract in June 2002. The construction effort on the first and most complex of two construction packages began in March 2006 and reached substantial completion in January 2008. This construction addressed SCADA needs at most pumping and CSO facilities, as well as establishing overall data communications improvements. The second construction package provided for SCADA needs at the remote headworks facilities, taking into consideration future CIP improvements at Chelsea, Columbus Park, and Ward Street Headworks facilities. This contract reached substantial completion in July 2009.

Scope

Sub-phase	Scope	Status
Planning	Development of a plan for a monitoring and control system for the MWRA wastewater transport system.	Completed
Design and Integration Services	Includes design, integration (PLC programming, operator graphics development, MIS/CMMS data transfer), and development and implementation of training. Also covers preparation of documentation and manuals for automating equipment and systems and for remote monitoring and control of the wastewater transport systems and facilities. Includes construction administration, engineering services during and after construction, and resident inspection.	Completed
Construction 1 (CP1)	Construction and installation of SCADA equipment and systems at seven pumping facilities, three CSOs and one screen house. Also covers Operation Control Center improvements. Facilities include Alewife, Caruso, Hingham, New Neponset, Hayes, Delauri, Houghs Neck, Chelsea Screen House, Cottage Farm, Prison Point, and Somerville Marginal. This construction package included the major components of the SCADA communications infrastructure (microwave radios, routers, etc.).	Completed
Construction 2 (CP2)	Construction and installation of SCADA instrumentation and control equipment at the three older headworks facilities and Nut Island Headworks. OCC improvements were also made to support these additional facilities.	Completed

Equipment Prepurchase	Purchase SCADA system components including computer hardware to ensure consistency with MWRA MIS infrastructure through existing Commonwealth of MA blanket contracts and low cost small quantity system components (ex. fuel tank monitoring units and interfaces, Prison Point Flow meter, CSU/DSUs), and additional instrumentation and control equipment at the Arthur St. Pump Station to ensure consistency and/or compatibility with installed systems.	Completed
Technical Assistance	Technical assistance work to support all subphases.	Completed
Wastewater Redundant Communications	To study and implement redundant communications alternatives for Wastewater facilities, with an emphasis on wireless options. It is critical to have alternative communication if an important facility alarm does not reach the Operations Control Center.	Future
Wastewater SCADA/PLC Upgrades	Replacement of existing SCADA PLCs nearing their end of life with a current PLC platform. New PLC platforms further provide increased security capabilities and improved programming functionality. Secondary goals include standardizing PLC logic and HMI graphics, and upgrading aging field instrumentation.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$27,482	$19,782	$7,700	$0	$360	$360	$2,910	$3,050

Project Status 6/16	72.0%	Status as % is approximation based on project budget and expenditures. Construction 1 contract was substantially complete in December 2007. Construction 2 contract was substantially complete in July 2009. Wastewater SCADA/PLC Upgrades is expected to begin in October 2017.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$27,482	$27,482	$0	Oct-32	Oct-32	None	$375	$360	($15)

Explanation of Changes

- Spending increase primarily due to delaying the Notice-to-Proceed for Wastewater Redundant Communications contract by two years, partially offset by updated cash flow increase in FY18 for the Wastewater SCADA/PLC Upgrades contract.

CEB Impacts

- None identified at this time.

S. 139 South System Relief Project

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To protect public health and property from sanitary system overflows and back-ups into homes and businesses during extreme wet weather events. Completion of the project will also extend the useful life of system assets and potentially avoid extraordinary costs resulting from system failures.

Project History and Background

Archdale Road Diversion Structure

On October 20, 1996 a 100-year rainstorm caused the MWRA High Level Sewer (HLS) (Section 70) to overflow in the area of Archdale Road in Boston. Following this overflow event, MWRA established a task force to recommend action to mitigate and/or prevent future overflows. The task force developed an emergency response plan and examined several relief alternatives. The first component of the recommended relief plan consisted of construction of a diversion structure that includes two 30-inch by 60-inch sluice gates connecting the HLS to BWSC's Stony Brook drainage conduit. The diversion structure is located at the end of Bradeen Street in Roslindale. If, based on monitoring results, it appears that the High Level Sewer is about to overflow in the Archdale Road area due to an extraordinary storm event, the overflow volume is diverted to the Stony Brook Conduit through the sluice gates. This eliminates the need to deploy large emergency response crews to build temporary sandbag dikes. Construction of the diversion structure was completed in August 1999.

High Level Sewer Repair

Subsequent to the October 1996 storm, MWRA initiated some short-term modifications to the sewer system to reduce overflows. However, during a June 1998 storm, these modifications actually pressurized the HLS. As a result, MWRA began an emergency evaluation of the HLS in June 1998 to analyze its hydraulic capacity and structural integrity. The evaluation, which was completed in January 1999, discovered cracking at a 77-degree bend in the sewer in the Archdale Road area that required immediate attention. Inspection also indicated that approximately 40 feet of the HLS, located in the Arnold Arboretum, needed repair. A construction contract notice to proceed was issued in June 1999 and construction was completed in October 1999.

Outfall 023 Cleaning and Structural Improvements

Following the October 1996 storm, the City of Boston engaged a consultant to review the events and recommend remedial actions to prevent future flooding under similar conditions. One recommendation was to clean sediment and debris from the Stony Brook Conduit. Boston Water & Sewer Commission (BWSC) has cleaned the upstream portion of the conduit and MWRA has cleaned the outfall from the Metropolitan District Commission (MDC) gatehouse at Charlesgate to the Charles River. This part of the project also covers structural modifications to Outfall 023 to permit access points and diversion capabilities for future cleaning. This portion of the project has been moved out to fiscal year 2019. Staff will continue to periodically inspect the outfall for increased sedimentation levels and report if schedule modification need to be made.

Milton Financial Assistance

Two residential areas in the Town of Milton have experienced sewage backups into homes during wet weather events and periods of prolonged wet weather. One area affected is a direct tributary of MWRA's High Level Sewer and the other is a tributary to MWRA's New Neponset Valley Sewer. In September 1999, MWRA and Milton entered into a financial assistance agreement to fund design and construction of new sewers, rehabilitation of an existing pump station, and construction of a new pump station to mitigate downstream impacts from high flow conditions in the improved High Level Sewer.

Pump Station Feasibility

MWRA considered investigating the feasibility of constructing a small pump station to convey wastewater from a small area of Quincy away from the Braintree Howard Street Pump Station. The flow would be re-routed back to the Quincy collection system. The City of Quincy would own and operate the pump station. Upon further evaluation, MWRA has decided to delete this project and instead, will continue an MOU with Braintree to pay the town annually for use of 25 percent capacity of Braintree's Howard Street Pump Station.

Scope

Sub-phase	Scope	Status
Archdale Des/CS/RI and Construction	Design, construction services, and resident inspection for the Archdale Road Diversion Structure. Construction of an underground diversion structure that houses two 30-inch by 60-inch horizontal sluice gates on the sidewall of the HLS. This structure controls flow into BWSC's Stony Brook Conduit.	Completed
Sections 70 and 71 HLS Evaluation/ Construction	Initial evaluation and construction of recommended improvements.	Completed
Construction and Improvements for Outfall 023	Removal and disposal of sediment and debris from Outfall 023 as well as continuation of structural improvements to enable future cleaning operations.	Future
Milton Financial Assistance	Payment to the Town of Milton for local projects to mitigate downstream impacts from high flow conditions.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$4,939	$3,439	$1,500	$0	$0	$0	$1,500	$0

Project Status 6/16	69.6%	Status as % is approximation based on project budget and expenditures. All sub-phases are complete except for Outfall 023 Structural Improvements which is scheduled to commence in FY19.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$4,939	$4,939	$0	Dec-20	Dec-20	None	$0	$0	$0

Explanation of Changes

- N/A

CEB Impacts

- None identified at this time.

S. 141 Wastewater Process Optimization

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To optimize wastewater system operating procedures and make system improvements and modifications to ensure maximum wastewater treatment, minimum operating and maintenance costs, and extension of the useful life of system assets.

Project History and Background

This project was established to support MWRA Business Plan strategies, which recommend the development of a wastewater process optimization plan, central monitoring facilities for the sewerage system, rehabilitation of wastewater interceptors, and the utilization of automation and new technology to increase efficiency.

The completed planning phase included the development of an updated hydrologic and hydraulic model (InfoWorks CS) and the evaluation of optimization alternatives under typical and extreme storm events. MWRA has evaluated several of the alternatives and has been using hydraulic information gained during this phase to develop facility control logic under the Wastewater Transport SCADA Implementation Project. Two alternatives, which include pipeline modifications, will be taken further as defined below. The model developed under this project continues to be used by MWRA staff for in-house system evaluation and NPDES reporting requirements and by outside consultants to support CSO-related and collection system improvement projects.

Scope

Sub-phase	Scope	Status
Planning	Evaluate collection system and facility modification alternatives to maximize wastewater treatment and minimize operating and maintenance costs.	Completed
Somerville Sewer	Design and construct a connection between the upstream end of the Somerville Medford Branch Sewer and the North Metropolitan Relief Sewer to reduce surcharge and divert flow away from the Cambridge Branch Sewer and Delauri Pump Station.	Future
Siphon Planning	Further evaluate the benefits of constructing a redundant siphon crossing the Mystic River from the Cambridge Branch Sewer to the Delauri Pump Station to assist in frequency of CSO discharges.	Future
North System Hydraulic Study	Review the frequency and extent of sanitary sewer overflows (SSOs) in the area tributary to Chelsea Creek Headworks and to evaluate and recommend alternatives to optimize the performance of the collection system and to eliminate or reduce SSOs or relocate them to minimize potential human health risks or environmental impacts.	Completed
Hydraulic Flood Engineering Design and Construction– North System	Future implementation of system optimization measures or more significant system modifications which will be identified during the initial study. Additional follow-up analysis or project implementation may be done under this phase.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$10,416	$1,502	$8,915	$0	$0	$297	$5,195	$3,719

Project Status 6/16	14.4%	Status as % is approximation based on project budget and expenditures. The Notice-to-Proceed for the North System Hydraulic Study was completed in June 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$10,389	$10,416	$27	Jun-27	Jun-27	None	$297	$297	$0

Explanation of Changes

- Project cost change due to inflation adjustment on Somerville Sewer Construction contract.

CEB Impacts

- None identified at this time.

S. 142 Wastewater Metering System Equipment Replacement

Project Purpose and Benefits

☑ *Extends current asset life*
☑ *Improves system operability and reliability.*

To improve the accuracy of meter data used to determine wholesale wastewater charges. This will be accomplished by replacing the existing wastewater metering system, including hardware and software utilizing the latest available technology. This technology will reduce confined space entries, making the metering system safer and less costly to maintain. This project will be coordinated with and support SCADA implementation for the wastewater system. Meter replacement was completed in FY06.

Project History and Background

Installation of MWRA's initial wastewater metering system began in 1989 and was completed in 1994. Individual meters in 43 customer communities receive routine maintenance on a continuous basis. This initial system was replaced in 2003-2004. Lessons learned with the initial metering system was that the life expectancy of wastewater meters is approximately 7-10 years and that timely replacement of meters can be scheduled to avoid whole scale replacement. Our current system is approaching its 12th year. Plans will be developed to evaluate new wastewater metering technology for our 3rd generation of meters. Once again, the entire wastewater system will be replaced. Certain key meters will be supplied with electric power instead of battery resulting in more civil, electrical, and construction costs. Each community's unmetered areas will be tested, evaluated, and quantified in order to update current Community Flow Formulas (CFFs) as well.

Scope

Sub-phase	Scope	Status
Planning/Study/Design	Development of a long-term plan to upgrade or replace the existing wastewater metering system (technology, hardware, software, telemetry). Evaluate, quantify and update Community Flow Formulas (CFF).	Future
Equipment Purchase/Installation	Purchase and installation of equipment.	Completed
Permanent Site Improvements Construction	Supply of power and enhanced wireless communications to approximately half of the 218 permanent wastewater metering sites. The data from these key sites will be used to optimize MWRA operation and maintenance activities during normal and wet weather conditions.	Future
Wastewater Metering Asset Protection/Equipment Purchase	Rehabilitation, replacement and upgrades (planning, design and construction) for the Wastewater Metering System to be required every 10 years over the 40 year planning period.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$28,438	$5,138	$23,300	$0	$513	$513	$8,188	$14,600

Project Status 6/16	18.1%	Status as % is approximation on project budget and expenditures. The purchase and installation of 2nd generation of meters is complete. Planning for the next replacement is underway.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$28,438	$28,438	$0	Jul-29	Jul-29	None	$1,150	$513	($637)

Explanation of Changes

- Spending change due to rescheduling meter replacement Notice-to-Proceed dates by nine months for Planning/Study Design, Construction, and Wastewater Meter System Equipment Replacement contracts.

CEB Impacts

- Potential cost savings associated with this project have yet to be be quantified.

S. 145 Interception and Pumping Facility Asset Protection

Project Purpose and Benefits

☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems.

Project History and Background

This project was developed to ensure that MWRA maintains ongoing service while optimizing operations in its wastewater facilities. This project, in its current form, addresses immediate critical facility and equipment issues. This project will eventually include five areas:

1. Equipment replacement (pumps, HVAC equipment, blowers, etc.).
2. Architectural projects (concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, electrical wiring, heating system, etc.).
4. Support Projects (process control system upgrades, etc.).
5. Specialty Projects (instrumentation upgrades, fuel storage tanks, etc.).

The Interception and Pumping Asset Protection project will be ongoing throughout the useful life of the facilities.

Scope

Sub-phase	Scope	Status
Rehab of Section 93A Lexington	Rehabilitation of 4,000 linear feet of pipeline in Lexington (Section 93A). Completed in April 2004.	Completed
Sections 80 and 83	Evaluation of the condition of Sections 80 and 83 and design and construct repairs to damaged portions. TV inspection revealed numerous cracks and holes, which impair the structural integrity of the pipe. Contract completed in September 2007.	Completed
Section 160	Rehabilitation of 11,000 linear feet of Section 160 of the Mystic Valley Sewer in Winchester due to extensive deterioration of the brick and concrete sewer. Rehabilitation of sewer completed.	Completed
93A Force Main Replacement	Replacement of 1,100 feet of 24-inch ductile iron force main due to extensive corrosion from hydrogen sulfide. Contract was substantially complete in January 2007.	Completed
Mill Brook Valley Sewer Sec 79 & 92	Rehabilitation of a portion of Section 79 pipeline in Arlington. Under MOU trust agreement, MWRA to absorb 50% of total cost of rehabilitation.	Completed
Interceptor Renewal No. 1 Reading Extension & Metropolitan Sewer Design CA/RI & Construction	Reading Extension Sewer (Sections 75, 74, and 73), rehabilitation of 12,400 linear feet of 15, 18, 20-inch Vitrified Clay (V.C.) pipe, primarily in Stoneham, with short reaches in Wakefield and Woburn. Approximately 1,400 linear feet of Reading Extension Sewer Section 74 were CIPP lined in the mid 1990's. Also, included is rehabilitation of 2,280 linear feet of 15-inch V.C. pipe of the Metropolitan Sewer Section 46 in Stoneham.	Active

Sub-phase	Scope	Status
Interceptor Renewal No. 3 Dorchester Interceptor Sewer Design CA/RI and Construction	Rehabilitation of Dorchester Interceptor Sewer Sections 240, 241, and 242.	Future
Study Cambridge Branch 27,26,25, 25.5, 24,23	The Cambridge Branch Sewer was completed between 1892 and 1895. The study will evaluate rehabilitation needs, feasibility, and scope.	Active
Design/ESDC/REI and Construction Cambridge Branch 1 Sections 27, 26	Design and construction of the Rehabilitation of Cambridge Branch Sewer Sections 27 and 26 in Charlestown, Somerville, and Cambridge.	Future
Design/ESDC/REI and Construction Cambridge Branch 2 Everett Sections 23 and 24	Design and Construction of the Rehabilitation of Cambridge Branch Sewer Sections 23 and 24 in Everett and Charlestown. Rehabilitation of Sections 25 and 25.5 to be determined.	Future
Malden & Melrose Hydraulics and Structural Study/Design and Construction	Rehabilitation of Melrose, Malden Sections 41,42,49,54 and 65.	Future
Melrose Sewer	Design and construct an 18-inch diameter sewer extension of an existing MWRA sewer on Melrose St. to reduce MWRA sewer overflows at the Roosevelt School. The construction contract was awarded in January 2010 and completed in September 2010.	Completed
Interceptor Renewal No. 5 Milton Sections 607/608/609/610 Design CA/REI and Construction	Rehabilitation of portions of Sections 607/608/609/610 in Milton.	Future
Interceptor Renewal No. 6 Chelsea Sections 12/14/15/62 Design CA/REI and Construction	Rehabilitation of portions of Sections 12/14/15/62 in Chelsea.	Future
Prison Point HVAC Upgrades, Design & Construction	The HVAC system improvements are complete and included the replacement of components for the HVAC system as well as the ductwork, air handling equipment, dampers, louvers, and odor control were in need of upgrade. The conversion of the control system for the HVAC to electronic digital control was completed in FY05/FY06 under the CEB. The diesel engine fuel system modifications at this facility were completed under the SCADA contract and included the fuel oil delivery feed to the system boiler.	Completed
Remote Headworks Heating System Upgrades	Existing boilers at each of the remote headworks require significant maintenance and consume substantial fuel. A preliminary design report was completed and alternative energy-saving systems are recommended to replace the existing heating systems. The replacement of the existing heating system at the Chelsea Creek Headworks was completed. The systems at Ward Street and Columbus Park will be replaced under the Remote Headworks Upgrade Project.	Completed

Sub-phase	Scope	Status
Remote Headworks Concept Design	A Concept Design was performed to identify the needs of the three remote headworks facilities to recommend equipment replacement and upgrades for further design and construction. The Concept Design included a Condition Assessment of all equipment and non-equipment assets to establish a basis for improvements and upgrades to meet business goals and objectives.	Completed
Hingham Pump Station Isolation Gate Construction	The Hingham Pump Station was built without an influent gate. The station services the Town of Hingham and had no direct means to isolate the flow to this station. Labor intensive and inefficient means using stop logs, sand bags, sewer plugs and pumps were required to isolate and divert flow. This project included the design and installation of a sluice gate in a diversion chamber, to isolate the station and bypass flow allowing maintenance to take place in the station without interruption of service.	Completed
Alewife Brook Pump Station Rehabilitation Design CA/RI and Construction	The Alewife Brook Pump Station was built in 1951. The wet weather pumps are original equipment. The rehabilitation includes replacing the three wet weather pumps, motors, and piping, replacing the influent screens and grinders, updating the HVAC system, upgrading the electrical system, remediating PCB-containing paints, and modifying the building interior to meet current building codes, energy efficiency improvements, flood protection measures, and security improvements.	Active
Chelsea Screenhouse Upgrades and ESDC/REI	The Chelsea Screenhouse has four climber screens and seven hydraulic gates and was built to screen sewerage upstream of the Chelsea Creek Siphons and Caruso Pump Station, and to provide screening of flows diverted from the Chelsea Creek Headworks during wet weather events. Most of the operating equipment has passed its useful lifespan. A preliminary evaluation of the gates in 2007 identified maintenance and operational issues. In November 2011, a conceptual design report for the facility was performed within the Remote Headworks Upgrades Design contract, with recommendations for replacements and upgrades to equipment at the facility. A task order, under the As-Needed Technical Assistance contract, was executed in August 2012 to perform final design of the upgrades. ESDC/REI is being performed under a separate contract.	Completed
Nut Island Headworks Fire Alarm/Wire Conduit	This project will replace the existing obsolete and problematic fire alarm system and faulty wiring at Nut Island Headworks. There have been significant repair costs over the past several years to keep the system functional and to correct deteriorated connections and ground faults. An engineering task order was used to design upgrades to the system and upgrades and replacements were completed in FY10.	Completed

Sub-phase	Scope	Status
NIH Electrical & Grit/Screenings Conveyance System Design CA/RI & Construction	This subphase includes the design and construction of improvements to the electrical system, which is subject to groundwater infiltration, and to the grit and screenings conveyance system which have alignment and operations problems, at the Nut Island Headworks. Based on final preliminary design reports completed in July and August 2011, recommendations were made to improve or replace these systems. Design recommendations were included in one construction contract.	Completed
Headworks Effluent Shaft Study, **Design CA/REI and Construction**	At each of the four remote Headworks, Chelsea Creek, Ward Street, Columbus Park and Nut Island, the wastewater is discharged into a vertical shaft connected to a tunnel that conveys the sewage to the Deer Island Treatment Plant. A past inspection of the shaft at Chelsea Creek indicated that the walls of the shaft are severely deteriorated. Failure of a shaft could incapacitate the Headworks facility. There is concern this may cause additional problems at Deer Island. To-date, there have been no reported issues but it is suggested that this material could be detrimental to pumps or other wastewater equipment at Deer Island. This study should also include requirements related to plant and shaft ventilation, and replacement of the grating and instrumentation. Evaluation and rehabilitation of the shafts is critical to maintaining wastewater flows through the remote headworks facilities to Deer Island for treatment.	Future
Chelsea Creek Headworks Upgrades Design CA/ESDC/REI and Construction	The Remote Headworks Preliminary Design proposed recommendations to upgrade the Chelsea Creek, Columbus Park, and Ward Street Headworks, which will be included in final design and construction documents. The recommendations include replacement/upgrades to the screens, grit and screenings collection and conveyance systems, odor control, HVAC, mechanical, plumbing, instrumentation, PCB removal, and electrical systems, as well as antenna towers. Chelsea Creek Headworks Upgrade construction is ongoing, and will be followed by design and construction contracts for Ward Street and Columbus Park Headworks. Chelsea Creek Headworks REI is being performed under a separate contract.	Active
Columbus Park and Ward St. Headworks Upgrades Design ESDC/REI and Construction	The recommendations from the Remote Headworks Preliminary Design include replacement/upgrades to the screens, grit and screenings collection and conveyance systems, odor control, HVAC, mechanical, plumbing, instrumentation, and electrical systems, as well as antenna towers for the Columbus Park and Ward St. Headworks.	Future
Pump Station/CSO Condition Assessment	This project provides professional engineering services including planning, inventory, evaluation, identification and prioritization of rehabilitation/replacement projects and operational processes for the older pump stations and CSO facilities.	Future
Cottage Farm Fuel System Upgrade	Replacement of existing fuel oil system to meet current code requirements, ensure reliable operation, and provide safeguards against accidental oil spills.	Completed

Sub-phase	Scope	Status
Somerville/Marginal Influent Gates and Stop-Log Replacement	The Somerville Marginal facility has two 5'X6' sluice gates that were installed in 1987. These 22-year old gates are used to hold wastewater in the upstream combined sewer system until the level reaches a predetermined elevation, at which point the sluice gates are opened and the facility is activated (chemicals added, screenings removed). The treated CSO is conveyed to the MWRA permitted CSO discharges MWR205 or MWR205A, upstream and downstream of the dam on the Mystic River. During October of 2009, MWRA staff discovered non-continuous, wet weather gate leakage. Repairs to the gates were made and an air barrier was created using stop planks and temporary sump pumps upstream of the gates to minimize gate leakage. However, given the age and frequent problems with these gates and need to create a more permanent and effective barrier between the CSO system and downstream receiving waters, this project was initiated. The project will replace the facility gate, as well as upstream and downstream stop planks and install permanent sump pumps downstream of the gates to create an air void to ensure CSO does not enter the receiving waters until a facility activation is required. Project design was completed under Task Order 20 (contract 7070) and construction was substantially complete in November 2011.	Completed
Prison Point Rehabilitation Design/CA/RI and Construction	The Prison Point CSO Facility was constructed in 1981. This rehabilitation will include upgrades to the facility including replacement of diesel pump engines, dry weather screen, updating of facility equipment including electrical distribution and chemical disinfection systems, and repair/replacement of miscellaneous equipment as identified in the 2012 Prison Point CSO Planning Report. Improvement/installation of systems as appropriate for flood control, energy efficiencies, security, and fire alarm will also be included.	Active
Cottage Farm Rehabilitation Design CA/RI and Construction	The Cottage Farm CSO Facility was constructed in 1971. Cottage Farm Rehabilitation to include updating of facility equipment including pumps, sluice gates, gearboxes for course screens, electrical distribution and chemical disinfection systems, architectural updating of facility including replacement of roof systems and repair/replacement of miscellaneous equipment and structures as identified in the 2012 Cottage Farm CSO Planning Report. Improvement/installation of systems as appropriate for flood control, energy efficiencies, security, and fire alarm will also be included. Also, to remediate PCB containing paint by removal and encapsulation where appropriate in accordance with the PCB abatement plan at Cottage Farm.	Future

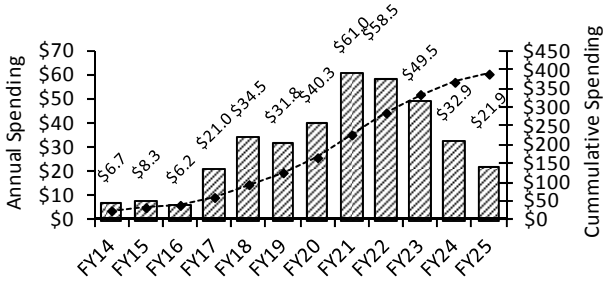
Sub-phase	Scope	Status
Pump Station Rehab Preliminary Design/Study	Preliminary design/study for upgrades at Hayes, Hingham, and the Somerville-Marginal CSO Facility. The project is to follow contract 7162, Pump Station and CSO Condition Assessment, which may result in other facility improvements. Upgrades to the facilities will ensure design output is met. Failure of a particular piece of equipment could lead to failure of another; such as failure of a grinder could negatively impact a pump. Upgraded facilities should result in fewer corrective maintenance calls. This is a system wide project designed to upgrade multiple facilities to ensure worker safety, equipment integrity, environmental protection, and ensure service is not interrupted. Final Design and Construction phases will be added to a future CIP cycle.	Future
System Relief & Contingency Planning Study	This project will investigate what can be done to avoid serious flooding issues. Increased capacity or controlled relief points must be identified in order to address flooding issues that occur during emergency scenarios. Project will be designed to create increased capacity within the collection system in order to decrease SSO discharges. Scope may also include facility specific plans for a failure at MWRA facilities.	Future
Caruso Pump Station Improvements Design, CA/RI, and Construction	This project will replace the existing standby generator, HVAC system, fire detection/suppression system and security system at the Caruso Pump Station. The standby generator is 25 years old and is a one of a kind of this type of generator. The manufacturer is no longer making spare parts and there is only a limited quantity of available spare parts. The generator is being replaced with a newer model with readily available parts to ensure reliable back-up power and increased to 1,000 kW to provide power for the full design capacity of the station. The HVAC system is in need of improvement as is the fire detection/ suppression system and security system.	Active
Prison Point/Cottage Farm Facilities Diesel Engine Upgrades/Pump and Gearbox Rebuilds ESDC and Construction	Refurbishment of the Prison Point CSO Gearboxes and pumps based on an inspection report performed in May 2010. It is critical during major wet-weather events to have all four pumps operational to provide maximum station capacity and provide redundancy at this critical CSO facility. Also, MWRA non-emergency generator upgrades required by EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations for Prison Point and Cottage Farm CSO facilities.	Completed
Section 156 Design/Build	Rehabilitation of sewer Section 156 and a portion of adjacent Sections 17 and 19, and associated structures/manholes located between Air Force Road and the Malden River in the City of Everett. The sewer is a 120-year old, 61-inch by 56-inch rounded horseshoe brick sewer, which conveys flows of up to 40 million gallons per day from Wakefield, Stoneham, Woburn, Winchester, and parts of Medford. The sewer is 1,800 feet long of which 125 feet was repaired in 2001. The design/build contract, including Cured-in-Place lining was completed.	Completed

Sub-phase	Scope	Status
Study and Rehabilitation of Sections 186, 4, 5, and 6 Design CA/RI and Construction	Emergency removal of delaminated plastic liner from Section 186 was performed in June 2011. Rehabilitation projects in 1991 and 1997 lined Sections 4, 5, and 6 with silica/shotcrete covered with epoxy. Project will include a manual inspection to identify rehabilitation needs, feasibility, and scope. Followed by design and construction of rehabilitation/repairs.	Active
Prison Point Piping Rehabilitation	As a recommendation of the Prison Point/Cottage Farm CSO Preliminary Design/Study, this project will repair weak spots, replace pipe saddle supports, and install an erosion/corrosion liner in the discharge piping.	Active
DeLauri Pump Station Screens & Security	This project replaces the existing catenary bar screens, sluice gates, and pump valves, and installs security upgrades. Design being done in-house with the and security reviewed by outside consultant. The security improvements include motion detectors, door switches, small security items in the main building and emergency generator room. This includes work associated with bringing signals underground into underground conduit to run sensor lines for SCADA.	Future
Quincy/Hingham Pump Station Fuel Storage Upgrades Construction	Project to improve diesel fuel storage capacity at Quincy and Hingham pump stations. Hingham's underground tank failed and will be replaced with an above ground tank. Quincy tank storage to be increased from 1 day to 5 days of storage with the addition of an above ground tank.	Future
Fuel Oil Tank Replacements at Various Facilities Design CA/RI and Construction	**Fuel and tank replacement at all facilities (water and wastewater) to avoid tank failures. Priorities in the following order are (1) single wall tanks in vaults, (2) double wall steel tanks approx. 20 years old, and (3) double wall fiberglass tanks over 25 years old.**	**Future**
Wiggins Terminal Pump Station Replacement Design CA/RI and Construction	**The Wiggins Terminal Pump Station services a small seasonal flow from Castle Island and Conley Terminal. The Station is in need of rehabilitation and updating of remote operational control. The facility is located within Conley Terminal and requires MassPort security clearance to access.**	**Future**

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$391,259	$38,670	$352,589	$21,000	$34,506	$76,923	$241,015	$56,068

I&P Asset Protection



Project Status 6/16	9.9%	Status as % is approximation based on project budget and expenditures. Chelsea Headworks Upgrades Final Design commenced in July 2012. NI Electrical & Grit/Screens Conveyance construction contract was substantially complete in May 2015. Prison Point/Cottage Farm Pumps, Engine, and Gearbox Rebuilds was substantially complete in November 2015. Caruso PS Improvements Design/CA/REI Notice to Proceed was issued in August 2012 and construction commenced in March 2016. Interceptor Renewal #1 Reading Extension Design CA/RI commenced in August 2015. Alewife Brook Pump Station Rehabilitation commenced in January 2016. Chelsea Screenhouse Upgrades was substantially complete in September 2016. Chelsea Creek Headworks Upgrades Construction commenced in November 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$353,470	$391,259	$37,789	Jan-27	Jan-25	(24) mos.	$81,427	$76,923	($4,504)

Explanation of Changes

- Project cost change primarily due to new projects for Headworks Effluent Shaft Rehabilitation of $12.2M, Fuel Oil Tank Replacements of$7.6M, and Wiggins Pump Station Rehabilitation of $2.5M. Also as a result of greater than budgeted awards for Chelsea Creek Headworks Construction of $10.8M and Prison Point Rehabilitation Design/Construction Administration/Resident Inspection of $0.3M. Additionally, updated cost estimates for Cottage Farm Rehabilitation Design/Construction Administration/Resident Inspection of $0.6M and Sections 186, 4, 5, and 6 Study phases of $0.3M as well as change orders for Caruso Pump Station Improvements, $0.4M, an amendment for Chelsea Creek Upgrade Design/Construction Administration Services, $0.3M, and inflation adjustments on unawarded contracts.

- Schedule change due to accelerating anticipated Notice-to-Proceed dates by two years for Ward Street and Columbus Park Headworks contracts.

- Spending change primarily due to rescheduled Notice-to-Proceed dates of 5 months for Pump Stations & CSOs Condition Assessment, Chelsea Creek Upgrades Construction and Resident Engineer/Inspection of four months, DeLauri Pump Station Screens & Security and Gates of three months, less than budgeted award for Cambridge Branch 23, 24, 26, 27 Study of $0.3M, updated cost estimates and new projects.

CEB Impacts

- None identified at this time.

S. 146 Inspection of Deer Island Cross Harbor Tunnels

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 2 (see Appendix 3)

To inspect, design, and repair MWRA deep rock tunnels to ensure proper wastewater system operation.

Project History and Background

The MWRA sewer system includes three deep rock tunnels that carry wastewater from the headworks to the DITP. The MWRA currently does not have the technology and capability of inspecting deep rock tunnels.

Scope

Sub-phase	Scope	status
Tunnel Inspection and Condition Assessment	The MWRA sewer system includes three deep rock tunnels that carry wastewater from the headworks to the DITP. The MWRA currently does not have the technology and capability of inspecting deep rock tunnels. This subphase includes inspection and condition assessment.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$5,000	$0	$5,000	$0	$0	$0	$5,000	$0

Project Status 6/16	0.0%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$5,000	$5,000	$0	Jun-20	Jun-20	None	$0	$0	$0

Explanation of Changes

- N/A

CEB Impacts

- None identified at this time.

S. 147 Randolph Trunk Sewer Relief

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2009 Priority Rating 3 (see Appendix 3)

To identify system improvements to reduce sanitary sewer overflows that occur at MWRA's Sewer section 628 and Pearl Street siphon.

Project History and Background

The Randolph Trunk Sewer was constructed in 1958 and consists of three sections: 627, 628 and 628A. Section 628 is a 42-inch diameter reinforced concrete sewer located in Braintree. During extreme wet weather events, Section 628 experiences overflows, particularly at a 50-foot long double-barrel siphon located at Pearl Street next to residential property. A study will be performed to determine the best method of reducing excessive wet weather flows or to provide hydraulic relief to this section of the Randolph Trunk Sewer.

Scope

Sub-phase	Scope	Status
Study	Study to identify system improvements at Sewer Section 628 and Pearl Street Siphon.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY15	FY16	FY14-18	FY19-23	Beyond FY23
$750	$0	$750	$0	$0	$0	$750	$0

Project Status 6/16	0.0%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$750	$750	$0	Jun-20	Jun-20	None	$0	$0	$0

Explanation of Changes

- N/A

CEB Impacts

- None identified at this time.

S. 206 Deer Island Treatment Plant Asset Protection

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Fulfills a regulatory requirement*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To protect the investment of MWRA ratepayers in the Deer Island Treatment Plant by ensuring timely replacement of DI's systems, which contain more than 60,000 pieces of equipment with an approximate value of $1 billion. Based on the Master Plan developed in 2006, most recently updated in 2013, MWRA expects to sequentially replace equipment and structures in the facility as they reach the end of their useful life.

Construction of the Deer Island Treatment Plant was one of the largest wastewater projects ever undertaken in the United States. DITP construction was a 12-year, $3.8 billion effort (not including the cost of off-island residuals facilities) started in 1988. MWRA commenced primary treatment at the new plant in 1995 and secondary treatment in 1997. With the completion of the Effluent Outfall Tunnel in September 2000, the plant discharges treated effluent 9.5 miles offshore into the Massachusetts Bay through a series of 55 diffusers spaced along the last 1.25 miles of the tunnel.

Project History and Background

At an expansive and complex facility like the Deer Island Treatment Plant (DITP), unanticipated equipment and system failures have the potential to cause operational and maintenance crises. It is prudent industry practice to take a proactive approach by establishing programs to anticipate when equipment and systems are near the end of their reliable service lives, and then overhaul, upgrade, or replace the equipment, systems, and structures as needed.

DITP staff have implemented a "reliability-centered maintenance" (RCM) program to monitor, evaluate, and maintain all of the pieces of equipment and major systems within the facility. RCM includes using non-invasive methods of assessing the current operational condition of equipment through programs such as vibration monitoring, lubricant and oil sampling/testing, thermography, and ultrasonics (audible sound). These programs involve developing a "base line" for each piece of equipment when it is relatively new or rehabbed, then comparing future test results to determine if there is a change in the base line which warrants invasive action or other maintenance procedures to mitigate the problems. In addition to RCM, staff follows original equipment manufacturer (OEM) maintenance protocols when appropriate. To assist staff in keeping all of the historic data; storing OEM maintenance instructions; monitoring costs associated with maintaining each piece of equipment; and providing work orders as needed, among other tasks - the maintenance software program MAXIMO has been implemented at DITP (and other Authority locations).

To augment the DITP maintenance program as needed, contracts are issued to obtain the services of factory-authorized technicians with the expertise to maintain specialized equipment and systems, such as electricity-generating turbines (hydro, wind, steam and combustion-driven), the oxygen generation facility, Thermal Power Plant equipment, etc. Recommendations to add capital projects to the budget come from staff managing these maintenance programs and service contracts.

The DITP Asset Protection project encompasses the following major functional categories:

1. Equipment Replacement (chains, pumps, motors, control systems, discrete process equipment, etc.).
2. Architectural projects (expansion joint replacements, concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, piping, electrical wiring, heating systems, etc.).
4. Support projects (Technical Information Center projects, security projects, etc.).

5. Specialty projects (chemical pipelines and storage tanks, fuels storage tanks, etc.).

Scope

Sub-phase *Equipment Replacement:*	**Scope**	**Status**
Equipment Condition Monitoring	Installation of temperature & vibration-monitoring equipment in NMPS and Winthrop Terminal Facility (WTF). Completed in January 2005.	Completed
CEMS Equipment Replacement	Replaced the data collection computers, upgraded the software, and added PLCs to the Continuous Emissions Monitoring Systems on the two high-pressure Zurn boilers. Project was substantially complete in March 2006.	Completed
Pump Packing Replacement	Replace pump packing seals with mechanical seals in the North Main, South System, and Winthrop Terminal pump stations. Purchases were complete by the end of FY08 with installations completed by in-house staff in FY09.	Completed
Cathodic Protection Design & Construction	Project to evaluate the current system condition, then complete a Design and Construction phase to repair DI's cathodic protection system as needed. Begin design in FY17, construction in FY19-22.	Future
Digester Chiller Replacement	Replaced the refrigeration-based digester gas chiller with a chilled water system that performs better at low operational loads. Completed in May 2006.	Completed
Dystor Tank Membrane Replacement	Emergency replacement of a torn gas membrane on one digester storage tank, and preventive replacement on the second. Completed both by October 2005.	Completed
Dystor Membrane Replacements	Periodic future replacement of the two gas & sludge storage tank membranes in the digester complex; added in FY08 per the Master Plan. Replaced both membranes in 2005, anticipated to be required every 12-15 years. Following a condition assessment in October 2015, the next phase is scheduled for FY20.	Future
Digested Sludge Pump Replacement Design & Construction (Phase 1)	The three positive displacement Abel pumps caused a great deal of pipe vibration and require extensive maintenance. Added per the Master Plan, centrifugal pumps with higher flow rates are being installed to reduce the potential for grit settlement in the pipes. The first phase ran from October 2009 to September 2011, to install one centrifugal pump and a flushing pump. These new pumps have been tested to ensure they work well before the three remaining pumps are replaced. See Phase 2 below.	Completed
Digested Sludge Pump Replacement (Phase 2)	New sub-phase added in FY14, to complete replacement of the Abel pumps. Awarded in November 2015, and expect work to be completed by July 2017.	Active
Centrifuge Back-drive Replacements	Replace the centrifuge back-drives, which have become obsolete. Commenced in February 2013 and reached substantial completion in March 2015.	Completed
Grit & East/West Odor Ctrl Air Handler Unit (AHU) Replacements	Replace deteriorated air handlers; added per the Master Plan. Replacements in FY09-16, then every 15 years. Grit AHU replacement was completed in June 2010. The E/W Odor Control AHU Replacements are now included as part of the HVAC Equipment Replacement project, below.	Completed

Sub-phase *Equipment Replacement:*	**Scope**	**Status**
Fire Alarm System Replacement – Design & Construction and REI	Newly identified in FY08, added from the Master Plan. To replace obsolete fire alarm monitoring & control systems. Design was awarded in October 2015, replace in FY19-22 and approximately every 20 years thereafter.	Active
HVAC Equipment Replacement – Design/ESDC & Construction and REI	Newly identified in FY08, added from the Master Plan. To replace two obsolete HVAC control systems with one manufacturer's system, reducing replacement parts and improving automation. Design began in FY14; replace in FY17-20 and then every 15 years. Scope includes central lab fume hoods and East/West Odor Control Air Handler replacements.	Active
Centrifuge Replacements – Design & Construction	Replace the sludge centrifuges when the scrolls/bowls are too worn to repair, or after catastrophic failure. Units have a 20-30 year life but were exposed to a lot of grit after start-up in 1996. Included in the Master Plan; begin design in FY19, construction in FY21. Centrifuges thicken secondary waste sludge before it goes to the digesters.	Future
Cryogenics Plant Equipment Replacement – Design & Construction	Design and construction to replace pumps, valves, motors, sensors, switches, programmable controllers and other obsolete equipment as needed. Added in FY08 per the Master Plan. Project to replace 3 chillers was given a separate sub-phase for FY13; see below. Remaining plant overhaul work to commence in FY19-22 with future rehab and upgrade work occurring every 10 to 15 years.	Future
Cryogenics Chillers Replacement	Project to replace failing air chillers that require frequent maintenance in the oxygen generation plant. Construction began in October 2014, substantially completed in September 2016.	Completed
South System Pump Station Pump Lube System Replacement	Change the pump lubrication system from one using grease to one using oil. Only requires routine maintenance after installation, not replacement. Included in the Master Plan. Construction is scheduled for FY19-20.	Future
Digester Modules 1 & 2 Pipe Replacement Design & Construction	During digester pipe cleaning done in mid-2007, deterioration of the glass lining was noted. This sub-phase was not in the Master Plan; it was added in FY08. The $8M funding was taken from the Equipment Replacement placeholder, so no net CIP increase occurred. Construction was substantially complete by August 2014. Scope also included plug valve replacements. A new project to complete additional digester storage tank rehab work was added in FY12, and given its own sub-phase in FY13; see the DITP Digester Storage Tank project under "Specialties".	Completed
Butterfly Valve Replacements, North Main Pump Station (NMPS) & Winthrop Terminal Facility (WTF)	There are twenty 60-inch butterfly valves in NMPS and eight 36-inch plug valves in WTF, for isolating the pumps when maintenance is required. One valve in NMPS has been replaced; the removed valve was sent out for evaluation, but the condition was too poor to rebuild. Several others began to leak, indicating that the gaskets and seals were failing. Scope revisions were made in FY10 to include replacing the magnetic flow meters; scope now includes the replacement of PSL piping and Eight (8) hydraulic actuators for the SSPS pump check valves. Work began in June 2014 with expected completion by June 2017.	Active

Sub-phase *Equipment Replacement:*	Scope	Status
Fixed Gas Protection Systems Replacement	**Replace gas detection devices in 13 different DITP locations: pump stations (NMPS, SSPS,WTF), odor control (East/West, Residuals, Winthrop Terminal) and process areas (Thermal Power Plant, Digesters, gas handling, primary & secondary galleries, disinfection, Grit Facility, and gravity thickeners). These detectors measure levels of oxygen, hydrogen sulfide, sulfur dioxide, chlorine, and other combustible gases. They are integral to ensuring the health & safety of employees and contractors.**	**Future**

Sub-phase *Architectural:*	Scope	Status
Expansion Joint Repairs	The program to periodically replace failed expansion joints in the concrete clarifier decks and/or various retaining walls. The first phase was completed in November 2003; phase 2 was completed in November 2013, phase 3 is scheduled for FY18-20.	Future
Eastern Seawall Design & Construction	Design and construction of repairs to the base of the eastern seawall due to tidal damage, exposing rebar. Removed in FY06, added back in FY09. Wall condition is assessed annually. Design to commence in FY18, construction work scheduled for FY19-20.	Future
Roof Replacement Phase 1	Added to the CIP in FY10, based on decision to capitalize these costs. Replaced the rubber membrane roof on the Winthrop Terminal, the Administration/Warehouse building, the Cryogenics Facility, and the lower roofs on the Digester Modules. Completed March 2010.	Completed
DITP Roof Replacements Phase 2	Also added in FY10, project to replace roof membranes at the North & South Main Pump Stations; East & West Odor Control; the Grit Facility; and the Centrifuge Thickener building. Completed July 2011.	Completed
Barge Berth and Facility Replacement	Major rehabs of the barge berth & pier facilities due to damage and/or normal wear. Added per the Master Plan. Personnel dock rehabilitation scheduled for FY17 and barge berth/facility work in FY19, then on a 20-year cycle.	Active
Rip-rap Material	Purchase of 6,400 tons rip-rap to reduce and prevent ocean wave soil erosion along the northeast and eastern shoreline at Deer Island. Purchases expected to occur in the spring and fall of 2017.	Future
DITP Roof Replacement Phase 3	Project added in FY13. New roofing was needed at the Grit Facility, North Main Pump Station, Main Switchgear Building, and the gravity thickeners in order to protect the equipment in these buildings. Replacement was completed in July 2014.	Completed

Sub-phase *Utilities:*	Scope	Status
Outfall Modifications	Inspection of the old outfall tunnels (decommissioned after startup of the new outfall tunnel). Inspection completed in July 2002.	Completed

Sub-phase *Utilities:*	**Scope**	**Status**
Electrical Equipment Upgrades (EEU) including future cycles from the Master Plan	The program to replace substation components and bus ducts. Bus duct 2&22 replacement completed October 2001, and EEU - 2 completed by March 2007. EEU–3 began in FY08, completed by August 2011. EEU-4 started in FY13, completed by June 2016; Under the Master Plan, Phase 5 was added and is scheduled to start in FY20. Additional cycles need to be added in the FY19 Proposed cycle.	Future
VFD Replacements, including Secondary Reactor VFDs	The program to replace obsolete variable frequency drives (VFDs) in the North Main Pump Station (in FY12-16), South System Pump Station (done in FY07-08), Winthrop Terminal Facility (FY16-20), and miscellaneous smaller VFDs throughout the plant (on-going). Future replacements every 12-15 years. In FY14 the scope was revised to include the addition of VFDs to the secondary oxygen reactor batteries A, B and C, to improve system efficiency and reduce energy consumption. This work began in February 2015, was substantially completed by August 2016.	Future
NMPS Harmonic Filter Replacement	The second phase of NMPS VFD and motor replacement is installation of new harmonic filters if they are determined to be necessary, in FY18-20.	Future
Power System Improvement Design & Constr. (Contracts 7061, 7061A, 7061B, 7061C, 7061D)	For modifications to DITP's electrical system as recommended in the consultant report after an FY04 power outage. Design completed in FY09-11. Completing the construction in a series of projects in FY09-14; added 7061C, dump condenser replacement and 7061D for NMPS fuel tank removal in FY11. Two awarded in FY09, two in FY11, the last – 7061A, Thermal Power Plant Fuel System Upgrade was awarded October 2015, expect completion by May 2017.	Active
TPP Boiler Control Replacement	Replace boiler controls in the Thermal Power Plant that are becoming obsolete. Contract began in November 2014, completed November 2016.	Completed
Switchgear Replacements including future cycles added per the Master Plan	On-going program to sequentially replace obsolete electrical switchgear. Several buildings scheduled for FY18-21, others in FY23-25. Future cycles beyond that period are not currently funded.	Future
Transformer Replacements	Approximately 42 electrical substations and 87 transformers have been in service an average of 13 years. Transformers are replaced when the routine electrical maintenance program identifies them as being near the failure point. Sub-phase eliminated in FY14; replacements are now included in Electrical Equipment Upgrades.	Completed
PICS Replacement including future cycles from the Master Plan	Replacement or upgrade of components of the Process Information Control System (PICS) including keypads, consoles, and software due to obsolescence. Project substantially completed in FY15 followed by two years of warranty; and may need to be repeated every 10-12 years.	Completed
PICS Distributed Processing Units (DPU) Replacement	Replace the system "backbone", the 26 DPU cabinets or internal components. Added per the Master Plan, scheduled for FY21-23.	Future

Sub-phase *Utilities:*	**Scope**	**Status**
Sodium Hypochlorite Pipe Replacement & Sodium Bisulfite & Hypochlorite Tanks Rehabilitation Design, REI and Construction	Replacement of PVC piping that transports sodium hypochlorite from the storage tanks to the disinfection basins with a better-suited pipe. This project will address issues with leaks, corrosion, and safety hazards in FY18-21. Hypochlorite Tanks rehabilitation added to scope of project in the Proposed FY17 CIP cycle to re-line two Bisulfite tanks. Tank 1 and Tank 2 are in fair condition on the outside (shows staining, rusting, and corrosion). If one tank fails there is no longer any back-up. By FY17, the tanks will have been in service for 22 years.	Future
Chemical Pipe Replacement Design and Construction	Planned periodic replacement of the various chemical pipelines in the odor control and disinfection facilities due to deterioration from corrosion. Scheduled for FY21-24.	Future
Heat Loop Pipe Replacement Construction	Rerouting heat loop piping into galleries to reduce underground corrosion and improve accessibility. Phase 1 completed in Dec. 2005, Phase 2 completed in February 2008. Phase 3 completed in June 2011. Includes periodic valve replacements. Another project phase needs to be added to provide redundancy to the heat loop.	Completed
Fuel Pipe Abandonment	To cement the existing fuel pipeline in place in FY13 instead of removing it. Project completed December 2012.	Completed
North Main Pump Station Motor Control Center (MCC) Construction	Sequential replacement of the MCC equipment that has become obsolete and unreliable. Designed under As-Needed Design task order, construction completed in two sequential phases in FY12-13. See Phase 2 below.	Completed
North Main Pump Station Motor Control Center (MCC) Phase 2 Design ESDC/REI and Construction	New sub-phase, pulled from the project above. Second phase of the work, scheduled to be done in FY17-22. In FY17, the design scope was revised to include replacement of switchgear in the Admin/Lab building.	Future
Combustion Turbine Generator (CTG) Rebuilds	Rebuilds of the combustion turbines in the Thermal Power Plant. Added from the Master Plan, scheduled for FY21-23 with repeat cycles every 15 years. With the addition of the "Combined Heat & Power" facility, this work may eventually be eliminated.	Future
STG System Modifications Design & Construction	Involved adding equipment to the steam turbine generator that will produce additional electricity utilizing the current steam production more efficiently. To help the MWRA meet the energy goals set out by executive order, the project began in FY09. Completed in February 2011. Added Pressure Reducing Valve (PRV) to maximize electrical generation, completed July 2014.	Completed
DI Digester Flare No. 4 Design and Construction	Install a fourth gas flare to reduce the potential for air permit violations when an existing flare is out of service and the boilers have to be taken off-line. Construction currently scheduled for FY20-22.	Future

Sub-phase *Support:*	**Scope**	**Status**
DISC Application	Hardware, software, and contract services to implement a DITP plant-wide computerized database of all plant systems (electrical, gas, water, etc). Current systems deemed sufficient, remaining project removed in FY14.	Completed
Document Format Conversion	Conversion of DITP construction documents into electronic format and completion of document-reference database. This work is in process, and has several phases. Expect completion by the end of FY20.	Active
As-Needed Design Phases 5, 6, 7, and 8	On-going technical design services and/or construction support to supplement existing engineering resources for specialized or complex engineering issues. Initially, the contracts are issued in tandem and run for two years each. Starting with Phase 6, the contract length was extended to three years each. Phases 6-1 and 6-2 ended by October 2012, followed by phases 7-1, 7-2, and 7-3 (awarded in FY13, at $1.6M each over three years). Phases 8-1, 8-2, and 8-3 were awarded in FY16 at $1.6M each, over three years.	Active
Deer Island As-Needed Technical Design	This subphase is a placeholder, used to continue the technical design services and/or construction support in the same fashion as the contracts listed above. Each series of new contracts will be deducted from this placeholder and given their own subphase numbers. Currently funded through FY26.	Future

Sub-phase *Specialties:*	**Scope**	**Status**
Sodium Hypochlorite Tank Liner Removal	Removed the failed lining in tank #1 of the four sodium hypochlorite storage tanks. Completed in September 2006.	Completed
Hypochlorite Tanks 1&3 Reline	Renamed the "Sodium Hypo Tank Repair 1" subphase in FY08. Included the stripping, repair and relining of tank 3. Completed in November 2007.	Completed
Hypochlorite Tanks 2&4 Reline	Added in FY08 per the Master Plan. Strip & reline the two remaining sodium hypochlorite storage tanks. Scope included removing ladders and replacing safety railings on the tanks. Completed in October 2008.	Completed
Future Sodium Hypochlorite Tank Rehabilitation or Replacement	Based on condition, expect to start replacing one tank per year beginning in FY23.	Future
Primary & Secondary Clarifier Rehab – Design (ESDC/REI)	Consultant to provide ESDC/REI services during the Primary & Secondary Clarifier rehab work described below (design done by As-Needed Design consultant). Project scope expanded to include secondary clarifiers due to deterioration in the longitudinal chains and scum collection systems. Work began once the Construction phase listed below was awarded; work completed by September 2013.	Completed

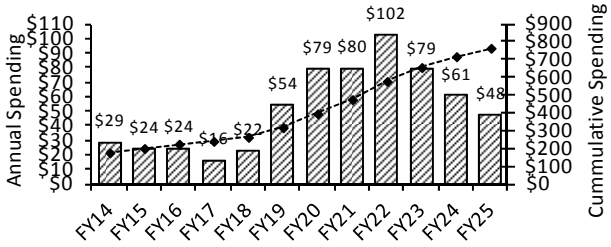
Sub-phase *Specialties:*	**Scope**	**Status**
Primary & Secondary Clarifier Rehab Construction	Replace longitudinal and cross collector chains and sprockets, chain drives, wear shoes; modify tip tubes, replace hose bibs; repair wall expansion joints, add more drop boxes, etc. Added the secondary clarifiers to the scope for FY09 and specified a higher-grade stainless steel, which substantially increased the project cost by $30M. Separated out the gravity thickener scope due to the need for separate, distinct schedules. Project awarded at $59.4M; work began in February 2009 and construction was completed in February 2012.	Completed
Gravity Thickener Rehabilitation - Design	Designing gravity thickener improvements, as discussed further below. Project staff determined that a separate design phase is not needed, dropped this subphase in the FY14 Final CIP cycle.	Completed
Gravity Thickener Improvements - Construction	This subphase was eliminated in FY08, and the scope was included with the Primary Clarifier Rehab work above. Made a stand-alone project again in FY09. Multiple phases needed - the first phase (6966) involved replacing some fiberglass covers in FY10-12. 6966A, B, and C were added for emergency repairs to center columns in three tanks in FY11. Project completed in June 2012.	Completed
Gravity Thickener Rehabilitation	Sub-phase pulled from the project above. This final phase involves installing catwalks around the perimeter of several tanks, removing concrete blocks in the effluent channels, and modifying the sludge thickener roofing to improve staff access and the operating efficiency beginning in FY18.	Future
Gravity Thickener Center Column Replacement	Complete replacement of the center columns in all 4 tanks with a higher grade steel, due to the failures experienced in FY11. Contract awarded in FY13 and was completed by January 2014.	Completed
Odor Control Rehabilitation Study, Design/ESDC, Construction and REI	Dropped the Preliminary Design phase and added ESDC/REI to the scope in FY11. The project involves modifications to the plant-wide odor control systems, including the digester gas systems and wet scrubber improvements. Added an "Odor Control System Rehab Study" in the FY18 Proposed cycle, to run May-17 to Nov-18. Design begins in FY19, construction currently scheduled for FY22-27.	Future
Clarifier W3H Flushing System	Sub-phase initially called Clarifier Rehab Phase 2 (see project description for that work, below). The assigned contract number was used for this part of the overall project, so the sub-phase was renamed for FY13. Project to replace deteriorated water flushing lines in the clarifier batteries, completed July 2013.	Completed
Clarifier Rehabilitation Phase 2 Design/ESDC, REI and Construction	Sub-phase pulled from the project above. This project is needed to correct deficiencies noted during the first Primary & Secondary Clarifier project. Influent gates not sealing off tanks adequately; effluent launders and aeration systems need repair; and concrete corrosion in primary clarifiers above the water line needs repair and coating to prevent future corrosion. The sludge removal system in primary tanks and aeration/recirculation systems in secondary tanks need to be rehabilitated as well. Design/ESDC contract began in FY15, and construction is currently scheduled for FY18-22.	Active

Sub-phase *Specialties:*	Scope	Status
Scum Skimmer (Clarifier Tip Tube) Replacement	Sub-phase also pulled from the W3H flushing project above. Needed a separate project for replacing the scum tip tubes. Scum tip tubes not working results in scum build-up in clarifiers that has to be manually collected and transported to the gravity thickeners. Project began in FY14 and was completed in FY17; secondary tip tubes added to scope, increasing the cost.	Completed
DI Digester Storage Tank Design/ESDC and REI and Rehabilitation Phase 2	The DITP residuals facility includes three digester modules and two gas handling/ sludge storage tanks. During the Digester Mods Pipe Replacement contract (7055), it was noted that other digester equipment has problems and needs replacement. Plugged digester recirculation pipes, mixer failures, and overflow box deterioration resulted in increasing the scope of work needed to correct all deficiencies in this area of DITP. Some steel plates in the digesters are also expected to need repair or replacement and the interior of the digesters needs to be coated. Construction scheduled to begin in FY21.	Future
Combined Heat & Power (CHP) Study, Design and Construction	A study has been done to evaluate how we can optimize the use of methane gas produced from the existing sludge processing system. One recommendation is to construct a CHP facility that would contain gas-fired turbines which would be more efficient, would increase electrical production and self-generation, and would ensure beneficial re-use of all methane gas in summer months all while still meeting all plant heat requirements. Additionally, this CHP system would be designed to handle the increased methane gas quantities associated with co-digestion, if that project moves forward. Depending on the CHP facility design, portions of the 17 year old On-Site Thermal Power Plant will require modification or elimination. Currently scheduled to start a detailed alternatives evaluation project in FY17, (followed by a design phase) and begin construction by the end of FY21.	Future
Co-Digestion Design/ESDC/REI and Construction	Due to uncertainty in the ability to barge food waste to DITP, the pilot program has been dropped. Co-digestion construction is for the addition of piping and a receiving tank for the liquid food waste to be collected at Deer Island. It is expected that food waste will be barged to the treatment plant, pumped into the receiving tank from the barge, and then fed through the piping into the digesters. This project schedule has been pushed out to FY22-23.	Future
Co-Digestion Temporary Facility	Moved this sub-phase from the Residuals CIP to DITP in the FY16 Proposed budget cycle. Due to uncertainty, the schedule has been pushed out to FY21-22.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$814,868	$224,644	$590,224	$16,023	$22,449	$115,616	$393,199	$158,552

DI Asset Protection



Project Status 6/16	27.6%	Status as % is approximation based on project budget and expenditures. Several previously completed phases for this project are included in the Completed Project list. Additional contracts completed include: As-Needed Design Phases 6-1 and 6-2, 7-1, 7-2, and 7-3; Primary & Secondary Clarifier Rehab Construction, TPP Dump Condenser Replacement, Fuel Transfer Pipe Abandonment, NMPS MCC Construction, Digester Modules Pipe Replacement, PICS Replacement Construction, Clarifier W3H Flushing System, Expansion Joint Repair Construction 2, Gravity Thickener Center Column Replacement, Roof Replacement Phase 3, Centrifuge Backdrive Replacement, NMPS VFD Replacement Construction, Electrical Upgrade Construction 4, Scum Skimmer Replacement, Cryo Chillers Replacement, Secondary Reactor Batteries VFD Installation, and Thermal Power Plant Boiler Control Replacement. Contracts in process include the following: NMPS and WTF Valve & Piping Replacement, Clarifier Phase 2 Design, HVAC Equipment Replacement Design, Fire Alarm System Replacement Design, Fuel System Modifications, Digester Sludge Pump Phase 2 contracts, and WTF VFD Replacement. Gravity Thickener Rehabilitation and Switchgear Replacement Construction are expected to start in FY18.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$772,633	$814,868	$42,235	Jun-48	Jun-48	None	$126,319	$115,616	($10,703)

Explanation of Changes

- Project cost change primarily due to updated cost estimates for Clarifier Rehabilitation Phase 2 Construction, $45.0M, Digester & Storage Tank Rehabilitation Construction, $8.3M, Fire Alarm Replacement Construction, $4.0M, DI CTG Rebuilds, $2.0M, Digester Storage Tank Resident Engineering Inspection, $2.0M, Gravity Thickener Rehabilitation, $0.4M, Rip Rap Material, $0.3M. Partially offset by deletion of Equipment Replacement Projection placeholder of $25.0M. Also, new project added for Fixed Gas Protection Systems Replacement of $2.0M and inflation adjustments on unawarded contracts.

- Spending change primarily due to updated Notice-to-Proceed and Substantial Completion dates for several contracts including Gravity Thickener Rehabilitation, HVAC Equipment Replacement Construction and Engineering Services During and Construction, Switchgear Replacement Construction, Co-Digestion Temporary Facilities, Expansion Joint Repair Construction 3, Clarifier Rehabilitation Phase 2 Design, Digester Storage Tank Rehabilitation Design/Engineering Services During Construction and Barge Berth and Facility Replacement. Also, an updated credit change order estimate for Electrical Equipment Upgrade Construction 4 for the switchgear portion of work that will not be done under this contract, partially offset by updated cash flow for Sodium Hypochlorite & Bisulfite Tanks Rehabilitation of $2.0M in FY18.

CEB Impacts

- The majority of the projects are required to replace obsolete equipment and systems. Some of the projects are expected to result in decreased maintenance and/or operating costs such as the HVAC equipment replacement. However, the potential benefits from most of the projects are not quantified at this time.

- Benefits of several energy-related projects have been estimated resulting in anticipated annual electrical savings. Some examples include: Winthrop Terminal Facility VFD Replacement ($30,000 in FY21), HVAC Equipment Replacement $200,000 in lab equipment in FY19, ($140,000 in FY21 and $50,000/yr in FY19-20), and Future SSPS VFD Replacements ($120,000 beginning in FY23). Any potential impacts of co-digestion and the combined heat and power facility have not yet been quantified or included in the planning estimates due to uncertainty regarding the scope and feasibility of the projects.

- Projects that are expected to reduce maintenance time and other resources are the Gravity Thickener Rehabilitation, Cryogenic Plant Chiller Replacements, Thickened Primary Sludge Pump Replacements and Digested Sludge Pump Replacements.

S. 210 Clinton Wastewater Treatment Plant

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

Project History and Background

The Clinton Wastewater Treatment Plant Rehabilitation was completed in 1992. The plant is generally in good condition. Some equipment rehabilitation and replacement projects were recommended in past CIP cycles. Operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimizing the risk of component failure. Any malfunction of mechanical equipment may impact wastewater treatment, particularly during large storm events that stress the hydraulic capacity of the facility. Key decision making to minimize risks includes the cost/benefit of when to replace aging equipment and which/how many spare parts to pre-purchase. Other uncertainties include technology upgrades to meet future regulatory requirements. Clinton WWTP was previously included in DITP's "Asset Protection – Specialties" program category, but was given its own distinct CIP program in FY08.

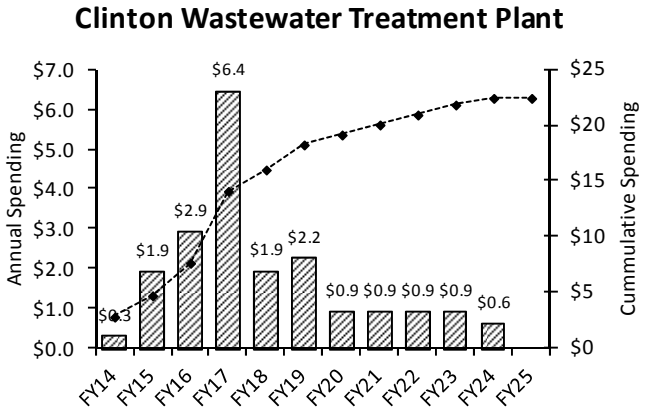
Scope

Sub-phase	Scope	Status
Clinton Soda Ash Replacement	The soda ash delivery system required for pH control in the activated sludge process was obsolete and needs to be replaced. The contract was awarded in November 2007 and work was complete by August 2008.	Completed
Clinton Permanent Standby Generator	Install a permanent standby generator at the Clinton Wastewater Treatment Plant. Completed in November 2007.	Completed
Clinton Digester Cleaning & Rehabs (and Influent Gates)	Clinton's two digesters were approximately 20% filled with compacted grit which was limiting their efficiency. A new discharge permit to be issued soon includes phosphorus limits requiring both digesters to be used at all times. The digester tanks needed to be emptied, cleaned, and rehabilitated (replace covers, piping, valves, gas lancers, and mixers) to operate under the new permit. The first digester was cleaned by July 2010. In FY12, the scope was expanded to include installing two new 36-inch influent gates to control flow from Clinton and Lancaster to prevent flooding and protect plant assets. As of FY14, the project scope also included plant-wide concrete repairs because walls, walkways and structural support beams across the primary clarifiers were deteriorated to the point that rebar was exposed. The project involved repairing the walls and replacing the walkways and equipment support beams that extend across the tops of the tanks. Construction began in late FY14 and was completed in FY16; the warranty period extends into FY17.	Completed

Sub-phase	Scope	Status
Clinton Aeration Efficiency Improvement (and Auxiliary Pumps)	A study completed by FS&T recommended installing fine bubble diffusers in three of the six secondary aeration tanks instead of using mechanical mixers, to obtain a better oxygen transfer rate while reducing electricity consumption. In FY12, this project scope was expanded to include the installation of four permanent submersible auxiliary pumps to increase pumping capacity during high flow conditions in the plant. These are needed to avoid the cost of renting additional pumps, which was required four times in the past two years. Work began in late FY12 and was completed by February 2013.	Completed
Phosphorus Reduction Design/ESDC and Construction	Final new NPDES permit requires compliance with lower phosphorus limits by April 2019, 18 months following current scheduled construction completion and start-up. Current treatment system does not reduce phosphorus to required levels, and new process equipment is needed to achieve the new limit. Design began in early FY14 and construction began in FY16, scheduled to be completed by September 2017.	Active
Clinton Roofing Rehabilitation	Added in FY14. Rehabilitate the tar and gravel roofing on the Administrative Building, Chemical Building, Headworks, Digester building, and the Dewatering and Maintenance Shop. Scheduled to begin in FY17.	Future
Clinton Facilities Rehabilitation	Added in FY14. Rehabilitate or replace the grit removal facilities, two belt filter presses, and close Cell #1 of the landfill. Scheduled to begin in FY19.	Future
NGRID Gas Line	Agreement with NGrid to construct a natural gas pipeline to convert plant from oil to natural gas.	Active
Valve and Screw Pumps Replacement	There are fifty 4-inch to 8-inch return aerated sludge line valves that need replacing, and six 48-inch screw pumps that have reached the end of their useful lives (25 years old). This project involves replacing the valves, and installing 6 MGD submersible pumps in place of the six screw pumps. Design by As-Needed Consultant. Schedule to begin construction in FY18.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$22,419	$7,629	$14,790	$6,445	$1,921	$13,469	$5,827	$597



Project Status 6/16	34.0%	Status as % is approximation based on project budget and expenditures. Phosphorus Reduction Design commenced in November 2013. Digester Rehabilitation construction was completed in April 2016. Phosphorus Removal Construction commenced in March 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY17**	**Chge.**
$20,555	$22,419	$1,864	Sep-23	Sep-23	None	$13,209	$13,469	$260

Explanation of Changes

- Project cost change due to updated cost estimate for Valve and Screw Pumps Replacement of $1.5M and change orders and amendments for Phosphorus Reduction of $0.3M, partially offset by final cost adjustments for the Clinton Digester Rehabilitation project of $0.1M.

- Spending change due to updated cost estimate for Valves and Screw Pumps Replacement and Phosphorus Reduction change orders and amendments as noted above. Partially offset by updated Notice-to-Proceed date for the Clinton Roofing Rehabilitation contract as well as final cost adjustments for the Clinton Digester Rehabilitation project.

CEB Impacts

- The projects are required to replace obsolete equipment and systems. The aeration efficiency project resulted in decreased electricity usage at Clinton. The concrete repair and digester rehab work may result in decreased maintenance and/or operating costs although the potential benefits have not been quantified at this time. The phosphorus reduction project is estimated to increase CEB costs for utilities and chemicals by approximately $30,000 in FY19.

S. 271 Residuals Asset Protection

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 1 (see Appendix 3)

To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems. MWRA expects to replace equipment and structures in the facility as they reach the end of their useful life.

Project History and Background

The Residuals Asset Protection program was created in FY08 as part of the Master Plan. The program consists of the anticipated contracts for maintaining and improving the operations and infrastructure of the biosolids processing plant in the long term. MWRA's Biosolids Processing Facility (aka the "pellet plant") was built in 1991 and expanded in 2001. By 2017, most of the major pieces of processing equipment will be 27 years old. The facility is currently in good condition, but some reinvestment is planned in the FY17-21 timeframe, as discussed in more detail below. For this facility, operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimizing the risk of component failure. Key decisions to minimize risk hinge on the results from cost/benefit analyses, to determine when to replace equipment. The residuals pelletizing process is also currently energy-intensive; future uncertainties include long-term energy costs and supply.

Under the terms of the contract for operation of the biosolids processing facility, New England Fertilizer Company (NEFCO) was responsible for all facility operation and maintenance including any necessary capital improvements until December 2015. They were obligated to turn the facility back over to the MWRA in an operable condition. The Asset Protection phase is intended to provide a dual-track planning approach addressing: (1) the existing facility capital improvement needs beyond the year 2015, if the Authority continues with pelletization, and (2) the option of assessing alternative technologies prior to the current contract expiration date; which culminated in a decision point in FY15.

A comprehensive Residuals Condition Assessment/Reliability Study begun in May 2009 was completed in July 2010. The study found the facility to generally be in good condition with only a few recommendations for improvement. A study to assess the latest technology and regulatory trends planned as a second phase started in FY13 and finished in FY14. The study was intended to narrow the list of viable options for the Authority to consider for long-term implementation. The study examined the feasibility of co-digestion which involves digestion of food wastes and/or fats, oils, and greases (in the digesters at Deer Island Treatment Plant (DITP) and Clinton Wastewater Treatment Plant) to generate additional methane, and determine if there are any changes in the sludge characteristics that may impact the pellet plant. This study also reviewed the adequacy of existing facility components and processes, to provide replacement recommendations based upon the latest existing or alternative technologies. Information developed by these projects will be used by MWRA to produce a prioritized list of recommended design and construction projects that will be scheduled over a 10-year period (FY17-26). Scheduling of upgrade projects will be based on equipment failure risk, construction sequencing to maintain facility operations, and capital expenditure planning.

The Technology and Regulatory Review study provided several major recommendations to the Authority. First, the study found co-digestion to be feasible and potentially beneficial and therefore recommended that the Authority proceed with projects needed to further evaluate the benefits of that process. As a result, several projects were

added to the DITP CIP to achieve that goal. Throughout 2016, efforts were made to determine the best means to transport food waste to DITP. It was determined that barging food waste was the primary acceptable option, but the collection, transport, and delivery via barge was not economically feasible at this time, so co-digestion is currently on hold until the market becomes more developed and associated costs can be more accurately predicted.

Secondly, it was determined that the Authority should continue with pelletization and pursue a five year extension to the NEFCO contract. Third, it was recommended that larger sludge dryers be installed for increased pelletization capacity at a lower energy cost per ton of sludge processed (further cost-benefit analysis is needed before proceeding). Funding for this element of the project (and other capital expenditures) were also to be points of negotiation with NEFCO.

After considering these recommendations, Authority staff decided to continue with pelletization and negotiated a five year extension to the pellet plant operations contract with NEFCO. On March 11, 2015 the Board of Directors approved Amendment 1 to contract S345 with NEFCO, which extends the end date to December 31, 2020 and includes a $7 million capital budget funding commitment by the Authority for potential capital projects identified as being necessary over the next five years. Any projects deemed necessary will be separately bid by the MWRA, subject to Board approval. This extension will be followed by another long-term competitive procurement. The additional time in this extension allows for planning and implementation of co-digestion of food waste at DITP if it proves feasible; further evaluation of the efficiency of larger dryer trains recently installed at two other facilities; a potential increase in competition over the next five years; and the opportunity for the Authority to better define the operating parameters for the next long-term competitive bid.

For the residuals biosolids processing facility, proposed spending of $180.3 million on eighteen projects was identified in the 40-year master plan timeframe of FY07 through FY48. The projects identified are merely placeholders in recognition that some capital improvements will likely be required at DITP and/or the pellet plant. Fifteen projects (equaling $148.6M) out of the eighteen were included in the FY08 CIP. The other three (addressing the rehabilitation of the polymer system, building envelope, and thermal oxidizers) have a priority rating of 3, and therefore are not yet included in the CIP.

In the FY14 Proposed CIP cycle, the conceptual plan for future design and construction projects was modified; the overall project cost estimate was reduced to $103.83 million and fewer sub-phases included funding to cover the potential construction projects since the plan for the future would not be fully developed until after the technology study mentioned above was completed and the findings evaluated, which has been done. See the 'scope' sections below for additional information regarding which sub-phases are funded and which are currently placeholders.

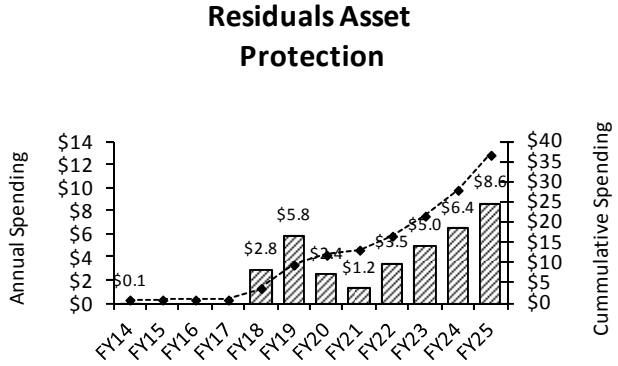
Scope

Sub-phase	Scope	Status
Condition Assessment/ Reliability Study	Evaluate the condition of the entire facility at the mid-point of the current contract and then assess other residuals processing options and regulatory changes which may provide cost-saving opportunities. First phase work (present condition assessment) began in May 2009 and finished in July 2010. Work on implementing any short-term recommendations from this phase began in FY11. The 2nd phase, Technology & Regulatory review began in FY13 and finished in January 2014; recommendations were as discussed above.	Completed

Sub-phase	Scope	Status
Residuals Plant Facility Plan/EIR	The design and construction of improvements to the plant utilities infrastructure (electric, water, sanitary, and drainage) may be necessary. This CIP project will address issues and/or recommendations identified during the initial study.	Future
Residuals Plant Upgrades – Phase 1 Design & Construction (initial phases to repaint sludge storage tanks and silos, mechanical and electrical improvements)	Select a consultant to design and oversee implementation of the first round of needed equipment replacements to coincide with the end of the operations contract. The total project is estimated at $2M for the design/ESDC and $7M for various construction sub-phases, for the duration of 5 years. Design is currently scheduled to begin in FY18, for any projects requiring design by MWRA. For FY17-21, funding of $2.7M is included to be spent in FY18 CIP to begin the first projects needed in the 5 year extension period (repainting the sludge storage tanks and pellet storage silos; mechanical improvements; and electrical improvements) as agreed to by MWRA and NEFCO.	Future
Residuals Phase 2 Design and Construction	Sub-phase change made in FY14, to broaden the scope and provide more flexibility in completing the work required. For selection of a consultant to design and oversee implementation of a second round of equipment replacements funded at $15M for design/ESDC and $75M for various unspecified construction phases. Following approval of the five year extension with NEFCO, phase 2 design work was moved out four years, to FY23.	Future
Residuals Pellet Conveyance Piping Relocation	**Build a separate support system to relocate the pipes that convey pellets to the "high silo system" that are currently attached to the wall of a building at the site that the MWRA does not own. This project would build a separate pipe support system and relocate these pipes.**	**Future**

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$103,832	$832	$103,000	$0	$2,835	$2,942	$17,873	$82,291



Project Status 6/16	0.8%	Status as % is approximation based on project budget and expenditures. The Residuals Plant Condition Assessment/Reliability Study was completed in July 2010. The Technology & Regulatory Review contract was completed in January 2014.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$103,832	$103,832	$0	Jun-48	Jun-48	None	$3,302	$2,942	($360)

Explanation of Changes

- Spending change due to updated cost for Residuals Upgrades Construction based on agreement with NEFCO (revised cost broken out into separate contracts for sludge tank and silo coating, mechanical improvements, and electrical improvements, as well as a new project for pellet conveyance piping relocation) and updated Notice-to-Proceed date for Residuals Facility Upgrades Design contract.

CEB Impacts

- The majority of the projects are required to replace obsolete equipment and systems. Some of the projects are expected to result in decreased maintenance and/or operating costs, however the potential benefits are not quantified at this time.

Introduction to Combined Sewer Overflow (CSO) Program

In 1987, MWRA entered a stipulation in the Federal District Court Order in the Boston Harbor Case ("First Stipulation") by which it accepted responsibility for developing and implementing a long-term CSO control plan for all combined sewer overflows hydraulically connected to MWRA's system, including the outfalls owned and operated by the communities of Boston (BWSC), Cambridge, Chelsea and Somerville (the "CSO communities"). In response to the First Stipulation, MWRA conducted site-specific and watershed based planning both to meet short-term CSO control requirements pursuant to federal regulations, including EPA Nine Minimum Controls ("NMC"), and to develop a long-term control plan to bring Boston area CSOs into compliance with the Federal Clean Water Act and Massachusetts Surface Water Quality Standards. MWRA developed these plans in conformance with federal and state CSO policies and associated guidance documents, which evolved during MWRA's nearly 20-year planning period, to 2006.

EPA's National CSO Policy (April 1994) requires CSO permitees to develop and implement a set of system optimization measures and reporting procedures intended to quantify and minimize CSO discharges in the short term, in part using detailed system characterization, easily implemented and less expensive system improvements and optimized operations and maintenance. In compliance with the policy, MWRA submitted its NMC compliance documentation by January 1, 1997, as required. While most of the reported compliance measures involve operations, maintenance and regulatory functions of MWRA that are funded through the Current Expense Budget, system characterization and hydraulic optimization measures described below were funded through the CIP.

The National Policy also requires permitees to develop and implement a long-term control plan in accordance with the provisions of the policy. In the CIP, MWRA undertook two major planning efforts: one in the period 1986 through 1990, which produced the 1990 CSO Facilities Plan primarily in accordance with the EPA CSO Strategy of 1989, and a second and final planning effort in 1992-1997, which produced a revised long-term plan for CSO control that MWRA recommended in July 1997. With subsequent modifications to the plan, MWRA attained full regulatory and court approval of the revised control plan in April 2006.

MWRA's CSO planning efforts were primarily conducted under the System Master Planning phase of the CIP and produced the following components of a broad plan to control CSO discharges and meet water quality standards:

- Through extensive inspections, system monitoring and modeling, MWRA developed a detailed, field-calibrated assessment of its planned collection and treatment system performance in advance of developing a long-term CSO control plan. The performance assessment incorporated major capital investments in the sewer system already underway or planned by MWRA, including upgrades to the transport system, pumping stations, headworks and Deer Island Treatment Plant. Together with MWRA's and the CSO communities' efforts in the late 1980's and the 1990's to operate and maintain their respective systems more efficiently, these improvements were shown to effectively maximize the system's capacity to control wet weather flows and markedly reduce CSO discharges system-wide. In the period 1988 through 1992, total annual CSO discharge predicted for the Typical Year Rainfall dropped from 3.3 billion gallons to 1.5 billion gallons, with approximately 51% of the remaining discharge treated at five MWRA CSO screening and disinfection facilities. The Charles River especially benefited from these improvements.

- In 1993-1994, MWRA presented a System Optimization Plan ("SOP"), which recommended approximately 160 low cost, easily implemented system modifications to maximize wet weather storage and conveyance. The SOP projects, which were fully implemented by MWRA and the CSO communities by 1997, further reduced CSO discharge by about 20 percent.

- MWRA recommended an extensive set of larger projects covering a range of control technologies to achieve long-term, site-specific CSO control goals using watershed-based assessments of receiving water impacts and uses. MWRA presented a conceptual plan of these improvements in 1994 and refined the recommendations in a facilities plan and environmental impact report it issued in 1997. The long-term plan received initial federal and state approvals in early 1998, allowing MWRA to move the projects into design and construction.

- As MWRA proceeded with implementation of the projects, it evaluated and recommended several adjustments and additions to the long-term plan in the period 1998 through 2006. These adjustments and additions

responded to regulatory inquiries seeking higher levels of control (Charles River) or to new information that raised concerns about construction requirements, cost or CSO control performance (North Dorchester Bay, Reserved Channel, East Boston, and Alewife Brook). A final, comprehensive long-term control plan was approved by EPA and DEP in March 2006 and accepted by the Federal Court in April 2006. This plan and its predicted level of CSO control for each outfall was formally amended in May 2008 to revise the long-term CSO discharges at the Prison Point Facility, based on hydraulic optimization MWRA incorporated into the operations of the facility pursuant to milestones in Schedule Seven. MWRA predicts that the long-term plan, scheduled to be completed in December 2015, will reduce total annual CSO discharge for the Typical Year Rainfall to 0.4 million gallons (an 88% reduction from the 1988 level), with 93% of the remaining discharge to be treated at four MWRA screening and disinfection/dechlorination facilities.

On April 27, 2006, Federal District Judge Richard G. Stearns approved a joint motion of the U.S. Department of Justice (DOJ), EPA, and MWRA that provides a comprehensive resolution of outstanding issues related to MWRA's CSO program. Under the approved motion, MWRA entered a Second CSO Stipulation by which it agreed to implement its previously recommended plans for Alewife Brook/Upper Mystic River and East Boston and to undertake additional work to further reduce CSO discharges to the Charles River from its Cottage Farm CSO Facility. The Cottage Farm facility had been the subject of discussions between EPA and MWRA and related investigations by MWRA since MWRA first issued its long-term control plan in 1997. The additional Charles River work is predicted to reduce CSO discharges from Cottage Farm to 2 activations and 6.3 million gallons in the Typical Year, from the previous goal of 6 activations and 23.6 million gallons. The scope, milestones and performance goals of other CSO projects remain unchanged.

The Federal Court ordered schedule had also contained three unmet milestones related to completion of the CSO control plans for Alewife Brook/Upper Mystic River, East Boston, and region-wide floatables control and outfall closings. The accepted joint motion and the revised court schedule ("Schedule Seven") that was created from it adjusted several previous project milestones and added milestones for the revised Charles River CSO control plan.

In exchange for MWRA agreeing to implement its revised long-term control plan, DEP agreed to issue a series of five (5), up to three-year extensions to the water quality variances for the Lower Charles River Basin and the Alewife Brook/Upper Mystic River through 2020. As they relate to MWRA, the terms and conditions of the variance extensions would be limited to the requirements of the Court Order (i.e. MWRA's responsibility is to implement the long-term control plan contained in the revised Schedule Seven). The most recent variance extensions were issued by DEP on August 31, 2016 for Alewife Brook/Upper Mystic River and for Lower Charles River Basin. These extensions are in effect until September 1, 2019 when it is expected that DEP will issue additional extensions.

The Second CSO Stipulation (2006) replaces the stipulation entered in 1987 that established MWRA's responsibility to develop and implement a region-wide CSO long-term control plan. The Second CSO Stipulation states that once MWRA has implemented the recommended plan and demonstrated that it meets the specified goals for activation frequency and discharge volumes, each CSO community will be solely responsible for level of control and other regulatory requirements at the CSO outfalls it owns and operates in accordance with its NPDES discharge permit. These important conditions in the Second Stipulation provide much greater certainty to the MWRA and its ratepayers relative to the scope and cost of the CSO program through 2020. The elements of the final long-term CSO control plan and the numerical CSO discharge goals for each receiving water segment are presented in Table 1 on the following page.

The CSO project schedules in Schedule Seven are aggressive and reflect project-specific design, permitting and construction requirements. The program has and will continue to face cost and schedule challenges relative to construction that continues in Cambridge to restore surfaces, including streets, affected by the CAM004 sewer separation project. Cost risks include unforeseen subsurface conditions, utility conflicts and the need to manage traffic and community impacts in densely populated neighborhoods. Notwithstanding these challenges, MWRA, in cooperation with the City of Cambridge, will continue to manage the CSO program with the goals of controlling project costs, maintaining schedule, and fully achieving the projects' CSO control objectives.

Table 1: Approved CSO Control Plan and Capital Cost by Receiving Water Segment

Receiving Water	CSO Discharge Goals (Typical Year Rainfall)		Projects*	Capital Cost* ($ millions)
	Activations	Volume (million gallons)		
Alewife Brook/Upper Mystic River	7 untreated and 3 treated @ Somerville Marginal	7.3 3.5	• Cambridge/Alewife Sewer Separation • MWR003 Gate and Rindge Siphon Relief • Interceptor Connections/Floatables • Connection/Floatables at Outfall SOM01A • Somerville Baffle Manhole Separation • Cambridge Floatables Control (portion)	109.9
Mystic River/Chelsea Creek Confluence and Chelsea Creek	4 untreated and 39 treated @ Somerville Marginal	1.1 57.1	• Somerville Marginal CSO Facility Upgrade • Hydraulic Relief at BOS017 • BOS019 Storage Conduit • Chelsea Trunk Sewer Replacement • Chelsea Branch Sewer Relief • CHE008 Outfall Repairs • East Boston Branch Sewer Relief (portion)	92.0
Charles River (including Stony Brook and Back Bay Fens)	3 untreated and 2 treated @ Cottage Farm	6.8 6.3	• Cottage Farm CSO Facility Upgrade • Stony Brook Sewer Separation • Hydraulic Relief at CAM005 • Cottage Farm Brookline Connection and Inflow Controls • Brookline Sewer Separation • Bulfinch Triangle Sewer Separation • MWRA Outfall Closings and Floatables Control • Cambridge Floatables Control (portion)	88.8
Inner Harbor	6 untreated and 17 treated @ Prison Point	9.1 243.0	• Prison Point CSO Facility Upgrade • Prison Point Optimization • East Boston Branch Sewer Relief (portion)	47.5
Fort Point Channel	3 untreated and 17 treated @ Union Park	2.5 71.4	• Union Park Treatment Facility • BOS072-073 Sewer Separation and System Optimization • BWSC Floatables Control • Lower Dorchester Brook Sewer Modifications	62.4
Constitution Beach	Eliminate		• Constitution Beach Sewer Separation	3.7
North Dorchester Bay	Eliminate		• N. Dorchester Bay Storage Tunnel and Related Facilities • Pleasure Bay Storm Drain Improvements • Morrissey Blvd Storm Drain	253.7
Reserved Channel	3 untreated	1.5	• Reserved Channel Sewer Separation	70.6
South Dorchester Bay	Eliminate		• Fox Point CSO Facility Upgrade (interim improvement) • Commercial Pt. CSO Facility Upgrade (interim improvement) • South Dorchester Bay Sewer Separation	126.8
Neponset River	Eliminate		• Neponset River Sewer Separation	2.5
Regional			• Planning, Technical Support and Land Acquisition	51.6
TOTAL **Treated**		**410** **381**		**909.5**

*Floatables controls are recommended at remaining outfalls and are included in the listed projects and capital budgets.

MWRA commenced implementation of the long-term CSO control plan in 1996. Project schedules, which reflect compliance with Federal Court milestones, are presented in Table 2 on the following page. By December 2015, MWRA and the CSO communities had completed all of the 35 projects in the plan. The completed CSO projects, together with earlier improvements to MWRA's wastewater conveyance and treatment systems, including the upgraded Deer Island Treatment Plant and associated pump stations, are predicted and intended to reduce the total annual volume of CSO discharge in MWRA's federal and state regulatory-approved Typical Rainfall Year from

3.3 billion gallons in 1988 to 0.44 billion gallons, an 88% reduction, with 93% of the remaining overflow receiving treatment at MWRA's four long-term CSO facilities.

Table 2: CSO Control Plan Project Schedules

Project		Commence Design	Commence Construction	Complete Construction
North Dorchester Bay Storage Tunnel and Related Facilities		Aug 97	Aug 07	May 11
Pleasure Bay Storm Drain Improvements		Sep 04	Sep 05	Mar 06
Hydraulic Relief Projects	CAM005 Relief	Aug 97	Jul 99	May 00
	BOS017 Relief		Jul 99	Aug 00
East Boston Branch Sewer Relief		Mar 00	Mar 03	Jul 10
BOS019 CSO Storage Conduit		Jul 02	Mar 05	Mar 07
Chelsea Relief Sewers	Chelsea Trunk Sewer Relief	Jun 97	Sep 99	Aug 00
	Chelsea Branch Sewer Relief		Dec 99	Jun 01
	CHE008 Outfall Repairs		Dec 99	Jun 01
Union Park Detention/Treatment Facility		Dec 99	Mar 03	Apr 07
CSO Facility Upgrades and MWRA Floatables Control	Cottage Farm Upgrade	Jun 96	Mar 98	Jan 00
	Prison Point Upgrade		May 99	Sep 01
	Commercial Point Upgrade		Nov 99	Sep 01
	Fox Point Upgrade		Nov 99	Sep 01
	Somerville-Marginal Upgrade		Nov 99	Sep 01
	MWRA Floatables Control and Outfall Closings		Mar 99	Mar 00
Brookline Connection and Cottage Farm Overflow Interconnection and Gate		Sep 06	Jun 08	Jun 09
Optimization Study of Prison Point CSO Facility		Mar 06	Mar 07	Apr 08
South Dorchester Bay Sewer Separation		Jun 96	Apr 99	Jun 07
Stony Brook Sewer Separation		Jul 98	Jul 00	Sep 06
Neponset River Sewer Separation			Apr 96	Jun 00
Constitution Beach Sewer Separation		Jan 97	Apr 99	Oct 00
Fort Pt Channel Conduit Sewer Separation and System Optimization		Jul 02	Mar 05	Mar 07
Morrissey Boulevard Storm Drain		Jun 05	Dec 06	Jul 09
Reserved Channel Sewer Separation		Jul 06	May 09	Dec 15
Bulfinch Triangle Sewer Separation		Nov 06	Sep 08	Jul 10
Brookline Sewer Separation		Nov 06	Nov 08	Apr 13
Somerville Baffle Manhole Separation			Apr 96	Dec 96
Cambridge/Alewife Brook Sewer Separation	CAM004 Stormwater Outfall and Detention Basin		Apr 11	Apr 13
	CAM004 Sewer Separation	Jan 97	Jul 98/Sep 12	Dec 15
	CAM400 Manhole Separation	Oct 08	Jan 10	Mar 11
	Interceptor Connection Relief/Floatables Control at Outfalls CAM002, CAM401B and CAM001	Oct 08	Jan 10	Oct 10
	MWR003 Gate and Rindge Ave. Siphon Relief	Mar 12	Aug 14	Oct 15
	Connection Relief/Floatables Control at SOM01A	Mar 12	Sep 13	Dec 13
Region-wide Floatables Control and Outfall Closings		Sep 96	Mar 99	Dec 07

MWRA's CSO program includes temporary flow metering and other efforts to collect and evaluate new data to track system performance. The performance of the sewerage system is continuously improving as CSO and non-CSO projects are completed. Updated assessments of the system's hydraulic performance and updated estimates of CSO discharges using actual field data and computer model simulations are essential to verify the predicted benefits of the CSO-related improvements as they are completed, to ensure that the system hydraulic model reflects updated conditions, and to support continuing CSO design efforts and long-term goal tracking.

MWRA's NPDES permit and the variances for the Charles River and Alewife Brook/Upper Mystic River require MWRA to estimate CSO discharges at each permitted outfall for all storm events on an annual basis. This is accomplished by MWRA staff using the InfoWorks collection system model and data from permanent and temporary meters located in the interceptor system, at CSO treatment facilities and at other CSO outfalls. In addition, the Federal Court schedule requires MWRA to conduct a system-wide performance assessment after completing the CSO projects in 2015. The court schedule requires MWRA to commence the performance assessment by January 2018 and submit a report on the assessment findings to EPA and DEP by December 2020.

Anticipated operating cost impacts of the CSO program are summarized below and will be further developed as part of the planning and design phases for individual projects.

Program

The following projects are court mandated, are recommended in MWRA's approved long-term CSO control plan, and are required to meet Massachusetts Surface Water Quality Standards.

Project	Purpose
MWRA Managed	
North Dorchester Bay & Reserved Channel	Virtually eliminate CSO discharges (25-year storm control) and provide a 5-year storm level of separate stormwater control to minimize beach closings along North Dorchester Bay in South Boston.
Hydraulic Relief	Eliminate hydraulic restrictions between local and MWRA systems at two locations, in Boston (Outfall BOS017) and Cambridge (Outfall CAM005) to improve collection and conveyance of wet weather flows, thereby reducing CSO discharges into the Mystic and Charles Rivers, respectively.
East Boston Branch Sewer Relief	Increase hydraulic capacity and provide long-term structural integrity to MWRA's East Boston Branch Sewer through the replacement or rehabilitation of the existing sewers. Completion of this project will increase wet weather transport capacity and reduce CSO discharges along the East Boston shoreline, minimizing CSO impacts to the Mystic/Chelsea Confluence, Chelsea Creek and Boston Inner Harbor and facilitating the beneficial uses of these receiving water segments.
BOS019 Storage Conduit	Control CSO discharges at Outfall BOS019, which discharges to the Little Mystic Channel in Charlestown, by storing most of the overflows and pumping them back into the interceptor system after storms.
Chelsea Trunk Sewer Relief	Control CSO discharges at Outfalls CHE002, CHE003, CHE004, and CHE008, which discharge to the Mystic/Chelsea Confluence and Chelsea Creek, by relieving a local trunk sewer and the MWRA Chelsea Branch Sewer and by repairing Outfall CHE008. The Chelsea Branch Sewer relief project also provides relief to the lower portion of the Revere Extension Sewer to improve service and control surcharging.
Union Park Detention Treatment Facility	Reduce the frequency and impacts of CSO discharges from the BWSC Union Park Pumping Station, which discharges into the Fort Point Channel at Outfall BOS070, by providing fine screening, disinfection, dechlorination and a level of detention and solids removal.

Project	Purpose
Upgrade Existing CSO Facilities and MWRA Floatables Control	Minimize CSO impacts to the Lower Charles River, Upper Inner Harbor, Mystic/Chelsea Confluence and South Dorchester Bay receiving waters by upgrading five MWRA CSO treatment facilities (Fox Point, Commercial Point, Cottage Farm, Prison Point, and Somerville Marginal), and providing floatables control at MWRA CSO outfalls along the Lower Charles River Basin that are not associated with treatment facilities.
MWR003 Gate, Rindge Ave. Siphon Relief and SOM01A	Minimize CSO discharges to Alewife Brook as part of MWRA's Alewife Brook CSO control plan and provide sewer system flood control in extreme storms with a control gate at outfall MWR003 and relief of MWRA's Rindge Ave. Siphon. Upgrade local connection capacity and provide floatables control at the City of Somerville's Outfall SOM01A.
Charles River CSO Controls	Bring the MWRA's "Brookline Connection" into service and implement Cottage Farm influent gate controls and other facility inflow controls to minimize treated discharges to Lower Charles River Basin at the Cottage Farm facility.
Community Managed	
South Dorchester Bay Sewer Separation (Fox Point)	Eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. This project allows MWRA to decommission the Fox Point CSO Facility.
South Dorchester Bay Sewer Separation (Commercial Point)	Eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. This project allows MWRA to decommission the Commercial Point CSO Facility.
Stony Brook Sewer Separation	Minimize CSO discharges to Stony Brook Conduit and the Back Bay Fens, both of which drain to the Lower Charles River Basin, by separating combined sewer systems in parts of Roxbury and Jamaica Plain. Implementation of this project is intended to reduce the number of overflows to the Stony Brook Conduit from as many as 22 to 2 in the Typical Year and reduce annual CSO discharge volume by 99.7%.
Neponset River Sewer Separation	Eliminate CSO discharges to the Neponset River and protect water quality at downstream swimming areas in South Dorchester (primarily Tenean Beach) by separating combined sewer systems in the Neponset section of Dorchester and by permanently closing CSO regulators associated with Outfalls BOS093 and BOS095.
Constitution Beach Sewer Separation	Eliminate CSO discharges at the Constitution Beach CSO Facility, allowing decommissioning of the facility, by separating combined sewer systems in parts of East Boston.
Cambridge Alewife Brook Sewer Separation	Minimize CSO discharges to Alewife Brook by separating combined sewer systems in parts of Cambridge and upgrading local system connections to MWRA's Alewife interceptors. Close certain outfalls.
BWSC Floatables Control	Limit the discharge of floatable materials from five BWSC combined sewer outfalls along Boston Inner Harbor and Fort Point Channel.
Cambridge Floatables Control	Limit the discharge of floatable materials from Cambridge CSO outfalls that will remain following completion of MWRA's CSO control plan.
Fort Point Channel Sewer Separation	Minimize CSO discharges to Fort Point Channel by separating sewer systems tributary to Outfalls BOS072 and BOS073. Implementation of the recommended sewer separation plan will reduce the number of overflows from these outfalls from as many as 23 to zero in the Typical Year. Also, relocate a CSO regulator and perform limited sewer separation to reduce CSO discharges from the Lower Dorchester Brook Sewer to Fort Point Channel with a MWRA funding cap of $2.03 million to BWSC.

Project	Purpose
Morrissey Boulevard Drain	Reroute stormwater away from the Outfall BOS087 tributary area and the North Dorchester Bay storage tunnel to Savin Hill Cove in large storms, to increase the level of stormwater control along the South Boston beaches provided by the tunnel.
Reserved Channel Sewer Separation	Minimize CSO discharges to Reserved Channel by separating combined sewer systems in a portion of South Boston. Implementation of the recommended sewer separation plan will reduce the number of overflows to Reserved Channel from as many as 37 to 3 in the Typical Year.
Brookline Sewer Separation	Separate several areas of Brookline, totaling 72 acres, where there are remaining combined sewers tributary to MWRA's Charles River Valley Sewer. The project is intended to reduce treated CSO discharges to the Lower Charles River Basin at the Cottage Farm Facility.
Bulfinch Triangle Sewer Separation	Separate the combined sewers in a 61-acre area of Boston bounded by North Station, Haymarket Station, North Washington St., and Cambridge St. The project is intended to reduce CSO discharges to the Lower Charles River Basin and Upper Inner Harbor, reduce overflows to the Prison Point CSO Facility, and close outfall BOS049.
CSO Support	
CSO Planning and Support	The goals of the CSO Program are to minimize CSO discharges, greatly reduce beach closings following wet weather events, and maximize the beneficial use of CSO receiving waters. This project includes CSO conceptual planning, system master planning, and facilities planning/environmental review that support these goals. It also includes directly related watershed planning activities, development of short-term CSO control measures (known as System Optimization Plans, or SOPs), various as-needed technical support and system performance assessments, including a court-mandated CSO performance assessment in the period 2018-2020, and acquisition of land, easements and construction permits required for CSO project implementation.

Expenditure Forecast (in $000s) and Program Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$909,536	$893,500	$16,036	$10,244	$209	$66,246	$5,583	$0

Program Status 6/16	98.2%	Status as % is approximation based on project budget and expenditures. MWRA and the CSO communities completed the remaining CSO projects in December 2015 in compliance with Schedule Seven. (See individual project status and background information).

Changes to Program Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$906,659	$909,536	$2,877	Dec-15	Dec-15	None	$65,973	$66,246	$273

Explanation of Changes

Project cost change due to updated costs for Cambridge Sewer Separation of $1.7M and CSO Support of$1.4M, partially offset by Reserved Channel Sewer Separation of $0.1M.

CEB Impacts

- Completion and start-up of these projects will result in a total net increase of $350,000 in FY23 (for periodic cleaning of the North Dorchester Bay Tunnel) every five years per the 2004 Supplemental Environmental Impact Report).

S. 339 North Dorchester Bay CSO Project

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*

The project will eliminate CSO discharges and provide a high level of stormwater control to greatly reduce beach closings along North Dorchester Bay in South Boston. The project is court mandated and is in accordance with revisions to MWRA's approved long-term CSO control plan recommended in the Supplemental Facilities Plan and Environmental Impact Report for North Dorchester Bay and the Reserved Channel filed with MEPA in April 2004. The project is necessary to meet DEP water quality standards, which prohibit CSO discharges to North Dorchester Bay and similar sensitive receiving waters (i.e. where swimming and/or shell fishing occur).

Project History and Background

Under MWRA's original (1997) recommended plan for CSO control in South Boston, CSO flows along North Dorchester Bay and the Reserved Channel would be captured by two consolidation conduits (near-surface tunnels). In small storms, the tunnels would hold all CSO and stormwater flows and be dewatered, after each storm, to the South Boston Interceptor for transport to the Columbus Park Headworks and Deer Island. In storms when flows exceed the tunnel storage capacity, the excess flows would be discharged to Reserved Channel through a 600 mgd CSO treatment and pumping facility that MWRA had proposed to construct on vacant land off East First Street, adjacent to the Massachusetts Bay Transportation Authority (MBTA) power plant. This proposed site and facility was designated "Site J."

Despite MWRA's belief at the time it filed the related *1999 Notice of Project Change* that the projects could be implemented as outlined in that Notice, opposition by elected officials and some residents to siting the Reserved Channel CSO Facility on Site J intensified. In December 1999, elected officials representing South Boston informed the MWRA's Board of Directors that they would block efforts by MWRA to obtain legislation necessary to build parts of the project on or under designated parkland.

MWRA suspended design work on all elements of the project in January 2000, and was unable to commence construction by September 2000 as required. In April 2001, MWRA filed a Notice of Project Change with MEPA, recommending a reassessment of the project and overall CSO control approach for North Dorchester Bay and Reserved Channel. The reassessment was completed in April 2004 when MWRA filed the Supplemental Facilities Plan and Environmental Impact Report for North Dorchester Bay and the Reserved Channel (the "SEIR"), recommending a new plan.

The new plan calls for a larger diameter tunnel along the North Dorchester Bay beaches, sized to provide storage of CSO flows up to the 25-year design storm and, together with a recommended storm drain along Morrissey Boulevard, provide a 5-year level of stormwater control for the beaches. The tunnel will be dewatered with a 15 mgd pumping station to be located at Massport's Conley Terminal. At the upstream end of the tunnel, a ventilation building to provide tunnel ventilation will be constructed adjacent to CSO outfall BOS087 and the State Police building. Surface piping, diversion chambers and control gates will be constructed at each existing outfall to direct CSO and stormwater flows into the tunnel. The Morrissey Boulevard storm drain (included in the CSO CIP under "Community Managed Projects") will allow large stormwater flows at outfall BOS087 to be redirected away from the tunnel to Savin Hill Cove (South Dorchester Bay) in storms greater than the one-year design storm, to further increase the level of stormwater control afforded by the project to the beaches and to dedicate the tunnel to CSO control in the largest storms. Finally, the North Dorchester Bay plan also includes improvements to the Department of Conservation and Recreation's stormwater system along Pleasure Bay to redirect stormwater that discharges into Pleasure Bay Beach to the Reserved Channel, which does not support primary contact recreation.

MWRA began design of the revised plan for North Dorchester Bay in August 2004. In June 2005, MWRA filed a motion with the Federal District Court seeking revisions to the court milestones to substitute the original plan and schedule for North Dorchester Bay and the Reserved Channel with the new plans and a new schedule. The Court allowed the motion on June 30, 2005. In compliance with the revised court milestones, MWRA completed construction of the Pleasure Bay storm drain improvements in March 2006 and commenced construction of the North Dorchester Bay tunnel in August 2006. MWRA completed the North Dorchester Bay tunnel and related facilities (including dewatering pumping station, force main/sewers and ventilation building) in May 2011, in compliance with Schedule Seven. For the Morrissey Boulevard storm drain, the revised milestones required MWRA, in cooperation with BWSC, to commence design by June 2005, commence construction by December 2006, and complete construction by June 2009.

Scope

Sub-phase	Scope	Status
Design/ESDC: Tunnel and Pleasure Bay	Design and engineering services during construction for the North Dorchester Bay tunnel and CSO/stormwater control structures and the Pleasure Bay drainage improvements; preliminary design for the dewatering pump station, sewers and ventilation building.	Completed
Tunnel Construction	Construction of the North Dorchester Bay tunnel, drop shafts, access shafts and CSO/stormwater diversion structures.	Completed
Dewatering Pump Station & Sewers Construction	Construction of the 15 mgd dewatering pump station at Conley Terminal and connecting sewers.	Completed
Tunnel and Facilities CM Services	Construction management services for the North Dorchester Bay tunnel, dewatering and odor control facilities, related piping and diversion/control structures and Pleasure Bay drainage improvements, including final design review and assistance during facilities start-up and optimization. Start-up activities for the CSO tunnel and facilities are included.	Completed
Pleasure Bay Construction	Construction of Pleasure Bay drainage improvements.	Completed
Final Design ESDC/CSO Facilities	Final Design and engineering services during construction for the dewatering pump station, sewers and ventilation building.	Completed
Ventilation Building Construction	Construction of the ventilation building on DCR land at the upstream end of the tunnel.	Completed
Communications Systems	Installation of communications systems at the Dewatering Pumping Station and Ventilation Building to include antennas, repeaters and radios.	Completed
North Dorchester Outfall Study/Design	This project includes a study/design for a periodic inspection at four of the remaining five outfalls that can discharge to the beaches of North Dorchester Bay to maintain service for the North Dorchester Bay CSO Project in the long-term. The four outfalls are potentially prone to sediment deposition and shifting in the long-term.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$221,510	$221,510	$0	$3	$0	($111)	$0	$0

Project Status 6/16	100%	Status as % is approximation based on project budget and expenditures. The CSO storage tunnel, dewatering pump station & sewers and ventilation building were substantially complete and brought into full environmental service in May 2011.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY17	Chge.
$221,600	$221,510	($90)	May-13	May-13	None	($21)	($111)	($90)

Explanation of Changes

- Project cost and spending change due to final cost adjustment for Tunnel Design/Engineering Services During Construction, $0.1M.

CEB Impacts

- Estimate of $350,000 in FY23 for periodic cleaning of the North Dorchester Bay Tunnel (every five years per the 2004 Supplemental Environmental Impact Report).

S. 355 MWR003 Gate and Siphon

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*
☑ *Improves system operability and reliability*

Minimizes CSO discharges to Alewife Brook as part of MWRA's Alewife Brook CSO control plan. This project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards determinations.

Project History and Background

The MWR003 Gate and Siphon project was recommended in the *Notice of Project Change for the Long Term CSO Control Plan for Alewife Brook, April 2001,* (the "NPC") and is part of the revised recommended CSO plan for Alewife Brook. The project consists of the following elements recommended in the NPC: an automated electric relief (weir) gate and associated controls at CSO regulator RE031 overflow upstream of CSO outfall MWR003; a 48-inch diameter inverted siphon barrel to replace the existing 30-inch inverted siphon barrel used to convey overflows from the Alewife Brook Sewer CSO regulator RE032 to the Alewife Brook Conduit and CSO regulator RE031; and floatables control in CSO regulator RE031 overflow discharge to outfall MWR003. In 2009, MWRA moved the recommended interceptor connection relief and floatables control at Somerville Outfall SOM01A to this project from the Cambridge Floatables Control project in the CIP. Implementation of this project and other elements of the recommended plan for Alewife Brook are required by the Court Order and by conditions in the Alewife Brook/Upper Mystic River CSO Variance extension, last issued by DEP on September 1, 2013, and expected to be reissued through 2020.

Scope

Sub-phase	Scope	Status
Design	Design and engineering services during construction.	Completed
Construction 1	Interceptor connection relief and floatables controls at outfall SOM01A.	Completed
Construction 2	Automated gate and controls at MWR003, relief of MWRA's Rindge Ave. siphon, and floatables control.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$4,445	$4,279	$166	$166	$6	$3,796	$0	$0

Project Status 6/16	96.3%	Status as % is approximation based on project budget and expenditures. Design contract was awarded in March 2012. MWRA substantially completed Interceptor Connection Relief and Floatables Controls at outfall SOM01A in December 2013 and substantially completed MWR003/Rindge Ave in October 2015. Design services were completed in October 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$4,445	$4,445	$0	Oct-15	Oct-15	None	$3,796	$3,796	$0

Explanation of Changes

- N/A

CEB Impacts

- No impacts identified at this time.

S. 341 South Dorchester Bay Sewer Separation (Commercial Point)

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*

This project, together with sewer separation at Fox Point, will eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. The project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards.

Project History and Background

This project involves the construction of new storm drains and appurtenant structures, relocation of storm runoff connections from the existing combined sewers to the new storm drains, and rehabilitation of the existing combined sewers for use as sanitary sewers. The plan calls for construction of approximately 65,000 feet of new storm drains. BWSC is implementing the project with MWRA funds.

A contract for design services was executed by Boston Water & Sewer Commission (BWSC) in June 1996, and a preliminary design report was submitted in December 1997. BWSC executed a separate contract for construction management services in December 1998 and commenced construction in April 1999. BWSC completed all of the sewer separation contracts and closed all of the CSO regulators tributary to South Dorchester Bay by June 2007, and MWRA decommissioned the Commercial Point CSO Facility in November 2007. BWSC is conducting flow monitoring and hydraulics model evaluations to verify that sufficient inflow has been removed from the sewer system and the project performance objectives for the sewer system have been achieved. Downspout disconnection and inflow removal are expected to continue through June 2019.

Scope

Sub-phase	Scope	Status
Design	Design services for construction contracts to be bid, awarded, and managed by BWSC.	Active
Construction	Construction of 65,000 feet of new storm drains and appurtenant structures, managed by BWSC. Relocation of storm runoff connections from the existing combined sewers to the new storm drains, rehabilitation of the existing combined sewers for use as sanitary sewers, individual building downspout removal and street paving are also included.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$64,174	$60,542	$3,631	($127)	$0	($731)	$3,758	$0

Project Status 6/16	94.3%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$64,174	$ 64,174	$0	Dec-16	Dec-16	None	$1,650	$1,650	($731)

Explanation of Changes

- Spending change due to updated schedules of work from Boston Water & Sewer Commission for Dorchester Interceptor inflow removal work.

CEB Impacts

- No impacts identified at this time.

S. 346 Cambridge Sewer Separation

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*

To minimize CSO discharges to Alewife Brook by separating combined sewer systems in parts of Cambridge and upgrading local connections to MWRA's interceptors. This project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards.

Project History and Background

The City of Cambridge is managing the separation work with MWRA funds and oversight. The City of Cambridge executed a contract for design services in January 1997, and completed the first four, early construction contracts in 2002.

As reported to the court in 1999, information gathered by the City of Cambridge during the design phase of this project indicated that the physical configurations of the Cambridge sewer and storm drain systems, including the degree to which these systems are interconnected, was significantly different from conditions shown on the city's base plans and older design plans. Both sets of plans were used by MWRA to develop the conceptual plan for the project. As a result, extensive additional work to separate sewers is required to meet CSO control goals. While construction began in 1998 on schedule, completion of construction has been delayed.

MWRA responded to the significant increase in estimated project costs by instructing Cambridge to suspend remaining final design efforts and award of any construction contracts not yet approved, until MWRA and Cambridge could complete a thorough reassessment of project costs and alternatives. At that time, Cambridge had received approval from MWRA to commence four of the ten proposed construction contracts that comprised the original scope.

Based upon an evaluation conducted by MWRA and Cambridge of alternatives that considered cost, performance, and non-monetary factors, the revised recommended plan for controlling CSO discharges to Alewife Brook, like the original plan, is a partial sewer separation alternative that includes the following components:

- Completion of sewer separation in the CAM004 tributary area (similar to the original CSO control plan, but with expanded scope).
- Separation of common manholes in the CAM400 tributary area (new).
- Relief of dry weather flow connections at CAM002, CAM401B, and SOM01A (new).
- Relief of an existing siphon and installation of a flow control gate at MWR003 (new).
- No further sewer separation in the CAM002 tributary area. (Although this work was included in the original plan and a small, related construction contract was completed by Cambridge in 1999, the revised plan recommends not completing separation in this area.
- No additional CSO control recommended for the recently discovered outfall at CAM401B.
- Floatables control at remaining CSO outfalls.

On May 24, 2000, the Board of Directors approved the revised CSO Control Plan for Alewife Brook. This budget reflects MWRA's estimate of the cost and MWRA's share of the revised plan. The federal court schedule milestone for completion of construction of sewer separation was January 2000. MWRA previously informed the court and court parties that MWRA would be unable to meet this milestone due to the increased scope of the project. In April, 2006 the court schedule was amended to incorporate milestones for each of the components of the revised recommended plan.

Cambridge submitted a Second Supplemental Preliminary Design Report (SSPDR) for the final recommended plan as presented in the Final Variance Report for the Alewife Brook/Upper Mystic River. However, Cambridge was unable to move forward with construction of the new stormwater outfall and constructed stormwater wetland of Contract 12 due to delays in obtaining relief from the citizens' appeal of the Superseding Order of Conditions that

was issued by Massachusetts Department of Environmental Protection ("DEP") in March, 2005, pursuant to the Wetlands Protection Act. The stormwater outfall and constructed stormwater wetland are critical early components of the long-term CSO control plan for the Alewife Brook and are necessary to support planned sewer separation in the CAM004 area and the closing of the CAM004 regulator. Administrative law decisions were issued in the spring of 2007, allowing DEP to issue a final superseding order of conditions. On June 1, 2007, the Acting DEP Commissioner issued a final decision sustaining the earlier superseding order DEP had issued. On June 12, 2007, the citizens group that had appealed the earlier orders filed a request for reconsideration of the DEP final decision, but DEP formally declined this request on October 16, 2007. On November 14, 2007, the appellants appealed this final DEP decision to Superior Court. Notwithstanding the Superior Court filing, the City of Cambridge now has wetlands approval to construct Contract 12. Design and construction activities related to the revised Alewife Brook CSO control plan were delayed by at least 27 months beyond the Schedule Seven milestones due to the wetlands appeals.

On July 16, 2008, MWRA's Board of Director's approved full funding of MWRA's then-estimated cost share for the Alewife Brook (CAM002-004) Sewer Separation project and Cambridge Floatables Control at $60 million and authorized the City of Cambridge to move forward with design and construction. In October 2008, the City of Cambridge resumed design of the CAM004 stormwater basin and outfall, commenced design of CAM400 manhole separation, and commenced design of the interconnections relief and floatables control work. The City of Cambridge commenced construction of the CAM400 manhole separation project and the interconnections relief and floatables project in one construction contract in January 2010 and completed all work in March 2011. Cambridge issued notice to proceed with Contract 12, stormwater basin and outfall in April 2011 and completed construction of CSO related components in April 2013 in compliance with Schedule Seven. In September 2012, Cambridge issued the notice to proceed with the first (Contract 8A) of four construction contracts (8A, 8B, 9, and Concord Lane) to complete the CAM004 sewer separation project, in compliance with Schedule Seven. Cambridge issued the notices to proceed with Contract 8B in September 2013, Contract 9 in February 2014 and Concord Lane in March 2015. By November 2015, Cambridge had attained substantial completion of contracts 8A, 8B and Concord Lane, and on December 23, 2015, in compliance with Schedule Seven, Cambridge attained substantial completion of Contract 9. Related surface restoration work is scheduled by Cambridge to continue through December 2017.

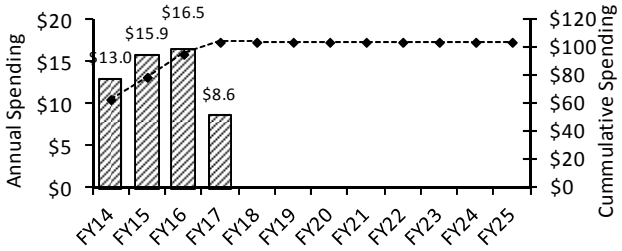
Scope

Sub-phase	Scope	Status
Design CS/RI	Design services.	Active
Construction	Four early construction contracts for CAM004 sewer separation work were completed in 2004. The remaining construction scope of work for this project is outlined above.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$104,448	$95,869	$8,579	$8,579	$0	$53,964	$0	$0

Cambridge CAM002-004
Sewer Separation



Project Status 6/16	91.8%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$102,745	$104,448	$1,703	Dec-15	Dec-15	None	$52,261	$53,964	$1,703

Explanation of Changes

- Project cost and spending change primarily due to updated costs for construction and engineering services during construction to Contracts 8B and 9.

CEB Impacts

- No impacts identified at this time.

S. 358 Morrissey Boulevard Drain

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*

Reroute stormwater from the BOS087 area (and the North Dorchester Bay consolidation storage tunnel) to Savin Cove to increase level of stormwater control to the beaches.

Project History and Background

In April 2001, MWRA filed a Notice of Project Change with MEPA, recommending a reassessment of the overall CSO control approach for North Dorchester Bay and Reserved Channel. The Secretary's Certificate, issued in June 2001, approved the reassessment as scoped by MWRA. MWRA began the reassessment in September 2001, which included updating the planning assumptions and water quality information and evaluating a full range of CSO control goals and technologies. The reassessment was completed in April 2004, when MWRA filed the Supplemental Facilities Plan and Environmental Impact Report for North Dorchester Bay and the Reserved Channel. The revised recommended plan included rerouting stormwater away from the North Dorchester Bay storage tunnel to Savin Hill Cove in storms greater than the 1 year design storm, in order to provide a 5-year level of stormwater control along the South Boston beaches. Boston Water & Sewer Commission (BWSC) began design in June 2005 and commenced the first construction contract in December 2006. BWSC awarded a second and much larger construction contract in July 2007. BWSC substantially completed all work associated with this project in July 2009 and conducted post-construction water quality monitoring in Savin Hill Cove through June 2013.

Scope

Sub-phase	Scope	Status
Design CS/RI	Design services for construction contracts bid, awarded and managed by BWSC.	Completed
Construction	Construction of a new storm drain and appurtenant structures along Morrissey Boulevard to Savin Hill Cove.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$32,186	$32,188	($2)	($2)	$0	($161)	$0	$0

Project Status 6/16	100%	Status as % is approximation based on project budget and expenditures. Construction was substantially complete in July 2009.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$32,186	$32,186	$0	Jun-09	Jun-09	None	($161)	($161)	$0

Explanation of Changes

- N/A

CEB Impacts

- No impacts identified at this time.

S. 359 Reserved Channel Sewer Separation

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*

To minimize CSO discharges to the Reserved Channel by separating combined sewer systems in an area of South Boston. Implementation of the recommended sewer separation plan will reduce the number of overflows to the Reserved Channel from as many as 37 to 3 in the Typical Year. This project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards.

Project History and Background

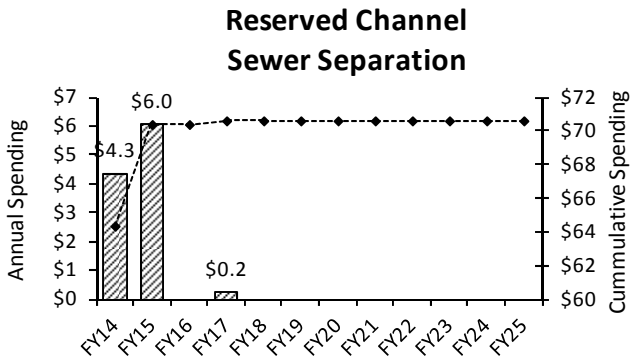
In April 2001, MWRA filed a Notice of Project Change with MEPA, recommending a reassessment of the overall CSO control approach for North Dorchester Bay and the Reserved Channel. The reassessment was completed in April 2004, when MWRA filed the Supplemental Facilities Plan and Environmental Impact Report for North Dorchester Bay and the Reserved Channel, which recommended a new plan for controlling CSO discharges to the Reserved Channel, by separating sewers in a 355 acre drainage area tributary to the Channel. Schedule Seven in the Federal District Court Order requires MWRA, in cooperation with Boston Water & Sewer Commission (BWSC), to commence design by July 2006, commence construction by May 2009 and complete construction by December 2015. In May 2009, BWSC issued the Notice-to-Proceed for the first of nine construction contracts for this project and in the period 2010-2015 issued the Notices-to-Proceed for the remaining eight construction contracts. As of December 2015, in compliance with Schedule Seven, BWSC had attained substantial completion of all nine contracts, including the outfall cleaning contract (BWSC Contract 1), four sewer separation contracts (Contracts 2, 3A, 3B and 4), two consecutive paving contract (contracts 7 and 8), a sewer and cleaning contract (Contract 5 – ineligible for MWRA funding), and a downspout disconnection contract (Contract 6).

Scope

Sub-phase	Scope	Status
Design CS/RI	Design services managed by BWSC for construction contracts to be bid, awarded and managed by BWSC.	Active
Construction	Construction of new storm drains and appurtenant structures within a 355-acre area tributary to the SBI-NB. Relocation of storm runoff connections from the existing combined sewers to the new storm drains. Rehabilitation of the existing combined sewers for use as sanitary sewers.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$70,613	$70,395	$218	$218	$0	$10,573	$0	$0



Project Status 6/16	99.7%	Status as % is approximation based on project budget and expenditures. BWSC began design in July 2006 and completed Contract 2 in December 2010, Contract 1 in December 2011, Contract 7 in April 2012, Contract 3A in October 2012, and Contract 3B in December 2014, Contract 4 in May 2015 and contracts 5, 6 and 8, in December 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$70,749	$70,613	($136)	Dec-15	Dec-15	None	$10,709	$10,573	($136)

Explanation of Changes

- Project cost and spending change primarily due to updated final cost estimates from Boston Water & Sewer Commission.

CEB Impacts

- No impacts identified at this time.

S. 324 CSO Planning and Support

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*

The goals of the CSO Program are to minimize CSO discharges and their impacts, eliminate beach closings caused by CSOs, and maximize the beneficial use of CSO receiving waters, in accordance with national and state CSO policies and in compliance with state water quality standards. This project includes CSO conceptual planning, system master planning, and facilities planning/environmental review. It also includes directly related watershed planning activities, development of short-term CSO control measures (known as System Optimization Plans or SOPs), various as-needed technical support activities, and acquisition of land and easements required for CSO control plan implementation.

Project History and Background

MWRA CSO planning work began in 1986. A revised Final Conceptual Plan and System Master Plan were completed in 1994, and a Final CSO Facilities Plan and Environmental Impact Report were filed with MEPA in August 1997. A MEPA certificate was issued in October 1997. In December 1997, DEP issued water quality determinations that were necessary for final CSO plan approval by DEP and EPA. DEP issued a two-year variance for the Charles River in October 1998 and has extended this variance several times. DEP issued a three-year variance for Alewife Brook and Upper Mystic CSOs in March 1999 and has extended the term of the variance several times. Consultant services have included assistance to MWRA in satisfying variance conditions.

As part of CSO Planning and Support, MWRA provided financial and technical assistance to the Charles River Watershed Association in its watershed planning efforts for the Charles River in the 1990s, known as the IM3 Study. MWRA also funded a portion of the costs of a U.S. Geological Survey (USGS) water quality study of the Charles River Basin. Results of these studies will provide additional technical information to support the reassessment of the appropriateness of the recommended Charles River controls in MWRA's CSO plan. To comply with its requirements under the Charles River CSO variance, in 1999 MWRA began funding USGS efforts to collect updated information on Charles River water quality. Final payments to the Charles River Watershed Association and USGS were made in the fall of 1998 and the fall of 2001, respectively.

The federal court order in the Boston Harbor Case required MWRA to develop, by June 1993, a plan for optimizing the existing combined sewer systems to maximize transport and in-system storage capacities, thereby minimizing CSO discharges prior to developing and implementing a long-term control plan. In June 1993, MWRA completed a report entitled System Optimization Plans (SOP) for CSO Control, which recommended more than 100 relatively low cost and easily implemented projects to optimize operation of existing systems. The projects were designed and constructed primarily by the CSO communities, pursuant to SOP financial assistance agreements executed between MWRA and each CSO community. Under the agreements, MWRA reimbursed the communities for design and construction costs. SOP work also includes two projects that are part of the long-term plan: Somerville Baffle Manhole Separation and Somerville Floatables Control. Short-term plans for CSO SOPs were completed in 1997 and MWRA obtained regulatory approvals for its long-term plan in 1997 and 1998.

Various CSO plan reevaluations and systems assessments have been performed under amendments to the CSO Master Planning contract. These include: reevaluation of the Alewife Brook sewer separation plan; assessment of Cottage Farm CSO Facility performance: reevaluation of the need for the Dorchester Brook In-line Storage Project (not included in the CSO Plan or the CIP); reevaluation of the feasibility of closing MWR010; reassessment of CSO discharges from the Boston Marginal Conduit to reevaluate the need for floatables control; and reevaluation of the cost-effectiveness of the East Boston Branch Sewer Relief project in light of cost increases.

By amendment to the Master Planning contract MWRA also added system modeling services to estimate and report actual CSO discharges on an annual basis (through 2003), in compliance with provisions in MWRA's renewed NPDES permit. Since 2004, the annual modeling activities have been conducted by MWRA staff.

The performance of the sewerage system is constantly improving as CSO and non-CSO projects are completed and as maintenance efforts continue to increase the system's capacity. Updated assessments of the system's hydraulic performance and estimates of CSO discharges based on actual field data are essential to verify the predicted benefits of various CSO-related improvements, to recalibrate the system hydraulic model to reflect updated conditions, and to provide up-to-date information to support CSO planning and design efforts. This project provides for temporary flow metering and other efforts to gather and evaluate new data and track system performance. It also includes technical support and system assessments to support the 3-year CSO performance assessment required by Schedule Seven, with work commencing by January 2018 and a report due to the Court by December 2020.

This project has also supported land and easement acquisitions and funded permit costs for all MWRA managed projects in the long-term CSO Control Plan.

Scope

Sub-phase	Scope	Status
Technical Assistance	Preliminary planning services prior to and in support of the 1988-90 Facilities Planning/EIR efforts.	Completed
Planning/EIR	Facilities planning and environmental review of CSO control alternatives (1990 Recommended CSO Control Plan).	Completed
Master Planning	System inspections, flow monitoring, water quality monitoring, and performance assessments to improve MWRA's understanding of the combined sewer and regional wastewater systems, optimize the performance of the existing systems, and reassess CSO control needs in the context of evolving EPA policy and a system master plan. Development of the 1997 Facilities Plan/EIR and subsequent reassessments of, and revisions to, that plan.	Completed
Watershed Planning	External watershed planning efforts that may affect CSO control needs, including the Charles River Watershed Association IM3 Study and ongoing USGS water quality studies.	Completed
Modeling	Receiving water quality modeling support to the Master Planning efforts.	Completed
SOP Program	Development and implementation of System Optimization Plans for short-term CSO control. Implemented by CSO communities. Also includes funding for Somerville Baffle Manhole Separation in the long-term control plan.	Completed
System Assessment	Temporary flow metering and other efforts to gather and evaluate new data on system performance.	Active
Technical Review	Technical assistance for the entire CSO control plan including affordability analysis.	Active
Land/Easements	Acquisition of land and easements for construction of MWRA-implemented projects. Also, permits not covered in design and construction contracts.	Active
Somerville Marginal In-System Storage	Memorandum of Agreement between MWRA and the City of Somerville approved on September 14, 2016. MWRA agreed to share the cost of the CIPP liner rehabilitation which is estimated at $4.2 million since MWRA's CSO control plan utilizes both the in-line storage and conveyance capacity of the current brick sewer to control and reduce the CSO volume discharged to the Mystic River.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$51,648	$48,203	$3,445	$1,411	$209	$459	$1,825	$0

Project Status 6/16	93.3%	Status as % is approximation based on project budget and expenditures. Master Planning was substantially complete in September 2004. On September 14, 2005, the MWRA Board of Directors approved an MOU with Massport that governs the Authority's construction and long-term operation on land owned by Massport, including the North Dorchester Bay tunnel mining shaft and dewatering pump station. Payments to Massport for temporary and permanent easements are complete. Schedule Seven requires MWRA to complete a CSO performance assessment in the period 2018-2020.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$50,248	$51,648	$1,400	Dec-20	Dec-20	None	($720)	$459	$1,179

Explanation of Changes

- Project budget and spending change due to addition of Somerville/Marginal In-System Storage contract via Memorandum of Agreement with City of Somerville.

CEB Impacts

- No impacts identified at this time.

S. 128 Infiltration/Inflow (I/I) Local Financial Assistance Program

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*

Infiltration and inflow (I/I), groundwater and storm water that enter the collection system, contributes significantly to the total wastewater flow treated by MWRA. This depletes capacity that would otherwise be available to transmit sanitary flows, resulting in sewer surcharging, overflows of untreated sewage, more frequent combined sewage overflows, and higher pumping and treatment costs. The I/I Local Financial Assistance Program provides funding assistance for communities to rehabilitate their collection systems with the goal of structurally reducing I/I flows. Funding assistance for local projects complements other MWRA strategies for regional I/I reduction including wastewater metering to support flow based rates, provision of I/I estimates to communities, technical assistance to communities on local projects, regional coordination of I/I policy issues, and interaction with DEP and EPA.

Project History and Background

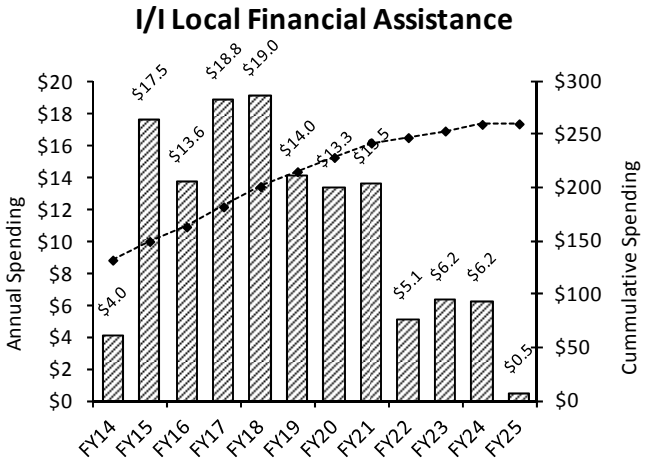
MWRA's Deer Island Wastewater Treatment Plant receives flow from 43 communities. The collection system encompasses 230 miles of MWRA interceptors and over 5,000 miles of community sewers. These sewers are of varying size, shape, age, material, depth, and conditions. All contribute some quantity of infiltration and inflow.

In August 1992, the Board of Directors approved $25 million to fund the initial phase of the I/I Local Financial Assistance Program. In June 1995, the Board approved $38.8 million to fund a second phase of the program. Both Phase1 and 2 funds were distributed as 25% grants and 75% interest-free loans. The Board approved $37 million to fund a third phase of the program in June 1998, an additional $40 million for Phase 4 in June 2001, an additional $40 million for Phase 5 in June 2004, an additional $40 million for Phase 6 in June 2006, an additional $40 million for Phase 7 and an additional $40 million for Phase 8 in June 2009. The grant/loan ratio was revised for Phases 3 through 8 to 45% grants and 55% interest-free loans. During the FY15 Final CIP development in June 2014, Phases 9 and 10 were added to the CIP at $80 million each to be distributed as 75% grants and 25% interest-free loans Payback period for Phases 9 and 10 loans was also extended from 5 years to 10 years. All program funds are allocated to the 43 member communities based on their share of MWRA's wholesale sewer assessment. Binding commitments for funds are issued by MWRA in the form of Financial Assistance Agreements. Distribution of funds is authorized through FY2025.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$242,585	$163,391	$79,194	$18,838	$19,047	$73,061	$52,180	($10,870)

Project Distribution Status 6/16	67.4%	Through June 2016, MWRA has distributed $135.5 million in grants and $174.7 million in interest-free loans to fund over 508 separate projects in 43 communities under the I/I Local Financial Assistance Program.



Project Repayment Status 6/16	67.4%	Through June 2016, a total of $146.8 million has been repaid by member communities receiving interest-free loans.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$242,585	$242,585	$0	Jun-35	Jun-35	None	$69,538	$73,061	$3,523

Explanation of Changes

- Spending change due to timing of grant and loan distributions and repayments.

CEB Impacts

- No impacts identified at this time.

Integrated Water Supply Improvement Program

MWRA's Integrated Water Supply Improvement Program is a 10-year, $1.7 billion initiative consisting of a series of projects to protect reservoir watersheds, build new water treatment and transmission facilities, and upgrade distribution storage and MWRA and community pipelines. The program improves each aspect of the water system from the watersheds to the consumer to ensure that high quality water reliably reaches MWRA customers' taps. The program began in 1995 and the principle components were completed by 2005. The main program components are as follows:

Watershed Protection The watershed areas around Quabbin and Wachusett Reservoirs are pristine areas with 85% of the land covered in forest or wetlands and about 75% protected from development by direct ownership or development restrictions. MWRA works in partnership with the Department of Conservation and Recreation (DCR) to manage and protect the watersheds. MWRA also finances all the operating and capital expenses for the watershed activities of DCR and on-going land acquisition activities.

MetroWest Water Supply Tunnel The 17-mile-long 14-foot diameter tunnel connects the new Carroll Water Treatment Plant at Walnut Hill in Marlborough to the greater Boston area. It is now working in parallel with the rehabilitated Hultman Aqueduct to move water into the metropolitan Boston area. Construction began on the tunnel in 1996 and the completed tunnel was placed in service in October 2003.

Carroll Water Treatment Plant The water treatment plant in Marlborough began operating in July 2005 and it has a maximum day capacity of 405 million gallons per day. This project consolidates all treatment steps into one plant which uses ozone for primary disinfection because ozone is a strong disinfection agent against pathogens such as Giardia and viruses while reducing levels of chlorine disinfection byproducts. Ultraviolet light treatment was added in 2014 as a second primary disinfection process for Cryptosporidium inactivation. The plant also provides corrosion control by adding carbon dioxide and sodium carbonate to raise the water's pH and alkalinity and thus control lead leaching from home plumbing fixtures. The treatment process concludes with fluoridation and residual disinfection with chloramines. A 45 million gallon storage tank on the site allows for daily variation in demand and flexibility in plant operation.

Water Storage Tanks As required by Massachusetts Department of Environmental Protection (DEP) rules, MWRA is building covered storage tanks to replace open distribution storage reservoirs near cities and towns to lessen the risk that contaminants will get into the tap water. A 20 million gallon tank in Stoneham replaced the open Fells Reservoir, two 12.5 million gallon circular tanks in Ludlow replaced the Nash Hill Reservoir and the 20 million gallon Loring Road tank replaced the Weston Reservoir. The largest tank, the 115 million gallon Norumbega Covered Storage Facility replaced the open Norumbega Reservoir in Weston and was placed in full service in 2004. In 2009, MWRA completed construction of a 20 million gallon tank to replace the currently off-line Blue Hills Reservoir in Quincy. The 20 million gallon Spot Pond Storage Facility to replace the off-line Spot Pond Reservoir in Stoneham was put in service in 2015.

Pipeline Rehabilitation An important component of the overall Integrated Water Supply Improvement Program is focus on the long-term rehabilitation of older, unlined cast iron and steel water mains in the MWRA and community systems. Water in direct contact with the metal surface corrodes through both biological and chemical processes resulting in tuberculation, thus narrowing the pipes and providing surfaces for bacteria growth. These processes also often result in consumer complaints about rusty water. To reap the full value of the other investments in the water system, MWRA decided to replace or rehabilitate the poor quality pipe particularly given that as of 1993, more than 80 percent of MWRA pipes were unlined. Since then, MWRA has been proceeding with a program of replacing or rehabilitating (normally through cleaning and lining) unlined cast iron and steel mains. Furthermore, in 1998, almost half (47%) of community pipes were unlined. In 1999, MWRA created a $250 million zero-interest loan program to encourage and facilitate rehabilitation of local mains. An additional $210 million was added in FY11 for the Phase 2 program known as Local Water System Assistance Program of which $10 million is

allocated among the Chicopee Valley Aqueduct (CVA) communities. The Local Water System Assistance Program was expanded beginning in FY17 to include $100 million in interest-free loans to communities solely for efforts to fully replace lead service lines. In FY18 Local Water Assistance Program Phase 3 was added in the amount of $210 million.

S. 542 Carroll Water Treatment Plant

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Fulfills a regulatory requirement*

To provide high quality drinking water to MWRA customers and to ensure that the water delivered from the Wachusett Reservoir meets the drinking water quality standards established by the federal Safe Drinking Water Act (SDWA). Part of this objective was met by constructing a 405 million-gallon per day (maximum) water ozonation/chloramination treatment plant primarily in Marlborough with portions of the facility located in Southborough and Northborough. Ultraviolet light disinfection facilities were added in 2014 to comply with new drinking water regulations.

Project History and Background

MWRA provides drinking water to 2.3 million people in 44 metropolitan Boston communities. The source water supply comes from the Quabbin and Wachusett reservoirs; two large, high quality water bodies in Central Massachusetts. About 50% of the water flowing from the Wachusett Reservoir comes first from the Quabbin Reservoir, the larger reservoir to the west. MWRA received a waiver from filtration requirements for the Quabbin Reservoir in 1991 from the Massachusetts Department of Environmental Protection (Mass DEP), the agency granted primacy to enforce the Safe Drinking Water Act (SDWA) by the United States Environmental Protection Agency (USEPA) in Massachusetts.

In June 1993, MWRA negotiated an administrative consent order with DEP setting forth the steps needed to comply with the Surface Water Treatment Rule (SWTR). The consent order required MWRA to find a site, design a filtration plant, and build it, unless MWRA along with MDC could demonstrate to Massachusetts DEP no later than 1998 that the system met the criteria for avoiding filtration and therefore that filtration was not required. After an extensive research and decision-making process, the MWRA Board of Directors voted in October 1998 to request a waiver of the filtration requirements from Mass DEP and to build a new water treatment facility using ozonation with chloramination for the water from Wachusett Reservoir as part of the Integrated Water Supply Improvement Program. The decision recognized that an ozonation/chloramination plant would provide appropriate treatment of the MWRA water supply from Wachusett Reservoir and that adding filtration components costing $180 million to the new plant would not provide as much additional benefit as would using funds to rehabilitate old, unlined cast iron pipes in the MWRA and local distribution systems. As part of the treatment technology decision, MWRA's Board also made a commitment to an expanded program of public health surveillance, financial incentives for communities to target rehabilitation of community pipes, and a full review of the need for further treatment including filtration when the plant was complete.

Mass DEP agreed with the MWRA approach in December 1998 and determined that filtration was not required for the MWRA system. Through the Department of Justice, USEPA sued under its SDWA “overfiling” rights, seeking to require MWRA to build a filtration plant and contending that the SDWA allowed no other option. After an extended trial, on May 5, 2000 Judge Stearns issued his decision that MWRA currently complies with all 11 federal criteria for avoiding filtration under the Surface Water Treatment Rule of the Safe Drinking Water Act. He evaluated the current quality of MWRA water and found MWRA’s integrated drinking water improvement program including ozonation treatment technology the better approach to “preserving its safety.” He found EPA failed to show that filtration of MWRA water was required either as a matter of cost-benefit or scientific necessity. The judge denied EPA’s request for injunctive relief but ordered MWRA to give the Court notice of any future violations of the avoidance criteria to allow the consideration of whether the type of relief requested by USEPA might be necessary. No other order was issued. On July 16, 2001, the U.S. Court of Appeals for the First Circuit affirmed Judge Stearns ruling.

The Carroll Water Treatment Plant (formerly Walnut Hill Treatment Plant) was placed in service in July 2005. It provides treatment necessary to fully comply with all current drinking water regulations. EPA issued new regulations in January 2006 for microbial protection (Long Term 2 Enhanced Surface Water Treatment Rule) and disinfection byproduct control (Stage 2 Disinfectants/Disinfection Byproducts Rule). MWRA will not need to make changes to comply with the Stage 2 D/DBP rule. The LT2ESWT rule required a second primary disinfectant and a somewhat more stringent inactivation of cryptosporidium than the plant's current design. This project included the addition of an ultraviolet light disinfection treatment process at the plant to meet requirements of the LT2ESWT rule. The UV system was placed in service in February 2014.

Scope

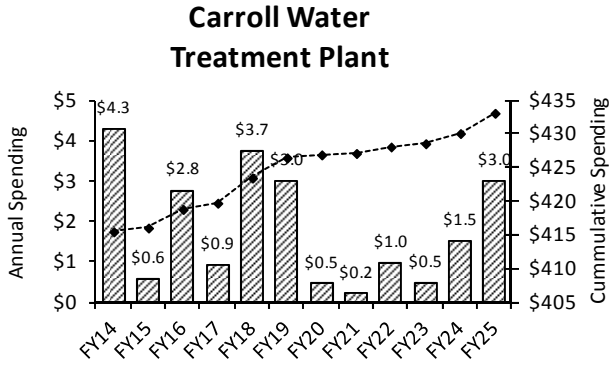
Sub-phase	Scope	Status
Study 1	Investigation of the potential impacts of SDWA amendments on the MWRA system and evaluation of the need, feasibility, and benefits of improved treatment processes.	Completed
Study 2	Evaluation of alternative filtration, disinfection, and corrosion control processes to determine the most appropriate for MWRA source waters. Construction and operation of a pilot plant at the Wachusett Reservoir to allow testing of various treatment technique combinations. Identification of potential locations for treatment facilities.	Completed
AWWARF Red Water Control Strategy Study	Evaluation of treatment options for eliminating discolored water caused by unlined cast-iron pipe. Also investigation of the fundamental aspects of iron chemistry and corrosion using unlined cast-iron pipe from the MWRA community distribution system.	Completed
Emergency Distribution Reservoir Water Management Study	Investigation of potential impacts on the emergency distribution reservoirs resulting from their replacement by new covered distribution reservoirs, and study of ways to maintain their water quality for emergency supply. Norumbega, Weston, Spot Pond, Fells, and Blue Hills Reservoirs have been studied. A pilot study was conducted to evaluate in-reservoir algae treatment for Wachusett Reservoir.	Completed
Cryptosporidium Inactivation Study	Determination of the site-specific efficacy of inactivating *Cryptosporidium* in Wachusett Reservoir source water using disinfectant alternatives (chlorine/chloramine and ozone/chloramine), and then development of design criteria for the full-scale disinfection contacting system.	Completed
Construction: Cosgrove Disinfection Facility Phases I and II	Construction of the Cosgrove Disinfection Facility. Free chlorine is applied at the Cosgrove Aqueduct to utilize travel time to achieve primary disinfection prior to corrosion control treatment and secondary disinfection.	Completed
Immediate Disinfection-MECo	Massachusetts Electric Co. power line installation to support the disinfection process at the Cosgrove Disinfection Facility.	Completed
Distribution Water Consultant	To provide technical assistance related to distribution system management.	Completed
EIR/Conceptual Design	Environmental reviews, data collection and analyses, and facility designs to support the dual track compliance approach, evaluation of design criteria, site plans, plant hydraulics, and construction of a small-scale demonstration water treatment plant.	Completed

Sub-phase	Scope	Status
Design/CS/RI: Walnut Hill WTP	Design and Engineering Services During Construction for the water treatment plant and associated components.	Completed
WHCP1: Wachusett and Cosgrove Intakes	Upgrade of the Cosgrove Intake and powerhouse to allow automatic, unstaffed operation of the facility. Replacement of the valves and piping in the Wachusett Intake is required to allow this facility to serve as a backup water supply.	Completed
WHCP2: Interim Aqueduct Rehabilitation	Shotcrete lining of the Wachusett Aqueduct to ensure supply of water continues to greater Boston during modifications to Shaft C and to enable it to serve as a backup to the Cosgrove Tunnel.	Completed
WHCP3: Site Work and Storage Tank	Includes clearing and excavation, site access roads, yard piping, and construction of a 45-million gallon storage tank.	Completed
WHCP4: Treatment Facilities	Construction of ozonation, corrosion control, chloramination operations and emergency generator buildings, modifications to Shafts B and C, and installation of system wide instrumentation from Wachusett Reservoir to Norumbega Reservoir.	Completed
WHCP6: Late Site Work	Final grading, landscaping, and paving of treatment facility site.	Completed
Design & Construction WHCP7: Existing Facilities Modifications	Modification to and conversion of the Interim Corrosion Control Facility, Cosgrove Disinfection Facility, Transmission Maintenance Facility. These buildings will be converted from water treatment/quality uses to expanded maintenance shops and SCADA technicians shop facilities for the new water treatment plant. In addition, the project includes demolition of old electrical building, some miscellaneous items at Cosgrove Intake Building and replacement of the roof, lab improvements and HVAC system for Water Quality Lab at Southboro. Also, buildings rehab will incorporate achievable LEED (Leadership on Energy & Environmental Design) goals.	Active
Design Management Support	Professional services and value engineering support to MWRA in review of the water treatment plant design.	Completed
Construction Management/RI	Construction management and resident inspection during construction of the water treatment plant.	Completed
Cosgrove Disinfection Facility Underwater Improvements	Installation of underwater piping needed to apply sodium hypochlorite at Shaft A.	Completed
Community Chlorine Analyzers	Purchase of free chlorine residual analyzers for eight communities to work in association with interim chloramination facilities.	Completed
OCIP	Owner Controlled Insurance Program, providing pollution liability, workers' compensation, general liability, and excess loss coverage during construction of the CWTP.	Completed
Professional Services	As needed legal, insurance, design, and construction specialty services for the Carroll Water Treatment Plant.	Completed
Marlborough MOA	Agreement to mitigate the impacts of the construction of the Carroll Water Treatment Plant on Marlborough.	Completed
WHWTP – MECo	Relocation of electric power lines.	Completed
Site Security Services	Site security services at the Carroll Water Treatment Plant.	Completed
CSX Crossing	Railroad track improvements adjacent to CWTP.	Completed

Sub-phase	Scope	Status
Wachusett Algae Design and Construction	Design and Construction of automated chemical dispensing system for algae control.	Future
Public Health Research	With the assistance of public health agencies and researchers, evaluation of the public health impact of the water treatment changes that occurred in 2004.	Completed
Security Equipment	Design and installation of card access, improved motion and intrusion alarm systems, video surveillance, and monitoring equipment for MWRA facilities.	Completed
WHCP8– Cosgrove Screens Design/CS/RI and Construction	Replace existing manual screens with finer automatically controlled traveling screens.	Completed
AWWARF-Evaluation Ozone and UV	Study of the effects of ozone and ultraviolet treatment on cryptosporidium to ensure inactivation in Wachusett Reservoir.	Completed
Fitout/Construction	Non-construction related items for start-up and operation of the new water treatment plant including furnishings, shop and maintenance equipment, audio/visual supplies, laboratory equipment, and miscellaneous consumable supplies.	Active
Carroll Ultra Violet Disinfection Design, and Construction	Design and construction programs to add Ultra Violet (UV) to the CWTP. UV system placed into service in February 2014.	Completed
As-Needed Technical Assistance No. 1 and No. 2	As-needed design services to support the start-up of the CWTP including electrical engineering, HVAC engineering, mechanical engineering, civil engineering and a variety of geotechnical, environmental, and architectural technical assistance.	Completed
Ancillary Modifications Construction 1	Follow-up construction from the As-Needed Technical Assistance contracts.	Completed
Ancillary Modifications Construction 2	Address improvements in reliability, optimization of plant performance and/or reduce plant operating costs.	Active
Ancillary Mods Design 3 and 4	Additional As-Needed design services as a follow-up for additional improvements at the Carroll Water Treatment Plant.	Completed
Technical Assistance No. 5 and #6	Continuation of as-needed engineering technical assistance for ancillary modifications design and plant optimization.	Completed
Carroll Water Treatment Plant Storage Tank Roof Drainage System Repair	Design and construct a solution that addresses trench drainage system's poor performance. Poor roof drainage could possibly result in water quality problems.	Future
Technical Assistance No. 7 and No. 8	The next two phases of as-needed engineering technical assistance for ancillary modifications design and plant optimization.	Active
Technical Assistance No. 9 and No. 10	The next two phases of as-needed engineering technical assistance for ancillary modifications design and plant optimization.	Future
CWTP Asset Protection	A consultant's evaluation of CWTP's capital assets and recommendations for upgrades or modifications to ensure operational efficiency of these assets.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$438,984	$418,815	$20,169	$923	$3,732	$12,262	$5,097	$10,417



Project Status 6/16	95.4%	Status as % is approximation based on project budget and expenditures. Closed Loop Cooling System, a contract of Ancillary Modifications Construction 2 subphase, was substantially complete in April 2010. Second Gaseous Oxygen Line was substantially complete in May 2012. Wachusett Emergency Connection Valves reached substantial completion in August 2013. Carroll Ultraviolet Disinfection Facility Construction reached substantial completion in February 2014. Existing Facilities Modifications CP-7 NTP was issued in August 2015. Technical Assistance 7 was completed in November 2015. Technical Assistance 8 was executed effective January 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$436,904	$438,984	$2,080	Dec-20	Dec-26	72 mos.	$13,599	$12,262	($1,337)

Explanation of Changes

- Project cost change primarily due to the addition of Technical Assistance Contracts 9 and 10 of $1.1M, change orders and updated cost estimates for CP-7 Existing Facilities Modifications of $0.5M, and updated cost estimate for Ancillary Modifications Construction 2 contract of $0.4M.

- Spending change due to updated schedule of work for Ancillary Modifications Construction 2 contract and updated Substantial Completion date of one year for Fitout/Construction contract.

CEB Impact

- Impacts are reflected in the Field Operations FY18 CEB for utilities, maintenance, labor and chemicals for UV Disinfection. Expect $35,000 in FY27 and $35,000 in FY28 for Wachusett Algae Facility.

S. 543 Brutsch Water Treatment Plant

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Fulfills a regulatory requirement*

To improve the quality of drinking water delivered to the Chicopee Valley Aqueduct (CVA) communities of Chicopee, Wilbraham, and South Hadley Fire District No. 1, and to ensure that the water delivered meets the drinking water quality standards established by the federal Safe Drinking Water Act. Improvements to the CVA system thus far have included the construction of covered storage at Nash Hill and construction of disinfection and contact time (CT) monitoring facilities. This project also includes the addition of ultraviolet treatment as a second primary disinfectant.

Project History and Background

MWRA provides water to the three CVA communities under long-term contracts. The three communities pay assessments based on actual capital and operating costs for the CVA system. MWRA expects that these agreements will continue beyond the contract dates. In the event the communities do not choose to extend the contracts, they would be required to reimburse MWRA for the capital investment to improve the CVA system.

Quabbin Reservoir is the source of the water delivered to the CVA communities. Massachusetts DEP has granted a conditional waiver from filtration for Quabbin Reservoir water serving the CVA. MWRA and DEP signed a consent order covering activities to support the continuation of the filtration waiver under the Surface Water Treatment Rule (SWTR) in December 1991. It required new disinfection facilities and the replacement of the open Nash Hill Reservoir with covered storage. The Nash Hill Covered Storage Facilities were constructed and put on-line in March 1999 in compliance with the consent order requirements. In February 1994, MWRA submitted to DEP a consent order schedule for design and construction of permanent disinfection facilities, which were needed to comply with the federal and state drinking water standards. Under the consent order, the approved treatment processes for disinfection were chlorination for primary disinfection, and chloramination for residual disinfection.

The publication of new regulations (Enhanced Surface Water Treatment Rule (ESWTR) and Disinfectant/Disinfection By-Products Rule (D/DBPR)), and discussions regarding a possible *Cryptosporidium* rule raised questions regarding the long-term efficacy of these treatment technologies and whether future modifications would be required. A life cycle cost analysis performed in 1995 as part of an action plan for the CVA system determined that disinfection with chlorine/chloramine was the most cost-effective treatment option, even if the treatment processes had to be upgraded as early as two years later. MWRA issued the notice to proceed for construction of the chlorination and chloramination facilities in November 1998. After commencement of field construction activities in March 1999, citizen opposition arose relative to the sitting of the secondary disinfection facility resulting in the cancellation of construction of the secondary disinfection facility in Ludlow. Instead, MWRA built a CT monitoring station at the Ludlow site. Both the primary disinfection facility and the Ludlow monitoring facility went on-line in summer 2000, in compliance with the consent order schedule, which is now closed out.

EPA issued new regulations in January 2006 (LT2ESWTR and Stage 2 D/DBP, see Carroll Water Treatment Plant project description) that will require cryptosporidium inactivation and the addition of a second primary disinfectant to the CVA system. MWRA conducted an evaluation of the application of ultraviolet technology and determined it was the most cost-effective and efficient upgrade for the system. Design and construction of the addition of UV treatment to the existing Ware Disinfection Facility are included in this project. The UV system in the renamed Brutsch Water Treatment Facility was placed in service in September 2014.

Scope

Sub-phase	Scope	Status
Quabbin WTP: Design/CA/RI and Construction	System hydraulics study, design, construction administration, resident inspection, and construction of disinfection and CT monitoring facilities.	Completed
Ware Fire Department MOA	"First Responder" training and protective clothing for the Ware Fire Department for Quabbin Disinfection Facility emergency scenarios.	Completed
CVA Shea Ave Leak Repair	Repair of pipeline leak and replacement of 36-inch valve on the Chicopee Valley Aqueduct.	Completed
WQ Analysis Equipment	Water quality analysis equipment for the Quabbin Disinfection Facility in Ware.	Completed
Quabbin Ultraviolet Water Treatment Plant: Study/Pilot, Design CS/RI, and Construction	Evaluation and implementation of ultraviolet technology at the Quabbin Disinfection Facility to meet new regulations requiring cryptosporidium inactivation and two primary disinfectants for unfiltered systems.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$19,973	$19,973	$0	$0	$0	$7,205	$0	$0

Project Status 6/16	100%	Status as % is approximation based on project budget and expenditures. The Quabbin Study/Pilot was completed in December 2005. Quabbin UVWTP Design CS/RI notice-to-proceed issued in December 2008. Construction was substantially complete in September 2014. Shea Ave Leak Repair was substantially complete in October 2014.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$19,973	$19,973	$0	Oct-14	Oct-14	None	$7,205	$7,205	$0

Explanation of Changes

- N/A

CEB Impact

- Impacts are included in the FY18 CEB.

S. 545 Blue Hills Covered Storage

Project Purpose and Benefits

☑ *Improves system operability and reliability*
☑ *Contributes to improved public health*

To ensure sufficient distribution storage for MWRA's Southern High Service Area. Prior to this project, the area relied on the old open reservoir for non-potable emergency storage, creating the potential for supply disruption and a boil water order if repairs were needed on a major transmission line for Quincy and other communities in the Southern High Service Area. Covered distribution storage equalizes pressure at the extremities of the Southern High pressure zone and provides potable emergency storage in case of unexpected interruptions of supply. New covered storage facilities at the Blue Hills Reservation have a capacity of 20 million gallons.

Project History and Background

Blue Hills Reservoir was constructed in the 1950's and was removed from active service in 1981 due to contamination from birds and animals. The reservoir was used as non-potable emergency supply. The new covered storage facility in the Southern High Service Area equalizes water pressure during periods of peak demand and works in conjunction with surface mains and the Chestnut Hill emergency pump station to supply water to the Southern High service area in the event that the Dorchester Tunnel requires repairs. Two 10 million-gallon buried drinking water storage tanks have been constructed in the east end of the existing Blue Hills Reservoir. In addition, this facility will supply water to Quincy and Milton if the northern portion of Section 22 is shut down because of a break or for repairs. A citizens' working group was formed to participate in the EIR/Conceptual Design process.

The Blue Hills Working Group was formed in 1997 to review alternatives and met periodically for 3-1/2 years to provide input to the MWRA. MWRA has worked closely with various interested parties to include features that have mitigated environmental impacts and improved the look of the finished site. The new covered tank was put into service in August 2009.

Scope

Sub-phase	Scope	Status
EIR/Conceptual Design/OR	Completion of an Environmental Impact Report, Conceptual Design and wetlands permitting. Preparation of Design/Build contract scope and specifications and technical support throughout Design/Build process.	Completed
Design/Build Field Oversight	Field oversight and administration of the Design/Build contract will be performed by in-house staff.	Completed
Design/Build	Design/Build of a 20 million gallon covered storage facility.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$40,083	$40,083	$0	$0	$0	$120	$0	$0

Project Status 6/16	100%	Status as % is approximation based on project budget and expenditures. Design/Build contract was awarded on November 15, 2006. The new tanks were put into service in August 2009. Construction contract reached substantial completion in April 2010.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY17	Chge.
$40,557	$40,083	($474)	Jan-20	Apr-10	(117) mos.	$198	$120	($78)

Explanation of Changes

- Project cost and deletion of Roadway Surface Restoration Design and Construction contracts of $0.4M, and reduction of Technical Support & Permit Compliance contract to actual of $.01M.
- Schedule change due to deletion of Roadway Surface Restoration contracts.
- Spending change due to reduction of Technical Support & Permit Compliance contract to actual of $0.1M.

CEB Impact

- The storage facilities will require periodic inspection, maintenance, and water quality testing.

S. 550 Spot Pond Covered Storage Facility

Project Purpose and Benefits

☑ *Contributes to improved public health* ☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 2 (see Appendix 3)

A new storage facility is required to meet the state and federal drinking water guidelines and MWRA's goal of providing a one-day supply of storage. With the Weston and Spot Pond Reservoirs removed from service, MWRA no longer meets the one-day supply goal.

Project History and Background

The Low Service System, which supplies 25% of the total metropolitan area demand, formerly had Weston Reservoir at its western end, where water was introduced into the system, and Spot Pond as its terminal reservoir at the northeast extremity. Due to transmission problems caused by old, corroded pipe with significantly reduced carrying capacity, this system gradually ceased to function properly and it became necessary, as a makeshift measure, to break this system into segments and transfer water from high service in order to serve large portions of the Low Service area.

The principal low service mains (Weston Aqueduct Supply Mains (WASM), Boston Low, and East and West Spot Pond Supply Mains) have been rehabilitated and their capacity has been restored to as-new condition. The new Weston Covered Storage Facility at Loring Road (constructed as part of the MetroWest Tunnel project) replaced the open Weston Reservoir. The Spot Pond Storage Facility replaced Spot Pond Reservoir in Stoneham.

The new Spot Pond Storage Facility is supplied through a pressure reducing valve on WASM 4 via the West Spot Pond Supply Main. During peak demand periods of the day, water flows into the Low Service System from both Loring Road and Spot Pond storage tanks.

At 20 million gallon capacity, the Spot Pond Storage Facility, comprised of two buried 10 million gallon storage tanks, is the same size as that at Loring Road. Just as pressure reducing valves allow the tanks at Loring Road to be supplied from the high service Norumbega Covered Storage, the Spot Pond Storage tank is supplied with water reduced in pressure from WASM 4.

The Spot Pond Storage Facility also includes a partially buried pump station to provide redundancy to the Gillis Pump Station supplying the Northern High and Northern Intermediate High service areas.

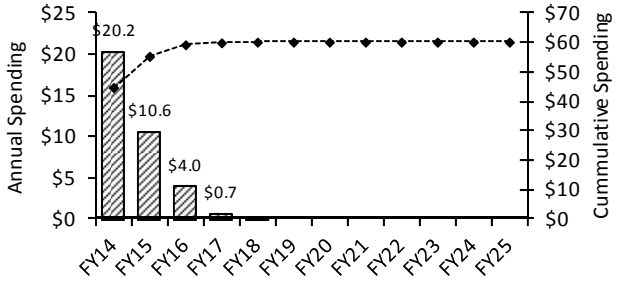
Scope

Sub-phase	Scope	Status
Environmental Reviews and Conceptual Design (6455/6456)	Preliminary engineering for tank siting, environmental reviews and conceptual design.	Completed
Design/Build (6457)	Design and construction by a single contractor of a 20 million gallon water storage tank and pump station.	Active
Owner's Representative (7233)	Provision of technical program management for the design/build contract procurement, monitoring, and administration.	Active
Easements/Land Acquisition (6868)	To provide adequate land for construction of the water storage tank.	Completed
Early Construction Water Connection (7314)	Construction of piping and meter connection to replace existing water supply to be removed as part of tank construction.	Status

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$60,285	$59,401	$885	$656	$229	$35,692	$0	$0

Spot Pond Storage Facility



Project Status 5/16	98.5%	Status as % is approximation based on project budget and expenditures. Design/ Build contract was awarded in October 2011 and the NTP was issued in November 2011. Early Construction Water Connection was substantially complete in February 2012. The facility was placed into service in December 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$60,253	$60,285	$32	Dec-15	Dec-15	none	$35,659	$35,692	$33

Explanation of Changes

- Project cost and spending change primarily due to a change order for the Design/Build contract.

CEB Impact

- Impacts included in FY18 CEB.

S. 597 Winsor Station/Pipeline Improvements

Project Purpose and Benefits

☑ *Extends current asset life* ☑ *Results in a net reduction in operating costs*

Master Plan Project ☑ 2008 Priority Rating 1 (See Appendix 3)

Rehabilitation of the water supply infrastructure at the Winsor Station in Belchertown. Design and construct station piping improvements which would allow water to go to the Swift River without going through the isolation valve. Design and construct means to control flow in the Quabbin Aqueduct. Quabbin Release Pipeline work is also included.

Project History and Background

Winsor Dam impounds the Quabbin Reservoir. At the dam, an intake feeds two conduits that are interconnected at a powerhouse below the dam. One conduit discharges to the Chicopee Valley Aqueduct; the other conduit feeds a now inoperative hydroelectric turbine/generator unit. A bypass valve at the Winsor Station house also allows flow to be discharged directly to the Swift River.

The water supply infrastructure within the Winsor Station is in need of major repair and upgrade as much of it is over 75 years old. Several other sub-phases are needed to address the extensive work on the Quabbin Transmission System and the Swift River bypasses. These sub-phases include:

- Winsor Station Chapman Valve Repair & Purchase of Sleeve Valves - Immediate replacement of the existing damaged Chapman Valve with sleeve valves.
- Pipeline Replacement Phase 1 – To repair and upgrade large-diameter piping and valving in the basement of the Winsor Station including the bypasses.
- Quabbin Aqueduct – To replace the antiquated and unreliable shutter system at Shaft 12 with a gate to control flow in the Quabbin Aqueduct and inspect the Quabbin Tunnel and recommend maintenance or repairs. Make building repairs to the Shaft 12 building and Shaft 2.
- Winsor Power Station Upgrades -. Rehabilitate Winsor Power Station and the CVA Intake Structure,
- Hatchery Pipeline- To convey cold, well-oxygenated hypolimnetic water from Quabbin Reservoir to the downstream trout hatchery via a new pipeline. A hydro turbine will be located in a vault near the connection of the pipeline to the CVA that would capture some of the hydraulic energy contained in the pipeline as the water is conveyed to the hatchery. The power generated will be sold back to the grid.

Scope

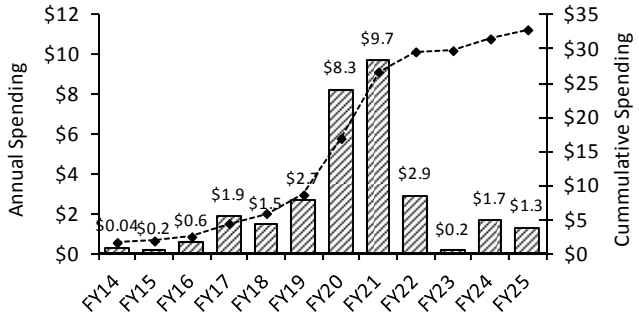
Sub-phase	Scope	Status
Quabbin Aqueduct & Winsor Power Station Preliminary Design (7114)	Preliminary design of improvements at Shafts 1, 2, 9 and 12 of the Quabbin Aqueduct and the Winsor Power Station.	Completed
Shaft 12 Isolation Gate Design CA/RI (7509) and Construction (7197)	Installation of a gate to control flow at Shaft 12, the intake to the Quabbin Aqueduct, thereby improving safety and reliability of the transmission system.	Future

Sub-phase	Scope	Status
Quabbin Aqueduct Inspection (6277)	TV inspection of the Quabbin Aqueduct.	Future
Winsor Power Station Upgrades and Quabbin Buildings Rehabilitation Design CA/RI (7460) and Construction (7115)	Design and Construction to address piping improvements and building rehabilitation for water supply and Swift River discharge. Will also include improvements to the CVA Intake Structure and include Shaft 2 structural improvements, and Shaft 12 intake and service building electrical, plumbing, and building improvements.	Future
Hatchery Pipeline Design (7017) and Construction (7235)	Design and construction of approximately 5,000 feet of pipeline to convey 6 MGD of water from the CVA to the downstream trout hatchery. The project would provide a consistent and reliable source of high quality cold water to the hatchery, as well as supplement flows to the Swift River. The project will also include a hydro turbine that would capture some of the hydraulic energy contained in the pipeline as the water is conveyed to the hatchery which will be sold back to the grid. The hydro turbine portion is funded under the Alternative Energy Initiatives project and Massachusetts Leading by Example Program.	Active
Winsor Station Chapman Valve Repair (7212)	Construction of replacement valving for the existing 36" Chapman Butterfly Valve (design by Technical Assistance consultant).	Completed
Purchase of Sleeve Valves (7234)	For replacing the damaged Chapman Butterfly Valve.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$32,878	$2,578	$30,299	$1,921	$1,479	$4,583	$23,838	$3,061

Winsor Station/Pipeline Improvements



Project Status 6/16	7.8%	Status as % is approximation based on project budget and expenditures. Winsor Station Chapman Valve Repair was completed in November 2009. Preliminary Design for Quabbin Aqueduct and Winsor Station Upgrades Notice-to-Proceed was issued in February 2010. Hatchery Pipeline Design/ESDC/RI commenced in August 2013 and construction commenced in March 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$31,177	$32,878	$1,701	Jul-21	Jul-21	None	$5,522	$4,583	($939)

Explanation of Changes

- Project cost change primarily due to updated cost estimates for re-structured phases for Winsor Station and Quabbin Buildings Rehabilitation and Shaft 12 Isolation Gate work, and inflation adjustments.
- Spending change primarily due to updated schedule of work for Shaft 12 Isolation Gate Design and Construction Administration/Resident Inspection re-structured contract.

CEB Impacts

- None identified at this time.

S. 604 MetroWest Water Supply Tunnel

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Fulfills a regulatory requirement*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To provide transmission redundancy for the Hultman Aqueduct ensuring reliable water delivery and providing sufficient hydraulic capacity to support the John J. Carroll Water Treatment Plant and covered storage distribution facilities. This project consists of construction of a 17.6-mile deep rock tunnel from Shaft D in Marlborough to Shaft 5 of the City Tunnel in Weston, and to Shaft W in Weston, as well as the construction of a covered storage facility at Loring Road in Weston. Also included construction of shafts and valve chambers for connections of Shaft 4 in Southborough and to the Norumbega Covered Storage facility.

Project History and Background

Adequate transmission capacity is a critical component of MWRA's Integrated Water Supply Improvement Program. MWRA's water delivery depends on a system of tunnels and aqueducts that transport water from the Quabbin and Wachusett Reservoirs to the distribution reservoirs in metropolitan Boston. The existing tunnels and aqueducts were deficient in several respects. First, the transmission system was unable to supply sufficient hydraulic capacity during peak flow periods, leading to pressure deficiencies in all high service areas during the summer months. Second, key sections of the transmission system, such as the Hultman Aqueduct and the Southborough Tunnel, relied on a single conduit. In the event of failure of any of the major transmission sections, the remaining waterworks system could not meet the demand for water.

Construction of the MetroWest Water Supply Tunnel and its extension to the Weston Aqueduct Terminal Chamber has provided the critically needed minimum level of transmission redundancy for the Hultman Aqueduct. Enhancements and improvements to the reliability of the City Tunnel and the City Tunnel Extension are being planned as part of the Long-Term Redundancy project. This will also enhance system maintenance by allowing each major supply conduit to be taken out of service for inspection, cleaning, and repair.

In June 1989, MWRA began engineering work on reconstruction of the Sudbury Aqueduct. In May 1990, the Board of Directors directed staff to put minimum effort into further study of the Sudbury Aqueduct reconstruction alternatives and maximum effort into study of the all-tunnel alternative. The advantages of tunneling included a large reduction in surface activities resulting in a reduced environmental impact, and the potential to obtain a large increase in water transmission capacity to enable the tunnel to supplant the Weston Aqueduct as well as provide redundancy to the Hultman Aqueduct. Other advantages included a higher pressure rating by constructing a tunnel deeper into rock, and the ability to construct along a straight line, reducing the overall length of the project by three miles.

In November 1990, the Board of Directors directed staff to eliminate the planned tunnel from Norumbega Reservoir to the Chestnut Hill Reservoir in favor of connecting to Shaft 5 of the City Tunnel and to the eastern end of the Weston Aqueduct. The connection allowed the Weston Aqueduct and Weston Reservoir to be taken off-line and used only for emergency supply as required by the Safe Drinking Water Act.

In December 1995, the Board of Directors authorized solicitation of bids on the first major construction contract of the MetroWest Tunnel project. In June 1996, a notice to proceed was issued on this contract, beginning the transition from design to construction of the project. In November 2003, the tunnel was placed in service.

In September 2005, the Board of Directors authorized an engineering services contract to rehabilitate the existing Hultman Aqueduct and to interconnect the MetroWest Tunnel with the Hultman Aqueduct. In the interim, Valve Chamber E-3 at Southborough was constructed in order to facilitate system operations and the demolition of an existing chlorine building was completed in preparation for construction of the interconnections.

In May 2013 construction was substantially complete on Contract CP6A to interconnect the MetroWest Tunnel with the Hultman Aqueduct and to rehabilitate the Hultman Aqueduct from Shaft 4 in Southborough to Shaft 5 of the City Tunnels and to Shaft W of the MetroWest Tunnel in Weston. A second construction contract (CP6B) was substantially complete to rehabilitate the remainder of the Hultman Aqueduct from Shaft C of the Cosgrove Tunnel to Shaft l of the Southborough Tunnel, and to rehabilitate the top-of-shaft facilities at Shaft 4 of the Southborough Tunnel in Southborough.

Program Elements

The MetroWest Tunnel is 17.6 miles long with a 14-foot finished diameter. The first segment of the tunnel extends from the water treatment plant site at Walnut Hill on the Marlborough/Southborough line to Shaft 4 of the Hultman Aqueduct in Southborough. From there, the tunnel continues to a "WYE" connection east of Norumbega Reservoir, and continues east from the "WYE" to Shaft 5 of the City Tunnel and northward to the Weston Aqueduct Terminal Chamber. The tunnel depth varies from 200 to 500 feet below ground surface along the alignment.

After the MetroWest Tunnel and the John Carroll Water Treatment Plant were in service, the Hultman Aqueduct was inspected and rehabilitated. Surface distribution facilities, including piping, valve chambers, and risers connect the tunnel to the Hultman Aqueduct and local community services. Intermediate connections between the MetroWest Tunnel and the Hultman Aqueduct permit operation of segments of either the aqueduct or the tunnel interchangeably, allowing flexibility in the maintenance of the two conduits.

Scope

Sub-phase	Scope	Status
Study	Study of the aqueduct/tunnel system to determine the best alternative to improve hydraulic capacity and create redundancy.	Completed
Construction-Sudbury Pipe Bridge	Rehabilitation of the Siphon Pipe Bridge at the Weston Aqueduct which experienced significant leakage.	Completed
Design/EIR-Tunnel-Engineering Services During Construction	Environmental impact report (EIR) process and design of the 17.6-mile long, 14-feet diameter tunnel. Construction support services, including environmental and safety compliance, claims assistance, contract administration, quality assurance testing, and community relations.	Completed
Construction: Western Tunnel Segment – CP1	Construction of the western portion of the tunnel and associated surface facilities. Shaft E was constructed at the Sudbury Dam and a tunnel was excavated 4.9 miles to Shaft D, located adjacent to the clear well of the Walnut Hill Water Treatment Plant (WHWTP). A riser shaft has been excavated to connect the tunnel to Southborough's Hosmer Pump Station and includes the surface piping facilities necessary to bring water from the Wachusett Reservoir.	Completed

Sub-phase	Scope	Status
Construction: Middle Tunnel Segment – CP2	Construction of approximately 11.9 miles of tunnel between Southborough and Weston. Construction was staged from Shaft L, located at a sand and gravel pit in Framingham, where a permanent connection to the Hultman will be constructed. Along the alignment, four small-diameter shafts have been constructed for community connections to Framingham and Weston. The western reach of the Middle Tunnel Segment portion of the tunnel terminates at Shaft E. The eastern reach terminates at the "WYE" where it meets the East Tunnel Segment. Shafts NE and NW will be constructed on the northwest side of Norumbega Reservoir where surface work included construction of valve chambers and surface piping to allow connections to the Hultman Aqueduct and Norumbega Reservoir. The design at Shaft N included provisions for connections to the Norumbega Covered Storage Facility and the proposed Metropolitan Tunnel Loop.	Completed
Construction: Shaft 5A-CP3	Shaft 5A was excavated near the intersection of Route 128 and the Massachusetts Turnpike.	Completed
Construction: Eastern Tunnel Segment – CP3A	Construction of the eastern portion of the tunnel. An approximately 4,400-feet long, 12-feet finished diameter tunnel was constructed from the Shaft 5A bottom through the “WYE” where it meets the Middle Tunnel Segment and on to Shaft W where a shaft connection to the Loring Road storage tanks was made.	Completed
Construction: MHD Salt Sheds – CP5	Massachusetts Highway Department (MHD) salt storage operations were relocated from the Shaft 5A site to a new, nearby location on MHD property on Recreation Road in Weston. This allowed demolition of the MHD salt sheds at the Shaft 5A site.	Completed
Testing and Disinfection – CP7	Pressure testing of the MWWST from Shaft E (west) to Shaft W and 5A, and disinfection and dechlorination of the entire tunnel from Shaft D to Shafts W and 5A, and final disinfection of the Norumbega Covered Storage tanks. Also included the disinfection and dechlorination of the Wachusett Aqueduct and the piping connections through Walnut Hill to MetroWest Shaft D.	Completed
Construction: Loring Road Covered Storage-CP8	Construction of surface facilities at the Shaft W site included a 20 million-gallon storage facility that replaced the function of the existing Weston Aqueduct/Weston Reservoir system, allowing the system to be taken off-line and placed on emergency stand-by status. The storage facility has been constructed as two concrete tanks partially buried in a hillside adjacent to Shaft W. Connections were made under this contract at Shaft W to two WASM (1 and 2) low service mains and the WASM 4 high service main, as well as to the 7-feet diameter branch of the Hultman Aqueduct. Also included rehabilitation of 4,100 linear feet of 60-inch diameter pipe and four master meters.	Completed
Construction Management/RI	Full inspection of all construction activity, as well as provision of construction support services including environmental and safety compliance, claims assistance, contract administration, quality assurance testing, community relations, labor relations, engineering services during construction, and provision of technical assistance.	Completed

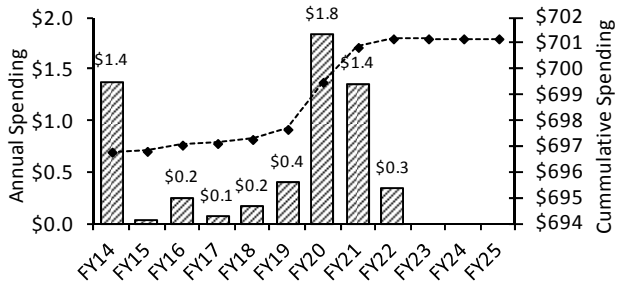
Sub-phase	Scope	Status
Hultman Study	Risk analyses to determine which leaks should be repaired now and a monitoring plan for leaks which presently do not threaten the integrity of the aqueduct.	Completed
Hultman Leak Repair	Test pit excavation and leak repair on the Hultman Aqueduct.	Completed
Hultman Repair Bands	Purchase of external repair bands to be installed as part of Hultman investigation and repair.	Completed
Hultman Investigation and Repair	Evaluation of various segments of the Hultman Aqueduct and installation of repair bands at major leak sites.	Completed
Land Acquisition	Easements along the 17.6-mile tunnel construction route, as well as land at the Shaft W and Shaft L sites.	Completed
Professional Services	Services such as construction safety, contractor audit, legal services, risk management consulting services, and other miscellaneous services.	Completed
Framingham MOU	Agreement to mitigate the impacts of the construction on the Town of Framingham.	Completed
Weston MOU	Agreement to mitigate the impacts of the construction on the Town of Weston.	Completed
Southborough MOU	Agreement to mitigate the impacts of the construction on the Town of Southborough.	Completed
Local Water Supply Contingency Design/CA/RI and Construction	Design and implementation of a Water Supply Contingency Plan including the installation of new local mains where residential well supplies could be affected by tunnel construction.	Completed
Community Technical Assistance	Funds to assist communities with the redesign of utility plans.	Completed
Owner Controlled Insurance	Owner controlled insurance program providing workers' compensation, general liability, and pollution liability insurance for MetroWest Water Supply Tunnel construction.	Completed
Design CA/RI Hultman Interconnect CP6	Design CA/RI of the interconnections between the MetroWest Water Supply Tunnel and the Hultman Aqueduct as well as inspection of the Southboro Tunnel and rehabilitation of the Hultman Aqueduct.	Completed
Construction: Hultman CP9	Construction of Valve Chamber E-3.	Completed
Interim Disinfection	Temporary disinfection related to CP-7 sub-phase.	Completed
Equipment Prepurchase	Pre-purchased one 10-foot diameter butterfly valve for installation in Valve Chamber E3.	Completed
Construction CP6A Lower Hultman Rehab. and 6B Upper Hultman Rehab.	Construction of interconnections between Metrowest Tunnel and the Hultman Aqueduct, and rehabilitation of Hultman Aqueduct including replacement or repair of air relief structures, blow off valves, culverts beneath the aqueduct; replacement of existing valves; and additional items to restore the aqueduct to safe and efficient operation after more than 70 years of service without an overhaul.	Completed
Construction 6A Demolition	Demolition of existing chlorine storage building to allow for construction of a new valve chamber on the Hultman Aqueduct.	Completed

Sub-phase	Scope	Status
CP6 Easements	Easements for CP-6 Contract.	Completed
Valve Chamber and Storage Tank Access Improvements Design and Construction	Design and construction to provide better and safer access to valve chambers for Water Quality and Maintenance personnel. Provide secure hatches at Loring Road Tanks.	Future
Shafts 5A/5 Surface Piping Cathodic Protection Construction (7477)	Construction to replace cathodic protection systems.	Active
Shaft 5 Electrical Upgrade	Upgrade of electrical service, switchgear, and motor control centers. Existing electrical system is approaching the end of its useful life and will need to be replaced. Maintenance of the current system will become increasingly more difficult due to the lack of available spare parts.	Future
Hultman Shaft 5A Leak	Repair Hultman Leak at Shaft 5A.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$701,178	$697,047	$4,131	$65	$156	$1,869	$3,910	$0

Metro West Tunnel



Project Status 6/16	99.4%	Status as % is approximation based on project budget and expenditures. MetroWest Tunnel was placed into service in November 2003. Hultman Interconnect Final Design/CA contract was awarded in September 2005. CP6A Lower Hultman Rehab was substantially complete in May 2013. Upper Hultman CP6B contract was substantially complete in June 2013. Shaft 5A/5 Surgacr Pipe Cathodic Protection began in November 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$707,447	$701,178	($6,269)	Dec-22	Jun-21	(18) mos.	$2,007	$1,869	($138)

Explanation of Changes

- Project cost change primarily due to transfer of scope of work for the Valve Chamber Modifications work of $6.2M to the Metropolitan Tunnel Redundancy project.

- Spending change primarily due to lower than budgeted award of $0.1M for the Shaft 5/5A Surface Piping Cathodic Protection - Construction contract.

CEB Impact

- None identified at this time.

S. 616 Quabbin Transmission Rehabilitation

Project Purpose and Benefits

☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To ensure continued reliable delivery of high quality water to MWRA customer communities through inspection, evaluations, and rehabilitation of the aging transmission system. Many of the transmission facilities and structures were constructed in the 1930s and 1940s and are in need of repair, routine maintenance, updating, and modifications for code compliance, health and safety, and security. Based on the findings and recommendations of this inspection phase, MWRA has and will continue to add design and construction phases to the CIP.

Project History and Background

This project provided an engineering assessment of key water transmission facilities, structures, and operations. Many of the 44 facilities were constructed in the 1930s and 1940s and are in need of repairs, routine maintenance, and modifications for code compliance, health and safety, and security. The facilities and structures include dams and spillways, structures on tops of shafts, hydraulic diversion facilities, gatehouses, intake buildings, service buildings, and garages. The facilities are spread over a large geographic area ranging from Quabbin Reservoir eastward to the Boston Metropolitan area.

The engineering assessment utilized existing information and site visits to inventory the condition of each facility. The work yielded a facility report that identifies existing conditions and provides recommendations for needed improvements, rehabilitation, and repairs. The project resulted in the development of a conceptual design for each facility including alternatives, basic design criteria, cost estimates, required permits, and schedules. MWRA uses the final conceptual design reports to develop a detailed scope of work for the future procurement of engineering services for subsequent design, construction administration, and resident inspection services. Staff will integrate and coordinate project findings with MWRA's current master planning efforts.

One critical component of the Quabbin Tunnel, the pressure-reducing valves at the Oakdale Power Station, was targeted for immediate replacement. These valves were in poor condition. Due to their important function of reducing hydraulic head to allow water from the Quabbin Reservoir to flow into Wachusett Reservoir, replacement of the Oakdale Valves was a high priority.

Scope

Sub-phase	Scope	Status
Facilities Inspection	Assessment of existing conditions; update of infrastructure rehabilitation evaluation; identification of improvements/repairs/upgrades, establishment of priorities for repairs, and preparation of cost estimates.	Completed
Oakdale Valves Phase 1	Study, design, and construction for the rehabilitation/replacement of two valves and miscellaneous support equipment at the Oakdale facility.	Completed
Equipment Pre-Purchase	The two large butterfly valves (84 inch and 72 inch) and the fixed orifice valve (48 inch) that were needed in Phase I Valve Rehabilitation, required 6 to 10 months to fabricate and had to be pre-purchased so the valves were available for installation.	Completed

Sub-phase	Scope	Status
Oakdale Phase 1A Design & Construction	Upgrade the 60 year old Oakdale facility and electrical control systems & the switchyard which are antiquated and unsafe to personnel. Will lower the station service voltage from 2,200 to 480.	Completed
Ware River Intake Valve Replacement Design and Construction	Replace oil-actuated valves currently underwater and inaccessible for maintenance with electric actuated valves. Also, replace siphons with hard piped intakes and automate equipment with remote control capabilities.	Future
CVA Intake Motorized Screen Replacement Construction	Replace current motorized screens on the CVA Intake. One screen has failed. Both have reached the end of their useful life. The screens keep debris from entering CVA. Construction NTP issued on 1/6/17.	Active
Rehabilitation of Oakdale Turbine Design and Construction	Rehabilitate turbine. Turbine was last rehabilitated in 1986 and we will be approaching thirty years which is the expected life of an overhaul.	Completed
Rehabilitate Wachusett Gatehouse/Bastion & Lower Gatehouse Geo-thermal Design/CA/RI and Construction	Rehabilitate the piping in the Lower Gatehouse. Investigate the possibility of simplifying the layout and improving the reliability of the valves. Existing piping and valves are of poor quality. Other piping and valves of the same age in this facility have already been replaced. Replace the leaking roof, gutters, and repair/seal masonry and degraded windows and doors. Sealing of the building will allow more efficient heating of building space to prevent further deterioration. Convert from propane fueled boilers to geo-thermal heating utilizing the internal water in the piping located in the building. The existing heating isn't sufficient to keep building warm enough and therefore remaining moisture contributes to accelerated deterioration.	Future
Oakdale High Line Replacement	Replacement of 70 year old 69kv overhead transmission line and ground operated switch that supplies power and delivers power from the Oakdale Power Station.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$16,406	$7,457	$8,949	$1,049	$0	$1,303	$7,900	$0

Project Status 6/16	45.5%	Status as % is approximation based on project budget and expenditures. Valves were received in February 2006 and Phase I Design was substantially complete in June 2007. Phase 1A Construction was substantially complete in July 2013. CVA Motorized Screens Replacement Construction began in November 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$15,957	$16,406	$449	Jun-22	Jun-22	None	$1,254	$1,303	$49

Explanation of Changes

- Project cost change primarily due to updated cost estimates for Wachusett Gatehouse/Bastion Lower Gate House Geo-Thermal Design and Construction contracts, $0.2M. Also, added Oakdale Turbine Rehabilitation Design contract, $0.2M.

- Spending change due to greater than budgeted award for CVA Motorized Screens contract.

CEB Impacts

- None identified at this time.

S. 617 Sudbury/Weston Aqueduct Repairs

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To ensure continued reliable delivery of high quality water to MWRA customer communities through study, design, and implementation of repairs to the Sudbury and Weston Aqueducts. These backup systems are both more than 100 years old, and need to be ready for emergency use.

Project History and Background

This project includes the inspection of the Sudbury Aqueduct in preparation for future repairs. This aqueduct constructed in 1878 is almost 140 years old and is in need of renewal and upgrade. This is a critical back-up facility for the City Tunnel and the Sudbury Reservoir emergency supply. The inspection phase of the Sudbury Aqueduct was conducted in 2006. The Inspection Report identified several short-term repairs required to better prepare the aqueduct for short-term use. This project will also fund inspections of the Weston Aqueduct which is more than 110 years old. The results of the inspection will allow MWRA to evaluate and prioritize future construction and repair work for this aqueduct.

Scope

Sub-phase	Scope	Status
Hazardous Materials	Remove contaminated sediment from aqueduct.	Completed
Sudbury Aqueduct Inspection	Inspection of the Sudbury Aqueduct to identify need for future repair work.	Completed
Ash Street Sluice Gates Design and Construction	Design and construct (rehabilitate) a means to isolate the Weston Reservoir from a break west of Ash Street. Investigate Ash Street and Happy Hollow Siphon. Existing gates in siphon are in need of repair.	Future
Sudbury Short-Term Repairs Phase 1 and 2 Construction	Repairs needed in order to better prepare the Sudbury Aqueduct for short-term use (flow test and emergency activation).	Future
Rosemary Brook Siphon Building Repairs	Repairs to stabilize structures for functional use as emergency water supply facility. Repairs include re-pointing and rebuilding of brick structures and roof replacement. Rosemary Brook Siphon in conjunction with the Sudbury Aqueduct supplies raw water to the Chestnut Hill Reservoir in the event of an emergency.	Active
Evaluation of Farm Pond Buildings-Waban Arches	Assessment of historic structures to determine measures to repair and stabilize facilities. Will include Massachusetts Historical Commission review of proposed alternative.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$6,453	$1,372	$5,081	$1,290	$428	$2,430	$3,363	$0

Project Status 6/16	21.3%	Status as % is approximation based on project budget and expenditures. Inspection of Sudbury Aqueduct was completed in October 2006. Rosemary Brook Building Repair began in March 2016. Evaluation of Farm Pond Buildings-Waban Arches was awarded in June 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$6,553	$6,453	($100)	Jan-21	Jul-24	42 mos.	$2,548	$2,430	($118)

Explanation of Changes

- Project cost and spending changes primarily due to the Weston Aqueduct Flow Control Valve work being done in the Current Expense Budget, $0.4M. This decrease was partially offset by greater than budgeted award for Evaluation of Farm Pond Buildings – Waban Arches contract, $0.2M.

- Schedule change due to updated Notice-to-Proceed date of 5 years for Sudbury Aqueduct Short-Term Repairs Phase 2 Construction contract due to other project priorities.

CEB Impacts

- None identified at this time.

S. 621 Watershed Land

Project Purpose and Benefit

☑ *Fulfills regulatory requirement.*
☑ *Provides water quality benefits.*
☑ *Continues to improve public health.*

Acquire, in the name of the Commonwealth, parcels of real estate or interests in real estate that are important or critical to the maintenance of water quality in MWRA water supply sources and the advancement of watershed protection.

Project History and Background

The Watershed Protection Act (WsPA) regulates land use and activities within critical areas of the Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds for the purpose of protecting the quality of drinking water. Since the passage of the WsPA in 1992, watershed lands had been purchased by the Commonwealth through its bond proceeds. The MWRA was then billed for and, over the years, paid increasing percentages of the debt service on those bonds, eventually reaching 100% of the debt service. MWRA also makes Payments In Lieu of Taxes (PILOT) to each watershed community for the land owned for water supply protection.

Since 1992, land acquisition has evolved into program-status and is a significant component of the Watershed Protection Plans for Quabbin Reservoir/Ware River and Wachusett Reservoir. Land in the watersheds undergoes analysis by the Land Acquisition Panel (LAP), which is comprised of Department of Conservation and Recreation (DCR) and MWRA staff. The LAP analyzes critical criteria for protection of the source water resources, including presence of streams and aquifers, steep slopes, forest cover, and proximity to the reservoirs. Parcels are ranked as to their value to the water supply system and, when the desirable parcels become available, are pursued through the LAP for acquisition through a "friendly taking" in fee or conservation restriction. LAP maintains an active list of parcels to pursue as seller and LAP interest, and funding availability, exist to support acquisition.

Under the revised Memorandum of Understanding between MWRA and DCR, executed April 2004, MWRA will utilize its own bond issuances for the purpose of acquiring, in the name of the Commonwealth, parcels of real estate or interests in real estate for the purpose of watershed protection. At its December 2004 meeting, the MWRA Board of Directors approved the use of MWRA bond proceeds for such purpose.

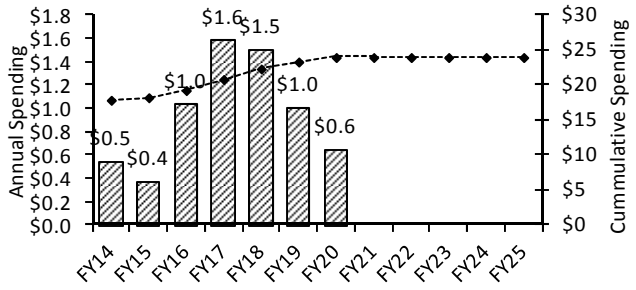
Scope

Sub-phase	Scope	Status
Land Acquisition	Acquire parcels of real estate or interests in real estate critical to protection of the watershed and source water quality.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$24,000	$19,277	$4,723	$1,580	$1,500	$5,015	1,643	$0

Watershed Land



Project Status 6/16	80.3%	Status as % is approximation based on project budget and expenditures. MWRA began purchasing land in FY07.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$24,000	$24,000	$0	Jun-18	Jun-20	24 mos.	$6,658	$5,015	($1,643)

Explanation of Changes

- Project schedule change of 2 years and spending change due to updated cash-flows for land purchases.

CEB Impacts

- None identified at this time.

S. 622 Cosgrove Tunnel Redundancy

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 1 (See Appendix 3)

To plan, design and construct the recommended redundancy improvements the Cosgrove Tunnel.

Project History and Background

This project evaluated alternatives and developed conceptual designs and cost estimates to provide redundancy for the metropolitan tunnel system and the Cosgrove Tunnel.

For the western system, the Board of Directors approved the construction of a new pump station to provide redundancy for water supply to the John J. Carroll Water Treatment Plant and to support the shutdown and repair of the Cosgrove Tunnel.

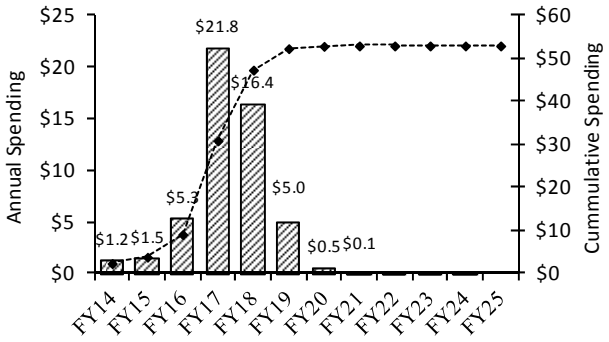
Scope

Sub-phase	Scope	Status
Wachusett Aqueduct Pump Station Design/ESDC/RI and Construction (7156/7517)	Design and construction of an emergency pump station to pump water from the Wachusett Aqueduct to the Carroll Water Treatment Plant. Pump station will provide redundancy in the event of a failure at the Cosgrove Tunnel or Intake and for the inspection/rehabilitation of the Cosgrove Tunnel. During a planned or emergency shutdown of the Cosgrove Tunnel, the existing gravity Wachusett Aqueduct with the proposed emergency pump station could deliver approximately 240 million gallons per day (mgd) of raw water to the CWTP for full treatment. The 240-mgd capacity would allow for unrestricted supply for at least eight months during the lower-demand fall/winter/spring period. This project, along with the completed Hultman Aqueduct rehabilitation and interconnections project, will provide fully treated water transmission redundancy from the Wachusett Reservoir to the beginning of the metropolitan distribution system in Weston.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$53,030	$9,132	$43,899	$12,841	$16,435	$46,232	$5,621	$0

Cosgrove Tunnel Redundancy



Project Status 6/16	17.2%	Status as % is approximation based on project budget and expenditures. Wachusett Aqueduct Redundancy Pump Station Design/ESDC/RI contract was awarded in January 2012. Wachusett Aqueduct Pump Station Construction commenced in March 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$52,053	$53,030	$977	May-20	May-20	-	$46,501	$46,232	($269)

Explanation of Changes

- The Wachusett Aqueduct Pump Station Design/ESDC/RI and Construction contracts were previously part of the Long-Term Redundancy project but are now established as a separate project.
- Project cost change due to inflation adjustments on unawarded contracts.
- Spending change due to updated Substantial Completion date of five months on the Wachusett Aqueduct Pump Station - Construction contract.

CEB Impacts

- None identified at this time.

S. 623 Dam Projects

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 2 (See Appendix 3)

To evaluate, design, and make necessary safety modifications and repairs to dams for proper operation as a result of the 2004 MOU between MWRA and DCR.

Project History and Background

Massachusetts Dam Safety Regulations, 302 CMR 10.00, require modifications to the Framingham Reservoir No. 3 (Foss) Dam to provide a spillway system capable of passing the applicable Spillway Design Flood (SDF) or safely storing this same flood within the reservoir without a spillway or other emergency overflow structure. Based on existing Hydraulics and Hydrology studies for Foss Dam, needed improvements may include spillway modifications and/or a parapet wave wall to safely pass the SDF. Dam Safety Regulations may also require dam embankment armoring to protect against overtopping.

All earthen dams and masonry dams under MWRA responsibility were built in the late 1800s to early 1900s and are in periodic need of maintenance. Based on completed internal inspections, repairs are needed including rip rap re-setting and replacement, mitigation of erosion features, and addressing mortar loss and consequent minor leakage at gatehouses are necessary at Foss, Weston, Chestnut Hill, Sudbury and Wachusett Open Channel Lower dams.

Scope

Sub-phase	Scope	Status
Dam Safety Modifications and Repairs	Provide Design and ESDC for required Dam Safety Modifications and Repairs. Construct parapet wave walls on dam crests to safely contain the SDF at the Weston Reservoir Dam. At present, alternatives are being evaluated at Foss.	Completed
Quinapoxet Dam Removal Design/ESDC/RI and Construction	Provide final design, ESDC/RI, and construction for the removal of the Quinapoxet Dam adjacent to the Oakdale Pump Station. The removal of the dam will help landlocked fish in the Wachusett Reservoir to reach spawning grounds in the Quinapoxet River.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$4,538	$3,116	$1,422	$0	$515	$546	$907	$0

Project Status 6/16	68.7%	Status as % is approximation based on project budget and expenditures. Design phase for Dam Safety Modifications and Repairs began in September 2009. Dam Safety Modifications and Repairs Construction commenced in August 2011 and reached substantial completion in September 2012.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$4,538	$4,538	$0	Dec-20	Dec-20	None	546	$546	$0

Explanation of Changes

- N/A.

CEB Impacts

- None identified at this time.

S. 625 Metropolitan Tunnel Redundancy

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 1 (See Appendix 3)

To plan, design and construct the recommended redundancy improvements to the City Tunnel, the City Tunnel Extension, the Dorchester Tunnel and the Cosgrove Tunnel.

Project History and Background

This project includes the study, permitting, design, and construction of redundancy improvements to critical elements of the water transmission system. The study phase evaluated alternatives and developed conceptual designs and cost estimates to provide redundancy for the metropolitan tunnel system and the Cosgrove Tunnel.

The metropolitan tunnel system was evaluated first with emphasis on providing redundancy for Shaft 7 of the City Tunnel. Historically, the plan for providing redundancy for the metropolitan tunnel system was based on one or more proposed parallel deep rock tunnel loops from the terminus of the Hultman Aqueduct and MetroWest Tunnel in Weston into the metropolitan area. The focus of this study was to develop and evaluate alternative surface pipe improvements, in addition to revisiting previously proposed tunnel loops, to achieve an acceptable level of redundancy at a lower cost.

The tunnels in the Metropolitan Boston area, i.e. the City Tunnel, City Tunnel Extension, and Dorchester Tunnel remain a weak link in the water transmission system. While the integrity of the underground tunnel sections is believed to be good based on very low, unaccounted water levels in the MWRA transmission system, there is still risk of failure mainly due to pipe and valve failures at the surface connections to the distribution system or due to major subsurface failures as a result of earthquakes or geological faults. A rupture of piping or a valve failure at surface connections points on any of the metropolitan area tunnel shafts would cause an immediate loss of pressure throughout the entire High Service area and would require difficult emergency valve closures and lengthy system repairs. The assumption is that tunnels have a useful life of 100 years but these subsurface structures have not been inspected and their actual condition is unknown because they cannot be shut down for inspection. Facilities at the top of tunnel shafts have been examined and a number of hardening measures are needed for risk reduction at these sites. Completion of distribution system storage projects at Blue Hills and the Spot Pond Storage Facility also assist in mitigating the effects of local pipe ruptures.

In the event of a failure of the City Tunnel, a limited amount of water could be transferred through the WASM 3 (scheduled for major rehabilitation) and WASM 4 (rehabilitation completed) pipelines and the Sudbury Aqueduct would need to be brought on-line. Extensive use of the Sudbury Aqueduct/Chestnut Hill Emergency Pump Station and open distribution storage at Spot Pond and Chestnut Hill would be required. Supply would be limited and a boil order would be put in place. Failure of the City Tunnel Extension would be similar with reliance on WASM 3 and open storage at Spot Pond.

The redundancy study was undertaken to recommend a phased program which could be implemented over a period of years. The study reviewed currently proposed MWRA pipeline improvement projects and recommendations as to changes in size and/or alignment to contribute to the objective of transmission redundancy within the metropolitan system.

For the western system, the Board of Directors approved the construction of a new pump station to provide redundancy for water supply to the John J. Carroll Water Treatment Plant and to support the shutdown and repair of the Cosgrove Tunnel.

For the metropolitan tunnel system, additional study has focused on the evaluation of new tunnels for providing redundancy. Several tunnel alternatives have been considered and staff presented a recommended plan to the Board of Directors in the fall of 2016. Staff also presented recommended plan to the MWRA water communities in December 2016. The recommended plan includes both northern and southern components. The northern and southern components are identified below in the Planning, Design and Construction phases.

Subsequent Design, Permitting and Construction phases will follow-up on the recommendations of the study. The Design and Construction costs have been updated based on the recommendations of the study. Long-Term Redundancy is one of the MWRA's largest undertakings in the next decade, and a variety of options are still being evaluated.

Scope

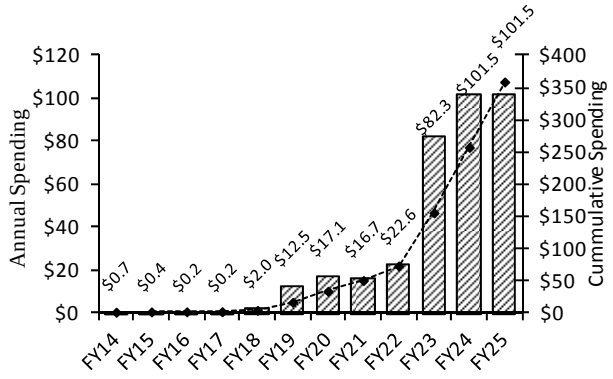
Sub-phase	Scope	Status
Water Transmission Redundancy Plan (6273)	Evaluation and recommendations of alternatives for long term redundancy.	Completed
Sudbury Aqueduct Pre-MEPA Review & Preliminary Design/EIR (7352)	Study and Pre-MEPA review of the Sudbury Aqueduct as a potential element for providing redundancy in the southern portions of the metropolitan tunnel system. Evaluate alternatives and conduct MEPA review for Sudbury pressurization. Also, includes final design and CA/RI for Rosemary Brook Siphon Buildings repair/stabilization.	Active
Conceptual Design Environmental Impact Report (7159)	Concept design, permitting and MEPA environmental review of the Northern and Southern Tunnel Loops.	Future
Construction Management (7356)	Constructability review of final documents. Full inspection of all construction activity, as well as provision of construction support services including environmental and safety compliance, claims assistance, contract administration, quality assurance testing, community relations, labor relations, and provision of technical assistance.	Future
Final Design/Engineering Services During Construction (7556)	Final Design and Engineering Services During Construction of the Northern and Southern Tunnel Loops, including connecting mains.	Future
Tunnel Construction (7291)	Construction of the Northern and Southern Tunnel Loops.	Future
Tops of Shafts Connecting Mains Surface Construction (7357)	Construction of Connecting Mains between existing facilities and the various tunnel shafts along the Northern and Southern Tunnel Loops.	Future
Tops of Shafts Rehabilitation Design CA/RI (7521) and Construction (7522)	Design CA/RI and Construction to rehabilitate the Tops of Shafts of the existing tunnel system.	Future

Sub-phase	Scope	Status
Shaft 7 Buildings Design CA/RI and Construction (7558/7559)	Design and construction of a new access building above the Shaft 7 Top of Shaft structure including new electrical service, HVAC equipment, piping corrosion protection, PRV replacement, new flow meters, and structural and access improvements to the facility.	Future
Public Relations Legal and Administrative	Community agreements, land takings and Owner Controlled Insurance Program for the Northern and Southern Tunnel Loops.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$1,357,686	$3,009	$1,354,677	$228	$2,020	$3,591	$151,111	$1,201,319

Metropolitan Tunnel Redundancy



Project Status 6/16	0.2%	Status as % is approximation based on project budget and expenditures. An engineering services contract for the Water Transmission Redundancy Plan was completed in September 2011. Sudbury Aqueduct MEPA Review was awarded in September 2012.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$1,474,687	$1,357,686	($117,001)	Jul-38	Jun-39	11 mos.	$63,435	$3,591	($59,844)

Explanation of Changes

- Project was previously called Long Term Redundancy.

- Project cost change primarily due to WASM 3 Rehabilitation, $61.2M, WASM 3 Sliplining, $58.6M, and Chestnut Hill Emergency Pump Station Stand-by Generator, $8.9M transferred to the Metropolitan Redundancy Interim Improvements project. Also, Chestnut Hill Final Connections Construction contract was transferred to Chestnut Hill Connecting Mains Project, $12.2M and Wachusett Aqueduct Pump Station Design and Construction was transferred to the Cosgrove Tunnel Redundancy project, $53.0M. This was partially offset by Shaft 7 Design and Construction work transferred from the Chestnut Hill Connecting Mains project, $6.2M. Other changes include updated cost estimates as a result of restructuring Tunnel Conceptual Design, $74.3M, Final Design/Engineering Services During Construction and Construction Management, $12.7M contracts. Also due to inflation adjustments on unawarded contracts.

- Schedule change due to Shaft 7 Buildings Design and Construction contracts transferred to this project.

- Spending change primarily due to Wachusett Pump Station Design and Construction phases transferred to Cosgrove Tunnel Redundancy project, $53.0M and restructuring Tunnel Conceptual Design, $13.8M, Final Design ESDC, and Construction Management contracts as well as updated cash-flow for Sudbury Aqueduct MEPA Review, $1.5M.

CEB Impacts

- None identified at this time.

S. 628 Metropolitan Redundancy Interim Improvements

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 1 (See Appendix 3)

To plan, design and construct the recommended interim redundancy improvements to the existing tunnel system, to protect or needed as back-up in case of failure.

Project History and Background

Design and Engineering Services during construction for four construction contracts that will be completed in the near term while the proposed tunnel redundancy project goes through environmental review, design and construction. These construction projects are needed to protect and improve critical facilities related to the existing tunnel system, or are needed as back-up means of supply in the event that one or more elements of the existing tunnel system fail. The construction projects include the Top of Shafts Interim Improvements, Chestnut Hill Emergency Pump Station improvements, Chestnut Hill Emergency Generator, WASM/SPSM PRV Improvements and rehabilitation of WASM 3.

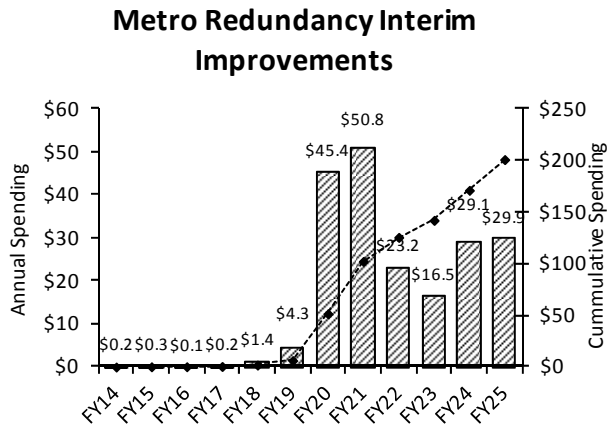
Scope

Sub-phase	Scope	Status
Metropolitan Redundancy Interim Improvements Design CA/RI (7560)	**Design and Engineering Services during construction for Top of Shafts Interim Improvements, Chestnut Hill Emergency Pump Station improvements, Chestnut Hill Emergency Generator and WASM/SPSM PRV Improvements that will be completed in the near term while the proposed tunnel redundancy project goes through environmental review, design and construction.**	**Future**
Tops of Shafts Interim Improvements Construction (7561)	**This project will provide strengthening of pipe directly connected to the tunnel system, if it is found to be deteriorated, cathodic protection for pipe connections to prevent further corrosion, replacement of faulty air valves directly on the shafts and piping, replacement of nuts on valve connections if found to be at risk, improvements to dewatering systems inside shafts, and installation of additional valves to allow isolation of the tunnel without operating old valves that are directly connected to the tunnel.**	**Future**

Sub-phase	Scope	Status
Chestnut Hill Emergency Pump Station Improvements Construction (7562)	**The Chestnut Hill Emergency Pump Station is in need of improvement to piping and pumping systems to reduce surge loads on the suction and discharge piping during emergency operation when the Dorchester Tunnel is out of service. Discharge pressures from the pump station would exceed normal pressures in community pipelines increasing risk of failure during emergency operation. Also, coordination of pump station operation between Chestnut Hill and Newton Street and Hyde Park pump stations is of concern. With CHEPS not operating, grade lines in the Southern High system fall below acceptable levels at high points in the system and Blue Hills tank is unable to be filled. Improvements under this contract include potential pump and motor replacement, pipe reconfiguration, surge controls, and possibly installation of variable frequency drives on motors to regulate discharge pressures.**	**Future**
Chestnut Hill Emergency Pump Station Emergency Generator Construction (7566)	Construction for the Chestnut Hill Emergency Pump Station Emergency Generator and electrical connections.	Future
WASM 3 Rehabilitation MEPA/Design CA/RI (6539) and Construction (Sliplining 6543 and Rehab 6544)	MEPA/Design CA/RI and construction of the WASM 3 rehabilitation from the Hultman Aqueduct Branch in Weston to the existing PRV chamber near Section 12 at Medford Square. Construction will include cleaning and cement mortar lining, some sliplining and some pipe replacement.	Active/Future
WASM/Spot Pond Supply Mains West PRV Improvements (7563)	**This project was developed as a phase of contingency planning until the new tunnel system is in place. The project will allow the Low Service system to be utilized to increase the supply to the Gillis Pump Station in Stoneham to avoid the need to pump out of the Spot Pond Reservoir in an emergency. The Low Service pipelines would be operated at grade lines consistent with WASM 3 grade line to push additional flow to the Gillis Pump Station in an emergency. Low Service revenue meters would require pressure reducing valves to lower pressures to communities along the way. In addition, PRV's on WASM 3/4 would also require replacement to maximize the supply to the north.**	**Future**
Section 101/Waltham Section Design CA/RI and Construction (7547/7457)	Design Construction Administration/Resident Inspection and Construction of 8,800 linear feet of a new connection to Waltham from the Northern Extra High Service Area.	Future
Commonwealth Avenue Pump Station Improvements Design CA/RI (7523) and Construction (7524)	Design, engineering services during construction, resident engineering/inspection services and construction to provide improvements to the Commonwealth Avenue Pump Station. The project includes new pipe connections to the Low Service Pipes and two new pumps (one replacement and one additional) for redundancy. Also, includes Supervisory Control and Data Acquisition (SCADA) controls, new electric switchgear, electric transformers, and heating, ventilation and air conditioning equipment to replace older equipment.	Active/Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$213,372	$503	$212,869	$223	$1,350	$2,076	$140,302	$70,994



Project Status 6/16	0.2%	Status as % is approximation based on project budget and expenditures. WASM 3 MEPA/Design CA/RI commenced in July 2013. Commonwealth Avenue Pump Station Improvements Design CA/RI was awarded in November 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$0	$213,372	$213,372	n/a	Jun-26		$0	$2,076	$2,076

Explanation of Changes

- Project cost and spending changes primarily due to setting up new interim project which includes new projects for Metropolitan Redundancy Interim Design/Construction Administration/Resident Inspection, $10.4m, Tops of Shafts Interim Improvements Construction, $6.1M, Chestnut Hill Emergency Pump Station Improvements Construction, $18.3M, and Weston Aqueduct Supply Mains/Spot Pond Supply Mains PRV Construction, $8.2M. Also, the addition of other contracts that were transferred from other projects including Chestnut Hill Emergency Pump Station Emergency Generator, $8.9M, WASM 3 MEPA Design/Construction Administration/Resident Inspection, $15.5M, WASM 3 Sliplining, $58.6M, WASM 3 Rehabilitation Construction, $61.2M, Section 101 Watertown Section Design and Construction, $15.8M and Commonwealth Avenue Pump Station Improvements Design/Construction/Administration/Resident Inspection and Construction, $10.3M.

CEB Impacts

- None identified at this time.

S. 630 Watershed Division Capital Improvements

Project Purpose and Benefit

☑ *Extends current asset life*
☑ *Fulfills regulatory requirement*
☑ *Improves system operability and reliability*
☑ *Continues to improve public health*

To renovate an aging Quabbin Administration Building complex to address existing code or operational deficiencies, energy efficiency, employee and public access. Also, to comply with regulatory requirements by Massachusetts Department of Environmental Protection related to Quabbin Administration Buildings water and wastewater systems.

Project History and Background

DWSP Quabbin/Ware Region facilities support a staff of approximately 80 employees, and provide recreational opportunities and services to more than 500,000 visitors annually to the reservoir.

Construction of the QAB was completed in 1938 and it is not uncommon to find original system controls still operational today (77 years). One of the more pressing needs is the rehabilitation of critically important utilities and support systems that both distribute power and water throughout the facility. Most of these system components are exhibiting signs of deterioration (e.g. wiring, plumbing, heating) and preemptive actions are necessary to avoid catastrophic failures.

The significant investment of capital into the restoration of the facility will also trigger necessary upgrades to satisfy today's more stringent standards for Universal Access, public safety and occupational standards. Example of possible Code induced upgrades may include added environmental safeguards for occupational safety (e.g. ventilation and hazard abatements), installation of fire alarms and expanded fire protection systems, universally accessible access routes to and from the building and special accommodations (e.g. elevator, public restrooms).

Mechanical control systems for the distribution of steam throughout the Complex are very old, antiquated systems that need modernization to ensure continued reliable operation. Many components also fail to satisfy current building code requirements and would require upgrading.

As discussed above in the Quabbin Administration Building Complex: Major Renovations Project, there are many building components that need work. Two issues that need immediate attention are the boiler room wastewater discharges and the leaking water system. In 2013, the Quabbin Administrative Building (QAB) water supply system came under scrutiny by the MA Department of Environmental Protection and the State Plumbing Inspector. DEP is requiring that floor drains located inside of the buildings boiler room be abandoned and that daily well withdrawal levels be brought down to acceptable levels. Also, in 2014 wastewater discharges from the MWRA laboratory inside of the QAB facility were authorized by the DEP under the condition that daily wastewater flows be verified and shown to be within approved limits. The DWSP has initiated monitoring of wastewater flows from the QAB facility and anticipates that future upgrades to the septic system will be needed. In order to satisfy these mandates, significant investments are needed to retrofit existing mechanicals and make significant improvements to the distribution of water and handling of wastewater throughout the building immediately.

These improvements will be needed no matter what form of Quabbin Administration Building renovations are determined to be needed under the larger capital project. These two issues are essentially "fast-track" components on the larger project needed for regulatory compliance. Using professional engineering consultants, DCR will have complete repair designs by end of June 2016. The water/wastewater work included in this Fast Track project will be completed in FY17.

Scope

Sub-phase	Scope	Status
Quabbin Administration Building Rehabilitation Design/ Construction Administration and Construction	**Design and Construction for improvements at the Quabbin Administration Building.**	**Future**

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$15,000	$0	$15,000	$0	$614	$614	$14,386	$0

Project Status 6/16	0%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY17	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$0	$15,000	$15,000	n/a	Jul-21		$0	$614	$614

Explanation of Changes

- New project added for the Quabbin Administration Building Rehabilitation.

CEB Impacts

- None identified at this time.

S. 677 Valve Replacement

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Fulfills a regulatory requirement*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To replace, repair or retrofit approximately 500 blow-off valves and several hundred main line valves within the pipeline distribution system. Blow-off valve retrofits eliminate cross-connections into sewers or drainage piping. Main line valve replacements improve MWRA's ability to respond to emergency situations such as pipe breaks and provide tight shutdown for pipeline construction projects. Faster response reduces negative impacts on customers. Combining the two valve replacement efforts reduces the need for repeat construction at sites and alleviates traffic impacts, re-paving needs, and other site-specific issues.

Project History and Background

MWRA owns and operates nearly 300 miles of distribution pipeline which contain approximately 1,109 blow-off valves and 1,246 main line valves. Some blow-off valves are cross-connected into sewers or drainage piping. To ensure there is no chance of contamination, DEP requires retrofitting of the blow-off valves to provide air gaps to ensure that non-potable water cannot reach the potable water lines. In addition, many of the main line valves in the system are significantly beyond their original design life. Many of these are either inoperable or inadequate and require replacement, repair, or retrofitting.

However, significant progress has been made in the last several years in correcting the cross connections at the blow-offs and in replacing defective main line valves and adding new valves to improve operations throughout the system. The valve replacement program continues this process. MWRA utilizes in-house crews and outside contractors to replace several blow-off and main line valves every year, both as part of the Valve Replacement Program and pipeline rehabilitation contracts.

Scope

Sub-phase	Scope	Status
Design/Phase 1	Design of valve replacements, setting priorities based on the level of urgency or risk associated with each valve and scheduling work on valves that would not otherwise be replaced during upcoming pipeline rehabilitation projects.	Completed
Construction - Phase 1 (5126)	Purchase and installation of 27 blow-off valve retrofits.	Completed
Construction - Phase 2 (6105)	Purchase and installation of 10 blow-off valve retrofits and 10 main line valve replacements.	Completed
Construction - Phase 3 (6278)	Purchase and installation of 10 blow-off valve retrofits and 12 main line valve replacements as well as rehabilitation of two meters.	Completed

Sub-phase	Scope	Status
Construction - Phases 4, 5 & 6 (6345, 6346, 6435)	For each phase, purchase and install blow-off valve retrofits and main line valve replacements and rehabilitation of miscellaneous meters. Phase 4 Contract included 12 main line valves, 10 blow-off retrofits, 2 check valves and the rehabilitation of 2 meters. Phase 5 Contract included 10 blow-off valve retrofits and 13 main line valve replacements. Phase 6 included 4 blow-off valve retrofits, 8 main line valve replacements and 9 globe valves (tank isolation).	Completed
Construction Phases 7, 8 & 9 (6436, 7195, 7236)	For each phase, purchase and install blow-off valve retrofits and main line valve replacements and rehabilitation of miscellaneous meters. Each phase includes approximately 10 blow-off valve retrofits and 10 main line valve replacements.	Completed/Future
Design CA/RI Phases 8 & 9 (7417, 7418)	Design/Contract Administration/Resident Inspection for construction of Phases 8 and 9.	Future
Equipment Purchase (6088)	Purchase of approximately 20 main line valves per phase for ten phases for replacement work to be done by in-house staff. Also includes the cost of line stops associated with this work.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$20,115	$12,016	$8,098	$0	$0	$0	$3,558	$4,540

Project Status 6/16	59.7%	Status as % is approximation based on project budget and expenditures. Phases 1-6 are complete. Phase 7 was completed in April 2013. Design CA/RI for Phase 8 is expected to commence in FY19.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$22,749	$20,115	($2,634)	Jun-28	Jun-28	None	$2,153	$0	($2,153)

Explanation of Changes

- Project cost and spending changes due to Equipment Purchases budget reduced to actuals since phase is no longer needed, $2.9M. This decrease was partially offset by inflation adjustments of $0.3M on unawarded contracts.

CEB Impacts

- None identified at this time.

S. 692 Northern High Service – Section 27 Improvements

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To rehabilitate/replace a segment of pipe originally installed in 1898 in Lynn which suffers from poor hydraulic performance and frequent leakage. Rehabilitate/replacement of approximately 7,200 linear feet of pipeline will improve service to the communities north of Lynn.

Project History and Background

Section 27 is a 12–20 inch diameter cast iron main installed in 1898 that serves the communities north of Lynn. The main has become severely corroded. As a result of this deterioration, various major leaks have occurred since 1966. Because the main runs under major thoroughfares in Lynn, repair of leaks is disruptive and costly. Appropriate corrosion control methods will be employed on the pipeline to minimize corrosion potential in Section 27. During preliminary design, an evaluation determined MWRA should abandon the portion of Section 27 that parallels Section 91 and an adjacent pipeline, Section 35.

Scope

Sub-phase	Scope	Status
Construction Section 27 (6333)	Rehabilitation/replacement of 7,200 linear feet of pipeline to replace severely corroded pipe.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$1,134	$124	$1,010	$14	$13	$28	$983	$0

Project Status 6/16	10.9%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$1,097	$1,134	$37	Nov-19	Nov-21	24 mos.	$183	$28	($155)

Explanation of Changes

- Project cost change due to inflation adjustments on unawarded contracts.
- Project schedule and spending changes due to updated Notice-to-Proceed 2 years later for Section 27 Construction due to other project priorities.

CEB Impacts

- None identified at this time.

S. 693 Northern High Service - Revere and Malden Pipeline Improvements

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To improve the delivery capabilities of major distribution lines serving the Northern High System. The existing pipelines are inadequate and suffer from extensive corrosion and leakage. Replacement, rehabilitation, and/or reinforcement will provide a strong and reliable means to convey water from the City Tunnel Extension to communities in the northern and eastern portions of the Northern High Service Area.

Project History and Background

The southeast corner of the Northern High Service Area has experienced pressure deficiencies because of undersized pipes and extensive pipeline corrosion. The corrosion problems have led to numerous leaks and pressure deficiencies which can cause fire-fighting difficulties. These deficiencies particularly affect Malden, Revere, Lynn, Winthrop, Deer Island, East Boston, Saugus, Nahant, Peabody, Marblehead, and Swampscott. To correct these problems, MWRA is implementing a series of pipeline improvements.

This project includes installation of pipeline on Sections 97, 97A and 68 in Revere and Sections 49, 53, 53A and Shaft9A-D in Malden; rehabilitation of Sections 53 and 55 in Revere; and installation of control valves to improve water pressure. All the work for this project, with the exception of the design and construction of Section 53 connections and Section 53A, Section 68 and the Shaft 9A-D Extension is complete. Completion of this construction will improve the pressure and flow of water conveyed to the Northern High Service Area.

A hydraulic study of the distribution system recommended that MWRA install a new pipeline in Revere, beginning at the Everett/Chelsea/Revere border and extending through Revere to the East Boston border. This new pipeline runs parallel with existing pipelines and carries a large portion of the flow formerly carried by the existing system, thereby increasing water pressure and flow to Revere, East Boston, Winthrop, and Deer Island, particularly during periods of high demand. Installation of new control valves was required to regulate water pressure and fill the Winthrop standpipe. The original control valves between Winthrop pipelines and MWRA transmission mains were inadequate. Fluctuations in pressure threatened to rupture the town's pipelines. More efficient valves were required to eliminate the danger. Flow tests performed on Sections 32 and 55 of the existing Revere and Winthrop pipelines revealed that these sections had severe flow problems. The pipelines were only able to carry a fraction of the designed capacity because of internal corrosion. Cleaning and lining the pipelines restored flow capacity.

Section 53 in Malden and Revere was an 18,900-feet long, 30-inch diameter steel pipeline, exceeding 60 years of age. Workers dug four test pits to determine the condition of this pipeline and uncovered 18 holes in the pipe. Investigations into recent failures revealed severe corrosion through the pipe wall in several locations. Replacement of the Malden portion of Section 53 with a new 48-inch diameter pipe has been completed. The Revere portion of Section 53 has been sliplined with 24-inch diameter steel pipe. In addition to feeding into the new 48-inch Saugus/Lynn pipeline, this pipe plays an important role in the supply network for Deer Island. Sections 49 and 49A, old 24-inch pipelines, are used to connect Section 53 to Shaft 9A of the City Tunnel. They are undersized for this purpose and are a severe restriction. A new 3,500-lf, 48-inch diameter pipe (proposed Section 53A) is needed to reinforce Sections 49 and 49A. A 1,000-lf, 20-inch diameter pipe, portion of Section 68, interconnects Section 53 with the new Saugus/Lynn pipeline. This section is undersized and needs to be reinforced with 1,000 lf of new 48-inch diameter pipe to improve hydraulic capacity. Approximately 4,000 lf of Section 14, an existing 30-inch diameter cast-iron pipe installed in 1916, will be cleaned and cement mortar lined to improve

redundancy for Section 84. The Shaft 9A-D Extension will provide a more reliable connector from Shaft 9A of the City Tunnel Extension to the Section 99 pipe that serves as the suction line to the Gillis Pump Station.

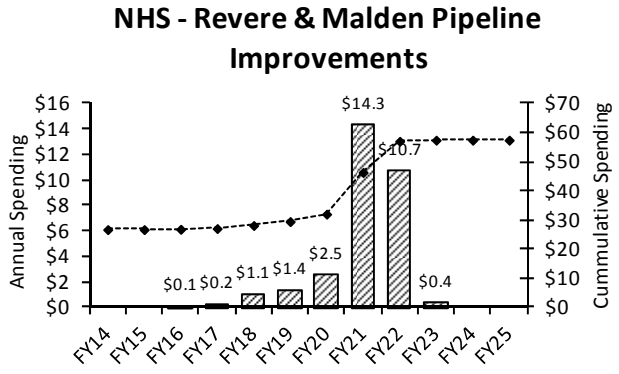
Scope

Sub-phase	Scope	Status
Design/CS/RI – Revere/Malden	Design, construction services, and resident inspection for Section 53 in Malden and Sections 97 and 97A in Revere.	Completed
Construction Revere Beach (5186)	Installation of 5,491 linear feet of 36-inch pipeline and 10,111 linear feet of 30-inch pipeline on Section 97, as well as 3,872 linear feet of 24-inch pipeline, and 1,350 linear feet of 20-inch pipeline on Section 97A in the vicinity of Revere Beach Parkway.	Completed
Construction Malden Section 53 (5176)	Installation of 11,907 feet of 48-inch diameter pipeline in Malden on Section 53.	Completed
Construction Linden Square (5238)	Construction and construction administration of a 1,000 linear feet segment of Section 53 in the Linden Square area of Malden. The Massachusetts Highway Dept constructed this section as part of its roadway reconstruction project around Linden Square.	Completed
Construction Revere Section 53 (5177)	Rehabilitation of 4,900 linear feet of 30-inch pipe in Revere on Section 53 and replacement of 1,500 linear feet under Route 1 in Revere.	Completed
Construction Road Restoration	Design, construction administration, and construction of the full road restoration to ensure a stable road surface without cracking on Eastern Avenue in Malden in compliance with the requirements of the Massachusetts Architectural Access Board. The City of Malden will do this work.	Completed
Construction Control Valves (5191)	Installation of control valves needed to regulate water pressure and fill the Winthrop standpipe.	Completed
Construction DI Pipeline Cleaning & Lining (5179)	Design and cleaning and lining of the 2,000 linear feet, 8-inch diameter water supply main to Deer Island.	Completed
Construction – Winthrop C&L (5178)	Rehabilitation of 7,900 linear feet of 16-inch diameter pipe on Section 32 and 20-inch diameter pipe on Section 55 in Revere and Winthrop.	Completed
Section 53 and 99 Connections Design CA/RI (7485)	Water Supply Plan Design, Construction Administration, Resident Inspection for Sections 53 and 99 Connections.	Future
Construction Section 53 Connections (6335)	Final Design, Construction Administration, Resident Inspection, and Construction of 1,000 linear feet of new 48-inch pipe in Revere and 4,500 linear feet of new 48-inch pipe in Malden plus rehabilitation of 4,000 lf of Section 14. These proposed pipelines will eliminate hydraulic restrictions and better integrate Section 53 into the Northern High distribution system.	Completed
Section 99 Connections Construction (6958)	Construction of approximately 3,000 linear feet of new 60-inch diameter pipeline in Malden connecting the Shaft 9A-D line (60-inch dia.) to Section 99 (72-inch dia.).	Future

Sub-phase	Scope	Status
Section 56 Repl./Saugus River Feasibility Study (7500), Design CA/RI (7454) and Construction (7486)	Feasibility Study, Design CA/RI, and Construction to replace failed 20/30-inch diameter steel water main crossing of the Saugus River by trenchless methods. Main was installed in 1934 and is out of service. This main provides redundancy to Section 26 which is currently also out of service.	Active
Section 56 Demolition Design CA/RI (7535) and Construction (7536)	Section 56 Design Construction Services/Resident Inspection and Construction Pipe Demolition at General Edwards Bridge.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$57,527	$26,955	$30,572	$237	$1,050	$1,409	$29,295	$0



Project Status 6/16	46.9%	Status as % is approximation based on project budget and expenditures. Revere Beach, Malden Section 53, Revere Section 53 Construction and Linden Square construction are complete. Section 56 Feasibility Study began in December 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$55,010	$57,527	$2,517	Apr-22	Apr-22	None	$814	$1,409	$595

Explanation of Changes

- Project cost change primarily due to separate contracts added for Section 56 Demolition Design and Construction of $0.9M, updated cost estimates for Section 56 Replacement Design/Construction Administration/Resident Inspection of $0.5M and Section 53 and 99 Connections Design/Construction Administration/Resident Inspection contracts of $3.4M. Also, inflation adjustments on unawarded contracts.

- Spending change due to separate phases added for Section 56 Demolition, partially offset by restructuring and updated Notice-to-Proceed date of ten months for Section 53 and 99 Design/Construction Administration/Resident Inspection contract.

CEB Impacts

- None identified at this time.

S. 702 New Connecting Mains - Shaft 7 to WASM 3

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To provide redundancy and improve the reliability of WASM 3; provide hydraulic looping and redundancy, enable Intermediate High Sections 59 and 60 to be taken off-line for rehabilitation, and improve water quality by reducing the length of unlined cast iron water mains in the MWRA system. Completion of this project will help provide the basis for a strong hydraulic network of piping among WASM 3, WASM 4, and the City Tunnel. The future conversion of Sections 23 and 24 to the Intermediate High Service system to create a unified Intermediate High Service area connecting the Belmont and Commonwealth Avenue pump stations will also be possible.

Project History and Background

WASM 3 is a 56-inch to 60-inch diameter lock-bar steel pipe installed in 1926 and 1927. It is connected to the MetroWest Tunnel and Hultman Branch at the west end and the City Tunnel Extension at its east end. It extends from Weston through Waltham, Belmont, Arlington and Somerville to Medford. Most of its flow comes from the MetroWest Tunnel Shaft W, with peak flow of 57 million gallons per day. A lesser amount enters the main from the City Tunnel Extension Shaft 9. Upon completion of the Hultman Aqueduct and its interconnection to the Weston Aqueduct Terminal Chamber in 1941, WASM 3 became part of the High Service system. There are no connecting mains along the length of this 11-mile pipeline, and no other means available to adequately supply the nine communities it serves. WASM 3 serves communities northwest of Boston and is the sole source of supply to the Northern Extra High Service Area (Bedford, Lexington, Waltham, Arlington, and Winchester) and the Intermediate High Service Area (Belmont, Arlington, and Watertown). It also supplies a portion of the Northern High Service Area (Waltham, Watertown, Belmont, Arlington, Medford, and Somerville), and is a means of supplying the Spot Pond Supply Mains and Reservoir. WASM 3 serves a population of more than 250,000.

A break almost anywhere on this pipeline would result in severe service disruptions in Waltham, Watertown, Belmont, Arlington, Lexington, Bedford, and Winchester. Virtually no water would reach Waltham if a break were to occur at the west end of the pipeline; water normally supplied through the Shaft W connection would be forced through the Shaft 9 connection, increasing flows and reducing hydraulic grade lines in WASM 3, the City Tunnel, and City Tunnel Extension. The lack of redundancy also makes routine cleaning and lining of the 90-year old pipeline impossible. The need for maintenance is indicated by a significant number of leaks, particularly on the most vulnerable west end, which are the result of corrosion pitting through the pipe wall, as well as by the reduced carrying capacity of the line.

Completion of this project will facilitate conveyance of high service water from Shaft 9 of the City Tunnel Extension to WASM 3. This will be accomplished by rehabilitating existing mains between the City Tunnel Extension and WASM 3.

Previously proposed portions of this project have been eliminated or placed on hold until the Long-Term Redundancy study is completed. Specifically, the proposed new 48-inch diameter pipe through Newton and Waltham has been eliminated. The rehabilitation of Sections 23, 24, and 47 will proceed.

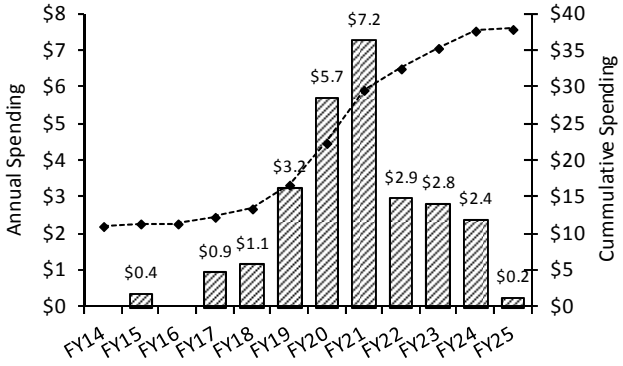
Scope

Sub-phase	Scope	Status
Watertown MOU	Payment to the City of Watertown to fund a portion of its Galen Street project to replace an existing 10-inch diameter pipeline with a new 12-inch diameter water main.	Completed
Routing Study (5163)	Identification of alternatives to determine the optimum approach for providing additional strong connections to WASM 3.	Completed
Design/CA/RI-DP1 (6383)	Design, construction administration and resident inspection services for a new 48-inch pipeline to interconnect WASM 3 with WASM 4 (CP-1). This design work was terminated based on the recommendation of the Long Term Redundancy Study.	Completed
Design DP2/4 Meter 120 (6384)	Design services for Section 47 from Meter 120 to WASM4. Construction Administration and Resident Inspection services to be performed by in-house staff.	Completed
CP2 C&L Sections 59 & 60 Construction (6548)	Cleaning and lining of 16,400 linear feet of 20-inch diameter pipe on Sections 59 and 60 (Intermediate High) from Section 25 in Watertown to Meter 121 in Arlington.	Future
Design/CA/RI and Construction of South Segment CP3 (6385/6392)	Cleaning and lining of 21,950 linear feet of 20-inch diameter pipe (Sections 24 & 47) and 5,800 linear feet of 36-inch diameter pipe (Section 23).	Active
NE Segment CP5 (6394)	Rehabilitation of 15,000 linear feet of 20 and 48-inch diameter pipe for Sections 18, 50, and 51 for the Northeast Segment plus Meter 32 replacement.	Completed
Design, CA/RI Replacement of Sections 25, 75, 59 & 60 (6955)	Design/Construction Administration/Resident Inspection services for Sections 25, 75, 59 & 60 pipelines.	Future
Section 25 Replacement Construction (6956)	Replacement of existing Section 25 (approximately 4,800 linear feet of existing 16" pipe) with a new pipeline.	Future
Section 75 Extension Construction (7484)	Addition of approximately 6,000 feet of new 30-inch diameter pipe to extend Section 75 from the Commonwealth Avenue pump station in Newton to Section 23, also in Newton, to provide a redundant feed to the Intermediate High Service area supplying Belmont and Watertown which also requires replacement of Section 25 under construction Contract 6956, above.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$37,861	$11,316	$26,545	$906	$1,143	$2,404	$21,907	$2,589

New Connecting Mains



Project Status 6/16	30.0%	Status as % is approximation based on project budget and expenditures. Northeast Segment CP-5 construction contract was completed in November 2011. Design of CP3 (Sections 23, 24 & 47) commenced in August 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$36,255	$37,861	$1,606	Jan-23	Mar-24	14 mos.	$2,559	$2,404	($155)

Explanation of Changes

- Project cost change primarily due to actual greater than budgeted award for South Segment, CP3 (Sections 23, 24, 47) Final Design/Construction Administration/Resident Inspection of $0.5M, updated cost estimates as a result of consolidating Sections 25, 75, and 59 & 60 Design/Construction Administration/Resident Inspection of $0.54M and inflation adjustments on unawarded contracts.

- Schedule and spending changes due to consolidating design phases for Sections 25, 75, and 59 & 60 and updating the Notice-to-Proceed dates for the Sections 75, and 59 & 60 construction contracts.

CEB Impacts

- None identified at this time.

S. 704 Rehabilitation of Other Pump Stations

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*
☑ *Improves system operability and reliability*

To rehabilitate five active pump stations (Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street) - each of which is more than 40 years old and is overdue for renewal for safety, reliability, and efficiency reasons. Project includes a future phase to rehabilitate Gillis, Newton Street, Lexington Street, and Commonwealth Ave pump stations.

Project History and Background

MWRA's waterworks distribution system includes ten active pump stations. Extensive rehabilitation of the James L. Gillis, Newton Street, Lexington Street, and Commonwealth Avenue pump stations was completed 20 years ago.

The Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street pump stations were built in 1907, 1936, 1937 and 1958, respectively and were overdue for major rehabilitation. The Brattle Court Pump Station serves the towns of Arlington, Lexington, Waltham, and Winchester. The Reservoir Road Pump Station serves Brookline. The Hyde Park Pump Station serves Boston, Milton, Norwood, Canton, Dedham, Westwood and Stoughton. The Belmont Pump Station serves Belmont, Arlington, and Watertown. The Spring Street Pump Station serves Lexington, Bedford, part of Waltham, Belmont, Arlington, and Winchester. Some equipment at each pump station were inoperable, and system demand patterns had shifted during the life of the stations, requiring adjustments to pumping capacity. In addition, station improvements have not kept pace with changes in building and safety codes.

MWRA has divided construction for these five pump stations into two contracts. The first contract (Construction - Interim Automation), based on a fast-track design was completed in February 2001, involved installation of Supervisory Control and Data Acquisition (SCADA) systems at each station. Under the second construction contract, MWRA completed rehabilitation of the five pump stations (Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street). The second construction contract was awarded in October 2006 and was substantially complete in June 2010.

The next phase will be to rehabilitate the Gillis, Newton Street, and Lexington Street pump stations. The Commonwealth Avenue Pump Station rehabilitation is included in Metropolitan Redundancy Interim Improvements project.

Scope

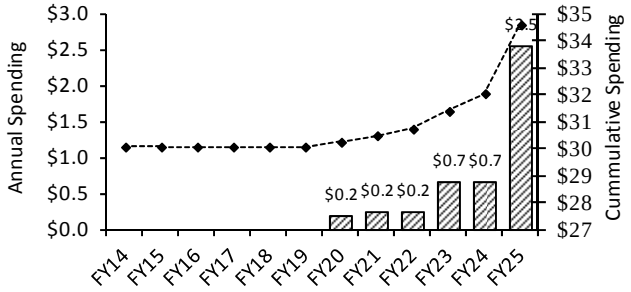
Sub-phase	Scope	Status
Preliminary Design (5153)	Planning and conceptual design including inspection and evaluation of the HVAC systems, buildings, pipes, valves, and other systems at the pump stations; determination of the need for improvements; and preparation of a conceptual design report.	Completed
Design 1/CA/RI (6110)	Design, Construction Administration and Resident Inspection for rehabilitation of five pump stations, including installation of SCADA systems.	Completed
Construction II and C (6304)	Installation of instrumentation at five pump stations to enable remote operation and monitoring.	Completed

Sub-phase	Scope	Status
Rehab of 5 Pump Stations (6375)	Rehabilitation of Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street pump stations, including installation of new mechanical, electrical, instrumentation, and security systems, and building and site refurbishment, and SCADA installation.	Completed
Proprietary Equipment Purchases (6676)	Purchase of proprietary materials for SCADA system for Interim Instrumentation and Control.	Completed
Design 2 CS/RI (6980)	Final Design, construction services, and resident inspection for rehabilitation of five pump stations.	Completed
Pump Station Rehabilitation Evaluation (7525), Design CA/RI (7526) and Construction (7527)	Rehabilitation of the Gillis, Newton Street, and Lexington Street pump stations. The pumps in these stations are over 20 years old and maintenance of the existing units will be an issue mostly due to availability of replacement parts. More efficient units will be installed based upon age and life of the equipment. Lexington Street is the only pump stations for its respective service area.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$50,258	$30,058	$20,200	$0	$93	$0	$1,321	$18,879

Rehab of Other Pump Stations



Project Status 6/16	59.8%	Status as % is approximation based on project budget and expenditures. Construction rehabilitation of 5 pump stations (Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street) was substantially complete in June 2010.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$55,058	$50,258	($4,800)	Jan-27	Jan-27	None	$253	$0	($253)

Explanation of Changes

- Project cost and spending changed due to transferring the Commonwealth Ave Pump Station Improvements Design/Construction Administration/Resident Inspection and Construction to the Metropolitan Redundancy Interim Improvements project.

CEB Impacts

- None identified at this time.

S.708 Northern Extra High Service - New Pipelines

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To improve hydraulic service and reliability for major portions of the Northern Extra High System. Existing lines are undersized and frequently experience pressure problems. Improvements will include construction of two new pipe segments and rehabilitation of an existing main.

Project History and Background

Sections 34 and 45 provide service to the Northern Extra High (NEH) communities of Waltham, Lexington, Bedford, Belmont, Winchester, and Arlington. The existing pipelines are not large enough to meet maximum day plus fire flow service goals. Construction of a new larger pipeline will improve reliability, pressure, and flows which will result in better fire protection and reduced pumping costs. Section 34, which is an undersized 1,532 linear feet 12-inch diameter cast iron main installed in 1911, may also be the source of water quality problems. The pipe is a key component of the NEH Service System and provides service between Brattle Court Pump Station and the community distribution systems. The remaining portion of Section 45 is a 16-inch diameter cast iron main 3,374 linear feet long that was installed in 1920. A portion of Section 45 was rehabilitated in an earlier phase of this project. The current phase includes rehabilitation of the remaining portion of the pipeline.

Scope

Sub-phase	Scope	Status
Design/CA/RI and construction – Sections 45, 63, and 83 (5242/6340)	Replacement of approximately 2,600 linear feet of Section 45 with 24-inch diameter pipe extending from the connection point at Meter 47 to Section 82 on Park Street at the Intersection of Paul Revere Road in Arlington; installation of about 2,100 linear feet of new 24-inch pipeline (Section 101), parallel to a portion of Section 83, starting from Meter 182 and proceeding to the intersection of Waltham Street (in Lexington and part of Waltham) and Concord Ave (in Lexington). Also, Rehabilitation of Section 63, consisting of about 3,400 linear feet of 20-inch pipeline connecting Section 63 to Meter 136.	Completed
Design and Construction Sections 34 & 45 (7404/6522)	Replacement of 1,532 linear feet of 12-inch diameter cast-iron pipe (Section 34) with new 20-inch diameter pipe and rehabilitation of 3,374 linear feet of 16-inch diameter cast iron main (Section 45).	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$8,045	$3,632	$4,413	$21	$36	$57	$3,599	$757

Project Status 6/16	45.1%	Status as % is approximation based on project budget and expenditures. Construction of a portion of Section 45 was completed in September 2001. Design of Sections 34 and 45 scheduled to start in FY19.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$7,889	$8,045	$156	Dec-23	Dec-23	None	$59	$57	($2)

Explanation of Changes

- Project cost increased due to inflation adjustments.

CEB Impacts

- None identified at this time.

S. 712 Cathodic Protection of Distribution Mains

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To evaluate the condition of existing cathodic protection systems and determine the feasibility of upgrading or installing cathodic protection systems to protect the system from corrosion.

Project History and Background

Within the MWRA water system there are approximately 300 miles of distribution pipe, 10 active pump stations, and 12 distribution storage facilities. A majority of the pipes are made of steel, cast iron and ductile iron and as a result subject to corrosion due to the environmental conditions in which they reside. In order to maintain pipe integrity, cathodic protection is utilized within the system. Proper cathodic protection decreases the number of pipeline leaks and failures and ensures the integrity of the water distribution system is maintained.

Approximately 68 miles or 24% of MWRA's waterworks pipelines ranging from 24 inches to 60 inches in diameter are made of steel and are particularly subject to corrosion from acidic soils, fluctuating groundwater levels (especially where the groundwater is saline), and stray electrical currents. These steel pipelines are located in 26 of MWRA's 50 water communities.

Cathodic protection reduces deterioration of structural material, thereby increasing pipeline and storage tank life and deferring the need for replacement. Without proper cathodic protection, pipeline leaks and premature pipeline and storage tank failures increase, causing potentially costly property damage and possible loss of service to customers.

Some sections of MWRA's existing steel pipes were originally equipped with cathodic protection systems intended to reduce the effects of corrosion. Other steel pipelines had cathodic protection systems installed sometime after the original pipe installation. Other steel pipelines have been rehabilitated and still other sections of steel pipeline have never received cathodic protection.

Scope

Sub-phase	Scope	Status
Planning	Evaluation of the condition of the steel pipelines, identification of areas of rapid corrosion due to stray currents, and design and installation of corrosion test stations.	Completed
Cathodic Protection Testing and Evaluation Program (6438)	Test and evaluate 1,019 cathodic protection test stations and 16 rectifiers including: level of protection; functionality of insulation joints; perform repairs; and indentify, recommend and test replacement electrodes.	Active
Design, CA/RI and Construction for Cathodic Protection at Shafts E&L and Section W16 (6439/6440)	Design and construction of Cathodic Protection at Shafts E & L and Section W16.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$1,704	$208	$1,496	$108	$42	$218	$1,345	$0

Project Status 6/16	12.2%	Status as % is approximation based on project budget and expenditures. Project Planning phase is complete. Cathodic Protection Testing and Evaluation Program commenced in August 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$1,656	$1,704	$48	Jan-20	Jan-20	None	$418	$218	($200)

Explanation of Changes

- Project cost and spending decreased due to Cathodic Protection Testing and Evaluation Program award was less than budget estimate. This was partially offset by updated cost estimates for work transferred from the MetroWest Shaft 5A/5 project.

- Spending changed due to updated schedule for Cathodic Protection Shafts E & L and Section W16 Design/Construction Administration/Resident Inspection phase.

CEB Impacts

- None identified at this time.

S. 713 Spot Pond Supply Mains - Rehabilitation

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To improve the condition, carrying capacity, and valve operability of the two long supply mains which extend north from Chestnut Hill to Spot Pond. These cast-iron mains, originally installed in 1899, deliver water to the Northern Low Service System. Improvements involve a combination of replacement, cleaning and lining, and valve replacement depending on specific site conditions and needs. Improving these supply lines will reduce the need to take water from the City Tunnel to augment the Low Service System and improve the quality of water delivered to eight user communities.

Project History and Background

The East and West Spot Pond Supply Mains (SPSMs) serve the Northern Low Service Area, including portions of Brighton, East Boston, Charlestown, Chelsea, Malden, Medford, Somerville, and Everett. The lines are also designed to fully supply Cambridge during drought or emergency. The mains have historically supplied Spot Pond and subsequently the James L. Gillis Pump Station (formerly the Spot Pond Pump Station). With the closure of Spot Pond as a water supply source and the construction of the Spot Pond Suction Main (Section 99) as the primary supply to the Gillis Pump Station, the Spot Pond Supply Mains serve as distribution mains to the eight communities and provide emergency backup supply to the Gillis Pump Station. In the event Section 99 is out of service, the station would take suction directly from these mains, rather than from Spot Pond. These mains interconnect with the new Spot Pond Water Storage Facility and pump station.

The East Spot Pond Supply Main consists of 61,000 linear feet of mostly 48-inch diameter pipe which passes through Brookline, Boston, Cambridge, Somerville, Medford, Malden, Melrose, and Stoneham. The West Spot Pond Supply Main consists of 53,000 linear feet of 48-inch and 60-inch diameter pipe that passes through Brookline, Boston, Cambridge, Somerville, Medford, and Stoneham. Portions of the SPSMs in Brookline, primarily on Beacon Street, were rehabilitated under the Boston Low Service Pipe and Valve Rehabilitation project.

The carrying capacities of the pipes had been significantly reduced as a result of the build-up of rust deposits (tubercules) and other matter along the pipe walls, which also contributed to water quality deterioration in the Low Service System. The ability of the mains to withstand service pressures was drastically reduced in some areas due to exterior corrosion of pipes. In addition, inoperable or poorly operating valves along the mains made isolation and re-routing of flow difficult to implement.

Section 67 is included in this project because it provides a connection between the East and the West SPSM from Section 11 at Porter Square in Cambridge to Section 4 at Union Square in Somerville. Section 67 consists of 6,900 linear feet of 48-inch diameter steel pipe constructed in 1949. Rehabilitation of this main was needed because of the age of the pipe and the critical role of the main in providing flow to the East and West mains during shut downs for maintenance and construction.

Internal lining of these mains to restore capacity and improve structural integrity, will ensure adequate peak and emergency flow to user communities, alleviate water quality deterioration, and provide emergency back-up capacity for the Northern High System and Northern Intermediate High via the Gillis Pump Station. MWRA's reconfiguration of the water distribution system provides for the Spot Pond Supply Mains to be fed from the City Tunnel Extension only during periods of peak demand, thus conserving tunnel supply for High Service use. Supply to the Low Service System will be provided by Weston Aqueduct Supply Mains 1 and 2, which are connected to the new Loring Road covered storage tanks in Weston that have been constructed as part of MWRA's MetroWest Water Supply Tunnel project. A portion of the supply is from WASM 4, which connects to the East and West Spot

Pond Supply Mains at Western Avenue and North Harvard Avenue and on Memorial Drive at Magazine Beach in Cambridge.

Completion of this project will improve pressures to the far reaches of the Northern High Service Area by reducing the demand burden on the City Tunnel Extension. The quality of water delivered to eight communities will improve as a result of the upgrade of 18 miles of deteriorated pipe.

Scope

Sub-phase	Scope	Status
Preliminary Design and Design/CA/RI (6223)	Preliminary design, design, construction administration, and resident inspection of the rehabilitation or replacement of Sections 3, 4, 5, 6, 7, 9, 10, 11, 12, 67, and portions of Sections 2, 16W, and 57.	Completed
North (Medford/ Melrose) Construction-CP1 (6317)	Cleaning and lining of 20,300 feet of 48-inch and 60-inch pipe in Medford, Malden, Melrose, and Stoneham (Sections 7 and 12). Replacement of valves and reconfiguration of blow-off valves to eliminate cross-connections with storm drains or sewers. Elimination of connection with Spot Pond (considered a cross connection with a non-potable water source), and configuration to allow emergency reconnection if needed.	Completed
Middle (Medford/ Somerville) Construction – CP2 (6381)	Cleaning and lining of 24,100 feet of the East Spot Pond Main (48-inch pipe) in Somerville and Malden (Sections 4, 5, 6, and 7) including reinforcement at rail and MBTA crossings; cleaning and lining of 14,000 feet of the West Spot Pond Main (48-inch pipe) in Medford and Somerville; and some steel pipe replacement on the Mystic Valley Parkway (800 feet, 60-inch, Section 16W), and Middlesex Fells Parkway (700 feet, 48-inch, Section 5 on land). Cleaning and lining on Somerville Avenue (Section 67, 6,500 feet of 48-inch steel). Replacement of valves throughout the pipelines, including in Medford Square at the interconnections of Sections 12, 16W, and 57.	Completed
South (Cambridge/ Boston) CA/RI Construction – CP3 (6382)	Cleaning and lining of 11,700 linear feet of the East Spot Pond Main in Charles River Crossing and Cambridge (48-inch, Sections 3 and 4) including valve replacement, and cleaning and lining of 16,800 linear feet of the West Spot Pond Main in Harvard St., Franklin St., No. Harvard Avenue, and Massachusetts Avenue (48-inch, Sections 9 and 11, Brighton and Cambridge).	Completed
Early Valve Replacement Contract (6475)	Installation of nine main line valves and associated blow-off valves, as well as permanent by-pass piping to meters and air valves. Also includes removal of pipe at three locations for materials strength testing.	Completed
Walnut Street Bridge Truss Design and Construction (6697/7483)	Section 4 Bridge Truss at Walnut Street spans New Hampshire-Maine Line is in need of repair, painting and possible replacement.	Future
Early Valve Equipment Purchase (6483)	Purchase Order for 12 valves that were installed from 1998-2001 as a precursor to the cleaning and lining contracts.	Completed

Sub-phase	Scope	Status
Section 4 Webster Ave Bridge Pipe Rehabilitation Design and Construction (7334/7335)	Section 4 is a 48-inch diameter cast iron main crossing the Webster Ave Bridge in Somerville that needed to be rehabilitated and was currently out of service due to pipe deflection and leakage. This project will return a currently isolated pipeline to service to provide redundancy.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$66,928	$63,601	$3,326	$2,001	$50	$4,670	$1,276	$0

Project Status 6/16	95.0%	Status as % is approximation based on project budget and expenditures. Work in CP1 (North), CP2 (Middle), CP3 (South) and the Early Valve Replacement Contract are complete. Section 4 Webster Ave Bridge Pipe Replacement Construction was completed.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$68,810	$66,928	($1,882)	Jan-23	May-22	(8) mos.	4,564	$4,670	$106

Explanation of Changes

- Project cost and schedule changed due to Section 50 Pipeline Rehabilitation phases transferred to the Northern Low Service Section 8 project.
- Project spending increased primarily due to change orders for Section 4 Webster Ave Pipe Rehabilitation

CEB Impacts

- None identified at this time.

S. 719 Chestnut Hill Connecting Mains

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To simplify the complex arrangement of old pipes near the Chestnut Hill pump stations for safety and operability. Also, create a connection between Shaft 7 of the City Tunnel and the Southern Distribution surface mains to provide redundancy along the Dorchester Tunnel. MWRA is restructuring the piping arrangement through a combination of constructing new pipelines, rehabilitating older pipelines, sliplining, abandoning aqueducts, replacing pressure regulating valves, replacing the emergency pumps at Chestnut Hill, and abandoning pipes and valves which are no longer needed for service.

Project History and Background

The City Tunnel divides into two branches at Chestnut Hill: the City Tunnel Extension going north to supply the Northern High, Northern Intermediate High and Northern Extra High Systems, and the Dorchester Tunnel, which goes south to supply the Southern High and Southern Extra High Systems. There are two shafts in the Chestnut Hill area: Shaft 7 on the City Tunnel, located immediately west of the Chestnut Hill Reservoir, and Shaft 7B on the Dorchester Tunnel, located immediately east of the reservoir. At each of these shafts two newer pipes extend to connect to the older pipelines of the Boston Low, Northern Low and Southern High Systems.

Previously, the Southern High System could only be supplied from Shaft 7B. If the Dorchester Tunnel were to be out of service, it would be necessary to activate the Sudbury Reservoir System, transport water from there via the Sudbury Aqueduct (currently on standby) to the Chestnut Hill Reservoir (currently on standby) and utilize the emergency pump station at Chestnut Hill to pump water from the reservoir to the Southern High System. This water would not be of acceptable quality and its use would require a boil order. A new potable water connection has been constructed from the low service pipes to the new emergency pump station.

The older pipes in the area were originally designed to be supplied from the Cochituate and Sudbury Aqueducts, the Chestnut Hill Reservoir, or the Chestnut Hill High Service and Low Service pump stations. None of these facilities are presently in normal use, and a new underground pump station has replaced the Chestnut Hill stations. The pipe network is not only old and inordinately complex, but it is not designed to take water from the two tunnel shafts that are the present sources of potable supply. Portions of this pipe network have been rehabilitated and integrated into the present operation of the system. Considerable lengths of pipe with minimal or stagnant flow, which are a source of discolored water, have been abandoned. Some new pipe was added to better connect the two tunnel shafts with the surface pipe network. The interconnections between the potable water system and standby facilities, which are considered non-potable, have been rebuilt to eliminate the possibility of cross-connections during normal operation.

The High and Low Service pump station buildings at Chestnut Hill housed facilities which served four functions: emergency pumping, surge relief for the Boston Low System, level control for the Chestnut Hill Reservoir, and remote hydraulic operation of large valves on and near the site of the High Service station. Construction of a new underground pump station provides more reliable emergency pumping capacity and has enabled MWRA to abandon the pump station buildings and return them to the Commonwealth. Surge relief was provided in a new Shaft 7B pressure reduction chamber that also interconnects restructured piping. Gate House No. 2 has also been refurbished to provide supply to the new pump station. New valves have been constructed to replace the old hydraulic valves.

Scope

Sub-phase	Scope	Status
Design/CA/RI and Construction – Pump Station Potable Connection (6141/6651)	Construction of potable suction and discharge piping to the emergency pump station, restructuring piping to permit surplusing of Chestnut Hill pump station site, elimination of potential cross connections with non-potable suction and discharge lines, reconstruction of the Shaft 7B PRV Station, upgrade of the Shaft 9A PRV station, rehabilitation of valves at Waban Hill Reservoir, and abandonment of the Ward Street Pumping Station and associated piping. Construction to provide potable low service suction to the new pump station and to restructure piping to permit surplusing of the historic pumping stations site. Completion of upgrades of facilities that also may be used during the Walnut Hill Water Treatment Plant startup at Shaft 7B, Shaft 9, and Ward Street.	Completed
Preliminary Engineering (6301)	Provide preliminary design services for the rehabilitation and upgrade of facilities so that MWRA is able to operate the water system during normal conditions and specific emergency scenarios.	Completed
Design/CA/RI and Construction – Emergency Pump Relocation (6503/6501)	Relocation of the emergency pumping function and other minor facilities from the existing High and Low Service pump station buildings to a new 90-mgd underground pump station constructed adjacent to the Low Service building. The relocation enables MWRA to surplus these historic buildings. The new pump station has the capacity to pump 90-mgd from the Sudbury Aqueduct/Chestnut Hill Reservoir to the Southern High Distribution System.	Completed
Boston Paving (6558)	Payment(s) to the City of Boston for paving work provided.	Completed
BECo Emergency Pump Connection (6623)	Payment to Boston Edison Company for installation of electrical service to meet special requirements.	Completed
Chestnut Hill Final Connections Design ESDC/REI and Construction (6995/6982)	Chapter 30 and Chapter 149 final pipe connections.	Future
Equipment Pre-Purchase (6814)	Valve pre-purchase to support potable connection construction so that the Chestnut Hill Pump Station site could be returned to the Commonwealth of Massachusetts as surplus property.	Completed
Demolition of Garages (6820)	Demolition of garages prior to transfer of property to the Commonwealth, at request of state Department of Capital Asset Management.	Completed
Chestnut Hill Gatehouse No. 1 Repairs (7382)	This project will provide structural stability of sub-structure of gatehouse which involves flowable fill and structural support walls.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$33,094	$17,487	$15,608	$1,000	$0	$1,000	$14,602	$6

Project Status 6/16	52.8%	Status as % is approximation based on project budget and expenditures. Chestnut Hill Gatehouse Repairs is expected to commence in late FY17.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$24,450	$33,094	$8,644	Jan-27	Dec-22	(61) mos.	$1,000	$1,000	$0

Explanation of Changes

- Project increased due as a result of Chestnut Hill Final Connections work transferred from the Metropolitan Tunnel Redundancy Project. This was partially offset by Shaft 7 Rehabilitation work transferred to the Metropolitan Tunnel Redundancy Project.

- Schedule shifted due to Shaft 7 Rehabilitation work transferred to the Metropolitan Tunnel Redundancy Project.

CEB Impacts

- None identified at this time.

S. 721 Southern Spine Distribution Mains

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To increase carrying capacity and improve valve operability along the large surface mains that run parallel to the Dorchester Tunnel and provide service to the Southern High and Southern Extra High systems. These mains have serious hydraulic deficiencies and many inoperable valves. Hydraulic performance improvements are needed to provide redundancy for the Dorchester Tunnel. Work will include rehabilitation of more than 12 miles of large diameter pipeline.

Project History and Background

The Southern Spine Distribution Mains comprise the surface piping which parallels the Dorchester Tunnel. The mains begin in the vicinity of Shaft 7B in Brookline and end at the Blue Hills Reservoir in Quincy. The mains serve the Southern High and Southern Extra High System communities of Boston, Brookline, Milton, Quincy, Norwood, Canton, Stoughton and Dedham-Westwood.

Because of the poor conditions of the valves, MWRA operations staff must frequently close several valves in order to shut down a line. This practice often results in closing more of the system than is otherwise necessary. Several of these pipelines are currently functioning at approximately 50% of their original carrying capacity due to the build-up of rust deposits and other matter along the pipeline walls. In their present condition, these mains could not provide adequate service to users if the Dorchester Tunnel was taken off-line.

Construction of the first two contracts for Section 22 South was completed by June 2005. The contracts for Section 107 Phase 1 and Phase 2 were completed in January 2009 and January 2012, respectively.

Scope

Sub-phase	Scope	Status
Sections 21,43, 22 Design/CA/RI	Design, construction administration, and resident inspection for five construction contracts in Phase 1, including rehab of 32,000 linear feet of 24- to 48-inch diameter pipes, and installation of 17,000 linear feet of 36- to 48-inch pipes. Rehabilitation to consist of cleaning and cement mortar lining, and replacement of the main line valves, blow-off valves, and appurtenances.	Completed
Section 22 South Construction	Rehabilitation of approximately 10,000 linear feet of 48-inch diameter Section 22 South, and installation of 1,700 linear feet of new pipe.	Completed
Adams Street Bridge	Relocation of a pipeline made necessary by the reconstruction of this bridge by the MBTA.	Completed
Southern High Ext Study (6602)	Study to determine the feasibility of expanding water services to additional communities in the Southern High Service Area. Cost of the study and public participation was fully funded by the Commonwealth of Massachusetts. Completed in May-1999.	Completed
Section 22 North Facility Plan/EIR (7155)	Facility Plan/EIR for Section 22 North.	Future

Sub-phase	Scope	Status
Section 22 North Design/ESDC (7120)	Design/ESDC for Section 22 North.	Future
Section 22 North Construction (6844)	Rehabilitation of 17,300 linear feet of 48-inch diameter Section 22 North.	Future
Section 20 and 58 Rehabilitation Design and Construction	Rehabilitation of approximately 19,000 feet of 36-inch diameter steel and cast iron pipes in Morton Street from Shaft 7C of the Dorchester Tunnel to Washington Street.	Future
Section 107 Phase 1 Construction (6845)	Construction of 4,400 linear feet of new 48-inch diameter pipe from East Milton Square to Furnace Brook Parkway in Milton and Quincy.	Completed
Section 107 Phase 2 Construction (7099)	Replacement of Sections 21 and 43 with 9,200 linear feet of new 48-inch diameter pipe from Dorchester Lower Mills in Boston to East Milton Square, and cleaning and lining of 4,000 feet of existing water mains	Completed
Contract 1 A Construction (6885)	Rehabilitation of 4,400 linear feet of Section 22 South.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$76,281	$36,683	$39,598	$1	$376	$369	$4,042	$35,179

Project Status 6/16	48.1%	Status as % is approximation based on project budget and expenditures. Construction of Contracts 1 and 1A for Section 22 South are completed. Section 107 Phase 1 Construction was substantially complete in January 2009. Section 107 Phase 2 Construction was substantially complete in January 2012.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$74,985	$76,281	$1,296	May-27	May-27	None	$369	$369	$0

Explanation of Changes

- Project cost increased due to inflation adjustments for Section 22 North and Sections 20 & 58.

CEB Impacts

- None identified at this time.

S. 722 Northern Intermediate High (NIH) Redundancy and Storage

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 1 (see Appendix 3)

The Northern Intermediate High System lacks both pipeline redundancy and sufficient storage. The intent of this project is to identify and take measures that reduce both the risk and impacts of a pipeline failure within the Northern Intermediate High System.

Project History and Background

This system serves Reading, Stoneham, Wakefield, Wilmington, Winchester, and Woburn with an average daily demand of 9.9 million gallons. The population served is approximately 150,000. The current six million gallon capacity of MWRA's Bear Hill Tank in Stoneham is both insufficient to meet MWRA's goal of one day of storage for the service area and is not advantageously placed within the NIH system.

Section 89 is a three mile, four foot diameter Prestressed Concrete Cylinder Pipe (PCCP) transmission main with no redundancy other than the low capacity, century old Section 29 that parallels its route for a short distance. The 10,500 foot length of Section 89 northwest of Spot Pond is constructed of Class IV wire which is of significant concern given experience with catastrophic failures elsewhere in the country. Section 29 was originally constructed in 1901 and measures 6,300 feet in length and 24 inches in diameter. Because of its age and the fact that it is unlined cast-iron pipe, tuberculation has reduced the pipeline carrying capacity to approximately 45% of the original design capacity (C-value: 58). In the event of a shut down in Section 89, Section 29 may not be able to meet the minimum hydraulic needs of the area and additional chlorination to maintain water quality may be required.

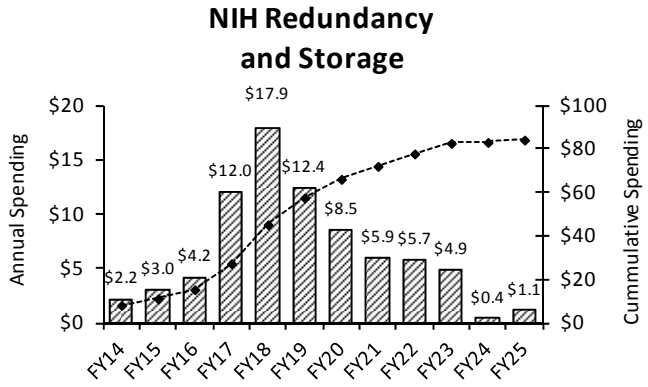
Scope

Sub-phase	Scope	Status
Concept Plan, ENF, and Mobile Pump Unit	Developed a concept level plan to evaluate options to reduce the risk and the impacts of potential failures in Sections 29 and 89. Measures evaluated included valve improvements, improved community interconnections, pipeline redundancy, targeted emergency response plans, additional storage and other improvements that can be implemented within the NIH system. Concept planning work included environmental review of the recommended plan and specification and purchase of the Mobile Pump Unit.	Completed
Design CA/RI and construction NIH Impr/Gillis PS Impr./Reading-Stoneham Interconnection (7045/7260/7261)	This phase includes the design and construction of short-term measures identified in the conceptual plan including Gillis PS Improvements and the Reading/Stoneham Interconnection.	Completed
Design CA/RI and	The Concept Plan has developed preliminary route alternatives in order to provide redundancy to Section 89. The route selected is	Completed /Active/Fut

Construction Section 89/29 Redundancy Phases 1A, 1B, 1C & 2	under review with MWRA staff. Final route has been selected based on consultations with local elected officials, consideration of permitting requirements, project impacts and the location of the recommended storage for the NIH system. Contract 6906 includes design and CA/RI for the redundant pipeline only (approximately 7 miles). Phase 1 consists of West Street Pipeline Reading Construction Phase 1A (7066) and Section 89/29 Redundancy Phase 1B (7471), and Phase 1C (7478). Phase 2 consists of Section 89/29 Redundancy Pipeline Stoneham (7067) contract.	ure
NIH Storage Design & Constr. (7311/7068)	The Concept Plan has identified several potential storage locations in the NIH system. This phase includes the design and construction of two 3-MG elevated tanks.	Future
Section 89/29 Rehab Design and Construction Ph 1 and 2 (7116/7117)	There must be a redundant pipeline prior to Section 89 being taken off line for repairs. At that point, the pipeline can be inspected and rehabilitated as necessary. These phases include design and construction of Section 89/29 rehabilitation.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$105,655	$15,345	$90,310	$12,015	$17,860	$39,246	$37,453	$22,982



Project Status 6/16	14.5%	Status as % is approximation based on project budget and expenditures. Concept planning began in February 2006. Design for Short-term Improvements contract began in September 2009. Mobile Pump Unit purchase was made in FY10. Section 89/29 Redundancy Design/CA/RI contract was awarded in March 2011. Reading/Stoneham Interconnections was substantially complete in October 2012. Gillis Pump Station Improvements was substantially complete in December 2014. West St Pipeline Reading Construction Phase 1A was substantially complete in May 2015. Phase 1B commenced in January 2016. Phase 1C was awarded in November 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$92,641	$105,655	$13,014	Jun-22	Jan-28	67 mos.	$46,523	$39,246	($7,277)

Explanation of Changes

- Project cost increased primarily due to updated cost estimates for Section 89/29 Rehabilitation Design/Construction Administration and Construction, Easements, change orders for Construction 1B, award greater than budgeted estimate for Phase 1C, and inflation adjustments on unawarded contracts.
- Project spending changed primarily due to schedule changes for Section 89 and 29 Redundancy Construction Phase 2 and 1C, partially offset by updated cost for easements and change orders for Phase 1B.
- Project schedule changed due to NIH Storage siting issues.

CEB Impacts

- The proposed storage facilities will require periodic inspection, maintenance, and water quality testing but impacts are not quantified yet.

S. 723 Northern Low Service Rehabilitation - Section 8

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To improve the condition and reliability of unlined cast-iron pipes serving a portion of the Northern Low System. These pipelines, have reduced carrying capacity because of rust build-up, and have experienced leaks at above average rates. Improvements will consist of a combination of replacement, cleaning, lining, and valve repairs. Rehabilitation of Sections 37 and 46 will improve the service to East Boston and will allow the shutdown of Section 8. The construction of Section 97A provides needed redundancy to East Boston via the Northern High System.

Project History and Background

Section 8 was installed between 1897 and 1915 and serves Malden, Everett, Chelsea, and East Boston. Section 8 is currently functioning at approximately 45% of its original capacity (C-value: 60) due to the build-up of rust deposits and other matter along the pipe wall. Excavations for the installation of new valves along portions of Section 8 have indicated severe external corrosion on the pipe wall, which could affect the structural stability of the pipeline.

Before rehabilitating Section 8, the distribution system supplying East Boston must be strengthened. Sections 37 and 46, located in Chelsea, are 36-inch diameter cast iron pipes. These two pipe sections connect between Section 57, portions of which were previously rehabilitated, and the two Chelsea River crossings to East Boston at Sections 8 and 38. It is anticipated that Sections 37 & 46 will need cleaning and cement mortar lining. Section 97A, a new 16-inch diameter pipe provides redundancy to East Boston via Northern High System. The pipeline connects to existing Meter 99 in East Boston and to the Boston low-pressure system through a new pressure-reducing valve.

Scope

Sub-phase	Scope	Status
Design CA/RI and Construction – Section 8 (7092/6322)	Cleaning and cement mortar lining of the pipeline interior, replacement of all defective and inoperable valves, and the addition of new valves for 7,500 linear feet of 48-inch pipe on Section 8 in Malden and Everett. Replacement work consists of replacing 9,722 feet of 42-inch pipeline with new 36-inch ductile iron main and replacement of blow-off connections from Second Street in Everett to the Mystic River Bridge in Chelsea.	Future
Rehab Sections 37 and 46 Chelsea, East Boston Design, CA/RI and Construction (7405/6962)	Rehabilitation of approximately 3,550 linear feet of 36-inch cast iron main (Section 37) and approximately 2,500 linear feet of 36-inch cast iron main (Section 46). Both sections are located in Chelsea and are critical to the supply of water to East Boston. Section 38, the 36-inch ductile iron pipeline under the Chelsea River, is assumed to not need rehabilitation.	Future
Section 97A Construction (7021)	Installation of approximately 3,000 linear feet of 20-inch, 16-inch and 12-inch water main and a new pressure-reducing valve. This completed work is part of the Northern High System and adds redundancy to East Boston, including Logan Airport.	Completed

Sub-phase	Scope	Status
Sections 50/57 Water and 19/20/21 Sewer Rehabilitation Design CA/RI (7540) and Construction (7541)	**Inspection, evaluation, and rehabilitation of: 12,000 feet of 20-inch cast iron water pipe; 8,000 feet of 48-inch steel water pipe and 11,000 feet of 51-inch by 56-inch and 56-inch by 61-inch brick sewer and associated manholes, valves and structures located in Medford and Malden, MA. NTP for Professional Services is anticipated by July 2017. Section 50 Pipeline Design is included in this design contract**	**Future**
Section 50 Pipe Rehabilitation Construction (7546)	Section 50 is several hundred feet of 20-inch diameter cast iron main on exposed pilings which is need of rehabilitation. This project will be combined with Section 57 above during the FY18 Final CIP process.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$52,678	$2,321	$50,357	$13	$901	$914	$27,730	$21,715

Project Status 6/16	4.4%	Status as % is approximation based on project budget and expenditures. Section 97A Construction contract was substantially complete in October 2009.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$23,441	$52,678	$29,237	Jul-23	Jul-28	60 mos.	$44	$914	$870

Explanation of Changes

- Project cost increased primarily due to new project for Section 50/57 Water and 21/20/19 Sewer Rehabilitation, Section 50 Rehabilitation transferred from Spot Pond Supply Mains Project, and inflation adjustments for Section 8 Design and Construction.
- Schedule shifted due to project priorities for Section 8 Construction.
- Spending increased primarily due to new project for Section 57 Water and 21/20/19 Sewer Rehabilitation Design/Construction Administration/Resident Inspection phase that was added.

CEB Impacts

- None identified at this time.

S. 727 Southern Extra High Redundancy & Storage

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Provides environmental benefits*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

Master Plan Project ☑ 2008 Priority Rating 2 (see Appendix 3)

To provide redundancy to Section 77 and 88 to the southern spine mains serving Boston, Canton, Norwood, Stoughton and Dedham-Westwood by construction a redundant pipeline. Also, to increase distribution storage within the service area to improve system operation and reliability.

Project History and Background

This project will provide redundancy to Sections 77 and 88 serving Boston, Canton, Norwood, Stoughton, and Dedham-Westwood, through construction of a redundant pipeline. The project will also increase distribution storage within the service area to improve system operation and reliability.

MWRA's Southern Extra High pressure zone serves Canton, Dedham, Norwood, Stoughton, Westwood, portions of Brookline, Milton, Newton, and the Roslindale and West Roxbury sections of Boston. Water is pumped to this pressure zone from the Dorchester tunnel through two pump stations.

The Southern Extra High pressure zone is currently deficient in distribution storage and lacking in redundant distribution pipelines. MWRA maintains two distribution storage tanks (Bellevue Tank 1 and Bellevue Tank 2) totaling 6.2 million gallons of storage for the entire Southern Extra High service area, which is significantly below the goal of one day of storage. Further highlighting the deficiency is the fact that the overflow elevation for the 2.5-million-gallon Bellevue Tank 1 is 25 feet lower than the overflow elevation for the newer 3.7-million-gallon Bellevue Tank 2, limiting its useful capacity.

The five communities in the southern portion of the service area (Canton, Norwood, Dedham, Westwood, and Stoughton) are served by a single MWRA 36-inch diameter transmission main (Section 77), which is five miles long. Canton and Stoughton are served by a branch (Section 88) off of Section 77. Although several of these communities are partially supplied by MWRA, the loss of this single transmission main would result in a rapid loss of service in Norwood and Canton, and water restrictions for Stoughton and Dedham/Westwood.

In addition, the Southern Extra High service area has expanded during the past several years with the addition of the partially-supplied Town of Stoughton and the Dedham-Westwood Water District. This growth has been concentrated to the south while the Bellevue tanks are located at the northern end of the service area. Although several of these communities are partially supplied by MWRA, the Town of Norwood is fully supplied by this line and has no back-up source of supply. There have been several instances when the water supply to Norwood has been interrupted due to valve and/or pipe failures.

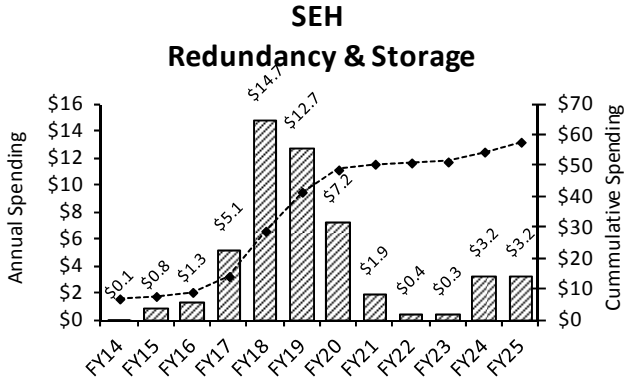
Scope

Sub-phase	Scope	Status
Concept Plan	A study to assess storage, capacity and condition of existing distribution pipes, new pipeline routing options and tank sites were identified.	Completed

Sub-phase	Scope	Status
University Ave Water Main Section 108 (6445)	Initial phase to provide redundant pipeline on University Avenue in Norwood. Project broken out from the larger SEH redundancy and storage projects. This work has been completed.	Completed
Redundancy Pipeline Section 111 Design (6453) & Construction Ph 1 Contracts 1, 2, and 3 (6454, 7504, 7505)	The first phase funds the design and construction of a pipeline from the Bellevue storage tank to East Street in Westwood, which will provide redundancy to Sections 77 & 88.	Active/Future
Storage Design & Construction Phase 2 (6444/7245)	The second phase will provide redundancy to Sections 77 & 88 through design and construction of one (1) 2.5 million gallon distribution storage tank. This tank is needed to provide adequate one day storage to the service area.	Future
Storage Design & Construction Phase 3 Second Tank (7263/7262)	The third phase will provide additional redundancy to Sections 77 & 88 through design and construction of an additional one (1) 2.5 million gallon distribution storage tank. This tank is needed to provide additional one day storage to the service area.	Future
Section 77/88 Design/Constr. (7112/7113)	Rehab of Sections 77 & 88 after redundant pipeline is in place.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$107,885	$8,944	$98,941	$5,125	$14,704	$22,016	$22,459	$56,653



Project Status 6/16	8.3%	Status as % is approximation based on project budget and expenditures. Conceptual Design began in February 2007. University Ave Water Main was substantially complete in November 2008. Redundancy/Storage Phase 1 Final Design/CA/RI commenced in February 2014. Redundancy Pipeline Section 111 Construction 1 commenced in July 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$101,694	$107,885	$6,191	Dec-35	Dec-35	None	$31,452	$21,016	($9,436)

Explanation of Changes

- Project cost Increased due to updated cost estimate for Redundancy Pipeline Section 111 Construction 2 and 3, inflation adjustments on unawarded contracts, partially offset by award for Construction1 being less than budgeted estimate.
- Project spending decreased during the FY14-18 period due to primarily due to updated schedules for Redundancy Pipeline Section 111 Construction Phases 1, 2, and 3.

CEB Impacts

None identified at this time

S. 730 Weston Aqueduct Supply Mains (WASMs)

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To improve the condition and carrying capacity of these major supply lines and the quality of the water supplied to the communities in the Low, High, Intermediate, and Northern Extra High pressure zones. Increasing the capacity of the WASM 3 Supply Main is a key component of the Long term Redundancy Plan for the metropolitan tunnel system. Timely rehabilitation will reduce the costs of replacing corroded pipes, reduce red water and chlorine tastes, and improve water pressure.

Project History and Background

MWRA's tunnels and aqueducts bring water to the metropolitan area from the supply reservoirs in central Massachusetts. In Weston, where the Hultman Aqueduct and the MetroWest Tunnel end, the water is still miles away from most customers. Together, the City Tunnel and the four Weston Aqueduct Supply Mains (WASMs) carry the water this final distance. When rehabilitation of the WASMs is complete, they will transmit about one-third of the water to MWRA's service areas, and the City Tunnel will carry the remaining two-thirds. The WASMs are now the only means of conveying water to the city in the event of a problem with the City Tunnel. The Sudbury Aqueduct can deliver non-potable water during an extreme emergency.

WASM 1 is a 48-inch diameter cement-lined cast iron pipeline about 38,700 feet long that was constructed in 1904. WASM 2, built in 1916, is a 60-inch diameter cement-lined cast iron pipeline about 34,800 feet long. WASMs 1 and 2 begin in Weston at the Weston Aqueduct Terminal Chamber (WATC) and run parallel through Newton, mostly along Commonwealth Avenue, ending in Boston near Chestnut Hill Reservoir. These pipelines supply water to the Boston Low pressure zone.

WASM 3 is an 11-mile steel pipeline that was installed between 1926 and 1933. This major supply line carries high service water from the 7-ft diameter branch of the Hultman Aqueduct to community connections and MWRA pumping stations serving the Northern High, Intermediate High, and Northern Extra High service systems. It extends from the Hultman Aqueduct branch in Weston northeast to the Shaft 9 line in Medford and supplies more than 250,000 customers. WASM 4 was constructed in 1932 and is predominantly a 60-inch diameter pipeline consisting primarily of unlined steel with some pre-stressed concrete cylinder and cast iron sections. It extends 47,000 linear feet from Weston through Newton, Watertown, and Boston, and into Cambridge.

WASM 3 and WASM 4 were originally part of the Low Service System and conveyed water from the Weston Aqueduct to the Spot Pond Supply Mains. Upon completion of the Hultman Aqueduct, and its interconnection to the Weston Aqueduct Terminal Chamber in 1941, WASM 3 became part of the High Service System. With the addition of Newton to the metropolitan service area in the early 1950s, the western portion of WASM 4 was transferred to the High Service System as a temporary means of conveying water from the Hultman to portions of Newton and Watertown. Supply to the Spot Pond Supply Mains from WASMs 3 and 4 was maintained at their east ends through pressure reducing valves.

WASMs 1, 2, and 4 were previously functioning below full capacity because of the buildup of rust deposits and other matter along the pipeline walls, and undersized main line valves. Rehabilitation of these pipelines was necessary to restore their original carrying capacity and included replacement of valves to provide more efficient operations and emergency response, elimination of tuberculation on the interior walls, and application of cement mortar lining to the interior pipe walls to prevent further internal corrosion and improve water quality.

The joints on WASM 1 and WASM 2 are constructed of bells and spigots filled with lead packing. The bell and spigot construction gives the joints some flexibility, but lead packed joints are more prone to failure compared to push-on or mechanical joints with modern synthetic gasket material. The existing joints are subject to potential failure because of deterioration, pipe movement due to frost, settlement, or adjacent construction. Water leaking from a failing joint can undermine the pipe, causing catastrophic failure. These failures can cause severe damage and disruption. WASM 2 also had insulating joints consisting of cast-iron pipes with wood fillers. These joints were intended to prevent electrical current from flowing along the pipeline but, in general, have been prone to failure and leakage.

The rehabilitation of WASMs 1 and 2 is now complete. WASM 1 and WASM 2 now connect to the new Loring Road tanks in Weston and supply the Boston Low mains in Clinton Road, Beacon Street, and Boylston Street, which were rehabilitated as part of the Boston Low Service Rehabilitation project. With the completion of these projects the entire Boston Low Service System, which accounts for 15% of overall MWRA water demand, is now rehabilitated from Weston to Boston.

There is no back up for WASM 3, which is the sole source of supply for the higher elevation portions of Waltham, Belmont, Arlington, Lexington, Bedford, and Winchester. This pipeline cannot be shut down for maintenance or rehabilitation until a new Waltham Connection to the Northern Extra High system is complete. Next to a failure of the Hultman Aqueduct or the Metropolitan Tunnel System, analysis has shown that a failure of WASM 3 is one of the highest risks in the MWRA distribution system. Improvements to WASM 3 are included in Project 628 Metropolitan Redundancy Interim Improvements. Replacement of Section 36 improves redundancy in the Northern Extra High pressure zone between Spring Street pump station and Brattle Court pump station, and installation of a redundant line from WASM 3 to Spring Street pump station provides flexibility to maintain flow to the Spring Street pump station during the rehabilitation of WASM 3.

Nonantum Road construction (rehabilitation by sliplining and cleaning and lining) was completed in March 1997 and the rehabilitation of the western portion of WASM 4 was completed in March 2001, including meter upgrades. In order to remove the western portion of WASM 4 from service to allow it to be rehabilitated, MWRA provided alternative supplies for Watertown Meter 103 and Newton Meters 104 and 105. Meter 103 was upgraded and local water main improvements were built along Galen Street in Watertown. These efforts allow the other Watertown meters to temporarily supply the area normally served by Meter 103. These improvements were constructed as non-participating bid items (i.e., funded by MWRA) under a contract administered by the Massachusetts Highway Department. Alternative sources for the Newton northern pressure district, normally supplied by Meters 104 and 105, have been constructed. Two pressure reducing valves, one at Chestnut Street and one at Walnut Street, were installed to allow the southern pressure district that is supplied by the Commonwealth Avenue Pumping Station to temporarily serve the northern pressure district. The rehabilitation of the eastern portion of WASM 4 included fixing a portion of the South Charles River Valley Sewer Sections 163 (D) and 164 (E), a 100+ year old brick sewer that is located directly below the water main. The rehabilitation of WASM 4 is complete.

WASM 4, since rehabilitated will continue to operate as a high service main from the Hultman Aqueduct Branch connection to Shaft W of the MetroWest Tunnel up to the pressure reducing valve facility at Nonantum Road. It will then continue as a low service main to its connection with the East and West Spot Pond Supply Mains. WASM 4 also has the capability to operate completely as a low service main. This flexibility in operating conditions allows WASM 4 to best support the system.

Scope

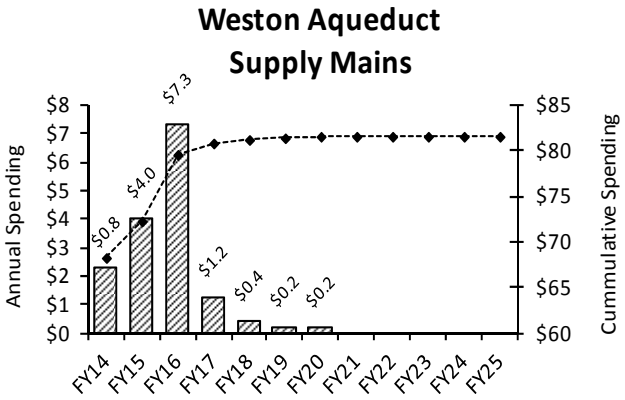
Sub-phase	Scope	Status
Design/CA/RI – WASMs 1 & 2 (6142)	Design, construction administration, and resident inspection for the rehabilitation of WASM 1 and WASM 2 (construction contracts 6280 and 6281).	Completed

Sub-phase	Scope	Status
Design/CA/RI - WASM 4 (5147)	Design, construction administration, and resident inspection for the rehabilitation of WASM 4 (construction contracts 6203, 6175, 6312, 6176, and 6313).	Completed
Construction - Newton WASMs 1 & 2 (6280)	Construction work on WASM 1 and WASM 2 along Commonwealth Avenue and WASM 1 through Centre Street to the Newton Commonwealth Golf Course.	Completed
Construction - Boston WASMs 1 & 2 (6281)	Construction on the remaining lengths of WASMs 1 and 2 consists of rehabilitation of 8,640 linear feet of Section 4 of WASM 1 through the Newton Commonwealth Golf Course to Gatehouse #1, rehabilitation of 11,450 linear feet of Sections 7 and 8 of WASM 2 between Grant Avenue and Cleveland Circle, and installation of 650 linear feet of 36-inch pipe from Shaft 7 to Section 47.	Completed
Construction - Arlington Section 28 CP1 (6546)	Rehabilitation of Section 28, the suction main to the Brattle Court Pumping Station, from the WASM 3 connection to the pumping station.	Completed
Construction - Auburndale WASMs 1, 2 & 4 (6175)	Cleaning and lining of 5,300 linear feet of 48-inch and 12,300 linear feet of 60-inch diameter mains of WASMs 1, 2 and 4 (Sections 2, 5, 13 and portions of 1) from Weston across the Charles River along Commonwealth Avenue to the Mass Pike in Newton, as well as replacement of existing line valves, air/vacuum valves and blow-off valves.	Completed
Construction - Newton WASMs 2 & 4 (6312)	Cleaning and cement lining of 21,200 linear feet of 60-inch pipe on WASM 4 (Sections 13 & 14) along Rowe, Webster, Elm and Washington Streets in Newton, and 5,800 linear feet of 60-inch pipe on WASM 2 (Section 2) along Commonwealth Avenue from Bullough Parkway to Grant Avenue as well as rehabilitation of Meters 104 and 105.	Completed
Construction - Allston WASM 4 & W. Ave Sewer (6313)	Replacement of the Nonantum Road PRV and sliplining of 1,600 linear feet of pipe from Brooks Street to North Beacon Street, sliplining with some limited pipe replacement and cement lining of 10,538 linear feet of 60-inch pipe mostly along Western Avenue, 1,008 linear feet of 42-inch pipe mostly along Memorial Drive, 808 linear feet of twin parallel 30-inch pipes within the Western Avenue Bridge, replacement of Master Meter 100 and rehabilitation of the South Charles River Valley Sewer to include installation of a cured-in-place liner in approximately 5,150 feet of sewer, as well as removal and disposal of sediment in the existing brick sewer, power washing, and rehabilitation of existing manholes and installation of new manholes.	Completed
Construction – WASM 3 PCCP SPL12 (7000)	Replacement of approximately 2,100 linear feet of 60-inch Prestressed Concrete Cylinder Pipe (PCCP) on WASM 3 (Section 12) in Arlington. Includes replacement of air release manhole, replacement of two blow-offs and addition of a mainline butterfly valve with chamber and separate air release manhole.	Completed
Design CA/RI WASM 3 PCCP SPL12 (7001)	Design, construction administration and resident inspection services for the replacement of the PCCP pipe portion of WASM 3 (construction contract 7000).	Completed

Sub-phase	Scope	Status
Design CA/RI Section 36/ WS/Waltham Connection (6540)	Design, construction administration and resident inspection services for the replacement of Section 36, rehabilitation of the Watertown Section, a new 11B interconnection to WASM 3, replacement of meter 86 in Arlington, and replacement of butterfly valve S9-A in Medford. (construction contracts 7222, 7448).	Active
Construction Watertown Section (7222)	Rehabilitation of approximately 5,795 linear feet of the Watertown Section.	Completed
Construction Section 36/W11/S9-A11 Valve (7448)	Replacement of approximately 5,200 linear feet of 1911 vintage 16-inch diameter cast-iron pipe from the Brattle Court pumping station to the Arlington Heights Standpipe, construction of a new 11B interconnection to WASM 3, replacement of meter 86 in Arlington, and replacement of 48 inch mainline butterfly S9-A11-A in Medford.	Active
Design CA/RI Section 28 (7083)	Design, construction administration, and resident inspection services for the rehabilitation of Section 28, suction main to the Brattle Court Pumping Station, from the WASM 3 connection to the pumping station (construction phase CP1, contract 6546).	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$81,564	$79,586	$1,978	$1,238	$383	$15,164	$357	$0



Project Status 6/16	97.6%	Status as % is approximation based on project budget and expenditures. Rehabilitation of WASMs 1, 2 & 4 are complete. Section 28 Arlington CP-1 was substantially complete in April 2011. Design CA/RI Section 36/Watertown Section/Waltham Connection commenced in January 2011. Watertown Section Rehabilitation was substantially complete in December 2013. Section 36/W11/S- 9-A11-A Valve was substantially completed in December 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$109,811	$81,564	($28,247)	Jun-23	Dec-16	(78) mos.	$16,679	$15,164	($1,515)

Explanation of Changes

- Project cost and schedule changed primarily due to WASM 3 Massachusetts Environmental Protection Act (MEPA)/Design/Construction Administration/Resident Inspection and Section 101 Waltham Connection Construction phases transferred to the Metropolitan Redundancy Interim Improvements Project.

- Project spending changed primarily due to WASM 3 Design/Massachusetts Environmental Policy Act (MEPA)/Design Construction Administration/Resident Inspection phase transferred to the Metropolitan Redundancy Interim Improvements Project.

CEB Impacts

- None identified at this time.

S. 735 Section 80 Rehabilitation

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

Master Plan Project☑ 2009 Priority Rating 3 (see Appendix 3)

Rehabilitation of approximately 16,197 feet of pipe along Route128/95. Section 80 supplies water to Wellesley and Needham. Rehabilitation will improve water quality to these two MWRA communities.

Project History and Background

Section 80 is a steel main that runs from Shaft 5 of the City Tunnel in Newton to supply Wellesley and Needham. The main runs along portions of 128/95 and has been exposed to highly corrosive conditions and the cathodic protection system has not been maintained. Complaints from residents in Needham and Wellesley of a tar-like smell in the water indicate deterioration of the pipe liner. Testing indicated phenols levels 10 times above allowable limits. Failure of Section 80 would create huge traffic challenges on this major metro-Boston highway.

Scope

Sub-phase	Scope	Status
Section 80 Rehabilitation Design, CA/RI and Construction (6892/6891)	Design and rehabilitation of approximately 16,197 feet of Section 80 along route 128/95.	Future
Section 80 Replacement Construction (7532)	Replacement of 200 linear feet of Section 80 that is leaking.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$12,103	$0	$12,103	$814	$1,071	$1,885	$9,250	$968

Project Status 6/16	0.0%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$10,606	$12,103	$1,497	Jun-23	Jun-23	None	$954	$1,885	$931

Explanation of Changes

- Project cost and spending increased due to award of Section 80 Replacement Construction being greater than the budget estimate.

S. 753 Central Monitoring System

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Improves system operability and reliability*
☑ *Extends current asset life*
☑ *Results in a net reduction in operating costs*

To provide a modern centralized system for monitoring, coordinating, and controlling critical waterworks functions. Many existing MWRA facilities are monitored and operated using obsolete methods and equipment, which can hinder emergency response capabilities and prevent coordinated system operation. Two operations control centers are already operational, and various field facilities have been equipped with telemetry and communications equipment as part of this project.

Project History and Background

MWRA has been converting to system-wide remote monitoring and control of essentially all hydraulic and hydroelectric operations. The original instrumentation used to measure operating parameters was incomplete, old, and in poor condition. In many cases necessary instrumentation did not exist. The system also lacked telemetry to provide centralized and immediate information on system performance, and the ability to remotely intervene when malfunctions occurred. Without telemetry, operating decisions had to be delayed until field personnel were dispatched to collect measurements. This was a cumbersome and undesirable mode of operation, particularly in emergency situations.

The lack of flow measurement within the water delivery system also impeded identification of sources of unmetered water. When fully implemented, the central monitoring system will generate instantaneous data on water flow and pressure in 18 subsystems beginning with the supply sources and ending at the delivery points to user communities. The data will assist operations staff in detecting and pinpointing leaks in the system. The response time for leak repair work can then be lessened, resulting in significant savings of water and reduction in potential MWRA liability for public safety and property damage.

The central monitoring project has grown from the initial automation of the Reservoir Road Pump Station to include eight other pump stations. Monitoring and control of water treatment facilities has expanded to include the Interim Corrosion Control Facility in Marlborough, the Cosgrove Disinfection Facility, the Norumbega Temporary Disinfection Facility and the Ware Disinfection Facility. In addition, water quality is monitored at seven locations from two Operations Control Centers. Real time Supervisory Control and Data Acquisition (SCADA) monitoring of Telog data is being established with 150 sites currently active. Operation control centers (OCCs) at the MWRA Chelsea and Clinton facilities provide remote monitoring and control of all the SCADA facilities. Also, as part of its Integrated Water Supply Improvement Program, MWRA built several new and upgraded facilities. These included the Nash Hill Covered Storage facility and the Loring Road Covered Storage facility, Carroll Water Treatment Plant, MetroWest Water Supply Tunnel, and the Norumbega Covered Storage facility. The existing system-wide backbone microwave communications network has been improved to connect these facilities to the waterworks communications system.

Scope

Sub-phase	Scope	Status
Study	Study to determine the implementation phases.	Completed

Sub-phase	Scope	Status
Design	Design of the replacement and rehabilitation of 34 existing master meter sites, 22 new master meter sites, 15 western revenue meter sites, 28 reservoir level instrumentation sites, ten pumping stations, eight pressure regulator control sites, four major throttle valve sites, six chemical feed sites, four hydroelectric sites, five weather stations, five sluice gate control sites, one stream gauging station, and other facilities.	Completed
Communications Structures	Installation of two radio towers, five antennas, one satellite dish, and an equipment shelter.	Completed
CS/Start-Up Services	Construction and startup services for the metropolitan Operations Control Center, as well as metering and monitoring construction.	Completed
Equipment Pre-Purchase	Purchase of instrumentation equipment, mechanical equipment, and new master meters.	Completed
Construction 1 – Reservoir Road and Cosgrove Pilots	Purchase and installation of equipment to automate the Reservoir Road Pump Station and an aqueduct monitoring system for use by the Cosgrove Intake and Shaft 4 operators. MWRA staff installed the equipment.	Completed
SCADA Implementation	Purchase of Supervisory Control and Data Acquisition System (SCADA) equipment for monitoring, control and metering sites.	Active
Microwave Equipment	Purchase of services and equipment necessary to allow MWRA to convert from analog to digital communications to continue to utilize the Commonwealth's Interagency Microwave System.	Completed
Construction – Operations Center	Construction of a 5,000 square feet center including an environmentally controlled computer room, a printer room, a control room, office space, and sanitary facilities in Chestnut Hill.	Completed
System Wide Backbone C.P. Construction– Monitoring & Control Communications Network	Improvement of the existing Waterworks system wide backbone including upgrades of microwave antennas at MDC Hill and Bellevue water tank and provision of new microwave antennas at five facilities.	Completed
Study and Design – Waterworks Monitoring & Control Communications Network	Provision of microwave antennas and radio equipment at twelve facilities.	Completed
Microwave Communication for Waterworks Facilities	Furnish and install seventeen microwave antennas (dishes), three 3-legged, 90- to 100-foot towers, one unpowered 80-foot steel monopole, and two prefabricated concrete shelters to house radio equipment with associated racks, cabinets and wiring.	Completed

Sub-phase	Scope	Status
Quabbin Power, Communication & Security Design CA/RI and Construction	Design and construction of 2.4 miles of power, and communication to Quabbin Aqueduct Shaft 12 and 1,500 feet to the DCR Boat Cove.. Also, upgrading 9,000 feet of existing overhead power line from Winsor Power Station to Quabbin Lookout Tower to insure uninterrupted service of the communication network. Increased security will be provided at Shaft 12, Winsor Power Station, CVA Intake, Nash Hill gate house, William A. Brutsch Water Treatment Facility, DCR Boat Cove and Quabbin Administration building. The Verizon communications service needed for the security devices to communicate to the Chelsea Head-end Facility will be extended to support this function.	Active
Waterworks SCADA/PLC Upgrades	Replacement of existing SCADA PLC's nearing their end of life with a current PLC platform. New PLC platforms further provide increased security capabilities and improved program functionality. Secondary goals include standardizing PLC logic and HMI graphics, and upgrading aging field instrumentation. During FY17 staff will purchase equipment and hire outside support to replace an obsolete PLC at the Commonwealth Ave. West Pump Station. This work is underway and expected to be complete in the spring of 2017. Additional work to upgrade the Brutch Water Treatment facility chemical feed PLC through CIP purchases and use of In-house staff for design and installation is underway. In-house work to scope out the design contract to upgrade the JJC WTP has begun, with an engineering design services contract anticipated by the middle of FY18.	Active/Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$39,040	$17,805	$21,235	$2,674	$1,516	$6,192	$6,277	$10,767

Project Status 6/16	45.6%	Status as % is approximation based on project budget and expenditures. Quabbin Power Communications & Security Design commenced in July 2014. Construction commenced in February 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$39,215	$39,040	($175)	Oct-31	Oct-31	None	$6,458	$6,192	($266)

Explanation of Changes

- Project cost and spending decreased primarily due to award of Utilities with Verizon was less than the budget estimate. This increase was partially offset by Quabbin Power Communications & Security change orders.

CEB Impacts

- None identified at this time.

S. 763 Distribution Systems Facilities Mapping

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Improves system operability and reliability*

To produce a complete, up-to-date set of appropriate scale maps of all underground waterworks facilities, along with a comprehensive database inventory. Existing maps were outdated and unreliable, complicating emergency response, field repairs, and planning.

Project History and Background

In 1995 MWRA did not have an adequate, updated set of maps of all of its underground waterworks facilities. Existing maps did not consistently show current conditions and were often incompatible or contradictory with MWRA databases. Engineering, operations, and emergency response were all affected by this inadequacy. Outdated maps hampered engineering because maps needed to be re-created. Field operations crews could not predict with certainty the results of valve shut-offs during repair efforts. The planning process was impaired because management did not have authoritative, consolidated data to evaluate pipe condition, age, C-Values, materials, and soil conditions. Additionally, the lack of a comprehensive understanding of the relationships between MWRA and local community pipe systems could result in service delays. The former mapping system created the possibility of incorrect actions, and in critical instances could have resulted in exacerbated property damage.

Reliable engineering records do not exist for certain sections of the distribution system. The Records Development sub-phase will create, update and automate record drawings and detail records for high priority areas.

Scope

Sub-phase	Scope	Status
Planning/Design	Creation of a complete set of 200 to 400 scale maps of the distribution system with an associated verified inventory of size, material, age, and condition of pipes.	Completed
Data Purchase	Purchase of project related data from Boston Edison.	Completed
Records Development	Automation of MWRA record drawings.	Future
Update of Record Drawings (7489)	Update record drawings and detail record information for selected water pipeline sections using information from detail records, plans, field books, surveys, and valve inventories. Establish procedures for continued updating and maintenance of detail record information.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$2,299	$1,036	$1,263	$0	$0	$0	$1,263	$0

Project Status 6/16	45.1%	Status as % is approximation based on project budget and expenditures. Update of Record Drawings is expected to begin in FY18.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$2,299	$2,299	$0	Jan-20	Jan-20	None	$533	$0	($533)

Explanation of Changes

- Project schedule and spending shifted due to updating scope and sequencing of projects.

CEB Impacts

- No additional impacts identified at this time.

S. 765 Local Water System Assistance Program

Project Purpose and Benefit

☑ *Contributes to improved public health*
☑ *Provides environmental benefits.*

To provide loans to facilitate water system improvements in MWRA communities.

Project History and Background

The Local Water System Assistance Program is a critical piece of MWRA's Integrated Water Supply Improvement Program. In November 1999, the Board of Directors approved the Phase 1 Local Pipeline Assistance Program, supported through a Tax Exempt Commercial Paper (TECP) program, to make $25 million available annually in loans to MWRA communities for pipeline relining and replacement in proportion to each community's share of total unlined pipe miles. Communities are required to pay back principal for each loan during a ten-year time period beginning one year after the project funding is approved. MWRA increased the initial total program budget to $256,796,500 to provide funds for additional water system communities: Stoughton ($4,480,000), Reading ($1,916,000), Lynnfield ($320,000), Dedham/Westwood ($7,500), and Wilmington ($73,000). The Phase 1 Local Pipeline Assistance Program concluded at the end of FY13 with a total of $222.3 million in interest-free loans distributed to member water communities.

An additional $210 million was added to the FY11 budget for the Phase 2 Local Water System Assistance Program. Community distributions from this program will be made from FY11 through FY20 with repayments scheduled for FY12 through FY30. The $210 million is split with $200 million allocated among 42 Metro-Boston/Metro-West communities and $10 million allocated among three Chicopee Valley Aqueduct (CVA) communities.

The Local Water System Assistance Program was expanded beginning in FY17 to include $100 million in interest-free loans to communities solely for efforts to fully replace lead service lines. The *Lead Service Lone Replacement Loan Program* is budgeted over twenty years, but the pace of spending for the program will depend on the level of participation by communities, the communities' ability to work with individual homeowners, and future regulatory requirements.

In FY18 Local Water Assistance Program Phase 3 was added in the amount of $210 million. Community distributions from this program will be made from FY18 through FY27 with repayments scheduled for FY19 through FY46.

Scope

Sub-phase	Scope	Status
Community Loans	Loans for MWRA water communities to replace and rehabilitate local water pipelines based on each community's share of total unlined pipe miles. These loans will be complete by the end of FY13.	Completed
Community Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active
Local Water System Assistance Program Loans	This is a continuation of the program of providing interest-free loans to water system communities for pipeline replacement, cleaning and lining, water metering and other local water system improvements.	Active
Local Water System Assistance Program Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active

CVA Loans	This is an extension of the Local Water System Assistance program to the CVA communities to provide interest-free loans to water system communities for pipeline replacement, cleaning and lining, water metering and other local water system improvements.	Active
CVA Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active
Lead Service Line Replacement Loans	Replacement of lead service lines budgeted over a twenty year period beginning in FY17.	Active
Lead Service Line Replacement Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Active
Local Water System Assistance Phase 3 Loans	This is a continuation of the program (Phase 3) of providing interest-free loans to water system communities for pipeline replacement, cleaning and lining, water metering and other local water system improvements.	Future
Local Water System Assistance Phase 3 Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget*	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$0	$121,568	($121,568)	$3,288	$7,457	$5,454	$49,770	($182,083)

***Total Loan Distributions less Loan Repayments.**

Project Status 6/16	60.5%	Through June 2016, $322.1 million in loans were distributed to member communities.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$0	$0	$0	May-46	May-46	None	$1,797	$5,454	$3,657

Explanation of Changes

- Spending and schedule shift is primarily due to updated cash flows including new phase added for Local Water Supply Assistance Program Phase 3 of $210 million.

CEB Impact

- The annual interest paid for the Commercial Paper program supporting the Local Water System Assistance Program initiative is over $398,000 average per year based on the last 5 years of actual spending.

S. 766 Waterworks Facility Asset Protection

Project Purpose and Benefits

☑ *Contributes to improved public health*
☑ *Extends current asset life*
☑ *Improves system operability and reliability*

To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems.

Project History and Background

This project was developed to ensure that MWRA maintains ongoing service while optimizing operations in its water facilities. This project in its current form addresses immediate critical facility and equipment issues. This project will eventually include five areas:

1. Equipment replacement (pumps, HVAC equipment, blowers, etc.).
2. Architectural projects (concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, electrical wiring, heating system, etc.).
4. Support Projects (process control system upgrades, etc.).
5. Specialty Projects (instrumentation upgrades, fuel storage tanks, etc.).

While the current schedule indicates a completion date of 2028 for construction, the Waterworks Facility Asset Protection project will be ongoing throughout the useful life of the facilities.

Scope

Sub-phase	Scope	Status
Meter Vault Manhole Retrofits Design and Construction (6689/7479)	Retrofit approximately 195 meter manholes.	Future
Design CA/RI for Construction of Walnut Hill Tank/Elevated Water Storage Tank Repainting (6832)	Design for the rehabilitation of the Walnut Hill Tank. Also, design to repaint 5 steel water storage tanks (Bellevue 1, Bellevue 2, Park Circle, Turkey Hill, and Walnut Hill).	Future
Construction Walnut Hill Tank (6833)	Full structural analysis of the Walnut Hill Elevated Tank based on corrosion discovered. Rehabilitation of the tank based on the structural analysis.	Future
Waltham Pipe Bridge Replacement (6910)	Replacement of approximately 100 feet of 30-inch steel pipe over commuter rail tracks in Waltham including a bridge crossing.	Completed
Design and Construction Cosgrove Valve Replacement (7064/7065)	Replacement of isolation sluice gates at Cosgrove Intake to improve reliability for emergency shut down of Cosgrove facility and to isolate new sliding sleeve valves to facilitate preventive maintenance and any future corrective maintenance.	Future
Transformer at Cosgrove Intake Building (7228)	Replacement of a 45 year old main service transformer and load break switch. This transformer supplies power to the Cosgrove Intake Building. If it were to fail, the building would be running on generator power for a significant period of time.	Completed

Sub-phase	Scope	Status
Covered Storage Tank Rehabilitation Design and Construction (7385/7482)	Rehabilitation of Fells and Loring Road Covered storage facilities commencing in FY19. The valves, sluice gates, and piping should be considered for rehabilitation by this time, as each facility will be more than 20 years old.	Future
Elevated Water Storage Tank Repainting Construction (7493)	Repaint 5 steel water storage tanks (Bellevue 1, Bellevue 2, Park Circle, Turkey Hill, and Walnut Hill). All were painted in 2000. Bellevue 1 and 2 are in the same service area (SEH); Park Circle, Turkey Hill and Walnut Hill are in the same service area (NEH). As noted, the various tanks are redundant to each other. Redundancy is maintained by performing this project and keeping the tanks in good condition and in service.	Future
Electrical Distribution Upgrades at Southborough (7425)	Upgrade of existing 13.8kV distribution system that supplies the various buildings at Southborough Complex due to on-going service disruptions. Install electrical metering equipment to better manage electrical use in facility.	Future
Water Meter Upgrade Replacement (7453)	Replace six older Venturi meters in Boston and upgrade to above ground cabinets. This will provide more accurate and reliable meter data since current meters are beyond their life expectancy.	Future
Beacon Street Line Repair Design CA/RI (7474) and Construction (7458)	Repair of 48" water main in Brookline serving Boston Meter 44. This main provides important water supply redundancy to Meter 60 which serves the Longwood Medical Center in Boston. Construction Contract 7458 was awarded with an NTP dated June 23, 2016, a contract term of 210 calendar days and substantial completion date of January 19, 2017.	Active
Cosgrove/Gillis PS/Cottage Farm CSO Flat Roof Replacement (7022)	Replace the damaged roofs that leak at Cosgrove, Gillis Pump Station, and Cottage Farm CSO Facility. There are issues around roof penetrations and along the parapet wall at Cosgrove.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$20,589	$726	$19,863	$1,759	$1,082	$3,021	$16,260	$756

Project Status 6/16	3.5%	Status as % is approximation based on project budget and expenditures. Transformer Replacement at Cosgrove Intake Building contract was completed in July 2012. Beacon Street Line Repair Design CA/RI commenced in December 2014 and construction was awarded in May 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$21,649	$20,589	($1,060)	Aug-28	Jul-23	(61) mos.	$2,552	$3,021	$469

Explanation of Changes

- Project cost and schedule changed primarily due to Shaft 9 Rehabilitation work transferred to the Metropolitan Redundancy Interim Improvements Project. This decrease was partially offset by updated cost estimates for Cosgrove/Gillis Pump Station/Cottage Farm Combined Sewer Overflow Roof Replacement and Water Meter Upgrade Design contracts.

- Project spending changed primarily due to updated cost estimate for Cosgrove/Gillis Pump Station/Cottage Farm Combined Sewer Overflow Roof Replacement contract.

CEB Impacts

- None identified at this time.

S. 881 Equipment Purchase

Project Purpose

To provide critical equipment for improved maintenance and operations at MWRA facilities.

Project History and Background

This project includes the purchase of large vehicles, purchase and installation of security equipment at various MWRA facilities, and purchase of an Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) for MWRA's Central Laboratory. The security equipment and installation component of the project includes the design and installation of security systems at MWRA facilities. MWRA is ranking facilities and locations with respect to the critical nature of service delivery, with an emphasis on the waterworks system. This ranking will frame the extent and scheduling of the security improvements for each specific site.

Scope

Sub-phase	Scope	Status
Security Equipment & Installation	Design and installation of security systems at various MWRA facilities and sites.	Active
ICP-MS Lab Testing Equipment	Purchase of Inductively Coupled Plasma – Mass Spectrometer to replace a 14-year-old instrument and expand the laboratory's high sensitivity metals testing capacity. Equipment was purchased in 2008.	Completed
FY14-18 Major Laboratory Instrumentation	Purchase major laboratory instrumentation, such as high resolution GC-MS or LC-MS to provide for lab testing of newly regulated contaminants.	Active
Vehicles:		
High Lift Fork Loader (Lull)	Purchase High Lift Fork Loader (Lull) to move equipment and materials at Deer Island.	Completed
Prior Vehicle Purchases	Vehicle purchases including TV Inspection Truck, Two Back Hoes, Vactor Truck, Water Service Truck, Bucket Machine, Excavator, Grove Crane, Land Fill Loader, Power Sweeper/Catch Basin Cleaner, Front-End Loader, Two Dump Trucks, Crane, and International Tractor/Trailer.	Completed
Ramp Truck	Purchase of Ramp Truck to support Fleet Services.	Completed
Street Sweeper	Purchase of Street Sweeper to support MWRA facilities and community assistance.	Completed
FY11-13 Vehicle Purchases	Vehicle purchases planned for FY11-13.	Completed
FY14-18 Vehicle Purchases	Vehicle purchases planned for FY14-18.	Active
FY19-23 Vehicle Purchases	Vehicle purchases planned for FY19-23.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$29,188	$18,489	$10,699	$2,723	$2,210	$11,314	$5,766	$0

Project Status 6/16	63.3%	Status as % is approximation based on project budget and expenditures. Purchase and installation of security equipment is in process and will continue into FY19.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$28,937	$29,188	$251	Jun-23	Jun-23	None	$11,633	$11,314	($319)

Explanation of Changes

- Project cost increased primarily due to revised cost estimates for Security Equipment and Installation phases, partially offset by updated cost estimate for vehicle purchases.

- Project spending decreased due to updated cost estimate for Vehicle Purchases and deletion of Unplated Mobile Equipment phase, partially offset by updated Security Equipment and Installation phase.

CEB Impacts

- No impacts identified at this time.

S.925 Technical Assistance

Project Purpose

To ensure ready access on an as needed basis, to professional and technical services not available or not cost-effectively provided by in-house staff.

Project History and Background

Efficient implementation of MWRA's Capital Improvement Program and other projects often requires specialized skills and technical assistance that are not available from in-house staff. This project ensures ready access to a variety of services through a series of task order contracts with pre-set limits. Task orders are used when immediate expertise on projects is required. When a task order is complete, the expense is transferred to the appropriate capital project or Current Expense Budget cost center.

Scope

Sub-phase	Scope
Technical Assistance	MWRA technical assistance contracts include the following: surveying, hazardous materials assessment, and land appraisals.

Status: MWRA uses technical assistance contracts in support of various CIP and CEB projects.

Expenditure Forecast (in $000s)

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$ 1,150	$0	$1,150	$0	$383	$383	$767	$0

Changes in Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$1,125	$1,150	$25	Jun-19	Jun-20	12 mos.	$775	$383	($392)

Explanation of Changes

- Project budget increased due to updated cost estimate for the Surveying phase of capital projects.
- Schedule and spending shifted to reflect continuation of contracts for an additional year.

CEB Impacts

- When Technical Assistance contracts are used to support a project in the operating budget, the costs are charged to the Current Expense Budget (CEB).

S. 933 Capital Maintenance Planning/Development

Project Purpose

To optimize the efficiency and effectiveness of MWRA maintenance practices by developing and implementing a strategic maintenance plan for MWRA assets.

Project History and Background

MWRA is responsible for rehabilitating, repairing, and maintaining the regional water and sewerage system infrastructure. Since its assumption of the ownership and operations of the water and sewer systems in 1985, MWRA has undertaken an ambitious program of capital improvements to the systems, with estimated expenditures of more than $7 billion for fiscal years 1986 through 2013.

Given the significant value and critical nature of these assets, system maintenance is of paramount importance. This project helps MWRA optimize maintenance practices by evaluating alternative approaches to equipment, infrastructure and facility maintenance, recommending a maintenance strategy, implementing a pilot program to test the recommended strategy, and developing a plan to implement the recommended strategy throughout MWRA.

In the FY01-03 CIP the Capital Maintenance Planning/Development project was part of the first phase of the Wastewater Facilities Asset Management Program (FAMP). This initial phase of FAMP consisted of evaluating maintenance strategies for equipment and systems at Deer Island, and led to the adoption of Reliability Centered Maintenance (RCM) as the maintenance strategy for Deer Island and subsequently the rest of MWRA. As a result of the decision to implement RCM throughout MWRA, the Capital Maintenance Planning/Development project was created. The remaining FAMP components, which address equipment system monitoring, Maximo improvements, and improved business practices at Deer Island, have been renamed Deer Island Treatment Plant Asset Protection.

The purpose of technical assistance contracts is to make available, on a continuing basis, the services of qualified, professional engineering firms to assist MWRA staff on engineering study and/or design initiatives. The contracts involve the engineering disciplines of architecture, civil, structural, geotechnical, surveying, environmental and sanitary, mechanical and process, fire protection, electrical, control systems, chemical, corrosion and odor control, permitting and security. These agency-wide technical assistance contracts supplement in-house staff on high-priority or unanticipated projects, or provide expertise on short-term assignments requiring specialized disciplines that are not cost effective for MWRA to maintain on an in-house basis and will ensure that adequate resources are available to quickly and comprehensively respond to MWRA's needs, particularly when emergency or unanticipated situations arise.

Scope

Sub-phase	Scope	Status
Inventory & Evaluation Phases 1 & 2	Development of a comprehensive, strategic maintenance plan for MWRA. (Completed by July 2005).	Completed
As-Needed Design	Contracts for professional design and/or technical assistance services for either wastewater or waterworks system improvement projects to supplement existing engineering resources for specialized and/or complex engineering issues. Sub-phases consist of As-Needed Design phases 1-15.	Completed/Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$15,886	$12,544	$3,342	$1,684	$1,371	$5,474	$288	$0

Project Status 6/16	79.0%	Status as % is approximation based on project budget and expenditures. All tasks in *Inventory & Evaluation Phases 1 & 2* are complete. As-Needed Design 7 was substantially completed in July 2012. As-Needed Design 8 was substantially completed in February 2012. As-Needed Contracts 9 and 10 were substantially complete in January and February 2014, respectively. As-Needed Design contracts 11-13 were awarded in November 2013. Contract 11 was completed in August 2015. As-Needed contracts 14-15 were awarded in January 2016 with NTPs issued in June 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
16,337	$15,886	($451)	May-18	Jun-18	1 mos.	$6,212	$5,474	($738)

Explanation of Changes

- Project cost and planned spending deceased due to updated cost estimates for As-Needed Design phases 11, 12, 13, 14 and 15.
- Schedule changed due to updated schedules for As-Needed Design contracts 14 and 15.

CEB Impacts

- None identified at this time.

S. 934 MWRA Facilities Management and Planning

Project Purpose

To improve MWRA operations by consolidating projects and providing a central point of review and decision making for space planning decisions.

Project History and Background

This project consolidated existing MWRA projects (DI Maintenance Facilities and DI CSB Demolition) to provide a central point of review and decision making for space planning decisions across the organization.

The project will cover work to rehabilitate or demolish the old Administration Building on Deer Island as the building has deteriorated and certain structures need to be upgraded to current standards if it is to remain occupied. The project also included funds for demolition of the CSB (Construction Support Building) which was built as a temporary structure and has also deteriorated. The CSB Demolition contract was completed in September 2009.

Scope

Sub-phase	Scope	Status
Design & Engineering Services	Design and engineering services to support space plan.	Future
Facilities Construction	Construction of modifications to MWRA facilities in accordance with space plan.	Completed/Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$2,151	$371	$1,780	$0	$0	$0	$1,780	$0

Project Status 6/16	17.2%	Status as % is approximation based on project budget and expenditures. CSB/Demolition contract was substantially complete in September 2009. Records Center Shelving and Moving to the interim warehouse/records center was completed in the spring of 2009. Remaining work is to demolish old Administration Building on DI. Some rehabilitation work will need to be done as well.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$2,151	$2,151	$0	Sep-20	Sep-20	None	$0	$0	$0

Explanation of Changes

- N/A.

CEB Impacts

- None identified at this time.

S. 935 Alternative Energy Initiatives

Project Purpose

A comprehensive "green energy" initiative that is expected to bring solar, wind and hydroelectric power either alone or in combination to a number of MWRA facilities

Project History and Background

This project was originally included under Deer Island in previous budget cycles. Building upon its track record in sustainable resource use – most notably dramatic system-wide reductions in water demand, 100% beneficial reuse of biosolids, self-generation of approximately 25% of Deer's Island power needs, and maximizing revenue through hydropower – MWRA continues to work aggressively to use its resources efficiently, respond appropriately to climate change, and reduce the environmental impacts of its daily operations. Key initiatives completed to-date include: A comprehensive "green energy" initiative that brought solar, wind and hydroelectric power to a number of MWRA facilities.

Scope

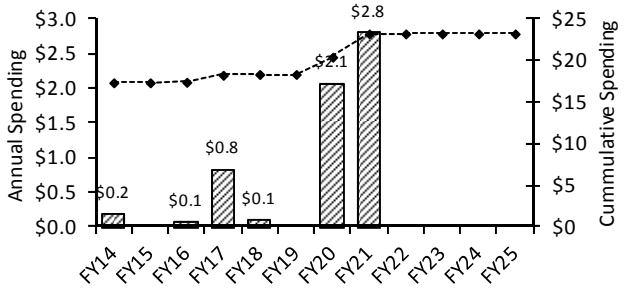
Sub-phase	Scope	Status
DI Solar Residuals Odor Control (ROC)	Design and construction of 100 kw photovoltaic array. Projected annual output estimated at 105,000 kwh.	Completed
DI Wind	Design and construction of 2 600kw solar wind turbine systems. Projected annual output estimated at 2,300,000 kwh. Project added to include repair/rehabilitation contract.	Completed
DI Solar Maintenance/Warehouse	Design and construction of 180kw photovoltaic array. Projected annual output estimated at over 200,000 kwh. Project funding includes $735K million from the American Recovery and Reinvestment Act ("ARRA").	Completed
Future DI Wind (Battery D Location – 7270)	Design and construction of up to two 600 kw wind turbines at Deer Island. Projected annual output estimated at 1,150,000 kwh per turbine.	Future
DI Solar Power Purchase Agreement (PPA)	Design and construction of 456 kw photovoltaic array through a third party 20 yr Power Purchase Agreement. Projected annual output estimated at 520,000 kwh. Project partially subsidized by $1.1M from ARRA program. No capital costs to MWRA; pay for electricity generated.	Completed
Loring Road Hydro	Construction of a 200 kW hydropower turbine/generator at Loring Road. Projected annual output estimated at 1,200,000 kwh. Project funding includes $1.5 million from the ARRA program.	Completed
Energy Adv Con Services	Consultant for comprehensive energy advisory services on throughout the Authority.	Completed
Technical Assistance	Various technical assistance contracts to aid solar, wind, and hydro initiatives.	Completed

Carroll WTP Solar Construction	Installation of photovoltaic cells with generating capacity of 496 kw at Carroll WTP plant. Projected annual output estimated at over 616,000 kwh. Project funding includes $2.2 million from the ARRA program.	Completed
Charlestown Wind	Design and construction of 1.5 MW wind turbine system. Projected annual output estimated at 3,000,000 kwh. Project funding includes $4.8 million from the ARRA program.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$23,271	$17,454	$5,816	$833	$100	$1,191	$4,883	$0

Alternative Energy Initiatives



Project Status 6/16	75.0%	Status as % is approximation based on project budget and expenditures. Carroll Water Treatment Solar and Loring Road Hydro Construction were completed in May 2011. Carroll Water Treatment Plant Solar Construction and Charlestown Wind Project were completed in 2011. DITP Solar PPA was completed in 2011.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	FY18	Chge.	FY17	FY18	Chge.	FY17	FY18	Chge.
$25,558	$23,271	($2,287)	Dec-20	Dec-20	None	$2,662	$1,191	($1,471)

Explanation of Changes

- Project cost and spending decreased due to Deer Island Wind Phase 2 (CSB) Construction phase being deleted.

CEB Impacts

- Assume $30,000 in avoided costs in FY19 for the Hatchery Pipeline Hydropower project.

Information Technology (IT) Strategic Plan

The Board recommended that staff develop a five-year strategic plan for the Management Information Systems Department (MIS) to ensure alignment of business goals, objectives, processes, and technology within the Authority. At the July 13, 2011 meeting, the Board approved the recommendation of a Selection Committee to award a contract to Westin Engineering, Inc. (Westin) for the development of a Five-Year Information Technology Strategic Plan (IT Plan). Westin's scope of work included evaluating MWRA's current applications, IT systems and infrastructure, as well as the MIS Department's organizational structure and staffing requirements. After Westin completed its review, it was charged with developing plans for future improvements to MWRA's IT systems and organizational approach and structure.

Based on the recommendation of the Five-Year IT Strategic Plan which was conducted during FY12, the structure of the MIS projects going forward were classified into four major programs, as follows:

Application Improvement Program – This program continues MWRA's efforts to update and enhance a wide range of applications to improve efficiencies of business processes and effectiveness of the staff while ensuring the availability, and integrity of the MWRA's data resources. This program relates to 123 applications with 227 modules that support various business functions across the Authority. Seventy-seven, or 63%, of these applications are commercially available off the shelf packages.

Information Security Program – This program focuses on the resiliency and sustainability of the MWRA's data security practices. MIS will establish policies, procedures, and information security awareness. The work under this subprogram will also review each IT system and make recommendations to improve its security profile in accordance with the Department of Homeland Security Guidelines.

Information Technology Management Program -This program improves the organization of MIS and the oversight processes for selecting and implementing IT solutions throughout the MWRA. To accomplish those goals, the study recommends that MWRA:

- Develops an Information Technology Service Management (ITSM) Program to improve service delivery.
- Adopts a Standardized Software Development Lifecycle (SDLC) to improve the quality of software delivered.
- Implements a more robust Project Management Program to improve the predictability of deliverables and cost associated with information technology projects.
- Updates the IT Steering Committee to ensure that the business and technology priorities of the MWRA are aligned and are being met.

Information Technology Infrastructure Program - This program assesses and implements consolidated and optimized versions of core IT infrastructure elements to improve and optimize data management practices, including: storage, backup, archive and purge processes, and technologies. These improvements cover the 1,238 desktops, 160 laptops, 105 servers, 20 Wide Area Network Circuits and associated ancillary equipment, as well as the 18 Terabytes of data managed by MIS.

S. 940 Applications Improvements Program

Project Purpose

To develop, improve, and procure management information systems (MIS) applications to improve efficiencies of business processes associated with managing the operations and support divisions.

Project History and Background

Currently there are 123 applications that have 227 modules. Seventy-seven of these applications are "commercially available off the shelf" (COTS) packages. These applications support business functionality for the Operations, Administration, Finance, Internal Audit, Public Affairs and Law Divisions along with the Office of Emergency Preparedness and the Office of the Executive Director. This program will continue the good work started in previous years to update and enhance a wide range of applications to improve efficiencies of business process and effectiveness of the staff performing the processes while ensuring the availability, integrity and confidentiality of the MWRA's data resources. It will further enhance the integration and availability of data to provide a more holistic view of the overall operational status with seamless access to the detailed data.

The application improvement program includes upgrades to applications such as Lawson, Maximo, LIMS and PIMS. The program also includes significant expansion to GIS, Mobile Integration, and Enterprise Content Management technologies.

This program is scheduled to be completed by FY20.

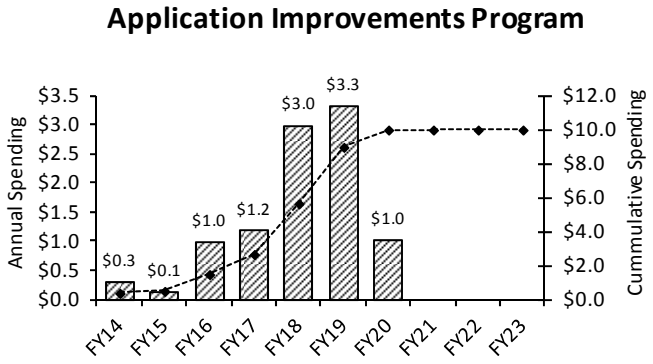
Scope – The table describes the CIP phases and associated projects.

Sub-phase	Scope	Status
GIS Applications & Integration	Expand role of GIS technology for scientific, environmental and engineering applications. Projected expenses include Hardware, Installations, Support, Software, Customizations and Technical Support. This project will assess the current state of the GIS Program and make recommendations for improvements in the future state.	Active
Lawson Enhancements	New releases and implementation of ERP System hardware, environment, and application replacement or upgrades. Implement contract management, strategic sourcing and process flow integrator modules.	Active
Maximo Upgrade	Complete migration to Maximo 7.5, acquire new modules and add richer integrations (e.g. GIS). Hardware replacements and enhancements to the system based on current useful life.	Active
Pre-Treatment Information Mgmt System (PIMS) Enhancements	The system is used by the MWRA to monitor the pretreatment program pursuant to MWRA's NPDES permit and EPA regulations. Hardware replacements and enhancements to the system based on current useful life. This project will assess the current state of the PIMS implementation to develop and execute a plan for addressing functional issues and complying with new regulations.	Future
Enterprise Performance Management Enhancements	Implement automated tools to support the compilation of monthly and quarterly performance reports, including tools for extracting data from existing operational applications, managing data quality, generating reports and automating report assembly.	Active

Sub-phase	Scope	Status
Enterprise Content Management	Implement an Authority-wide Content Management Program to address dependence upon paper records, support records management and improve access to information, streamline workflows and replace several department-level solutions.	Future
Mobile Integrations	Define integrated business strategy for mobile computing. Expand the application of mobile computing to meet the Authority's business requirements in the Laboratory, DITP Operations and Maintenance and other Operations and management areas.	Active
LIMS Enhancement	Laboratory Information Management System (LIMS) Enhancements: The e-Lab is a new project that will improve productivity of staff and reduce the amount of paper being generated. This initiative adds a new module into LIMS called Electric Laboratory Notebook (ELN). ELN will replace paper based laboratory notebooks with tablets that are connected to LIMS and integrated into the core product. This project includes the purchase of tablets, ELN licenses and services required to implement the new module.	Completed

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$9,980	$1,476	$8,504	$1,180	$2,984	$5,568	$4,340	$0



Project Status 6/16	14.8%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$10,176	$9,980	($196)	Dec-19	Dec-19	None	$6,881	$5,568	($1,313)

Explanation of Changes

- Project cost decreased due to updated cost estimate for LIMS Enhancements.
- Spending changed primarily due to updated schedule for Lawson Enhancements and PIMS Enhancements, and updated cash flow for Maximo Upgrade contract.

CEB Impacts

- Annual increased costs associated with Lawson Enhancements of $75,000 in FY20 for the Application Improvement Program.

S. 942 Information Security Program

Project Purpose

To ensuring the availability, integrity and confidentiality of the MWRA's data resources through the selection and implementation of Information technology solutions associated with cyber security.

Project History and Background

This program focuses on the resiliency and sustainability of the MWRA's data security practices. The projects associated with this program will establish policies, procedures and an information security awareness program for all of the MWRA. This program includes designing both an information security program and electronic security plans in order to provide a more formal, comprehensive IT security framework that is compliant with Federal Standards .

This program is scheduled to be completed by FY19.

Scope – The table describes the CIP phases and associated projects.

Sub-phase	Scope	Status
IT Security Program	Information Security Program Development and Implementation Project – To develop and coordinate an IT Security program to provide a holistic approach to physical and cyber security efforts. Define and coordinate implementation of an Authority-wide information security plan, electronic security plans, and a cyber security plan including standards, policies, and practices. This project started in FY13 and ended in FY14.	Completed
	Information Security Awareness Program Development and Delivery Project – Formal and informal activities to inform staff (including contractors and business partners) of the information security risks associated with their activities and their responsibilities in complying with MWRA policies and procedures designed to reduce these risks. This project started in FY13 and was completed in FY14.	Completed
	Information Security Protection Infrastructure Upgrade – Upgrade the existing hardware and software infrastructure that protects MWRA's information from internal and external threats. These infrastructure components are at the end of their useful life, and need to be upgraded in order to keep MWRA's protection current and vigilant. This project also includes installation and configuration services.	Active
Electronic Security Plans	Electronic Security Plan Development and Implementation Project - Coordinate a system-by-system development of Electronic Security Plan (ESP) to apply security controls and standards to each system within MWRA's application portfolio.	Future

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$2,822	$1,181	$1,641	$274	$665	$1,585	$702	$0

Project Status 6/16	41.8%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$2,385	$2,822	$0	Jun-19	Jun-19	None	$1,885	$1,585	($300)

Explanation of Changes

- Project spending increased due to updated schedule for Information Security Protection Infrastructure Upgrade.

CEB Impacts

- None identified at this time.

S. 944 Information Technology Management Program

Project Purpose

To improve the overall efficiencies in how MIS delivers IT services and to more effectively adapt to the changing business needs associated with managing the operational and administrative systems of the Authority.

Project History and Background

This program and associated projects are intended to bring to the MWRA a new and improved Management Information Systems Department and an improved oversight process for selecting and implementing Information Technology solutions throughout the MWRA by establishing:

a. An Information Technology Service Management (ITSM) Program to improve service delivery

b. A Standardized Software Development Lifecycle (SDLC) to improve the quality of software delivered

c. A Project Management Program to improve the predictability of deliverables and cost associated with information technology projects

d. An updated IT Steering Committee to ensure that the business and technology priorities of the MWRA are aligned and are being met

e. Organizational changes to reflect the changing technologies and processes

This program is scheduled to be completed by FY18 at an estimated cost of $0.9 million.

Scope – The table describes the CIP phases and associated projects.

Sub-phase	Scope	Status
Implement IT Steering Committee	Implement formal practices for allocating IT resources among competing demands and prioritizing requests for IT services. Define and implement roles and responsibilities for allocation of technology related policies and standards.	Completed
MIS Organization and Change Management	Reorganize MIS Department to better align responsibilities with current and emerging requirements. Implement a focus on problem resolution and customer service issues. Change Management – Enhance capabilities for planning and implementing organizational change, integrated with software development lifecycle, project management and information technology service management.	Active Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$923	$0	$923	$728	$165	$893	$30	$0

Project Status 6/16	0%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY17**	**Chge.**
$923	$923	$0	Jun-18	Jun-18	None	$893	$893	$0

Explanation of Changes

- Some of this work was accomplished with staff and not consultants.

CEB Impacts

- None identified at this time.

S. 946 IT Infrastructure Program

Project Purpose

To assess and implement consolidated and optimized versions of equipment and data bases and improve and optimize data management practices.

Project History and Background

The MWRA currently owns and operates 1,238 desktops, 108 servers, 20 Wide Area Network Circuits and associated equipment. It also manages in excess of 7 Terabytes of data stored in 148 data bases; and an additional 12 Terabytes of unstructured data on file shares. This program will assess and implement consolidated and optimized versions of these core IT infrastructure elements as utility like services and commodities. Furthermore, it will look to improve and optimize data management practices, including: storage, backup, archive and purge processes and technologies.

This program is scheduled to be completed by FY19.

Scope – The table describes the CIP phases and associated projects.

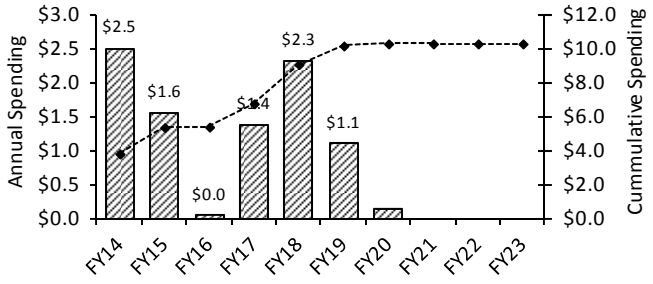
Sub-phase	Scope	Status
IT Infrastructure Upgrades	IT System Architecture - This effort will focus on the development of a MWRA Technical Reference Model (TRM). The TRM will provide an architectural framework used to identify the standards, specifications and technologies that support the MWRA's computing environment. The TRM will identify both the current state and the target state of the MWRA's computing environment. Elements of the TRM will include the following domains: 1. Access - Addresses how information, transactions and services are delivered to and accessed by the MWRA's staff, constituents and business partners. 2. Information – Addresses standards and guidelines for Data Interoperability, Data Management, Data Formats and Records Management. 3. Application – Defines how applications are designed and developed, and identifies open standards to facilitate rapid service-oriented development, integration and implementation of new applications and business processes. 4. Integration – Addresses how information, transactions, security, systems management and Business Services are integrated across intra-enterprise entities, e.g. SCADA, PICS, Security & MIS, as well as extra-enterprise entities, e.g. business partners. 5. Management – Introduces service management concepts using Information Technology Infrastructure Library (ITIL) Guidelines for the management of traditional IT infrastructure and business services. 6. Security – Addresses the approach, methodology and technology components necessary to provide the appropriate level of protection for the information assets of the MWRA, its constituents and business partners. Data center Upgrades – The Chelsea facility hosts the Computer Center, Operations Control Center (OCC) and the primary Emergency Operations Center. Specialty fire suppression systems, UPS equipment, environmental control and alarming systems, console apparatus, etc. were purchased in 2000/01 with the facility opening. All of	Active

	this equipment has a useful life of approximately 15 years and will require replacement in FY15.	
	Network Infrastructure Project - Plan and coordinate upgrades to IT infrastructure elements, including networks, servers, storage, etc. The Net 2020 DITP/Southborough includes Copper cable upgrade to CAT6 since the existing cabling and fiber are non-compliant with current standards. The new standards and fiber upgrade will support increased backbone capacity for 10GIG. Storage Upgrades - Implement recommended IT infrastructure changes that include enhancements to capacity and performance of networking and communications, storage, backups, server consolidation, disaster recovery, and integration approach and tools. Backup Upgrades – Evaluate need for tape backup versus alternative means for different record types. Plan and implement backup capabilities to expand backup coverage (user data). Server Management – Develop specifications for server hardware and software including ability to implement greater virtualization. Seek opportunities to standardize operating systems, and hardware, for greater ease of support. Enterprise Application Integration – Develop systems architecture as framework for infrastructure changes. Coordinate activities needed to support Enterprise Application Integration, Data Management and application improvements. Adopt Service-Oriented Architecture (SOA). Select SOA toolkits and approaches that maximize ability to integrate existing and current applications.	Active
E-Mail Upgrades	E-Mail Upgrades - Complete migration to Exchange 2010. Increase default attachment size. Substantially increase total email capacity. Establish procedures for managing PST files, including managing on local hard disks, archiving, and automated backups. Explore automation tools for managing email, including automated archiving, automated backup, legal holds, indexing and search.	Active
Enterprise Data Management	Enterprise Data Management - Develop an Authority-wide data architecture that maximizes benefit from data capture and ongoing maintenance. Implement Authority-wide data modeling and management, to standardize data access across multiple systems for a consistent view of the Authority across all business units.	Active
User Data Management	User Data Management – Implement secure capability for large file transfers and upgrade Authority-wide storage capabilities to better support individual user and work team data sharing.	Active

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY16	Remaining Balance	FY17	FY18	FY14-18	FY19-23	Beyond FY23
$10,271	$5,374	$4,897	$1,373	$2,307	$7,762	$1,218	$0

IT Infrastucture Program



Project Status 6/16	52.3%	Status as % is approximation based on project budget and expenditures.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY17	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**	**FY17**	**FY18**	**Chge.**
$10,271	$10,271	$0	Jun-19	Jun-19	None	$7,994	$7,762	($232)

Explanation of Changes

- Project spending changed due to updated cash flows.

CEB Impacts

- Annual incremental cost for Storage Upgrades are estimated at $100,000 in FY19; Telecommunications increases are estimated at $25,000 in FY19; and $101,000 for the IT Infrastructure Program in FY19.

APPENDIX 2

Expenditure Forecast Report with Planned NTP and SC dates

Understanding the Expenditure Forecast

Capital expenditure forecasts, sometimes referred to as project cashflows, are presented in this section of the FY18 Proposed CIP document. Expenditure forecasts are accrual based, i.e., projected expenditures are estimated based on when services are expected to be rendered. Projects appear in this report in the same order they appear on-line, organized by capital program area. Grant and loan receipts for various projects and programs appear in the section following the expenditure forecasts.

The following presents a description of each column in the expenditure forecast tables:

Project and Subphase Names

The first column of the expenditure forecast identifies the organizational hierarchy of the CIP: capital program area (e.g., Wastewater System Improvements), program category (e.g., Interception and Pumping), project (e.g., Quincy Pump Facilities), and sub-phases (e.g., Facilities Plan/EIR). Sub-phases represent awarded and unawarded contracts.

Contract Number

To the left of each project name is a string of nine numbers. These numbers are assigned by the Rates and Budget Department, and are the number reference for the sub-phase in MWRA's capital budgeting database.

The first string is a five-digit number representing the MWRA Lawson Activity Management System sub-phase number. Project budgets and expenditures are tracked by this account number.

Following the five-digit sub-phase number is a four-digit number representing the contract reference number in MWRA's contract management system. This reference number is used to access contract information such as the award amount, change order activity, and processed invoices.

Notice to Proceed (NTP) and Substantial Completion (SC)

Project schedules are tracked by two key milestones: Notice to Proceed and Substantial Completion. These milestones indicate the expected start and end dates for contract activity.

Contract Value

The Contract Value represents the budget amount for the capital program, program category, project, or sub-phase. For unawarded contracts, the contract amount is based on a cost estimate. For awarded contracts, this amount includes the award amount plus any change orders, amendments, and purchase orders accounted for prior to completing the budget.

Payments through FY16

Payments through FY16 include actual and accrued expenditures since the inception of the contract through the end of FY16.

Remaining Balance

Remaining Balance is calculated by subtracting Payments through FY16 from the Contract Amount. This amount is then spread in the columns to the right, for FY14-18, FY19-23, and Beyond FY23.

APPENDIX 2
FY18 PROPOSED FIVE-YEAR CIP BY MAJOR PROGRAM CATEGORY
FY18 by Quarters

CAPITAL IMPROVEMENT PROGRAM													
EXPENDITURE FORECAST FY2014-2018													
($000)													
	Total Contract Amount	Project Payments Thr. FY16	Balance as of 6/30/16	FY14	FY15	FY16	FY17	QI FY18	QII FY18	QIII FY18	QIV FY18	FY18	5-Year Total FY14-18
Wastewater System Improvements	3,172,494	1,931,262	1,241,232	55,690	75,387	64,185	73,085	20,211	20,512	19,939	22,511	83,174	351,520
Waterworks System Improvements	3,992,529	1,965,078	2,027,451	40,966	22,705	26,725	60,990	34,114	13,556	13,593	14,882	76,145	227,531
Business & Operations Support	131,461	92,708	38,753	5,507	5,524	4,235	8,795	2,282	2,636	2,682	2,585	10,185	34,246
Total MWRA	7,296,485	3,989,048	3,307,436	102,163	103,616	95,144	142,870	56,607	36,705	36,214	39,978	169,504	613,297
Contingency	195,584		195,584				7,586	2,795	2,299	2,158	2,573	9,825	17,411
Total MWRA w/ Contingency	7,492,069	3,989,048	3,503,020	102,163	103,616	95,144	150,456	59,402	39,004	38,372	42,551	179,329	630,708

Massachusetts Water Resources Authority
FY18 Proposed Expenditure Forecast

Program/Project/Subphase	Contract No.	Notice To Proceed	Substantial Completion	Total Contract Amount	Payments through FY16	Remaining Balance	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
Total MWRA				**7,296,484,522**	**3,989,048,179**	**3,307,436,343**	**142,870,027**	**169,503,932**	**613,297,221**	**1,406,312,374**	**1,588,749,993**
Wastewater				**3,172,494,495**	**1,931,262,178**	**1,241,232,317**	**73,084,692**	**83,174,142**	**351,520,357**	**775,726,450**	**309,247,029**
Interception & Pumping				**980,614,986**	**542,626,109**	**437,988,877**	**21,534,912**	**36,712,381**	**80,333,339**	**301,064,667**	**78,676,916**
102 Quincy Pump Facilities	**completed project**			**25,907,202**	**25,907,202**	**-**					
104 Braintree-Weymouth Relief Facilities				**234,492,623**	**227,704,621**	**6,788,001**		**240,899**	**241,588**	**6,547,101**	
Geotechnical - Marine	10001_5333	Nov-91	Apr-92	442,860	442,860	-					
Geotechnical - Land	10044_5332	Nov-91	Mar-92	7,980	7,980	-					
Facilities Planning - Phase 1	10045_5311	Oct-81	Dec-90	331,140	331,140	-					
EIR - Phase 1	10046_5312	Nov-84	Oct-90	513,530	513,530	-					
Design 1/CS/RI	10047_5313	Nov-94	Jun-06	18,882,312	18,882,312	-					
Land Acquisition	10048_5314	Mar-97	Jun-10	12,841,909	12,841,908	-					
Tunnel Construction/Rescue	10049_5315	Jun-99	Jul-03	83,190,599	83,190,599	-					
Intermediate Pump Station - Construction	10050_5316	Dec-00	Apr-05	47,444,929	47,444,929	-					
North Weymouth Relief Interceptor	10051_5303	Mar-01	Jun-02	4,704,618	4,704,618	-					
HDD Siphon - Construction	10052_5373	Jul-03	May-07	16,357,407	16,357,407	-					
Braintree-Weymouth Replacement Pump Station	10054_5375	Jan-05	Apr-08	17,728,028	17,728,028	-					
Design - Rehab	10055_5308	Sep-88	Dec-89	23,710	23,710	-					
Construction - Rehab	10056_5309	Jan-92	Dec-96	255,490	255,490	-					
Final EIR/Facility Plan	10057_5324	Apr-91	Aug-93	1,111,007	1,111,007	-					
Design 2/CS/RI	10058_5331	Apr-95	Dec-11	14,999,141	14,999,141	-			(573)		
Rehabilitation of Section 624 - Construction	10060_5310	Jul-10	Dec-10	2,505,767	2,505,767	-					
Technical Assistance	10061_5951	Nov-84	Apr-07	144,264	144,264	-					
Sedimentation Testing	10251_6016	Sep-94	Apr-96	95,880	95,880	-					
Legal	10263_6072	Jul-95	Apr-08	849,220	849,220	-					
Public Relations	10264_6073	Jul-95	Apr-07	-	-	-					
Hazardous Waste	10265_6074	Jul-95	Apr-07	7,937	7,937	-					
Marine Pipeline - Design	10278_6119	Feb-97	Aug-97	1,100,000	1,100,000	-					
Mill Cove Siphon - Construction	10302_6368	Aug-97	Jun-98	2,748,908	2,748,908	-					
Community Technical Assistance	10354_6631	Jul-99	Apr-07	1,111,451	1,111,451	-					
Geotechnical Consultant	10375_6766	Sep-00	Mar-03	56,045	56,045	-					
IPS/RPS Communication System	10378_6792	Dec-02	Apr-08	224,884	224,884	-					
Rehabilitation of Section 624 - Design	10452_7193			-	-	-					
Wetlands Replication	10470_7290			25,607	25,606	1			1,262		
Mill Cove Siphon Sluice Gates - Design	10479_7326	Jul-17	Mar-21	788,000	-	788,000		157,599	157,599	630,401	
Mill Cove Sluice Gates - Construction	10480_7327	Mar-19	Mar-20	2,000,000	-	2,000,000				2,000,000	
B/W Improvements - Construction	10493_7366	Dec-19	Dec-21	3,200,000	-	3,200,000				3,200,000	
B/W Improvements - Design/CS/RI	19567_9586	Dec-17	Nov-22	800,000	-	800,000		83,300	83,300	716,700	
105 New Neponset Valley Relief Sewer	**completed project**			**30,300,304**	**30,300,304**	**-**					
106 Wellesley Extension Replacement Sewer	**completed project**			**64,358,543**	**64,358,543**	**-**					
107 Framingham Extension Relief Sewer	**completed project**			**47,855,986**	**47,855,986**	**-**					

Massachusetts Water Resources Authority
FY18 Proposed Expenditure Forecast

Program/Project/Subphase	Contract No.	Notice To Proceed	Substantial Completion	Total Contract Amount	Payments through FY16	Remaining Balance	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
127 Cummingsville Replacement Sewer	**completed project**			**8,998,768**	**8,998,768**	**-**					
130 Siphon Structure Rehabilitation				**6,880,793**	**939,770**	**5,941,023**				**5,941,023**	
Planning	10253_6017	Jan-96	Nov-98	937,670	937,670	-					
Land Acquisition	10280_6165	Jul-19	Jun-20	50,000	2,100	47,900				47,900	
Design/CS/RI	10293_6224	Jul-18	Jun-22	1,428,932	-	1,428,932				1,428,932	
Construction	10294_6225	Jul-20	Jun-21	4,464,191	-	4,464,191				4,464,191	
131 Upper Neponset Valley Sewer System	**completed project**			**54,174,077**	**54,174,077**	**-**					
132 Corrosion & Odor Control				**27,879,417**	**3,372,834**	**24,506,583**	**535,216**	**1,092,705**	**1,999,351**	**22,878,662**	
Planning/Study	10279_6137	Jan-97	Dec-98	587,422	587,422	-					
Land Acquisition	10323_6549	Aug-02	Jun-05	11,831	11,831	-			8,491		
Legal	10325_6551	Dec-00	Jul-08	1,925	1,925	-					
Design/CS/RI	10327_6553	Aug-02	Jun-05	1,787,912	1,787,912	-					
Interim Corrosion Control	10373_6743	Jul-00	Dec-01	620,805	620,805	-					
FES/FERS Biofilters - Design	10406_6919	Jul-18	Apr-21	1,122,484	-	1,122,484				1,122,484	
FES/FERS Biofilters - Construction	10456_7215	Apr-19	Apr-20	1,836,792	-	1,836,792				1,836,792	
System-wide Odor Control - Study	10491_7364	Jul-18	Jul-20	1,000,000	-	1,000,000				1,000,000	
NI Mechanical & Electrical Upgrades - Design/CA/REI	10492_7365	Oct-17	Sep-22	1,570,000	-	1,570,000		224,286	224,286	1,345,714	
NI System-wide Odor Control - Evaluation	10495_7494	Sep-15	Feb-17	536,310	362,939	173,371	173,371		536,310		
NI Mechanical & Electrical Upgrades - Construction	10496_7495	Mar-19	Jun-21	6,053,936	-	6,053,936				6,053,936	
NI Odor Control & HVAC Improvements - Design/CA/REI	10497_7517	Feb-17	Aug-21	2,750,000	-	2,750,000	361,845	868,419	1,230,264	1,519,736	
NI Odor Control & HVAC Improvements - Construction Phase 2	10498_7548	Dec-18	Dec-20	10,000,000	-	10,000,000				10,000,000	
136 West Roxbury Tunnel				**11,313,573**	**10,313,573**	**1,000,000**				**1,000,000**	
Inspection	10299_6230	Jul-98	Sep-99	344,202	344,202	-					
Tunnel Easements & Permits	10329_6566	Mar-10	Dec-15	53,789	53,789	-					
Legal	10330_6567	Apr-00	Mar-10	2,133	2,133	-					
Land Acquisition	10331_6568	Apr-00	Mar-10	440,154	440,154	-					
Construction	10332_6569	Jun-01	Jun-02	6,673,671	6,673,671	-					
Design/CS/RI	10333_6570	Apr-00	Jun-03	1,416,580	1,416,580	-					
Technical Assistance	10366_6709	Nov-99	Mar-10	7,752	7,752	-					
Tunnel - Design	10400_6897	Feb-09	Jun-11	1,375,292	1,375,292	-					
Tunnel Inspection	10401_6898	Sep-19	Jun-20	1,000,000	-	1,000,000				1,000,000	
137 Wastewater Central Monitoring				**27,482,036**	**19,782,036**	**7,700,000**		**360,000**	**359,835**	**3,050,000**	**4,290,000**
Planning	10301_6232	Jan-98	Jul-99	563,425	563,425	-					
Design and Integration Services	10319_6532	Jun-02	Jul-10	6,344,266	6,344,266	-					
Construction 1 (CP1)	10320_6533	Mar-06	Jan-08	7,662,173	7,662,173	-					
Construction 2 (CP2)	10321_6534	Feb-08	Jul-09	5,139,444	5,139,444	-					
Technical Assistance	10322_6535	Sep-02	Jul-10	7,425	7,425	-					
Wastewater SCADA/PLC Upgrades	10356_6656	Oct-17	Oct-32	7,000,000	-	7,000,000		360,000	360,000	2,350,000	4,290,000
Equipment Prepurchase	10398_6861	Apr-05	Dec-09	65,303	65,303	-			(165)		
Wastewater Redundant Communications	10490_7363	Jul-19	Mar-23	700,000	-	700,000				700,000	

Massachusetts Water Resources Authority
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Program/Project/Subphase	Contract No.	Notice To Proceed	Substantial Completion	Total Contract Amount	Payments through FY16	Remaining Balance	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
139 South System Relief				**4,939,244**	**3,439,244**	**1,500,000**				**1,500,000**	
Archdale - CS/RI	10309_6419	Nov-98	Aug-99	5,379	5,379	-					
Archdale - Construction	10310_6420	May-99	Aug-99	210,748	210,748	-					
Sections 70 & 71 HLS - Evaluation	10318_6519	Sep-98	Oct-99	215,140	215,140	-					
Outfall 023 - Design	10345_6595	Jun-99	Sep-99	509	509	-					
Outfall 023 - Cleaning	10346_6596	Apr-00	Nov-00	1,097,526	1,097,526	-					
Land Acquisition/Easements	10347_6605	Apr-99	Apr-05	5,053	5,053	-					
Sections 70 & 71 HLS - Construction	10349_6611	Jun-99	Oct-99	417,021	417,021	-					
Milton Financial Assistance	10350_6616	Oct-99	Jun-00	1,487,868	1,487,868	-					
Outfall 023 - Structural Improvements	10386_6801	Jan-19	Dec-20	1,500,000	-	1,500,000				1,500,000	
141 Wastewater Process Optimization				**10,416,274**	**1,501,767**	**8,914,507**			**296,588**	**5,195,484**	**3,719,023**
Planning	10367_6733	Aug-01	Aug-04	930,308	930,308	-					
North System Hydraulic Study	10412_6930	Nov-11	Jun-15	571,459	571,459	-			296,588		
Somerville Sewer - Design	10413_6931	Oct-19	Mar-22	200,000	-	200,000				200,000	
Somerville Sewer - Construction	10414_6932	Mar-21	Mar-22	1,122,484	-	1,122,484				1,122,484	
Siphon - Planning	10415_6933	Nov-18	Jun-19	150,000	-	150,000				150,000	
Hydraulic Flood Engineering Design & Construction - N. System	19401_7412	Jan-19	Jun-27	7,442,023	-	7,442,023				3,723,000	3,719,023
142 Wastewater Meter System - Equipment Replacement				**28,437,912**	**5,137,912**	**23,300,000**		**512,500**	**512,500**	**8,187,500**	**14,600,000**
Planning / Study / Design	10371_6739	Jul-17	Oct-20	2,700,000	-	2,700,000		512,500	512,500	2,187,500	
Equipment Purchase & Installation	10379_6793	Nov-03	Jun-08	5,137,912	5,137,912	-					
Permanent Site Improvements - Construction	10411_6929	Mar-19	Apr-20	2,000,000	-	2,000,000				2,000,000	
Wastewater Metering Asset Protection Equipment Purchases	10451_7191	Apr-19	Apr-30	18,600,000	-	18,600,000				4,000,000	14,600,000
143 Regional I/I Management Planning	**completed project**			**168,987**	**168,987**	**-**					
145 Facility Asset Protection				**391,259,249**	**38,670,485**	**352,588,764**	**20,999,697**	**34,506,277**	**76,923,477**	**241,014,897**	**56,067,893**
Prison Point HVAC Upgrades - Construction	10380_6795	Dec-10	Dec-13	2,764,188	2,764,181	7	7		318,377		
Remote Headworks Heating System Upgrade	10381_6796	May-05	May-06	1,175,181	1,175,181	-					
Alewife Brook Pump Station Rehab - Construction	10382_6797	Jan-16	May-18	12,613,000	-	12,613,000	6,818,032	5,794,968	12,613,000		
Rehab of Section 93A Lexington	10383_6798	Jul-03	Apr-04	1,565,742	1,565,742	-					
Chelsea Creek Upgrades - REI	10387_6802	Oct-16	Jan-21	3,632,829	-	3,632,829	419,172	838,345	1,257,517	2,375,312	
Technical Assistance	10392_6829	Jul-02	Mar-22	83,688	83,688	-			35,803		
Sections 80 & 83	10394_6842	Apr-07	Sep-07	364,590	364,590	-					
Section 160	10395_6843	Jun-07	Dec-08	1,581,369	1,581,369	-					
Survey	10396_6857	Nov-04	May-05	10,708	10,708	-					
Permits	10397_6858	May-03	Nov-08	12,856	12,856	-			3,945		
Remote Headworks Concept Plan	10399_6886	May-08	Sep-09	670,436	670,436	-					
Cambridge Branch 1, Sections 26 & 27 -Construction	10418_6936	Sep-20	Sep-22	14,500,000	-	14,500,000				14,500,000	
Alewife Brook Pump Station Rehab - Design/CA	10419_6937	Apr-10	Oct-11	223,194	223,194	-					
Prison Point HVAC Upgrades - Design	10420_6938	Jan-08	Mar-13	441,387	441,387	-			(10,818)		
93A Force Main Replacement	10423_6987	May-06	Jan-07	461,962	461,962	-					
Mill Brook Valley Sewer Sections 79 & 92	10424_7004	Jun-04	Mar-05	542,292	542,292	-					
Hingham Pump Station Isolation Gate - Construction	10427_7033	Sep-11	May-12	124,500	124,500	-					
Alewife Brook Pump Station - Final Design/CA/REI	10428_7034	Mar-12	May-19	1,813,026	1,030,539	782,487	243,698	248,672	898,474	290,117	
Caruso Pump Station Improvements - Design/CA/REI	10431_7037	Aug-12	Jun-17	865,096	528,118	336,978	163,822	138,526	607,025	34,630	
Land/Easements	10440_7073	Jul-03	Jun-10	103,386	103,386	-					
Nut Island Headworks Fire Alarm/Wire Conduit	10444_7144	Jun-09	Dec-09	285,391	285,391	-					

Massachusetts Water Resources Authority
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Program/Project/Subphase	Contract No.	Notice To Proceed	Substantial Completion	Total Contract Amount	Payments through FY16	Remaining Balance	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
Chelsea Creek Headworks Upgrades - Construction	10445_7161	Nov-16	Nov-20	72,859,000	-	72,859,000	4,553,687	18,214,750	22,768,437	50,090,563	
Pump Stations & CSOs Condition Assessment	10446_7162	Dec-17	Dec-19	3,254,970	-	3,254,970		610,000	610,000	2,644,970	
Interceptor Renewal 1, Reading Extension - Design/CA/REI	10447_7163	Aug-15	Jun-19	1,156,116	249,743	906,373	258,774	287,822	796,338	359,777	
Interceptor Renewal 1, Reading Extension - Construction	10448_7164	Mar-17	Jun-18	4,425,581	-	4,425,581	276,599	3,319,186	3,595,785	829,796	
Chelsea Creek Headworks Upgrades - Design/CA	10455_7206	Jul-10	Jun-21	8,786,831	5,480,852	3,305,979	544,438	649,775	4,383,852	2,111,766	
Malden & Melrose Hydraulics & Structural -Study & Design	10457_7216	Jan-19	Dec-19	300,000	-	300,000				300,000	
Malden & Melrose Hydraulics & Structural - Construction	10458_7217	Jul-20	Jul-22	1,000,000	-	1,000,000				1,000,000	
Headworks Effluent Shaft - Study	10463_7237	Jul-17	Jul-18	500,000	-	500,000		375,000	375,000	125,000	
Interceptor Renewal 3, Dorchester Interceptor Sewer-Construct.	10467_7279	Jan-19	Jan-21	4,146,152	-	4,146,152				4,146,152	
Cambridge Branch 2 Everett Sections 23, 24 - Construction	10468_7280	Sep-22	Sep-24	10,000,000	-	10,000,000				2,800,000	7,200,000
Cottage Farm Fuel System Upgrade	10469_7281	Jun-12	Apr-13	497,558	497,558	-					
NI Elecrical & Grit/Sreenings Conveyance System - Design/CA/RI	10477_7312	Mar-11	May-16	1,249,477	1,232,802	16,675	16,675		626,326		
NI Electrical & Grit/Sreenings Conveyance System - Construction	10478_7313	Jul-13	May-15	5,192,243	5,192,243	-			5,192,243		
Interceptor Renewal No. 5 - Milton Sections 607, 608, 609, 610	10481_7328	Oct-19	Oct-21	10,000,000	-	10,000,000				10,000,000	
Interceptor Renewal No. 6 - Chelsea Sections 12, 14, 15, 62	10482_7329	Mar-21	Mar-23	11,000,000	-	11,000,000				11,000,000	
Prison Point/Cottage Farm Pump & Gearbox Rebuilds ESDC	10483_7330	Feb-14	Dec-16	319,682	407,208	(87,526)	(87,526)		319,682		
Somerville/Marginal Influent Gates & Stop-Log Replacement	10484_7344	Jul-11	Nov-11	366,848	366,848	-					
Prison Point Rehab - Design/CA/RI	10486_7359	Jul-16	Jul-21	2,838,370	-	2,838,370	459,757	559,674	1,019,431	1,818,939	
System Relief & Contingency Planning	10487_7360	Jul-20	Jun-23	500,000	-	500,000				458,334	41,666
DeLauri Pump Station Screens, Gates, Valves & Security	10488_7361	Oct-17	Mar-19	1,078,570	-	1,078,570		359,524	359,524	719,046	
Caruso Pump Station Improvements - Construction	10489_7362	Mar-16	Mar-17	4,484,597	578,884	3,905,713	3,905,712		4,484,597		
Pump Station Rehab - Preliminary Design/Study	10500_7375	Jul-19	Jul-20	750,000	-	750,000				750,000	
Section 156 Rehab - Design/Build	10503_7393	Jul-11	Jul-12	2,562,778	2,562,773	5	5		5		
Cambridge Branch 1 Sections 26, 27 - Design/ ESDC	10504_7410	Sep-18	Sep-23	3,600,000	-	3,600,000				3,245,902	354,098
Sections 4, 5, 6, 186 - Design CA/RI	10505_7421	Nov-18	Nov-23	3,000,000	-	3,000,000				2,605,000	395,000
Sections 4, 5, 6, 186 - Construction	10506_7422	Nov-20	Nov-22	16,000,000	-	16,000,000				16,000,000	
Sections 4, 5, 6, 186 - Study	10507_7423	Jan-17	Jun-18	1,831,878	-	1,831,878	407,084	1,323,023	1,730,107	101,771	
Columbus Park & Ward Street Headworks - Design/CA/REI	10510_7429	Jul-18	Jan-26	10,510,532	-	10,510,532				6,583,519	3,927,013
Columbus Park & Ward Street Headworks - Construction	10511_7430	Aug-20	Jan-25	103,064,440	-	103,064,440				62,227,586	40,836,854
Chelsea Screenhouse Upgrades	10512_7431	Aug-15	Sep-16	5,036,570	3,373,670	1,662,900	1,662,901		5,036,571		
Prison Point/Cottage Farm Pump & Gearbox Rebuilds	10515_7452	Oct-13	Nov-15	6,439,438	6,439,438	-			6,439,438		
Prison Point Piping Rehab	10518_7459	Oct-16	May-17	466,200	-	466,200	466,200		466,200		
Prison Point Rehab - Construction	10519_7462	Jul-18	Jul-20	5,822,752	-	5,822,752				5,822,752	
Cottage Farm Rehab - Construction	10520_7463	Jul-21	Jul-23	10,073,880	-	10,073,880				8,814,645	1,259,235
Chelsea Screenhouse Upgrades - ESDC/REI	10521_7490	Sep-15	Sep-17	880,000	318,946	561,054	391,597	169,457	880,000		
Cottage Farm Rehab - Design/CA/REI	10522_7508	Jul-19	Jul-24	2,014,776	-	2,014,776				1,511,082	503,694
Chelsea Headworks - Caruso Pump Station - Utilities	10523_7510	Jul-16	Jun-17	32,000	-	32,000	26,714	5,286	32,000		
Cambridge Branch 23, 24, 25, 25.5, 26, 27 - Study	10524_7511	Oct-16	Mar-18	686,954	-	686,954	228,984	457,970	686,954		
Interceptor Renewal 3 Dorchester Interceptor Sewer - Des/CA/RI	10525_7512	Jan-17	Jan-22	1,000,000	-	1,000,000	50,000	200,000	250,000	750,000	
Cambridge Branch 2 Everett Sections 23, 24 - Design/ESDC	10526_7513	Sep-20	Sep-25	2,500,000	-	2,500,000				1,353,000	1,147,000
Interceptor Renewal 6 Chelsea Sections 12, 14, 15, 62 - Design CA/R	10527_7514	Mar-19	Mar-24	2,200,000	-	2,200,000				1,796,667	403,333
Interceptor Renewal 5 Milton Sect. 607, 609, 610 - Des/CA/REI	10528_7515	Oct-17	Oct-22	2,000,000	-	2,000,000		200,000	200,000	1,800,000	
Quincy & Hingham Pump Stations Fuel Storage Upgrades - Const.	10529_7534	Jan-17	Sep-17	580,095	-	580,095	193,365	386,730	580,095		
Headworks Effluent Shaft Rehab - Design/CA/REI	10530_7549	Jan-19	Jul-22	2,038,140	-	2,038,140				2,038,140	
Headworks Effluent Shaft Rehab - Construction	10531_7550	Jul-20	Jul-21	10,190,700	-	10,190,700				10,190,700	
Wiggins Terminal Pump Station - Design	10532_7551	Sep-17	Apr-21	508,855	-	508,855		80,955	80,955	427,900	
Wiggins Terminal Pump Station - Construction	10533_7552	Apr-19	Apr-20	2,035,420	-	2,035,420				2,035,420	
Fuel Oil Tank Replacement at Various Facilities - Design	10534_7553	Jul-17	Jul-21	1,528,605	-	1,528,605		286,614	286,614	1,241,991	
Fuel Oil Tank Replacement at Various Facilities - Const. Phase 1	10535_7554	Jul-18	Jul-20	3,566,745	-	3,566,745				3,566,745	
Fuel Oil Tank Replacement at Various Facilities - Const. Phase 2	10536_7555	Jan-19	Jul-20	2,547,675	-	2,547,675				2,547,675	

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146 Deer Island Cross Harbor Tunnels				**5,000,000**	**-**	**5,000,000**				**5,000,000**	
Tunnel Inspection and Condition Assessment	10454_7199	Jul-18	Jun-20	5,000,000	-	5,000,000				5,000,000	
147 Randolph Trunk Sewer Relief				**750,000**	**-**	**750,000**				**750,000**	
Study	10461_7220	Jul-18	Jun-20	750,000	-	750,000				750,000	
Treatment				**871,835,505**	**266,822,001**	**605,013,504**	**22,468,263**	**24,369,942**	**128,937,436**	**399,025,752**	**159,149,545**
182 Deer Island Primary and Secondary Treatment	**completed project**			**(957,878)**	**(957,878)**	**-**					
200 Deer Island Plant Optimization	**completed project**			**33,278,598**	**33,278,598**	**-**			**(148,080)**		
Ancillary Modifications - Design 1	18212_6364	Jun-99	May-07	2,055,252	2,055,252	-				-	-
As-needed Design - Phase 1	19154_6233	Jul-98	May-03	1,121,573	1,121,573	-				-	-
Plumbing - Construction	19156_6235	Apr-96	Apr-98	110,410	110,410	-				-	-
Supplementary Modification Package #1	19170_6369	Jun-99	Mar-00	488,200	488,200	-				-	-
Ancillary Modifications - Construct 1	19183_6499	Jul-04	Mar-06	9,973,337	9,973,337	-				-	-
Ancillary Modifications-Construct 2-1	19186_6536	Aug-01	Jun-03	3,094,506	3,094,506	-				-	-
Ancillary Modifications-Construct 3-1	19187_6537	Nov-03	Nov-04	3,387,070	3,387,070	-				-	-
Ancillary Modifications-Des/REI 2-1	19189_6590	Aug-01	Jun-03	583,549	583,549	-				-	-
Ancillary Modifications - Design 3-1	19190_6591	Feb-01	Nov-05	940,723	940,723	-				-	-
Digester Storage Tank - Repair	19206_6673	Aug-97	Oct-97	274,838	274,838	-				-	-
As-needed Design Phase 4-1	19211_6698	Mar-05	Sep-07	1,123,892	1,123,892	-					
As-needed Design Phase 4-2	19212_6699	Mar-05	Sep-08	1,000,860	1,000,860	-			(148,080)		
Plumbing/Mechanical Services	19213_6700			-	-	-					
As-needed Design Phase 3-1	19214_6701	Apr-03	May-05	795,990	795,990	-					
As-needed Design Phase 2-1	19215_6702	Oct-00	Jan-03	759,515	759,515	-					
Ancillary Modifications Const. 3-2	19216_6703			-	-	-					
Polymer Area - Construction	19219_6720			-	-	-					
Ancillary Modifications - Const. 2-2	19232_6744	May-05	Oct-07	5,387,275	5,387,275	-					
As-needed Design Phase 2-2	19234_6753	Oct-00	Jan-03	695,201	695,201	-					
Ancillary Modific Design2-2/REI/ESDC	19240_6768	Jun-04	Oct-07	577,219	577,219	-					
CEMS Modifications	19242_6794			-	-	-					
As-needed Design Phase 3-2	19257_6874	Mar-03	Mar-05	624,664	624,664	-					
BHP Site Completion	19286_6201	Oct-98	Dec-04	284,524	284,524	-					
206 Deer Island Treatment Plant Asset Protection				**814,867,853**	**224,644,166**	**590,223,687**	**16,023,274**	**22,449,334**	**115,616,197**	**393,198,504**	**158,552,574**
DITP Roof Replacements	18045_6196	Jun-10	Jun-11	2,299,881	2,299,881	-					
DISC Application	19162_6241			125,077	125,077	-					
Pump Packing Replacement	19176_6422	Sep-03	Jun-08	732,447	732,447	-					
Demineralizer Construction	19177_6423	Jul-00	Dec-00	50,527	50,527	-					
Odor Control Rehab - Construction	19188_6538	Nov-21	Nov-25	30,570,656	-	30,570,656				8,916,441	21,654,214
Odor Control Rehab - REI	19191_6592	Nov-21	Feb-26	3,774,995	-	3,774,995				1,036,273	2,738,722
Equipment Condition Monitoring	19193_6594	May-04	Jan-05	1,776,946	1,776,946	-					
NMPS and WTF Valve & Piping Replacement - ESDC/REI	19194_6598	Dec-14	Oct-18	2,349,946	871,172	1,478,774	654,675	799,099	2,324,946	25,000	
Expansion Joint Repairs - Design	19204_6668	Apr-99	Oct-04	149,421	149,421	-					
Expansion Joint Repairs - Construction 1	19205_6669	Aug-02	Nov-03	304,726	304,726	-					
Expansion Joint Repairs - Construction 2	19217_6704	Aug-12	Feb-14	1,893,500	1,893,500	-			1,207,968		

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Expansion Joint Repairs - Construction 3	19218_6705	Oct-17	Oct-19	2,013,786	-	2,013,786		447,508	447,508	1,566,278	
As-needed Design Phase 6-1	19220_6721	May-09	Oct-12	1,910,867	1,910,867	-			(7,566)		
As-needed Design Phase 6-2	19221_6722	May-09	Aug-12	1,743,843	1,743,843	-					
Eastern Seawall Design - 1	19222_6723	Jul-17	Jan-21	671,262	-	671,262		251,723	251,723	419,539	
Eastern Seawall Construction - 1	19223_6724	Jan-19	Jan-20	3,915,695	-	3,915,695				3,915,695	
Rip-rap Material DITP	19226_6727	Mar-17	Nov-17	310,000	-	310,000	137,777	172,223	310,000		
Digester Gas Flare No. 4 - Design	19227_6728	Jul-19	Mar-22	542,495	-	542,495				542,495	
Digester Gas Flare No. 4 - Construction	19228_6729	Dec-20	Mar-22	1,193,489	-	1,193,489				1,193,489	
Combined Heat & Power - Design	19229_6730	Dec-18	Jun-26	6,000,000	-	6,000,000				4,187,500	1,812,500
Roof Replacement - Phase I	19230_S464	Mar-09	Mar-10	2,749,941	2,749,941	-					
Drive Chain Replacement	19231_6742	Oct-01	Jul-03	264,000	264,000	-					
Busduct Replacement (2+22)	19236_6763	Jan-01	Oct-01	195,500	195,500	-					
Reline Hypochlorite Tanks 1 & 3	19237_6764	May-07	Nov-07	1,691,095	1,691,095	-					
CTG Modifications	19238_6765	Mar-01	May-02	482,339	482,339	-					
Electrical Equipment Upgrades - Construction 2	19239_6767	Apr-05	Feb-07	1,913,183	1,913,183	-					
Document Format Conversion	19241_6791	May-07	Jun-20	145,275	68,110	77,165			12,412	77,165	
Outfall Modification - Inspection	19243_6811	Dec-01	Jul-02	173,500	173,500	-					
Secondary Clarifier Access	19244_6812	Sep-01	Jul-02	274,874	274,874	-					
Transformer Replacement	19245_6813			1,703,072	1,703,072	-					
Digested Sludge Pump Replacement - Phase 2	19246_6821	Jan-16	Jul-17	2,591,100	502,522	2,088,578	1,740,357	348,221	2,591,100		
Co-Digestion Design/Build	19247_6822	Aug-21	Feb-23	5,000,000	-	5,000,000				5,000,000	
Reline Hypochlorite Tanks 2 & 4	19250_6849	Apr-08	Oct-08	2,241,692	2,241,692	-					
Chemical Pipe Replacement - Design	19252_6851	Jun-20	Dec-23	650,994	-	650,994				501,808	149,186
Chemical Pipe Replacement - Construction	19253_6852	Dec-21	Dec-23	2,169,840	-	2,169,840				1,175,330	994,510
Electrical Equipment Upgrades - Construction 3	19256_6855	Feb-08	Aug-11	15,173,750	15,173,750	-					
WTF VFD Replacement - Construction	19258_6875	Jun-16	Mar-20	11,945,000	-	11,945,000	1,029,056	3,085,333	4,114,389	7,830,611	
Heat Loop Pipe Replacement - Construction 1	19259_6876	Mar-05	Dec-05	615,000	615,000	-					
Secondary Reactor VFDs	19260_6877	May-05	Aug-16	3,232,191	3,014,426	217,765	217,765		2,299,740		
Cathodic Protection - Design/ESDC	19263_6880	Feb-17	Aug-22	1,000,000	-	1,000,000	26,316	315,789	342,105	657,895	
Grit Air Handler Replacements	19264_6881	Jul-08	Jun-10	2,029,247	2,029,247	-					
CEMS Equipment Replacement	19265_6882	Nov-05	Mar-06	100,392	100,392	-					
Heat Loop Pipe Replacement - Construction 2	19266_6883	Dec-06	Feb-08	1,488,356	1,488,356	-					
PICS Replacement - Construction	19267_6884	Jul-11	Sep-15	1,229,952	1,229,952	-			298,123		
Primary & Secondary Clarifier Rehab - Construction	19268_6899	Feb-09	Feb-12	56,786,629	56,786,629	-					
Electrical Equipment Upgrades - Construction 4	19270_6901	May-13	May-16	7,871,148	7,193,782	677,365	677,365		7,871,147		
NMPS VFD Replacement - Design/ESDC	19271_6902	Dec-07	Apr-12	1,275,969	1,275,969	-					
NMPS VFD Replacement - Construction	19272_6903	Dec-11	Mar-16	24,453,703	24,644,179	(190,475)	(190,475)		17,907,640		
Fire Alarm System Replacement - Design	19273_6904	Dec-15	Jan-23	2,078,771	172,651	1,906,120	533,079	309,204	1,014,934	1,063,837	
Combined Heat & Power Alternatives Study	19274_6963	Jan-17	Jan-18	675,000	-	675,000	168,750	506,250	675,000		
Combined Heat & Power - Construction	19275_6964	Jun-21	Jun-25	83,000,000	-	83,000,000				32,854,167	50,145,833
Primary & Secondary Clarifier Rehab - Design	19276_6965	Mar-09	Sep-13	1,677,666	1,677,666	1			(13,326)		
Gravity Thickener Improvements - Construction	19277_6966	Apr-10	Jun-12	933,118	1,033,118	(100,000)	(100,000)		200,000		
Steam Turbine Generator System Modifications - Design	19278_6967	Jun-09	Apr-11	(44,268)	(44,268)	-			(450,000)		
Electrical Equipment Upgrades 3 - REI	19279_6968	Feb-08	Nov-11	1,111,984	1,111,984	-					
NMPS Motor Control Center - Construction	19283_6972	Jan-12	Apr-13	913,900	913,900	-			3,451		
Steam Turbine Generator System Modifications - Construction	19284_6973	May-10	Apr-11	2,119,673	2,119,673	-			(450,000)		
Digester Chiller Replacement	19287_7005	Sep-05	May-06	635,244	635,244	-					
Dystor Tank Membrane Replacement	19288_7006	Sep-04	Oct-05	640,195	640,195	-					
Fire Alarm System Replacement - Construction	19289_7051	Jul-18	Jan-22	20,000,000	-	20,000,000				20,000,000	
Digester & Storage Tank Rehab - Design/ESDC	19290_7052	Apr-18	Apr-25	3,000,000	-	3,000,000				2,433,672	566,328

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Digester & Storage Tank Rehab - REI	19291_7053	Oct-20	Jul-24	2,000,000	-	2,000,000				1,200,000	800,000
Thickened Primary Sludge Pump Replacement - Construction	19292_7054	Oct-13	Jun-14	27,297	27,297	-					
Digester Modules 1 & 2 Pipe Replacement	19293_7055	Aug-11	Aug-14	7,096,335	7,096,335	-			1,203,504		
Cathodic Protection - Construction	19294_7056	Feb-19	Aug-21	6,471,420	-	6,471,420				6,471,420	
Centrifuge Backdrive Replacement	19295_7057	Feb-13	Mar-15	3,965,205	3,965,204	1			3,644,286		
Switchgear Replacement - Construction	19297_7059	Oct-17	Oct-20	8,000,000	-	8,000,000		666,666	666,666	7,333,334	
Power Consultant Recommnedations - Design	19298_7060	Jan-06	Jul-09	2,097,404	2,097,404	-					
Power System Improvements - Construction	19299_7061	Jan-09	May-17	10,177,407	6,964,878	3,212,529	2,425,463	787,067	4,754,750		
NMPS VFD Replacement - REI	19300_7062	Dec-12	Jun-16	792,980	768,442	24,538	24,538		750,224		
Heat Loop Pipe Replacement - Construction 3	19301_7063	Jun-09	Jun-11	11,546,392	11,549,258	(2,866)	(2,866)		207,592		
Odor Control Rehab - Design/ESDC	19303_7088	May-19	Nov-26	4,640,050	-	4,640,050				2,996,698	1,643,352
Sodium Hypochlorite Tank Liner Removal	19304_7089	May-06	Sep-06	196,400	196,400	-					
As-needed Design Phase 5-1	19305_7090	Aug-07	Aug-09	955,174	955,174	-					
As-needed Design Phase 5-2	19306_7091	Jul-07	Jul-09	1,055,822	1,055,822	-					
HVAC Equipment Replacement - REI	19307_7094	Apr-17	Nov-20	2,000,000	-	2,000,000		418,604	418,604	1,581,396	
HVAC Equipment Replacement - Design/ESDC	19309_7111	Mar-14	Oct-20	1,981,441	1,195,543	785,898	401	127,888	1,323,832	657,609	
HVAC Equipment Replacement - Construction	19310_7110	Apr-17	Aug-20	29,500,000	-	29,500,000		4,978,125	4,978,125	24,521,875	
Deer Island As-needed Technical Design	19311_7121	Jul-19	Jul-26	16,250,000	-	16,250,000				8,898,811	7,351,189
Odor Control System Study	19312_7122	May-17	Nov-18	750,000	-	750,000		458,333	458,333	291,667	
Digester Sludge Pump Replacement - Construction	19313_7123	Oct-09	Dec-14	1,873,723	1,873,723	-			367,219		
Electrical Equipment Upgrades - Phase 5	19314_7124	Dec-19	Dec-23	23,161,875	-	23,161,875				14,283,156	8,878,719
Future SSPS VFD Replacements - Design	19316_7126	Jan-18	Jul-23	4,800,000	-	4,800,000		171,429	171,429	2,211,544	2,417,027
Future SSPS VFD Replacements - Construction	19317_7127	Jul-19	Jul-22	19,200,000	-	19,200,000				19,200,000	
Future NMPS VFD Replacements - Design	19318_7128	Jun-24	Dec-31	4,420,000	-	4,420,000					4,420,000
Future NMPS VFD Replacements - Construction	19319_7129	Dec-26	Dec-30	17,680,000	-	17,680,000					17,680,000
Future Miscellaneous VFD Replacements - Construction	19321_7131	May-17	May-22	5,334,000	-	5,334,000		500,000	500,000	4,834,000	
DI Switchgear Replacement - Design	19322_7132	Jul-20	Jul-25	4,500,000	-	4,500,000				2,790,000	1,710,000
DI Switchgear Replacement - Construction	19323_7133	Jul-22	Jul-24	16,000,000	-	16,000,000				4,000,000	12,000,000
DI PICS Replacement - Construction	19324_7134	Feb-21	Feb-23	5,400,000	-	5,400,000				5,400,000	
DI Dystor Membrane Replacements	19325_7135	Jul-19	Nov-19	3,000,000	-	3,000,000				1,800,000	1,200,000
DI Combustion Turbine Generator Rebuilds	19326_7136	Jul-20	Jul-23	8,000,000	-	8,000,000				7,111,112	888,888
DI Centrifuge Replacements - Design	19327_7137	Dec-18	Jun-23	4,160,000	-	4,160,000				4,122,181	37,819
DI Centrifuge Replacements - Construction	19328_7138	Jun-20	Jun-22	16,640,000	-	16,640,000				16,640,000	
Cryogenics Plant Equipment Replacement - Design	19329_7139	Dec-18	Dec-23	1,600,000	-	1,600,000				1,600,000	
Cryogenics Plant Equipment Replacement - Construction	19330_7140	Dec-20	Dec-22	5,300,000	-	5,300,000				5,300,000	
Future Sodium Hypochlorite Tank Rehab	19332_7142	Jul-22	Jul-26	10,000,000	-	10,000,000				1,250,000	8,750,000
Fixed Gas Protection Systems Replacement	19333_7167	Nov-17	Nov-19	2,000,000	-	2,000,000		166,667	166,667	1,833,333	
Barge Berth and Facility Replacement	19334_7168	Dec-16	Jun-19	2,264,750	-	2,264,750	850,000	100,000	950,000	1,314,750	
South Systm Pump Station Lube System Replacement	19335_7169	Jun-18	Jun-20	2,900,000	-	2,900,000				2,900,000	
East/West Odor Control Air Handler Replacement	19336_7170	Jun-25	Jun-30	2,000,000	-	2,000,000					2,000,000
PICS Distributed Process Units Replacement	19338_7172	Feb-21	Feb-23	8,000,000	-	8,000,000				8,000,000	
NMPS & WTF Butterfly Valve Replacement	19339_7275	Jun-14	Jun-17	17,489,692	8,779,325	8,710,367	5,211,549	3,498,819	17,489,692		
Digester & Storage Tank Rehab - Construction	19345_7373	Oct-20	Apr-24	30,000,000	-	30,000,000				19,285,713	10,714,287
Clarifier W3H Flushing System	19346_7374	Jul-12	Jul-13	1,262,406	1,262,406	-			48,612		
Clarifier Rehab Phase 2 - Design	19347_7394	Jan-15	Jan-23	2,280,517	535,950	1,744,567	390,367	64,635	990,952	1,289,565	
Clarifier Rehab Phase 2 - Construction	19348_7395	Apr-18	Jan-22	80,000,000	-	80,000,000				80,000,000	
Scum Skimmer Replacement	19349_7396	Oct-13	Oct-16	20,393,784	20,138,143	255,641	255,641		20,393,784		
Clarifier Rehab Phase 2 - REI	19351_7397	Apr-18	Apr-22	2,500,000	-	2,500,000		468,750	468,750	2,031,250	
Cryogenics Chillers Replacement	19352_7398	Oct-14	Oct-16	3,235,800	2,358,527	877,273	877,273		3,235,800		
As-Needed Design 7-1	19353_7399	Oct-12	Oct-15	1,547,446	1,547,445	-			1,095,113		

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Program/Project/Subphase	Contract No.	Notice To Proceed	Substantial Completion	Total Contract Amount	Payments through FY16	Remaining Balance	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
As-Needed Design 7-2	19354_7400	Oct-12	Apr-16	1,060,919	1,060,919	-			764,426		
Thermal Power Plant Boiler Controls Replacement	19355_7401	Nov-14	Nov-16	1,628,631	1,628,631	-			1,628,631		
NMPS Harmonic Filter Replacement	19557_7414	May-18	May-20	3,000,000	-	3,000,000				3,000,000	
Fuel Pipe Abandonment	19558_7415	Aug-12	Jan-13	230,000	230,000	-					
Electrical Equipment Upgrades 4 - REI	19559_7416	May-14	Oct-16	764,918	671,834	93,084	93,084		764,918		
NMPS Motor Control Center Phase 2 - Dsesign/ESDC/REI	19560_7419	Feb-17	Jan-23	2,500,000	-	2,500,000	50,000	600,000	650,000	1,850,000	
NMPS Motor Control Center Phase 2 - Construction	19561_7420	Apr-19	Jan-22	10,585,725	-	10,585,725				10,585,725	
Roof Replacement Phase 3	19562_7424	Sep-13	Jul-14	610,500	610,500	-			610,500		
Fire System Replacement - REI	19563_7426	Jul-18	Apr-22	1,800,000	-	1,800,000				1,800,000	
Gravity Thickener Center Column Replacement	19564_7427	Jan-13	Jan-14	825,457	825,457	-			537,657		
Gravity Thickener Rehabilitation	19565_7428	Apr-18	Apr-21	14,500,000	-	14,500,000				14,500,000	
As-Needed Design 7-3	19566_7434	Oct-12	Apr-16	895,799	885,637	10,162	10,162		841,007		
As-Needed Design 8-1	19600_7501	Jul-16	Jul-19	1,400,000	-	1,400,000	249,999	466,667	716,666	683,334	
As-Needed Design 8-2	19601_7502	Jul-16	Jul-19	1,400,000	-	1,400,000	392,999	323,667	716,666	683,334	
As-Needed Design 8-3	19602_7503	Jul-16	Jul-19	1,400,000	-	1,400,000	299,999	416,667	716,666	683,334	
Co-Digestion Temporary Facilities	26073_7148	Sep-13	Sep-22	2,300,000	433,832	1,866,168			433,832	1,866,168	
Sodium Hypochlorite & Bisulfite Tanks Rehab.	40256_7449	Jun-17	Jun-19	5,000,000	-	5,000,000		2,000,000	2,000,000	3,000,000	
210 Clinton Wastewater Treatment Plant				**22,419,257**	**7,629,442**	**14,789,815**	**6,444,989**	**1,920,608**	**13,469,319**	**5,827,248**	**596,971**
Clinton Soda Ash Replacement	19302_7075	Nov-07	Aug-08	267,221	267,221	-					
Clinton Permanent Standby Generator	19308_7095	Feb-07	Nov-07	230,440	230,440	-					
Clinton Concrete Repair - Design	19340_7276	Feb-13	Dec-13	62,615	62,615	-					
Clinton Digester Cleaning & Rehab	19341_7277	May-10	Apr-17	3,441,094	3,417,382	23,712	23,712		3,352,494		
Clinton Aeration Effciency Improvement	19342_7278	Apr-12	Feb-13	1,864,562	1,864,561	-			(12,283)		
Valves & Screw Pumps Replacement	19344_7372	Sep-17	Dec-18	1,500,000	-	1,500,000		400,000	400,000	1,100,000	
Phosphorus Reduction - Design/ESDC	19350_7377	Nov-13	Sep-18	1,395,284	508,956	886,329	301,909	117,000	927,865	467,420	
Phosphorus Reduction - Construction	19400_7411	Mar-16	Sep-17	7,476,256	882,505	6,593,751	5,797,375	796,376	7,476,256		
Clinton Roofing Rehab	19405_7450	Mar-17	Nov-18	1,214,462	-	1,214,462	227,712	607,232	834,944	379,519	
Clinton Facilities Rehab	19406_7451	Sep-18	Sep-23	4,477,280	-	4,477,280				3,880,309	596,971
NGRID Gas Line	19407_7528	Apr-16	Jun-16	490,043	395,762	94,281	94,281		490,043		
211 Laboratory Services	**completed project**			**2,227,674**	**2,227,674**	**-**					

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Program/Project/Subphase	Contract No.	Notice To Proceed	Substantial Completion	Total Contract Amount	Payments through FY16	Remaining Balance	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
Residuals				**167,642,622**	**64,642,623**	**103,000,000**		**2,835,243**	**2,942,050**	**17,873,091**	**82,291,666**
261 Residuals	**completed project**			**63,810,848**	**63,810,848**	**-**					
271 Residuals Asset Protection				**103,831,775**	**831,775**	**103,000,000**		**2,835,243**	**2,942,050**	**17,873,091**	**82,291,666**
Residuals Facility Plan / EIR	26069_7143	Jan-20	Jan-25	1,000,000	-	1,000,000				666,667	333,333
Residuals Facility Upgrades - Design	26070_7145	Mar-18	Dec-23	2,000,000	-	2,000,000				1,791,667	208,333
Residuals Facility Upgrades - Construction	26071_7146	Jun-17	Jun-20	2,590,000	-	2,590,000		604,333	604,333	1,985,667	
Condition Assessment/Technology & Regulatory Review	26072_7147	May-09	Jan-14	831,775	831,775	-			106,807		
Residuals Phase 2 - Design	26074_7149	Nov-21	Jun-28	15,000,000	-	15,000,000				3,250,000	11,750,000
Residuals Phase 2 - Construction	26075_7150	Jan-23	Jan-30	75,000,000	-	75,000,000				5,000,000	70,000,000
Sludge Tank & Silo Coating	26076_7151	May-17	Apr-18	730,000	-	730,000		530,909	530,909	199,091	
Electrical Improvements	26077_7152	May-17	May-18	1,930,000	-	1,930,000		804,167	804,167	1,125,833	
Mechanical Improvements	26078_7153	May-17	May-18	1,750,000	-	1,750,000		729,167	729,167	1,020,833	
Pellet Conveyance Piping Relocation	26079_7173	Dec-17	Jun-19	3,000,000	-	3,000,000		166,667	166,667	2,833,333	
CSO				**909,535,519**	**893,499,645**	**16,035,874**	**10,243,877**	**209,250**	**66,246,446**	**5,582,744**	
CSO MWRA Managed				**433,555,016**	**433,388,865**	**166,152**	**166,150**		**3,676,538**		
339 North Dorchester Bay	**completed project**			**221,509,794**	**221,509,793**				**(110,812)**		
347 East Boston Branch Sewer Relief	**completed project**			**85,637,164**	**85,637,164**				**(8,831)**		
348 BOS019 Storage Conduit	**completed project**			**14,287,581**	**14,287,581**	**-**					
349 Chelsea Trunk Sewer	**completed project**			**29,779,319**	**29,779,320**	**-**					
350 Union Park Detention Treatment Facility	**completed project**			**49,583,407**	**49,583,407**	**-**					
353 Upgrade Existing CSO Facilities	**completed project**			**22,385,200**	**22,385,200**	**-**					
354 Hydraulic Relief Projects	**completed project**			**2,294,549**	**2,294,549**	**-**					
355 MWR003 Gate & Siphon				**4,444,927**	**4,278,777**	**166,150**	**166,150**		**3,796,182**		
Design	32722_6952	Mar-12	Oct-16	1,641,643	1,475,493	166,150	166,150		992,898		
Construction 1	32723_6953	Sep-13	Jan-14	235,783	235,783	-			235,783		
Construction 2	32755_7409	Aug-14	Oct-15	2,567,501	2,567,501	-			2,567,501		
357 Charles River CSO Controls	**completed project**			**3,633,077**	**3,633,077**	**-**					

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CSO Community Managed				**424,332,383**	**411,907,555**	**12,424,828**	**8,667,068**		**62,111,187**	**3,757,757**	
340 Dorchester Bay Sewer Separation (Fox Point)	**completed project**			**54,625,590**	**54,625,590**	**-**			**473,295**		
341 Dorchester Bay Sew Separation (Commercial Point)				**64,173,625**	**60,542,452**	**3,631,173**	**(126,584)**		**(731,282)**	**3,757,757**	
Design	32650_6154	Jun-96	Dec-16	17,692,322	16,813,378	878,944	(126,584)		49,059	1,005,528	
Construction	32665_6248	Apr-99	Dec-16	46,481,303	43,729,074	2,752,229			(780,341)	2,752,229	
342 Neponset River Sewer Separation	**completed project**			**2,549,087**	**2,549,087**	**-**			**104,692**		
343 Constitution Beach Sewer Separation	**completed project**			**3,731,315**	**3,731,315**	**-**			**(37,573)**		
344 Stony Brook Sewer Separation	**completed project**			**44,246,462**	**44,246,463**	**-**			**48,079**		
346 Cambridge Sewer Separation				**104,448,064**	**95,869,484**	**8,578,580**	**8,578,580**		**53,963,860**		
Design/CS/RI	32654_6161	Jan-97	Dec-17	33,843,970	31,345,893	2,498,077	2,498,077		12,608,622		
Construction	32672_6255	Jul-98	Jun-17	70,604,094	64,523,591	6,080,503	6,080,503		41,355,238		
351 BWSC Floatables Controls	**completed project**			**945,936**	**945,936**	**-**			**12,957**		
352 Cambridge Floatables Controls	**completed project**			**1,126,708**	**1,126,708**	**-**			**39,783**		
356 Fort Point Channel Sewer Separation	**completed project**			**11,917,090**	**11,917,089**	**-**			**(89,618)**		
358 Morrissey Boulevard Drain				**32,185,790**	**32,188,262**	**(2,472)**	**(2,473)**		**(160,999)**		
Design	32735_7015	Jun-05	Jun-13	3,864,949	3,867,422	(2,473)	(2,473)		(161,193)		
Construction	32713_6696	Dec-06	Jun-09	28,320,841	28,320,840	1			194		
359 Reserved Channel Sewer Separation				**70,613,021**	**70,395,477**	**217,545**	**217,545**		**10,573,120**		
Design	32734_7014	Jul-06	Jun-16	15,257,775	14,386,634	871,141	871,141		2,626,418		
Construction	32727_6994	May-09	Dec-15	55,355,246	56,008,843	(653,596)	(653,596)		7,946,702		
360 Brookline Sewer Separation	**completed project**			**24,715,291**	**24,715,291**	**-**			**(1,282,073)**		
361 Bulfinch Triangle Sewer Separation	**completed project**			**9,054,405**	**9,054,404**	**-**			**(803,053)**		

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324 CSO Support				**51,648,120**	**48,203,225**	**3,444,896**	**1,410,659**	**209,250**	**458,721**	**1,824,987**	
Technical Assistance	32400_5790	Feb-94	Dec-95	228,320	228,320	-					
Planning/EIR	32401_5791	Mar-88	Sep-90	10,768,610	10,768,610	-					
Master Planning	32403_5716	Mar-92	Sep-04	21,762,805	21,762,805	-					
Technical Assistance - Geotech	32407_5970	Jun-90	Jun-92	61,110	61,110	-					
Modeling	32409_5795	May-92	Mar-95	299,840	299,840	-					
SOP Program	32411_5767	Jan-94	May-01	772,828	772,829	-			(1,183,721)		
Watershed Planning	32645_6036	Dec-94	Apr-01	877,134	877,134	-					
Technical Review	32648_6150	Jul-96	Dec-20	1,933,448	528,932	1,404,516		100,000	100,000	1,304,516	
Land Acquisition/Easement	32658_6169	Jul-96	Sep-21	12,875,388	12,835,008	40,380	10,659	9,250	42,442	20,471	
System Assessment	32691_6372	May-97	Dec-20	668,637	68,637	600,000		100,000	100,000	500,000	
Somerville Marginal In-System Storage	32748_7539	Nov-16	Jun-18	1,400,000	-	1,400,000	1,400,000		1,400,000		
Other Wastewater				**242,865,861**	**163,671,801**	**79,194,061**	**18,837,640**	**19,047,325**	**73,061,085**	**52,180,196**	**(10,871,098)**
128 I/I Local Financial Assistance				**242,584,985**	**163,390,925**	**79,194,061**	**18,837,640**	**19,047,325**	**73,061,085**	**52,180,196**	**(10,871,098)**
Phase II - Grants	10273_6084	May-93	May-06	15,928,524	15,928,524	-					
Phase II - Loans	10274_6085	May-93	May-06	47,664,000	47,664,000	-					
Phase II - Repayments	10282_6170	May-94	May-11	(47,664,000)	(47,664,000)	-					
Public Participation	10348_6609	Feb-99	Jun-02	6,461	6,461	-					
Phase IV - Grants	10368_6736	Nov-99	May-10	34,650,000	34,650,000	-					
Phase IV - Loans	10369_6737	Nov-99	May-10	42,350,000	42,350,000	-					
Phase IV - Repayments	10370_6738	Nov-00	May-15	(42,350,000)	(42,350,000)	-			(587,977)		
Phase V - Grants	10407_6925	Aug-04	May-12	18,000,000	18,000,000	-					
Phase V - Loans	10408_6926	Aug-04	May-12	22,000,000	22,000,000	-					
Phase V - Repayments	10409_6927	Aug-05	May-17	(22,000,000)	(21,619,242)	(380,758)	(380,758)		(3,143,568)		
Phase VI - Grants	10441_7107	Nov-06	Jun-21	18,000,000	17,194,117	805,883	180,000	625,884	3,436,468		
Phase VI - Loans	10442_7108	Nov-06	Jun-21	22,000,000	21,015,031	984,969	220,000	764,969	4,200,127		
Phase VI - Repayments	10443_7109	Nov-07	Jun-26	(22,000,000)	(16,649,946)	(5,350,054)	(1,711,403)	(1,375,913)	(10,680,171)	(2,262,738)	
Phase VII - Grants	10471_7293	Aug-09	Jun-21	18,000,000	15,573,817	2,426,183	1,800,000	626,183	6,242,288		
Phase VII - Loans	10472_7294	Aug-09	Jun-21	22,000,000	19,034,667	2,965,333	2,200,000	765,333	7,629,462		
Phase VII - Repayments	10473_7295	Aug-10	Jun-26	(22,000,000)	(11,967,282)	(10,032,718)	(2,977,493)	(2,683,586)	(14,784,676)	(4,371,638)	
Phase VIII - Grants	10474_7296	Aug-12	Jun-21	18,000,000	12,675,543	5,324,457	2,137,950	2,479,951	13,105,126	706,556	
Phase VIII - Loans	10475_7297	Aug-12	Jun-21	22,000,000	15,492,331	6,507,669	2,613,050	3,031,050	16,017,375	863,569	
Phase VIII - Repayments	10476_7298	Aug-13	Jun-26	(22,000,000)	(5,967,135)	(16,032,865)	(3,077,162)	(3,012,162)	(12,056,460)	(9,150,919)	(792,621)
Phase IX Grants	10560_7464	Jul-14	Jun-21	60,000,000	15,548,925	44,451,075	11,250,000	11,250,000	38,048,925	21,951,075	
Phase IX Loans	10561_7465	Jul-14	Jun-21	20,000,000	5,182,975	14,817,025	3,750,000	3,750,000	12,682,975	7,317,025	
Phase IX Repayments	10562_7466	Jul-15	Jun-31	(20,000,000)	(543,098)	(19,456,903)	(560,286)	(982,751)	(2,086,134)	(8,570,234)	(9,343,632)
Phase X Grants	10563_7467	Jul-16	Jun-25	60,000,000	5,932,650	54,067,350	2,688,025	3,000,000	11,620,675	37,500,000	10,879,325
Phase X Loans	10564_7468	Jul-16	Jun-25	20,000,000	1,977,550	18,022,450	896,008	1,000,000	3,873,558	12,500,000	3,626,442
Phase X Repayments	10565_7469	Jul-16	Jun-35	(20,000,000)	(75,000)	(19,925,000)	(190,255)	(191,633)	(456,888)	(4,302,500)	(15,240,612)
138 Sewerage System Mapping Upgrades	**completed project**			**280,876**	**280,876**	**-**					

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Waterworks				**3,992,529,303**	**1,965,078,162**	**2,027,451,141**	**60,990,433**	**76,144,505**	**227,530,696**	**610,813,229**	**1,279,502,964**
Drinking Water Quality Improvements				**665,999,644**	**644,945,565**	**21,054,079**	**1,578,356**	**3,961,845**	**55,278,215**	**5,096,869**	**10,417,007**
542 Carroll Water Treatment Plant				**438,984,378**	**418,815,184**	**20,169,194**	**922,827**	**3,732,492**	**12,261,977**	**5,096,869**	**10,417,007**
Study 1	53293_5023	Jan-88	Feb-89	444,190	444,190	-					
Study 2	53294_5024	Jul-90	Mar-94	2,368,323	2,368,323	-					
EIR / Conceptual Design	53296_5042	Nov-93	Jul-95	5,807,703	5,807,703	-					
Technical Assistance	53300_5997	Jan-88	Jun-00	72,108	72,108	-					
Wachusett WTP - Design/CS/RI	53301_5017	Oct-96	Sep-06	46,605,542	46,605,542	-					
Permit Fees	53304_5157	Jul-93	Nov-19	87,037	86,354	683	283	400	6,787		
Cryptosporidium Inactivation Study	53367_6118	Feb-97	May-00	150,000	150,000	-					
Management Support - Design	53371_6134	Apr-97	Apr-00	1,729,937	1,729,937	-					
AWWARF Study	53375_6182	Dec-96	Sep-03	650,342	650,342	-					
Emergency Distribution Reservoir Water Management Study	53376_6206	Nov-98	Sep-02	1,453,825	1,453,825	-					
Wachusett and Cosgrove Intakes - CP1	53377_6207	Jun-00	Jun-03	15,489,314	15,489,314	-					
Construction Management / RI	53378_6208	Aug-98	Sep-06	31,437,824	31,437,824	-					
Cosgrove Disinfection - Phase II	53390_6365	Apr-98	May-99	2,169,292	2,169,292	-					
Cosgrove Disinfection - Phase I	53391_6397	Jul-97	Oct-97	150,380	150,380	-					
Distribution Water Consultant	53392_6401	Jul-97	Jun-98	3,200	3,200	-					
Immediate Disinfection - MECO	53393_6406	Jul-97	Jul-97	10,300	10,300	-					
Cosgrove Disinfection Facility - Underwater Improvements	53406_6479	Jan-98	Jun-98	217,400	217,400	-					
Community Chlorine Analyzers	53410_6485	Apr-98	Jun-98	48,863	48,863	-					
Wachusett Aqueduct Interim Rehab. - CP2	53412_5522	Dec-00	Oct-02	23,400,005	23,400,005	-					
Sitework & Storage Tanks - CP3	53413_6488	Mar-99	Nov-02	67,367,673	67,367,673	-					
Treatment Facilities - CP4	53414_6489	Dec-00	Jul-05	145,761,497	145,761,497	-					
Late Sitework - CP6	53416_6491	Jul-04	Jan-06	4,087,831	4,087,831	-					
OCIP	53418_6494	Mar-99	Dec-07	5,107,089	5,107,089	-					
Professional Services	53419_6495	Sep-98	Oct-05	2,752,328	2,752,328	-					
Marlboro MOA	53420_6497	Sep-98	Jun-05	5,859,141	5,859,141	-					
CWTP- MECO	53421_6520	Sep-98	Mar-05	128,328	128,328	-					
Site Security Services	53425_6613	May-99	Mar-05	1,263,635	1,263,635	-					
Existing Facilities Modifications - CP7	53426_6650	Aug-15	Apr-19	7,044,004	3,073,274	3,970,730	657,980	2,905,688	6,636,942	407,062	
CSX Crossing	53427_6670	Aug-01	Dec-01	64,700	64,700	-					
Wachusett Algae - Design CS/RI	53428_6671	Jul-24	Dec-27	450,000	-	450,000					450,000
Public Health Research	53432_6691	Jul-00	Jun-07	1,702,560	1,702,560	-					
Security Equipment	53435_6756	Jun-00	Jun-00	570,721	570,721	-					
Cosgrove Screens, CP8 - Construction	53437_6773	Aug-03	Aug-04	3,238,306	3,238,306	-					
AWWARF - Evaluation Ozone & Ultraviolet	53443_6815	Jul-01	Jan-04	301,750	301,750	-					
Fitout / Construction	53445_6827	Oct-03	Jun-19	1,499,966	545,159	954,807		200,000	199,589	754,807	
Wachusett Algae - Construction	53448_6889	Feb-25	Dec-26	1,800,000	-	1,800,000					1,800,000
CWTP Ultraviolet Disinfection - Design/ESDC/REI	53450_6923	Jul-08	Apr-15	4,350,956	4,350,956	-			1,820,233		
CWTP Ultraviolet Disinfection - Construction	53451_6924	Apr-11	Feb-14	31,057,187	31,057,187	-			1,825,410		
As-needed Technical Assistance No. 1	53452_6939	Jan-06	Jun-08	491,274	491,274	-					
Existing Facilities Modifications, CP7 - Design	53453_6951	Jul-05	Apr-15	964,746	964,746	-			15,540		
As-needed Technical Assistance	53455_6989	Jan-06	Jun-08	702,024	702,024	-					
Ancillary Modifications - Construction 1	53456_7084	Jul-06	Jun-08	160,475	160,475	-					
Ancillary Modifications - Construction 2	53457_7085	Jan-09	Jun-24	8,690,650	4,853,643	3,837,007		225,000	445,212	2,945,000	667,007
Ancillary Modifications - Design 3	53458_7192	Mar-08	Sep-10	299,101	299,101	-					

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Ancillary Modifications - Design 4	53459_7208	Mar-08	Sep-10	527,412	527,412	-					
Technical Assistance 5	53464_7315	Sep-10	Mar-13	254,922	254,922	-			(18,000)		
Technical Assistance 6	53465_7316	Sep-10	Mar-13	407,989	407,989	-			37,736		
CWTP Storage Tank Roof Drainage System	53470_7376	Jan-24	Nov-26	7,000,000	-	7,000,000					7,000,000
Technical Assistance 7	75530_7406	Jun-13	Nov-15	593,529	593,529	-			593,529		
Technical Assistance 8	75531_7407	Jan-16	Jan-18	563,000	33,032	529,968	264,564	265,404	563,000		
CWTP - Asset Protection	75546_7455	Jul-23	Jun-25	500,000	-	500,000					500,000
Technical Assistance 9	75601_7543	Jan-18	Jan-20	563,000	-	563,000		68,000	68,000	495,000	
Technical Assistance 10	75602_7544	Jan-18	Jan-20	563,000	-	563,000		68,000	68,000	495,000	
543 Brutsch Water Treatment Facility	**completed project**			**19,972,883**	**19,972,879**	**-**			**7,204,637**		
544 Norumbega Covered Storage	**completed project**			**106,674,147**	**106,674,146**	**-**					
545 Blue Hills Covered Storage	**completed project**			**40,082,837**	**40,082,837**	**-**			**120,000**		
550 Spot Pond Covered Storage Facility				**60,285,401**	**59,400,519**	**884,882**	**655,529**	**229,353**	**35,691,600**		
Environmental Review	53400_6455	Apr-02	Feb-03	232,830	232,830	-					
Design / Build	53402_6457	Nov-11	Dec-15	50,559,191	49,863,940	695,251	567,837	127,414	32,967,461		
Easement/Land Acquisition/Permits	53447_6868	Oct-08	Dec-14	6,112,268	6,112,268	-			763,564		
Owners' Representative	53462_7233	Mar-10	Feb-18	3,159,096	2,969,465	189,631	87,692	101,939	1,960,575		
Early Construction Water Connection	53463_7314	Jul-11	Feb-12	222,016	222,016	-					
Transmission				**2,451,652,508**	**770,602,308**	**1,681,050,201**	**28,197,388**	**24,497,036**	**68,258,575**	**352,981,133**	**1,275,374,640**
597 Winsor Station Pipeline				**32,877,576**	**2,578,137**	**30,299,439**	**1,921,238**	**1,478,854**	**4,582,638**	**23,838,027**	**3,061,320**
Preliminary Permit, Study & Licensing	60032_6276	Nov-97	Jun-99	38,901	38,604	297	297		619		
Quabbin Aqueduct TV Inspection	60033_6277	Jul-23	Oct-24	3,061,320	-	3,061,320					3,061,320
Hatchery Pipeline - Design/ESDC/RI	60077_7017	Aug-13	Sep-18	814,276	608,317	205,959	104,493	67,644	780,310	33,822	
Quabbin Aqueduct & WPS Upgrades - Design/CA/RI	60087_7114	Feb-10	Aug-15	838,039	838,031	8	8		265,569		
Winsor Power Station Rehab & Improvement - Construction	60088_7115	Jul-19	Jul-21	17,857,700	-	17,857,700				17,857,700	
Shaft 12 Isolation Gates Const	60095_7197	Jul-18	Jul-19	2,244,968	-	2,244,968				2,244,968	
Winsor Station Chapman Valve Repair	60101_7212	Feb-09	Nov-09	416,425	416,425	-					
Purchase of Sleeve Valves	60105_7234	Jul-08	May-09	368,270	368,270	-					
Hatchery Pipeline - Construction	60106_7235	Mar-16	Sep-17	2,657,677	308,490	2,349,187	1,767,660	581,527	2,657,677		
Winsor Power Station Rehab & Improvement-Final Design/CA/RI	60140_7460	Jul-17	Sep-22	3,580,000	-	3,580,000		537,000	537,000	3,043,000	
Shaft 12 Isolation Gates - Design/CA/RI	60141_7509	Jan-17	Jul-20	1,000,000	-	1,000,000	48,780	292,683	341,463	658,537	
601 Sluice Gate Rehabilitation	**completed project**			**9,158,411**	**9,158,411**	**-**					

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604 MetroWest Tunnel				**701,177,915**	**697,046,552**	**4,131,364**	**65,361**	**156,000**	**1,869,405**	**3,910,000**	
Study	59794_5043	Jun-84	Oct-89	414,770	414,770	-					
Design/EIR - Tunnel/ESDC	59795_5044	Apr-92	Mar-07	37,939,302	37,939,302	-					
Sudbury Pipe Bridge - Construction	59796_5048	Nov-91	Jun-92	295,910	295,910	-					
West Tunnel Segment - CP1	59798_6054	Apr-97	Apr-03	147,774,009	147,774,009	-					
Construction Management/Resident Inspection	59799_5284	May-95	Apr-04	39,427,799	39,427,799	-					
Technical Assistance	59804_5976	Jun-84	Jun-98	131,400	131,400	-					
Land Acquisition	59805_5139	Oct-95	Jul-13	6,258,741	6,258,741	-					
Hultman Study	59806_5141	Apr-95	Mar-05	1,863,998	1,863,998	-					
DEP Permit Fees	60012_6037	Oct-94	Sep-14	58,000	56,178	1,822	1,822		1,822		
Middle Tunnel Segment - CP2	60013_6055	Jun-96	Apr-03	245,809,358	245,809,358	-					
MHD Salt Sheds - CP5	60014_6056	Sep-96	Jun-97	1,313,900	1,313,900	-					
Shaft 5A - CP3	60015_6059	Aug-97	Aug-98	5,815,614	5,815,614	-					
Local Supply Contingency - Design/CA/RI	60017_6063	May-96	Oct-99	858,703	858,703	-					
Community Technical Assistance	60018_6067	Jun-95	Apr-99	297,408	297,408	-					
Professional Services	60020_6117	Nov-95	Dec-03	730,860	730,860	-					
OCIP	60021_6122	Jun-96	May-06	26,021,794	26,021,794	-					
Hultman Leak Repair	60022_6128	Aug-96	May-97	307,280	307,280	-					
Framingham MOU	60023_6129	May-96	Dec-03	2,444,171	2,444,171	-					
Local Supply Contingency - Construction	60024_6130	Jun-97	Dec-03	4,298,444	4,298,444	-					
Local Supply Contingency - Legal/Easement	60025_6131	Apr-97	Jun-02	9,110	9,110	-					
Hultman Repair Bands	60026_6140	Aug-96	Dec-96	28,400	28,400	-					
Loring Road Storage Tanks - CP-8	60029_6203	Sep-97	Nov-00	41,367,921	41,367,921	-					
Testing & Disinfection - CP7	60030_6204	Jan-03	Oct-03	3,612,435	3,612,435	-					
Upper Hultman Rehab - CP6B	60031_6205	Apr-12	Jun-13	5,849,390	5,849,390	-			295,920		
Southboro MOA	60038_6366	May-97	Jun-03	254,883	254,883	-					
Weston MOA	60039_6367	Apr-96	Oct-04	1,005,524	1,005,524	-					
East Tunnel Segment - CP3A	60040_6374	Nov-98	Sep-02	56,262,907	56,262,907	1			74,813		
Hultman Investigation and Repair	60042_6430	Jun-99	Nov-00	1,604,381	1,604,381	-					
Hultman Repair Bands 98-99	60043_6492	Apr-99	Jun-99	116,457	116,457	-					
Wayland MOA	60053_6762	Jun-00	Dec-02	35,040	35,040	-					
Equipment Prepurchase	60054_6777	Jun-05	Mar-06	198,000	198,000	-					
Hultman Rehab - CP9	60058_6856	Nov-05	Dec-06	3,256,702	3,256,702	-					
Interim Disinfection	60059_6872	Jan-03	Oct-05	1,244,540	1,244,540	-					
Hultman Interconnect - Final Design/CA/R	60066_6911	Sep-05	Sep-14	5,732,364	5,732,364	-			495,154		
Lower Hultman Rehab - CP6A	60073_6975	Sep-09	May-13	52,288,838	52,288,838	-			476,851		
Hultman Interconnection - Resident Inspection Services	60083_7082	Jan-10	Jan-15	1,870,346	1,870,346	-			144,904		
CP6 Easements	60085_7105	Jan-08	Apr-14	33,094	33,015	79	76		1,040		
CP6A Demolition	60086_7106	Sep-08	Jan-09	57,222	57,222	-					
Valve Chamber & Storage Tank Access Improvements - Design	60109_7283	Oct-17	Sep-22	600,000	-	600,000		90,000	90,000	510,000	
Shaft 5 Electrical Upgrade	60128_7367	Jan-19	Jan-20	1,000,000	-	1,000,000				1,000,000	
Valve Chamber & Storage Tank Access Improvements - Constr.	60160_7476	Jul-19	Jun-21	2,400,000	-	2,400,000				2,400,000	
Shaft 5A/5 Surface Piping Cathodic Protection	60161_7477	Nov-16	Oct-17	132,000	-	132,000	66,000	66,000	132,000		
Hultman Leak Shaft 5A	60162_7507	Mar-16	May-16	156,900	159,438	(2,538)	(2,537)		156,901		
615 Chicopee Valley Aqueduct Redundancy	**completed project**			**8,666,292**	**8,666,291**	**-**					

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616 Quabbin Transmission System				**16,405,914**	**7,456,913**	**8,949,001**	**1,049,000**		**1,303,449**	**7,900,000**	
Facilities Inspection	60055_6828	Oct-05	Oct-07	1,005,413	1,005,413	-					
Oakdale High Line Replacement - Construction	60068_6940	Aug-18	Feb-19	500,000	-	500,000				500,000	
Equipment Pre-purchase	60075_7007	Feb-05	Jun-08	534,366	534,366	-					
Oakdale Phase 1A Electrical - Design	60103_7229	Oct-09	Jul-14	775,534	775,534	-			77,651		
Oakdale Phase 1A Electrical - Construction	60104_7230	Apr-12	Jul-13	2,260,002	2,260,001	1			176,798		
Ware River Intake Valve Replacement - Design	60108_7282	Jul-18	Jun-23	300,000	-	300,000				300,000	
Rehab Wachusett Gatehouse/Bastion Lower Gatehouse - Design	60113_7333	Jul-18	Jun-23	1,000,000	-	1,000,000				1,000,000	
Rehabilitate Oakdale Turbine	60135_7378	May-20	Jan-21	1,000,000	-	1,000,000				1,000,000	
Rehab Wachusett Gatehouse/Bastion Lower Gatehouse - Const.	60137_7380	Jul-20	Jun-22	4,000,000	-	4,000,000				4,000,000	
Ware Rver Intake Valve Replacement - Construction	60138_7487	Jul-20	Jun-22	900,000	-	900,000				900,000	
CVA Intake Motorized Screens Replacement - Construction	60139_7488	Nov-16	Jun-17	1,049,000	-	1,049,000	1,049,000		1,049,000		
Oakdale Turbine Rehab - Design	60201_7545	May-19	Jun-23	200,000	-	200,000				200,000	
Oakdale Valves - Phase 1 Construction	75491_6690	Oct-05	Jun-06	1,811,309	1,811,309	-					
Oakdale Valves - Phase 1 Study & Design	75496_6831	Apr-04	Jun-07	1,070,290	1,070,290	-					
617 Sudbury/Weston Aqueduct Repairs				**6,452,684**	**1,371,948**	**5,080,736**	**1,290,069**	**427,664**	**2,429,733**	**3,363,003**	
Sudbury Aqueduct Inspection	60056_6838	Aug-05	Oct-06	369,520	369,520	-					
Technical Assistance	60057_6839	Sep-09	Dec-11	25,000	25,000	-					
Sudbury Short-Term Repairs	60076_7016	Jul-17	Jun-18	460,012	-	460,012		345,009	345,009	115,003	
Sudbury Short-Term Repairs - Phase 2	60110_7317	Jul-23	Jul-24	2,098,000	-	2,098,000				2,098,000	
Ash Street Sluice Gates - Construction	60130_7369	Jun-20	Jun-21	800,000	-	800,000				800,000	
Rosemary Brook Siphon Building Repair	60150_7472	Mar-16	Nov-16	1,745,598	712,000	1,033,598	1,033,598		1,745,598		
Evaluation of Farm Pond Buildings - Waban Arches	60151_7473	Jul-16	Jul-17	339,126	-	339,126	256,471	82,655	339,126		
Ash Street Sluice Gates - Design	60152_7491	Jun-18	Jan-22	350,000	-	350,000				350,000	
Hazardous Materials Sudbury Aqueduct	75486_6617	Apr-99	May-05	265,428	265,428	-					
620 Wachusett Reservoir Spillway Improvements	**completed project**			**9,287,460**	**9,287,460**	**-**					
621 Watershed Land				**24,000,000**	**19,277,400**	**4,722,600**	**1,580,000**	**1,500,000**	**5,015,000**	**1,642,600**	
Land Acquisition	60081_7069	Apr-06	Jun-20	24,000,000	19,277,400	4,722,600	1,580,000	1,500,000	5,015,000	1,642,600	
622 Cosgrove Tunnel Redundancy				**53,030,240**	**9,131,536**	**43,898,704**	**21,840,654**	**16,435,405**	**46,232,153**	**5,621,291**	**1,354**
Wachusett Aqueduct Pump Station - Design/ESDC/RI	60090_7156	Feb-12	May-20	6,842,240	4,219,757	2,622,483	916,461	538,744	4,499,520	1,167,278	
Wachusett Aqueduct Pump Station - Construction	60091_7157	Mar-16	Feb-19	46,173,000	4,905,869	41,267,131	20,923,333	15,895,515	41,724,717	4,448,283	
Permits/Easements	60124_7354	Aug-15	Dec-25	15,000	5,910	9,090	860	1,146	7,916	5,730	1,354
623 Dam Projects				**4,538,205**	**3,115,745**	**1,422,460**	**5**	**515,113**	**545,681**	**907,342**	
Dam Safety Modifications & Repairs - Construction	60094_7194	Aug-11	Sep-12	2,054,559	2,054,554	5	5		5		
Dam Safety Modifications & Repairs - Design/ESDC	60100_7211	Sep-09	Jun-14	1,532,646	1,060,757	471,889		471,889	502,377		
Quinapoxet Dam Permits	60118_7346	Jul-17	Dec-20	1,000	434	566		366	441	200	
Quinapoxet Dam Removal - Design/ESDC/RI	60119_7347	Jul-17	Dec-20	200,000	-	200,000		42,858	42,858	157,142	
Quinapoxet Dam Removal - Construction	60120_7348	Jul-18	Dec-20	750,000	-	750,000				750,000	

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625 Metropolitan Tunnel Redundancy				**1,357,685,868**	**3,008,809**	**1,354,677,059**	**228,177**	**2,020,000**	**3,590,530**	**151,110,826**	**1,201,318,056**
Water Transmission Redundancy Plan	60035_6273	Oct-08	Sep-11	1,396,572	1,396,572	-			(1,848)		
Conceptual Design EIR	60092_7159	Jul-17	Jul-19	7,549,990	-	7,549,990		2,000,000	2,000,000	5,549,990	
Tunnel Construction	60107_7291	Jul-22	Jun-34	924,010,917	-	924,010,917				57,750,681	866,260,236
Sudbury Aqueduct - MEPA Review	60122_7352	Oct-12	Jun-17	3,405,107	1,612,237	1,792,870	228,177	20,000	1,592,378	1,544,693	
Construction Management	60126_7356	Jul-21	Jun-35	110,014,140	-	110,014,140				13,751,767	96,262,373
Tops of Shafts Connecting Mains Surface Construction	60127_7357	Jul-30	Jun-33	39,049,626	-	39,049,626					39,049,626
Public Relations, Legal & Administration	60170_7516	Jul-18	Jun-34	160,695,877	-	160,695,877				47,706,587	112,989,290
Tops of Shafts Rehab - Design/CA/RI	60172_7521	Jul-34	Jul-39	1,186,427	-	1,186,427					1,186,427
Tops of Shafts Rehab - Construction	60173_7522	Jul-36	Jul-38	4,961,422	-	4,961,422					4,961,422
Final Design/ESDC	60174_7556	Jul-19	Dec-34	99,228,440	-	99,228,440				24,807,108	74,421,332
Shaft 7 - Design CA/RI	60176_7558	Jun-33	Jan-35	1,237,470	-	1,237,470					1,237,470
Shaft 7 Buildings - Construction	60177_7559	Jan-35	Jun-39	4,949,880	-	4,949,880					4,949,880
628 Metropolitan Redundancy Interim Improvements				**213,371,942**	**503,104**	**212,868,838**	**222,884**	**1,350,000**	**2,075,988**	**140,302,044**	**70,993,910**
Metropolitan Redundancy Interim Design CA/RI	60200_7560	Jan-18	Jul-23	10,414,895	-	10,414,895		150,000	150,000	9,412,000	852,895
Tops of Shafts Interim Improvement - Costruction	60202_7561	Jan-19	Jan-20	6,114,420	-	6,114,420				6,114,420	
Chestnut Hill Emergency PS Improvements - Construction	60203_7562	Jul-20	Jul-22	18,343,260	-	18,343,260				18,343,260	
WASM/Spot Pond Supply Mains West PRV Improvements-Const.	60204_7563	Jul-19	Jul-21	8,152,560	-	8,152,560				8,152,560	
Chestnut Hill Emergency PS Stand-by Generator - Construction	60205_7566	Jan-20	Jan-21	8,886,290	-	8,886,290				8,886,290	
WASM 3 - MEPA/Design/CA/RI	68166_6539	Jul-13	Oct-26	15,482,625	503,104	14,979,521	122,884	500,000	1,125,988	8,340,000	6,016,637
WASM 3 Sliplining	68170_6543	Jul-22	Jun-26	58,609,494	-	58,609,494				8,880,228	49,729,266
WASM 3 Rehab	68171_6544	Jul-19	Jun-22	61,203,455	-	61,203,455				61,203,455	
Section 101/Waltham Section - Construction	68333_7457	Jul-23	Jul-25	12,826,112	-	12,826,112					12,826,112
Section 101/Waltham Section - Design CA/RI	68334_7547	Jul-21	Jun-26	3,000,000	-	3,000,000				1,431,000	1,569,000
Commonwealth Ave. PS Improvements - Design/CA/RI	75580_7523	Dec-16	Dec-21	2,775,831	-	2,775,831	100,000	700,000	800,000	1,975,831	
Commonwealth Ave. PS Improvements - Construction	75581_7524	Dec-18	Dec-20	7,563,000	-	7,563,000				7,563,000	
630 Watershed Division Capital Improvements				**15,000,000**	**-**	**15,000,000**		**614,000**	**614,000**	**14,386,000**	
Quabbin Admin Building Rehab - Design CA\RI	60300_7564	Jul-17	Jul-21	3,000,000	-	3,000,000		614,000	614,000	2,386,000	
Quabbin Admin Building Rehab - Construction	60301_7565	Jul-19	Jul-21	12,000,000	-	12,000,000				12,000,000	

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Distribution And Pumping				**805,461,182**	**400,906,743**	**404,554,440**	**23,493,407**	**37,630,372**	**89,326,945**	**179,165,530**	**164,265,126**
677 Valve Replacement				**20,114,541**	**12,016,378**	**8,098,163**				**3,558,280**	**4,539,878**
Construction 1	67559_5126	Nov-95	Nov-96	717,800	717,800	-					
Technical Assistance	67560_5124	Oct-95	May-10	124,607	124,607	-					
Equipment Purchase	68005_6088	Oct-95	Jun-18	1,111,804	1,111,804	-					
Construction 2	68012_6105	Nov-97	Jul-99	1,356,516	1,356,516	-					
Construction 3	68039_6278	Feb-00	Aug-01	1,337,571	1,337,571	-					
Construction 4	68079_6345	May-02	Oct-03	1,539,911	1,539,911	-					
Construction 5	68080_6346	Mar-04	Jul-05	1,389,006	1,389,006	-					
Construction 6	68126_6435	May-07	Dec-08	1,571,992	1,571,992	-					
Construction 7	68127_6436	Apr-11	Apr-13	2,858,864	2,858,859	5					
Permits	68239_6859	Jan-02	May-10	2,542	2,542	-					
Easements	68240_6860	Jan-02	May-10	5,770	5,770	-					
Construction 8	68300_7195	Jan-21	Jun-23	3,374,232	-	3,374,232				3,036,809	337,423
Construction 9	68307_7236	Jun-25	Jun-28	3,374,232	-	3,374,232					3,374,232
Phase 8 - Design/CA/RI	68330_7417	Jan-19	Jun-24	674,847	-	674,847				521,471	153,376
Phase 9 - Design/CA/RI	68331_7418	Jun-23	Jun-29	674,847	-	674,847					674,847
678 Boston Low Service - Pipe & Valve Rehabilitation	**completed project**			**23,690,863**	**23,690,863**	**-**					
683 Heath Hill Road Pipe Replacement	**completed project**			**19,358,036**	**19,358,036**	**-**					
689 James L. Gillis Pump Station	**completed project**			**33,419,007**	**33,419,008**	**-**					
692 Northern High Service - Section 27 Improvement				**1,133,702**	**123,646**	**1,010,055**	**14,310**	**13,196**	**27,506**	**982,549**	
Section 27 - Construction	67769_6333	Mar-20	Nov-21	1,009,131	26,581	982,549				982,549	
Easements	68192_6589	Apr-16	Mar-18	22,800	-	22,800	12,000	10,800	22,800		
Technical Assistance	68211_6712	Oct-99	Mar-18	64,500	59,794	4,706	2,310	2,396	4,706		
Surveying	68229_6809	Jun-01	Mar-17	37,271	37,271	-					
693 NHS - Revere & Malden Pipeline Improvements				**57,526,870**	**26,954,957**	**30,571,913**	**236,531**	**1,050,250**	**1,408,998**	**29,285,132**	
Revere & Malden - Design/CS/RI	67780_5185	May-88	Sep-94	1,785,747	1,785,747	-					
Revere Beach - Construction	67781_5186	Aug-92	Oct-94	6,314,186	6,314,186	-					
Malden Section 53 - Construction	67782_5176	Apr-92	Sep-94	10,026,430	10,026,430	-					
Revere Section 53 - Construction	67784_5177	Sep-08	Aug-09	2,938,022	2,938,022	-					
Control Valves - Construction	67785_5191	Jun-88	Aug-89	948,780	948,780	-					
Deer Island Pipeline Cleaning & Lining - Construction	67786_5179	Jun-90	Sep-90	157,930	157,930	-					
Winthrop Cleaning & Lining - Construction	67787_5178	Jun-90	Aug-90	575,040	575,040	-					
Section 53 Connections - Construction	67790_6335	Jan-20	Jan-22	12,306,470	-	12,306,470				12,306,470	
Technical Assistance	67791_5986	Jul-06	Mar-18	246,445	246,445	-					
Linden Square - Construction	67792_5238	Apr-91	Nov-91	1,849,430	1,849,430	-					
Linden Square - Construction Administration	67793_5239	Apr-91	Nov-91	125,380	125,380	-					
Road Restoration - Design/CA/RI	67996_6033	Nov-94	Dec-95	77,250	77,250	-					
Road Restoration - Construction	67997_6034	Jul-95	Jun-96	1,713,790	1,713,790	-					
Malden Section 53 - Landscaping	68020_6113	Apr-96	Jun-96	20,000	20,000	-					
Sidewalk Restoration	68033_6183	Sep-96	Oct-96	54,100	54,100	-					
Revere Section 53 - Easements	68078_6334	Sep-02	Jul-09	210	210	-					

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Section 99 Connection - Construction	68258_6958	Mar-20	Mar-22	3,135,662	-	3,135,662				3,135,662	
Easements	68265_6978	Jul-06	Dec-20	30,000	-	30,000	5,000	10,000	15,000	15,000	
Permits	68280_7049	Apr-05	Mar-22	5,000	-	5,000	750	1,250	2,000	3,000	
Section 56 Replacement/Saugus River - Design CA/RI	75545_7454	Apr-18	Apr-23	2,000,000	-	2,000,000				2,000,000	
Section 53 and 99 Connections - Design CA/RI	75548_7485	Jun-17	Mar-23	3,750,000	-	3,750,000		225,000	225,000	3,525,000	
Section 56 Replacement- Construction	75549_7486	Apr-20	Apr-22	8,300,000	-	8,300,000				8,300,000	
Section 56 Replacement/Saugus River - Feasibility Study	75565_7500	Dec-15	Jun-17	246,998	122,217	124,781	124,781		246,998		
Section 56 Pipe Demo Des CA/RI	75569_7535	Jan-17	Jun-18	320,000	-	320,000	106,000	214,000	320,000		
Section 56 Pipe Demolition - Construction	75570_7536	Sep-17	Mar-18	600,000	-	600,000		600,000	600,000		
702 New Connecting Mains - Shaft 7 to WASM 3				**37,860,699**	**11,315,807**	**26,544,892**	**906,100**	**1,143,000**	**2,404,100**	**21,907,133**	**2,588,658**
Routing Study	67846_5163	Aug-94	Nov-96	397,087	397,087	-					
Watertown MOU	68035_6199	Jun-94	Sep-97	167,000	167,000	-					
CP1- Design/CA/RI	68110_6383	Sep-98	Jul-11	3,532,814	3,532,814	-					
Des/CA/RI DP2/4 Meter 120	68111_6384	Aug-02	Oct-08	1,277,722	1,277,722	-					
CP3 (Sect 23,24,47)-Final Des/CA/RI	68112_6385	Jul-16	Jun-22	3,506,868	-	3,506,868	896,100	900,000	1,796,100	1,710,768	
CP1 A&B - Easements	68114_6387			16,919	16,919	-					
CP3 - Easements	68115_6388	Jan-18	Dec-18	40,000	-	40,000		20,000	20,000	20,000	
CP5 - Easements	68117_6390	Dec-06	Jan-11	21,659	21,659	-					
CP3-Sect 23,24,47, Rehab	68119_6392	Jul-18	Jun-21	8,083,561	-	8,083,561				8,083,561	
CP5 - Northeast Segment	68121_6394	Aug-09	Nov-11	5,902,607	5,902,606	1			355,000		
CP2 - Clean & Line Sections 59&60 - Cons	68174_6548	Mar-22	Mar-24	5,431,859	-	5,431,859				3,336,201	2,095,658
CP2 -Easements	68175_6547	May-17	May-25	33,000	-	33,000	10,000	23,000	33,000		
Repl Sect 25, 75, 59460 Des CA/RI	68255_6955	Jan-18	Mar-25	3,000,000	-	3,000,000		200,000	200,000	2,307,000	493,000
Replacement of Section 25 - Construction	68256_6956	Jul-19	Feb-21	2,929,603	-	2,929,603				2,929,603	
Section 75 Extension - Construction	68350_7484	Mar-20	Mar-22	3,520,000	-	3,520,000				3,520,000	
704 Rehab of Other Pump Stations				**50,257,852**	**30,057,852**	**20,200,000**				**1,320,834**	**18,879,166**
Preliminary Design	67885_5153	Aug-94	Mar-96	351,000	351,000	-					
Design/CS/RI	68017_6110	May-97	Nov-04	2,545,826	2,545,826	-					
Construction II & C	68072_6304	Jan-00	Feb-01	639,272	639,272	-					
Rehab of 5 Pump Stations	68102_6375	Oct-06	Jun-10	21,847,856	21,847,856	-					
Legal	68179_6557	Jul-99	Jan-10	6,097	6,097	-					
Proprietary Equipment Purchases	68204_6676	Jun-99	Jan-10	157,638	157,638	-					
Design 2 CS/RI	68266_6980	Dec-04	Jun-11	4,510,163	4,510,163	-					
Pump Station Rehab - Evaluation	75582_7525	Jul-19	Jul-21	500,000	-	500,000				500,000	
Pump Station Rehab - Design/CA/RI	75583_7526	Jan-22	Jan-28	3,940,000	-	3,940,000				820,834	3,119,166
Pump Station Rehab - Construction	75584_7527	Jan-25	Jan-27	15,760,000	-	15,760,000					15,760,000
706 NHS-Connecting Mains from Section 91	**completed project**			**2,360,194**	**2,360,194**	**-**					

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708 Northern Extra High Service - New Pipelines				**8,045,232**	**3,632,119**	**4,413,114**	**20,687**	**36,428**	**57,115**	**3,599,000**	**756,999**
Design/CA/RI	67970_5242	Sep-94	Jun-01	587,802	587,802	-					
Appraisal & Easements	67971_6339	Sep-94	Jun-01	389	389	-					
Construction	67972_6340	Aug-99	Sep-01	3,031,572	3,031,572	-					
Regulatory Compliance	68010_6099	Nov-95	Oct-00	250	250	-					
Sections 34 & 45 - Construction	68162_6522	Jul-20	Dec-23	3,626,666	-	3,626,666				3,000,000	626,666
Public Participation	68176_6554	Jul-15	Dec-20	5,000	-	5,000	1,500	2,000	3,500	1,500	
Legal	68177_6555	Jul-15	Dec-20	5,000	-	5,000	1,500	1,000	2,500	2,500	
Technical Assistance	68210_6707	Nov-10	Jan-17	54,000	7,886	46,114	15,087	31,028	46,115		
PLC Equipment Purchases	68215_6749	Dec-99	Dec-00	4,220	4,220	1					
Permits	68281_7050	Nov-10	Jan-17	5,000	-	5,000	2,600	2,400	5,000		
Sections 34 & 45 - Design/CA/RI	75528_7404	Jul-18	Dec-24	725,333	-	725,333				595,000	130,333
712 Cathodic Protection of Distribution Mains				**1,703,947**	**208,121**	**1,495,826**	**108,473**	**42,071**	**217,752**	**1,345,284**	
Planning Phase I	68002_6058	Apr-95	Dec-97	107,680	107,680	-					
Cathodic Protection Testing and Evaluation Program	68129_6438	Aug-15	Aug-17	217,750	67,208	150,542	108,473	42,071	217,752		
Cathodic Protection at Shafts E&L & Section W 16 - Design/CA/RI	68130_6439	Apr-18	Sep-21	814,125	-	814,125				814,125	
Cathodic Protection at Shafts E&L & Section W 16 - Construction	68131_6440	Jan-19	Jan-20	531,159	-	531,159				531,159	
Technical Assistance	68216_6751	Jan-00	May-09	33,233	33,233	-					
713 Spot Pond Supply Mains Rehab				**66,927,509**	**63,601,327**	**3,326,182**	**2,000,532**	**50,000**	**4,669,859**	**1,275,650**	
Section 4 Webster Avenue Bridge Pipe Rehab - Design	60114_7334	Oct-13	Mar-17	685,536	543,323	142,213	142,213		685,536		
Section 4 Webster Avenue Bridge Pipe Rehab - Construction	60115_7335	May-15	Dec-16	3,861,368	2,004,799	1,856,569	1,856,569		3,861,369		
Walnut Street Bridge Truss - Construction	60145_7483	Oct-20	May-22	1,000,000	-	1,000,000				1,000,000	
Preliminary Design & Design/CA/RI	68038_6223	Sep-98	Oct-08	10,868,582	10,868,582	-					
Easements & Paving - CP1	68059_6316	May-00	Mar-02	143,347	143,347	-					
North (Medford/Melrose)	68060_6317	May-00	Jan-02	6,597,330	6,597,330	-					
Easements - CP2	68106_6379	May-02	Jun-06	49,601	49,601	-					
Easements - CP3	68107_6380	Apr-04	Nov-07	79,782	79,782	-					
Middle (Medford/Somerville)	68108_6381	Jun-02	Jul-06	22,176,813	22,176,813	-					
South (Cambridge/Boston)	68109_6382	Oct-04	Apr-08	17,590,133	17,590,133	-					
Early Valve Replacement Contract	68150_6475	Sep-98	Jan-00	2,387,073	2,387,073	-					
Easements - CP4	68151_6476	Sep-06	May-09	1,451	1,451	-					
Early Valve Equipment Purchase	68153_6483	May-98	Nov-01	161,390	161,390	-					
Walnut Street Bridge Truss - Design	68209_6697	Oct-18	May-23	325,650	-	325,650		50,000	50,000	275,650	
Easements - CP5	68225_6784	Jul-14	Jun-20	74,797	73,047	1,750	1,750		72,954		
CA/RI - CP3	68274_7003	Sep-04	Apr-09	924,656	924,656	-					
714 Southern Extra High Sections 41 & 42	**completed project**			**3,657,244**	**3,657,244**	**-**					

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719 Chestnut Hill Connecting Mains				**33,094,496**	**17,486,675**	**15,607,821**	**1,000,000**		**1,000,000**	**14,602,301**	**5,520**
Pump Station Potable Connection - Design/CA/RI	68026_6141	Mar-00	Dec-04	1,359,533	1,359,533	-					
Preliminary Engineering	68051_6301	Jan-05	Apr-06	457,200	457,200	-					
Easements	68053_6303	Apr-03	Dec-07	80,575	80,575	-					
Emergency Pump Relocation - Construction	68155_6501	Feb-99	Mar-01	6,502,187	6,502,187	-					
Emergency Pump Relocation - Design/CA/RI	68157_6503	May-98	May-01	1,120,816	1,120,816	-					
Boston Paving	68180_6558	Jul-99	Dec-07	132,896	132,896	-					
Legal	68182_6560	Jul-99	Jun-08	1,137	1,137	-					
BECo Emergency Pump Construction	68199_6623	Sep-99	Jun-00	430,641	430,641	-					
Pump Station Potable Connection - Construction	68203_6651	Apr-02	Dec-03	7,132,109	7,132,109	-					
Equipment Pre-purchase	68230_6814	Apr-01	Oct-01	154,337	154,337	-					
Demolition of Garages	68231_6820	Feb-02	May-02	71,600	71,600	-					
Utilities	68244_6869	Jun-02	Aug-02	43,644	43,644	-					
Chestnut Hill Final Connection - Construction	68267_6982	Jul-20	Dec-22	12,176,301	-	12,176,301				12,176,301	
Chestnut Hill Final Connection - Design/ESDC/REI	68268_6995	Jul-18	Dec-23	2,431,520	-	2,431,520				2,426,000	5,520
Chestnut Hill Gatehouse No. 1 Repairs - Construction	75521_7382	Apr-17	Jun-17	1,000,000	-	1,000,000	1,000,000		1,000,000		
720 Warren Cottage Line Rehab	**completed project**			**1,204,821**	**1,204,821**	**-**					
721 Southern Spine Distribution Mains				**76,280,691**	**36,683,102**	**39,597,589**	**952**	**376,270**	**368,675**	**4,041,607**	**35,178,761**
Sections 21, 43 & 22 - Design	68083_6290	Sep-00	May-13	7,114,815	7,114,815	-			(8,547)		
Sections 21, 43 & 22 - Easements	68084_6291	Mar-02	May-12	106,986	106,986	-					
Section 22 South - Construction	68085_6292	Jul-03	Jun-05	4,993,131	4,993,131	-					
Sections 20 & 58 - Design	68089_6296	Jun-23	May-28	3,149,374	-	3,149,374					3,149,374
Sections 20 & 58 - Easements	68090_6297	Sep-21	Sep-25	35,070	-	35,070				13,883	21,187
Sections 20 & 58 - Construction	68091_6298	Sep-25	May-27	14,821,102	-	14,821,102					14,821,102
Adams Street Bridge	68122_6396	Jul-98	Dec-99	153,783	153,783	-					
Southern High Public Participation	68193_6601	Oct-98	May-99	15,000	15,000	-					
Southern High Extension Study	68194_6602	Sep-98	May-99	242,372	242,372	-					
Boston Paving	68228_6787			3,194	3,194	-					
Section 22 North - Construction	68235_6844	Jan-23	Jan-25	18,088,235	-	18,088,235				2,170,588	15,917,647
Section 107 Phase 1 - Construction	68236_6845	Jul-07	Jan-09	6,184,362	6,184,362	-					
Legal	68237_6846	May-04	May-27	5,000	1,192	3,808	952	1,270	2,222	794	793
Technical Assistance	68238_6847	Feb-04	Oct-05	28,102	28,102	-					
Contract 1A - Construction	68247_6885	Nov-03	Jun-05	2,858,603	2,858,603	-					
Section 107 Phase 2 - Construction	68290_7099	Jan-10	Jan-12	14,846,562	14,846,562	-					
Milton Pressure Regulator Valve	68291_7104	Jun-06	Nov-06	135,000	135,000	-					
Section 22 North - Design/ESDC	68298_7120	Jul-20	Jan-26	2,500,000	-	2,500,000				1,231,342	1,268,658
Section 22 North - Facility Plan/EIR	68299_7155	Aug-17	Jun-19	1,000,000	-	1,000,000		375,000	375,000	625,000	

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722 NIH Redundancy & Storage				**105,654,814**	**15,344,942**	**90,309,873**	**12,015,431**	**17,860,063**	**39,246,071**	**37,452,627**	**22,981,752**
Concept Plan	53454_6954	Feb-06	Aug-10	796,748	796,748	-					
Easements	68093_6306	Jul-17	Jun-20	929,450	-	929,450	500,000	429,450	929,450		
Section 89 & 29 Redundancy - Design	68252_6906	Mar-11	Aug-20	6,172,381	3,122,848	3,049,533	892,405	804,000	3,991,810	1,353,128	
Purchase Mobile Pump Unit	68276_7026	Jul-09	Jan-10	290,848	290,848	-					
Short Term Improvements - Design/CA/RI	68277_7045	Sep-09	May-15	820,733	820,733	-			227,954		
Permits	68278_7047	Jan-10	Dec-18	5,000	150	4,850	2,000	2,850	5,000		
Technical Assistance	68279_7048	Jan-10	Dec-18	18,000	-	18,000	2,500	7,000	9,500	8,500	
West Street Pipeline Reading - Construction Phase1A	68282_7066	Jun-14	May-15	1,909,952	1,909,952	-			1,909,952		
Section 89 & 29 Redundancy - Construction Phase 2	68283_7067	May-17	Dec-19	18,230,000	-	18,230,000		5,730,000	5,730,000	12,500,000	
NIH Storage - Construction	68284_7068	Jan-26	Jan-28	19,017,191	-	19,017,191					19,017,191
Section 89 & 29 Rehab - Design	68294_7116	Jul-17	Jan-24	3,200,000	-	3,200,000		364,000	364,000	2,730,000	106,000
Section 89 & 29 Rehab - Construction	68295_7117	Jan-20	Jun-22	16,000,000	-	16,000,000				16,000,000	
Gillis Pump Station Improvements	68309_7260	Jul-13	Dec-14	2,178,325	2,177,646	679	679		2,178,325		
Reading/Stoneham Interconnections	68310_7261	Aug-11	Oct-12	3,466,546	3,466,546	-					
NIH Storage - Design	68316_7311	Jan-24	Jan-29	3,858,561	-	3,858,561					3,858,561
Section 89/29 Redundancy - Phase 1B Construction	68317_7471	Jan-16	Mar-18	10,943,080	2,759,471	8,183,610	7,378,847	804,763	10,943,080		
Section 89/29 Redundancy - Phase 1C Construction	68318_7478	Dec-16	Jun-18	17,817,999	-	17,817,999	3,239,000	9,718,000	12,957,000	4,860,999	
723 Northern Low Service Rehab Section 8				**52,677,936**	**2,320,986**	**50,356,950**	**13,100**	**900,800**	**913,900**	**27,729,500**	**21,713,550**
Easements	68094_6321	Jul-15	Jul-27	80,000	-	80,000	12,500	20,000	32,500	29,500	18,000
Section 8 - Construction	68095_6322	Jul-26	Jul-28	14,740,927	-	14,740,927					14,740,927
Rehab Sections 37 & 46 Chelsea/East Boston - Construction	68262_6962	Jul-25	Jun-27	3,200,000	-	3,200,000					3,200,000
Permits	68263_6977	Jul-05	Jul-27	299,000	284,912	14,088	600	800	1,400	8,000	4,688
Technical Assistance	68264_6979	Jul-05	Jul-17	44,245	44,245	-					
Section 97A - Construction	68275_7021	Oct-08	Oct-09	1,991,829	1,991,829	-					
Section 8 - Design/CA/RI	68287_7092	Jul-23	Jul-29	2,948,185	-	2,948,185					2,948,185
Rehab Sections 37 & 46 Chelsea/East Boston - Design/CA/RI	75529_7405	Jul-23	Jun-28	801,750	-	801,750					801,750
Section 57 Water Pipeline & 21/20/19 Sewer - Des./ESDC/REI	75610_7540	Jul-17	Nov-21	4,800,000	-	4,800,000		880,000	880,000	3,920,000	
Section 57 Water Pipeline & 21/20/19 Sewer Rehab - Const.	75611_7541	May-19	Nov-20	22,272,000	-	22,272,000				22,272,000	
Section 50 Pipe Rehab - Construction	75612_7546	Mar-19	Mar-21	1,500,000	-	1,500,000				1,500,000	
725 Hydraulic Model Update	**completed project**			**598,358**	**598,358**	**-**					
727 SEH Redundancy & Storage				**107,884,706**	**8,943,573**	**98,941,134**	**5,125,132**	**14,704,000**	**22,015,734**	**22,458,565**	**56,653,437**
Concept Plan/Preliminary Design/Environmental Review	53397_6452	Feb-07	Feb-14	632,519	632,520	-			13,161		
Redundancy Pipeline Phase 1 - Design/CA/RI	53398_6453	Feb-14	Aug-21	7,677,305	2,172,564	5,504,741	1,298,132	1,403,000	4,873,696	2,803,609	
Redundancy Pipeline Section 111 Phase 1 - Construction	53399_6454	Jul-16	Aug-18	11,770,000	-	11,770,000	3,697,000	6,013,000	9,710,000	2,060,000	
Redundancy/Storage Phase 2 - Final Design/CA/RI	68135_6444	Jan-26	Dec-31	6,192,392	-	6,192,392					6,192,392
University Avenue Water Main	68136_6445	Mar-08	Nov-08	6,137,445	6,137,445	-					
Sections 77 & 88 Rehab - Design	68292_7112	Mar-21	Mar-26	1,425,612	-	1,425,612				714,000	711,612
Sections 77 & 88 Rehab - Construction	68293_7113	Apr-23	Apr-25	5,702,447	-	5,702,447					5,702,447
Easements/Agreements	68305_7226	Jul-14	Jul-27	300,000	-	300,000	50,000	55,000	105,000	195,000	
Permits/Utilities	68306_7227	Aug-08	Jul-27	300,000	1,044	298,956	80,000	100,000	180,877	118,956	
Redundancy/Storage Phase 2 - Construction	68308_7245	Jan-28	Dec-30	30,961,960	-	30,961,960					30,961,960
Phase 3, 2nd Tank - Construction	68311_7262	Jan-33	Dec-35	10,904,189	-	10,904,189					10,904,189
Phase 3, 2nd Tank - Design	68312_7263	Jan-31	Dec-36	2,180,837	-	2,180,837					2,180,837
Redundancy Pipleline Section 111 Phase 2 - Constr uction	68555_7504	Apr-17	Nov-19	13,700,000	-	13,700,000		3,800,000	3,800,000	9,900,000	
Redundancy Pipleline Section 111 Phase 3 - Construction	68556_7505	Jun-17	Nov-19	10,000,000	-	10,000,000		3,333,000	3,333,000	6,667,000	

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730 Weston Aqueduct Supply Mains				**81,563,884**	**79,585,770**	**1,978,112**	**1,238,159**	**382,885**	**15,163,519**	**357,068**	
Newton Water Mains - Construction	59774_5034	Apr-95	Oct-96	668,790	668,790	-					
Technical Assistance	59776_5975	Mar-95	Oct-18	186,424	186,424	-					
WASM 4 - Design/CA/RI	67865_5147	Mar-95	Sep-07	5,978,368	5,978,368	-					
WASMs 1 & 2 - Design/CA/RI	68027_6142	Jun-97	Jul-06	5,059,988	5,059,988	-					
Appraisal / Easement	68030_6174	Mar-95	Oct-18	753,000	448,682	304,318		27,250	141,555	277,068	
WASM 1, 2 & 4 - Auburndale	68031_6175	Jun-97	Nov-98	4,001,461	4,001,461	-					
Meter 103 - Construction	68032_6176	Oct-96	Jul-98	61,027	61,027	-					
WASMs 1 & 2 - Newton	68041_6280	Mar-00	Jun-02	9,218,520	9,218,520	-					
WASMs 1 & 2 - Boston	68042_6281	Feb-03	Jun-05	7,038,896	7,038,896	-					
WASMs 2 & 4 - Newton	68069_6312	Apr-98	Mar-01	8,281,877	8,281,877	-					
WASM 4 - Allston & Western Avenue Sewer	68070_6313	Feb-02	Dec-04	17,330,800	17,330,800	-					
Section 36/Watertown Sec./Waltham Connection - Design/CA/RI	68167_6540	Jan-11	May-17	2,450,348	1,884,584	565,764	251,448	314,316	1,264,737		
Section 28, Arlington - CP1	68173_6546	Aug-09	Feb-11	2,303,626	2,303,626	-					
Survey	68245_6870	Dec-01	Oct-25	210,000	88,681	121,319		41,319	41,319	80,000	
Arlington Pipe Work	68269_6996	Dec-09	May-10	401,035	401,035	-					
WASM3 Section 12 Replacement - Construction	68272_7000	Oct-04	Sep-05	2,113,693	2,113,693	-					
WASM3 Section 12 Replacement - Design	68273_7001	May-04	Aug-06	264,663	264,663	-					
Section 28 - Design/CA/RI	68285_7083	Oct-06	Apr-11	866,688	866,688	-					
Watertown Section Rehab	68301_7222	May-13	Dec-13	2,818,298	2,668,297	150,000	150,000		2,159,526		
Section 36/W11/S 9-A11 Valve	68332_7448	Nov-14	Dec-16	11,556,382	10,719,670	836,711	836,711		11,556,382		
731 Lynnfield Pipeline	**completed project**			**5,625,829**	**5,625,828**	**-**			**(51,694)**		
732 Walnut St. & Fisher Hill Pipeline Rehab	**completed project**			**2,717,141**	**2,717,141**	**-**					
735 Section 80 Rehabilitation				**12,102,815**	**-**	**12,102,815**	**814,000**	**1,071,409**	**1,885,409**	**9,250,000**	**967,406**
Section 80 Rehab - Construction	68249_6891	Jul-19	Jun-23	8,211,525	-	8,211,525				7,699,000	512,525
Section 80 Rehab - Design CA/RI	68250_6892	Feb-18	Jan-25	2,052,881	-	2,052,881		50,000	50,000	1,550,000	452,881
Section 80 Replacement - Construction	68410_7532	Nov-16	Jul-17	1,828,409	-	1,828,409	812,000	1,016,409	1,828,409		
Permits	68411_7533	Oct-16	Jun-24	10,000	-	10,000	2,000	5,000	7,000	1,000	2,000
Other Waterworks				**69,415,968**	**148,623,546**	**(79,207,578)**	**7,721,281**	**10,055,252**	**14,666,961**	**73,569,697**	**(170,553,809)**
753 Central Monitoring System				**39,040,065**	**17,804,950**	**21,235,115**	**2,674,204**	**1,516,464**	**6,191,890**	**6,277,328**	**10,767,120**
Study	75300_5025	Mar-84	Sep-86	189,590	189,590	-					
Design	75301_5026	Oct-87	Jan-92	2,651,250	2,651,250	-					
Equipment Prepurchase	75302_5027	Oct-87	Dec-93	2,161,920	2,161,920	-					
SCADA Implementation	75303_5028	Aug-96	Mar-17	2,101,110	2,034,833	66,277	66,277		188,695		
Communications Structures	75304_5160	Nov-92	May-93	161,290	161,290	-					
Construction & Start-up Services	75305_5173	Jul-92	Aug-98	352,040	352,040	-					
Construction 1	75306_5171	Nov-97	Nov-98	208,950	208,950	-					
Operations Center - Construction	75308_5849	Sep-92	Jun-94	1,498,980	1,498,980	-					
Technical Assistance	75309_5987	Jul-92	Dec-97	385,601	385,601	-					
Waterworks SCADA/PLC Upgrades	75310_5218	Oct-16	Oct-31	18,500,000	-	18,500,000	312,880	1,200,000	1,512,880	6,220,000	10,767,120
Microwave Equipment	75474_6125	Mar-96	Dec-01	781,987	781,987	-					
Microwave Communication System-Wide Backbone	75488_6653	Sep-01	Jun-02	1,694,018	1,694,018	-					

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Monitoring & Control - Study & Design	75489_6654	Dec-99	Sep-04	1,807,784	1,807,784	-					
Microwave Communication for Waterworks Facilities	75494_6816	Sep-02	Jul-04	1,957,399	1,957,399	-					
Ludlow Communications	75495_6825	Sep-01	Oct-01	40,504	40,504	-					
Quabbin Power, Communication & Security - Construction	75512_7338	Feb-16	Apr-17	3,505,320	1,335,490	2,169,830	2,081,056	88,774	3,505,320		
Quabbin Power, Communication & Security - Design/CA/RI	75540_7461	Sep-14	Sep-18	813,905	540,966	272,939	100,957	114,654	756,577	57,328	
Utility Fees and Permits	75541_7475	Jul-14	Dec-17	228,418	2,348	226,070	113,034	113,036	228,418		
763 Distribution System Facilities Mapping				**2,298,919**	**1,036,368**	**1,262,551**				**1,262,551**	
Planning and Design	75458_5162	Feb-95	Dec-98	936,368	936,368	-					
Data Purchase	75476_6152	Nov-95	Aug-96	100,000	100,000	-					
Records Development	75484_6525	Oct-19	Jan-20	762,551	-	762,551				762,551	
Update of Record Drawings	75600_7489	Apr-18	Apr-19	500,000	-	500,000				500,000	
764 Local Water Infrastructure Rehab	**completed project**			**7,487,762**	**7,487,762**	**-**					
765 Local Water System Assistance Program				**-**	**121,568,086**	**(121,568,085)**	**3,287,581**	**7,457,217**	**5,453,643**	**49,770,043**	**(182,082,929)**
Community Loans	75485_6608	Aug-00	Jun-13	222,317,575	222,317,575	1					
Community Repayments	75493_6759	Aug-01	Jun-23	(222,317,575)	(179,105,788)	(43,211,787)	(11,832,783)	(9,153,147)	(66,753,948)	(22,215,596)	(10,261)
Local Water System Assistance Loans	75513_7339	Aug-10	Jun-20	200,000,000	97,711,357	102,288,643	19,000,000	18,000,000	96,142,246	65,288,643	
Local Water System Assistance Repayments	75514_7340	Aug-11	Jun-30	(200,000,000)	(20,721,058)	(179,278,942)	(9,771,136)	(11,671,136)	(39,482,155)	(78,744,502)	(79,092,168)
CVA Loans	75515_7350	Nov-10	Jun-20	10,000,000	2,085,000	7,915,000	1,100,000	1,100,000	2,200,000	5,715,000	
CVA Repayments	75516_7351	Nov-11	Jun-30	(10,000,000)	(719,000)	(9,281,000)	(208,500)	(318,500)	(1,152,500)	(3,273,500)	(5,480,500)
Lead Service Line Replacement Loans	75517_7529	Aug-16	May-36	100,000,000	-	100,000,000	5,000,000	5,000,000	10,000,000	25,000,000	65,000,000
Lead Service Line Replacement Repayments	75518_7530	Aug-17	May-46	(100,000,000)	-	(100,000,000)		(500,000)	(500,000)	(10,000,000)	(89,500,000)
LWSAP Phase 3 Loans	75620_7567	Aug-17	May-46	210,000,000	-	210,000,000		5,000,000	5,000,000	85,000,000	120,000,000
LWSAP Phase 3 Repayments	75621_7568	Aug-17	May-46	(210,000,000)	-	(210,000,000)				(17,000,000)	(193,000,000)
766 Waterworks Facility Asset Protection				**20,589,222**	**726,381**	**19,862,841**	**1,759,496**	**1,081,571**	**3,021,429**	**16,259,774**	**762,000**
Meter Vault Manhole Retrofits - Design	75490_6689	Sep-18	Jun-22	423,925	-	423,925				423,925	
Walnut Hill Tank Rehab/Elevat. Water Tanks Repainting Design	75497_6832	Jul-17	Jul-22	800,000	-	800,000		120,000	120,000	680,000	
Walnut Hill Tank - Construction	75498_6833	Jul-18	Jul-19	1,000,000	-	1,000,000				1,000,000	
Waltham Bridge Pipe Replacement	75501_6910	Mar-04	Sep-04	237,550	237,550	-					
Permits and Legal Fees	75502_6920	Mar-04	Jun-18	16,340	10,156	6,184	2,388	3,796	7,184		
Technical Assistance	75503_6921			-	5,517	(5,517)	(5,517)				
Cosgrove Flat Roof Replacement	75505_7022	Sep-17	Mar-18	900,000	-	900,000		900,000	900,000		
Cosgrove Valve Replacement - Construction	75509_7064	Jul-20	Dec-20	1,898,764	-	1,898,764				1,898,764	
Cosgrove Valve Replacement - Design	75510_7065	Jul-19	Dec-21	223,384	-	223,384				223,384	
Transformer at Cosgrove Intake Building	75511_7228	Jun-11	Jul-12	299,313	299,313	-					
Covered Storage Tank Rehab - Design CA/RI	75524_7385	Jul-19	Jul-24	1,000,000	-	1,000,000				914,000	86,000
Electrical Distribution Upgrades at Southborough	75535_7425	Apr -18	Apr-19	400,000	-	400,000				400,000	
Water Meter Upgrade Replacement	75536_7453	Sep-20	Jun-23	1,000,000	-	1,000,000				1,000,000	
Beacon Street Line Repair - Construction	75537_7458	Jun-16	Jan-17	1,551,178	-	1,551,178	1,551,178		1,551,178		
Beacon Street Line Repair - Design/CA/RI	75538_7474	Nov-14	Dec-17	443,067	173,845	269,222	211,447	57,775	443,067		
Meter Vault Manhole Retrofits - Construction	75550_7479	Sep-19	Jun-21	1,695,701	-	1,695,701				1,695,701	
Covered Storage Tank Rehab - Construction	75553_7482	Jul-21	Jul-23	4,000,000	-	4,000,000				3,360,000	640,000
Water Meter Upgrade - Design CA/RI	75554_7542	Sep-18	Jun-24	200,000	-	200,000				164,000	36,000
Elevated Water Storage Tanks Repainting - Construction	77552_7493	Jul-19	Jun-21	4,500,000	-	4,500,000				4,500,000	
Business & Operations Support				**131,460,724**	**92,707,839**	**38,752,885**	**8,794,902**	**10,185,285**	**34,246,168**	**19,772,696**	

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881 Equipment Purchase				**29,187,988**	**18,488,576**	**10,699,412**	**2,723,113**	**2,210,000**	**11,314,361**	**5,766,298**	
Security Equipment & Installation	92374_6760	Jan-01	Jun-18	11,101,520	8,603,519	2,498,001	437,200	1,805,000	4,178,343	255,800	
ICP-MS Lab Testing Equipment	92379_6808	Oct-08	Dec-08	117,432	117,432	-					
High Lift Fork Loader (Lull)	92411_7239	Oct-10	Dec-10	121,449	121,449	-					
Ford Ramp Truck	92416_7246	Apr-10	Jun-10	121,572	121,572	-					
Street Sweeper	92417_7247	Jul-09	Sep-09	181,673	181,673	-					
Prior Vehicle Purchases	98454_7306	Jul-00	Jun-10	2,415,190	2,415,190	-					
FY11-13 Vehicle Purchases	98455_7307	Jul-09	Jun-13	2,361,415	2,361,415	-					
FY14-18 Vehicle Purchases	98456_7308	Jul-13	Jun-18	6,506,516	4,020,603	2,485,913	2,285,913	200,000	6,506,516		
FY19-23 Vehicle Purchases	98457_7309	Jul-18	Jun-23	5,140,000	-	5,140,000				5,140,000	
FY14-18 Major Lab Instrumentation	98458_7310	Jun-16	Mar-20	1,000,000	424,502	575,498		205,000	629,502	370,498	
Front-End Loader	98467_7325	Oct-10	Dec-10	121,221	121,221	-					
925 Technical Assistance				**1,150,000**	**-**	**1,150,000**		**383,333**	**383,333**	**766,667**	
Land Appraisal	77000_LAND			150,000	-	150,000		50,000	50,000	100,000	
Surveying	80000_SURV			100,000	-	100,000		33,333	33,333	66,667	
Hazardous Material	90000_HAZM			900,000	-	900,000		300,000	300,000	600,000	
930 MWRA Facility - Chelsea	**completed project**			**9,813,635**	**9,813,635**	**-**					
931 Business Systems Plan	**completed project**			**24,527,709**	**24,527,709**	**-**			**76,479**		
932 Environmental Remediation	**completed project**			**1,478,602**	**1,478,602**	**-**			**(200)**		
933 Capital Maintenance Planning & Development				**15,886,005**	**12,543,838**	**3,342,168**	**1,683,802**	**1,370,804**	**5,474,202**	**287,562**	
Inventory & Evaluation - 1 & 2	19175_6421	Apr-00	Jul-05	2,579,434	2,579,434	-					
As-Needed Design Contract 1	92387_6976	Mar-05	Sep-07	313,302	313,302	-					
As Needed Design Contract 2	92393_6988	Mar-05	Sep-07	317,539	317,539	-					
As-Needed Design Contract 5	92399_7070	Sep-08	Mar-11	558,111	558,111	-					
As-Needed Design Contract 3	92402_7101	Aug-07	Feb-10	578,622	578,623	-					
As-Needed Design Contract 4	92403_7102	Aug-07	Aug-09	247,384	247,384	-					
As-Needed Design Contract 6	92413_7242	Aug-08	Aug-10	704,220	704,220	-					
As-Needed Design Contract 7	92414_7243	Jan-10	Jul-12	979,576	979,576	-					
As-Needed Design Contract 8	92415_7244	Feb-10	Jun-13	1,043,586	1,043,586	-			(46,988)		
As-Needed Design Contract 9	98470_7390	Jul-11	Jan-14	1,609,621	1,609,621	-			215,542		
As-Needed Design Contract 10	98471_7391	Aug-11	Feb-14	1,872,994	1,869,994	3,000	3,000		511,594		
As-Needed Design Contract 11	98473_7436	Feb-14	Aug-15	431,584	431,584	-			431,584		
As-Needed Design Contract 12	98474_7437	Jan-14	Jul-16	935,000	730,302	204,698	204,698		935,000		
As-Needed Design Contract 13	98485_7456	Feb-14	Aug-16	966,677	580,562	386,115	386,115		966,677		
As-Needed Design Contract 14	98487_7496	Jun-16	Jun-18	1,425,000	-	1,425,000	538,592	709,127	1,247,719	177,281	
As-Needed Design Contract 15	98488_7497	Jun-16	Jun-18	1,323,355	-	1,323,355	551,397	661,677	1,213,074	110,281	

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934 MWRA Facilities Management				**2,150,535**	**370,533**	**1,780,002**				**1,780,002**	
Design/Engineering Services	92389_6983	Jul-18	Sep-19	150,000	(2)	150,002				150,002	
Facilities Construction	92390_6984	Sep-19	Sep-20	2,000,535	370,535	1,630,000				1,630,000	
935 Alternative Energy Initiatives				**23,270,514**	**17,454,074**	**5,816,439**	**833,490**	**100,000**	**1,190,760**	**4,882,950**	
Deer Island Solar	19285_6974	Sep-07	May-08	903,714	903,714	-					
DI Wind	92428_6974C	Nov-08	Apr-10	4,063,294	4,063,294	-					
Future DI Wind Construction (Battery D Location)	92430_7270	Oct-19	Dec-20	4,882,950	-	4,882,950				4,882,950	
Loring Road Hydro - Design	92432_6974E	Mar-08	Sep-09	2,344	2,344	-					
Technical Assistance - Solar	92439_7274	May-09	Nov-12	123,540	123,540	-			(600)		
Energy Advisory Consultant Services	92440_6974B	Jun-08	Jun-10	45,632	45,632	-					
Wind Power Feasibility Study	92441_OP67	Mar-07	Jun-10	346,426	346,426	-					
DI Photovoltaic System Phase 1 - Construction	92442_7292	Sep-09	Mar-10	1,119,000	1,119,000	-					
Technical Assistance -Energy Efficiency	92443_7274A	May-09	Nov-13	463,085	463,085	-			169,070		
Technical Assistance - Solar II	92444_7274B	May-09	Nov-12	347,937	347,937	-					
Technical Assistance - Emerging Technology	92445_7274C	May-09	Dec-13	101,264	101,263	-			22,290		
Technical Assistance - Wind	92446_7274D	May-09	May-13	460,242	460,242	-					
Charlestown Wind - Construction	98450_7302	Feb-10	Oct-11	5,124,506	5,124,502	4					
John J. Carroll WTP Solar - Construction	98452_7304	Jan-10	Aug-11	2,367,287	2,367,287	-					
Loring Road Hydro - Construction	98459_6974F	Jan-10	May-11	1,882,218	1,882,218	-					
DI Wind Phase II Construction	98463_7321	Aug-18	Oct-19	37,075	37,080	(5)					
Fish Hatchery Pipeline Hydro	98465_7323	Mar-16	Sep-17	1,000,000	66,510	933,490	833,490	100,000	1,000,000		
940 Application Improvement Program				**9,980,394**	**1,476,397**	**8,503,997**	**1,180,218**	**2,984,227**	**5,567,717**	**4,339,552**	
GIS Applications & Integration	92420_7251	Jan-14	Jun-18	350,000	22,272	327,728	122,898	163,864	309,034	40,966	
Lawson Enhancements	92435_7286	Mar-17	Jun-19	1,750,000	-	1,750,000	62,500	750,000	812,500	937,500	
Maximo Upgrade	92436_7287	Jul-15	Dec-18	2,625,904	992,166	1,633,738	703,716	531,441	2,227,323	398,581	
PIMS Enhancements	92437_7288	Jan-17	Sep-18	400,000	-	400,000	57,143	228,571	285,714	114,286	
Enterprise Performance Management Enhancements	92469_7386	Mar-16	Jun-18	200,000	80,900	119,100	44,664	59,550	111,989	14,886	
Enterprise Content Management	98475_7438	Sep-17	Dec-19	4,000,000	-	4,000,000		1,166,667	1,166,667	2,833,333	
Mobile Integrations	98476_7439	Apr-14	Jun-18	300,000	26,569	273,431	189,297	84,134	300,000		
LIMS Enhancements	98484_7447	Mar-15	Jun-16	354,490	354,490	-			354,490		
942 Information Security Program (ISP)				**2,821,703**	**1,180,838**	**1,640,865**	**273,819**	**665,093**	**1,584,560**	**701,953**	
IT Security Infrastructure - Equipment	92434_7285	Sep-11	Jun-14	501,414	501,414	-					
Information Security Protection Infrastructure Upgrade	92500_7499	Jun-16	Jun-19	1,456,292	361,013	1,095,279	273,819	365,093	999,925	456,367	
Electronic Security Plan Implementation	98477_7440	Sep-17	Jun-19	545,586	-	545,586		300,000	300,000	245,586	
IT Security Program (ISP) Development	98483_7446	May-13	Jun-14	318,411	318,411	-			284,635		
944 Information Technology Management Program				**922,640**	**-**	**922,640**	**727,590**	**165,107**	**892,697**	**29,943**	
Service Delivery & Best Practices	92421_7252	Dec-16	Aug-17	110,640	-	110,640	44,257	53,107	97,364	13,276	
IT Project Management Methodology	98472_7408	Jan-17	Jun-18	200,000	-	200,000	83,333	100,000	183,333	16,667	
Software Development Life Cycle (SDLC)	98478_7441	Mar-17	Jun-18	612,000	-	612,000	600,000	12,000	612,000		

Massachusetts Water Resources Authority
FY18 Proposed Expenditure Forecast

Program/Project/Subphase	Contract No.	Notice To Proceed	Substantial Completion	Total Contract Amount	Payments through FY16	Remaining Balance	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
946 IT Infrastructure Program				**10,271,000**	**5,373,640**	**4,897,360**	**1,372,870**	**2,306,721**	**7,762,260**	**1,217,769**	
IT System Architecture	92404_7200	Sep-12	Oct-15	1,009,341	1,009,341	-			546,568		
Net 2020/Net 2020 DITP/Southborough	92405_7201	Mar-11	Jun-19	2,551,659	1,065,716	1,485,943	364,968	750,000	1,479,657	370,975	
Storage Upgrades	92406_7203	Jul-13	Jun-19	1,575,000	891,532	683,468	284,779	284,779	1,341,925	113,910	
Backup Upgrades	92407_7204	Jul-13	Jun-19	894,000	580,658	313,342	120,516	120,516	821,690	72,310	
Server Management	92408_7205	Oct-13	Jun-19	500,000	266,939	233,061	62,810	75,667	405,416	94,584	
Enterprise Application Integration	98480_7443	Jul-14	Jun-19	2,091,000	468,086	1,622,914	308,692	800,000	1,576,778	514,222	
E-Mail Upgrades	98481_7444	Jun-16	Jun-18	150,000	8,006	141,994	74,733	67,261	141,994		
Enterprise Data Management	98482_7445	Jan-14	Jun-19	1,500,000	1,083,362	416,638	156,372	208,498	1,448,232	51,768	

APPENDIX 3

New Capital Projects Added During the FY18 CIP

APPENDIX 3

New Capital Projects Added to the FY18 CIP

Project	Program	Project	Subphase	Contract Number	Total Contract Amount	FY18	FY14-18	FY19-23	Beyond FY23	Total Expenditures
1	Interception & Pumping	Corrosion & Odor Control	Nut Island Headworks Odor Control and HVAC Improvements Construction	7548	$ 10,000,000		**$ -**	**$ 10,000,000**	$ -	**$ 10,000,000**
2	Interception & Pumping	Facility Asset Protection	Fuel Oil Tank Replacements at Various Facilities Design CA/RI	7553	$ 1,528,605	$ 286,614	**$ 286,614**	**$ 1,241,991**		**$ 1,528,605**
	Interception & Pumping	Facility Asset Protection	Fuel Oil Tank Replacements at Various Facilities Construction Phase 1	7554	$ 3,566,745		**$ -**	**$ 3,566,745**		**$ 3,566,745**
	Interception & Pumping	Facility Asset Protection	Fuel Oil Tank Replacements at Various Facilities Construction Phase 2	7555	$ 2,547,675		**$ -**	**$ 2,547,675**		**$ 2,547,675**
3	Interception & Pumping	Facility Asset Protection	Headworks Effluent Shaft Rehabilitation Design CA/RI	7549	$ 2,038,140		**$ -**	**$ 2,038,140**		**$ 2,038,140**
	Interception & Pumping	Facility Asset Protection	Headworks Effluent Shaft Rehabilitation Construction	7550	$ 10,190,700		**$ -**	**$ 10,190,700**		**$ 10,190,700**
4	Interception & Pumping	Facility Asset Protection	Wiggins Terminal Pump Station Replacement Design CA/RI	7551	$ 508,855	$ 80,955	**$ 80,955**	**$ 427,900**		**$ 508,855**
	Interception & Pumping	Facility Asset Protection	Wiggins Terminal Pump Station Replacement ConstructionI	7552	$ 2,035,420		**$ -**	**$ 2,035,420**		**$ 2,035,420**
5	Treatment	DITP Asset Protection	Fixed Gas Protection Systems Replacement	7167	$ 2,000,000	$ 166,667	**$ 166,667**	**$ 1,833,333**		**$ 2,000,000**
6	Residuals	Residuals Asset Protection	Residuals Pellet Conveyance Piping	7173	$ 3,000,000	$ 166,667	**$ 166,667**	**$ 2,833,333**		**$ 3,000,000**
7	Distribution and Pumping	Northern Low Service - Section 8	Section 57 Water Pipeline and Sect. 21/20/19 Sewer Rehab Design/ESDC/REI	7540	$ 4,800,000	880,000	**$ 880,000**	**$ 3,920,000**		**$ 4,800,000**
	Distribution and Pumping	Northern Low Service - Section 8	Section 57 Water Pipeline and Sect. 21/20/19 Sewer Rehab Construction	7541	$ 22,272,000		**$ -**	**$ 22,272,000**		**$ 22,272,000**
8	Transmission	Metropolitan Redundancy Interim Improvements	Metropolitan Redundancy Interim Improvements Design CA/RI	7560	$ 10,414,895	150,000	**$ 150,000**	**$ 9,412,000**	$ 852,895	**$ 10,414,895**
	Transmission	Metropolitan Redundancy Interim Improvements	Tops of Shafts Interim Improvements Construction	7561	$ 6,114,420		**$ -**	**$ 6,114,420**		**$ 6,114,420**
9	Transmission	Metropolitan Redundancy Interim Improvements	Chestnut Hill Emergency Pump Station Improvements Construction	7562	$ 18,343,260		**$ -**	**$ 18,343,260**		**$ 18,343,260**
10	Transmission	Metropolitan Redundancy Interim Improvements	WASM/Spot Pond Supply Mains West PRV Improvements Construction	7563	$ 8,152,560		**$ -**	**$ 8,152,560**		**$ 8,152,560**
11	Transmission	Watershed Improvements	Quabbin Admin Building Rehabilitation Design CA/RI	7564	$ 3,000,000	614,000	**$ 614,000**	**$ 2,386,000**		**$ 3,000,000**
	Transmission	Watershed Improvements	Quabbin Admin Building Rehabilitation Construction	7565	$ 12,000,000			**$ 12,000,000**		**$ 12,000,000**
	SUMMARY:									
	Total Wastewater Projects				**$ 37,416,140**	**$ 700,903**	**$ 700,903**	**$ 36,715,237**	**$ -**	**$ 37,416,140**
	Total Waterworks Projects				**$ 85,097,135**	**$ 1,644,000**	**$ 1,644,000**	**$ 82,600,240**	**$ 852,895**	**$ 85,097,135**
	Total Projects				**$ 122,513,275**	**$ 2,344,903**	**$ 2,344,903**	**$ 119,315,477**	**$ 852,895**	**$ 122,513,275**

APPENDIX 4

Overview of the FY18 Proposed CIP and Changes from the FY17 Final CIP

APPENDIX 4
Overview of the FY18 Proposed CIP and Changes from the FY17 Final CIP

Program and Project	FY17 Final				FY18 Proposed				Change from Final FY17			
	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23
Total MWRA	**7,024,072**	**661,210**	**1,176,629**	**1,498,106**	**7,296,487**	**613,299**	**1,406,314**	**1,588,753**	**272,411**	**(47,916)**	**229,687**	**90,645**
Wastewater	**3,083,688**	**363,785**	**623,868**	**360,028**	**3,172,495**	**351,519**	**775,726**	**309,246**	**88,804**	**(12,267)**	**151,858**	**(50,783)**
Interception & Pumping	**938,785**	**85,595**	**186,827**	**145,821**	**980,615**	**80,334**	**301,065**	**78,677**	**41,828**	**(5,262)**	**114,238**	**(67,145)**
102 Quincy Pump Facilities	25,907	-	-	-	25,907	-	-	-	-	-	-	-
104 Braintree-Weymouth Relief Facilities	232,455	208	4,543	-	234,493	242	6,547	-	2,038	34	2,004	-
105 New Neponset Valley Relief Sewer	30,300	-	-	-	30,300	-	-	-	-	-	-	-
106 Wellesley Extention Replacement Sewer	64,359	-	-	-	64,359	-	-	-	-	-	-	-
107 Framingham Extension Relief Sewer	47,856	-	-	-	47,856	-	-	-	-	-	-	-
127 Cummingsville Replacement Sewer	8,999	-	-	-	8,999	-	-	-	-	-	-	-
130 Siphon Structure Rehabilitation	6,669	-	5,729	-	6,881	-	5,941	-	212	-	212	-
131 Upper Neponset Valley Sewer	54,174	-	-	-	54,174	-	-	-	-	-	-	-
132 Corrosion & Odor Control	26,117	2,139	20,976	-	27,879	1,999	22,879	-	1,762	(140)	1,903	-
136 West Roxbury Tunnel	11,314	-	1,000	-	11,314	-	1,000	-	-	-	-	-
137 Wastewater Central Monitoring	27,482	375	2,910	4,415	27,482	360	3,050	4,290	-	(15)	140	(125)
139 South System Relief Project	4,939	-	1,500	-	4,939	-	1,500	-	-	-	-	-
141 Wastewater Process Optimization	10,389	297	5,168	3,719	10,416	297	5,195	3,719	27	-	27	-
142 Wastewater Meter System-Equipment	28,438	1,150	7,550	14,600	28,438	513	8,188	14,600	-	(637)	638	-
143 Regional I/I Management Planning	169	-	-	-	169	-	-	-	-	-	-	-
145 Facility Asset Protection	353,470	81,427	131,701	123,088	391,259	76,923	241,015	56,068	37,789	(4,504)	109,314	(67,020)
146 D.I. Cross Harbor Tunnel Inspection	5,000	-	5,000	-	5,000	-	5,000	-	-	-	-	-
147 Randolph Trunk Sewer Relief	750	-	750	-	750	-	750	-	-	-	-	-
Treatment	**827,737**	**139,380**	**369,635**	**133,997**	**871,836**	**128,937**	**399,026**	**159,148**	**44,099**	**(10,443)**	**29,391**	**25,151**
182 DI Primary and Secondary	**(958)**	-	-	-	(958)	-	-	-	-	-	-	-
200 DI Plant Optimization	33,279	(148)	-	-	33,279	(148)	-	-	-	-	-	-
206 DI Treatment Plant Asset Protection	772,633	126,319	365,173	133,640	814,868	115,616	393,199	158,552	42,235	(10,703)	28,026	24,912
210 Clinton Wastewater Treat Plant	20,555	13,209	4,462	358	22,419	13,469	5,827	597	1,864	260	1,365	239
211 Laboratory Services	2,228	-	-	-	2,228	-	-	-	-	-	-	-
Residuals	**167,643**	**3,302**	**9,738**	**90,067**	**167,643**	**2,942**	**17,873**	**82,291**	**-**	**(360)**	**8,135**	**(7,776)**
261 Residuals	63,811	-	-	-	63,811	-	-	-	-	-	-	-
271 Residuals Asset Protection	103,832	3,302	9,738	90,067	103,832	2,942	17,873	82,291	-	(360)	8,135	(7,776)

APPENDIX 4
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Program and Project	FY17 Final				FY18 Proposed				Change from Final FY17			
	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23
CSO	**906,658**	**65,970**	**2,979**	**-**	**909,535**	**66,245**	**5,582**	**-**	**2,877**	**275**	**2,603**	**-**
340 Dorchester Bay Sewer Separation (Fox Point)	54,626	473	-	-	54,626	473	-	-	-	-	-	-
341 Dorchester Bay Sewer Separation (Commercial Point)	64,174	1,650	1,376	-	64,174	(731)	3,758	-	-	(2,381)	2,382	-
342 Neponset River Sewer Separation	2,549	105	-	-	2,549	105	-	-	-	-	-	-
343 Constitution Beach Sewer Separation	3,731	(38)	-	-	3,731	(38)	-	-	-	-	-	-
344 Stony Brook Sewer Separation	44,246	48	-	-	44,246	48	-	-	-	-	-	-
346 Cambridge Sewer Separation	102,745	52,261	-	-	104,448	53,964	-	-	1,703	1,703	-	-
351 BWSC Floatables Controls	946	13	-	-	946	13	-	-	-	-	-	-
352 Cambridge Floatables Control	1,127	40	-	-	1,127	40	-	-	-	-	-	-
356 Fort Point Channel Sewer Separation	11,917	(90)	-	-	11,917	(90)	-	-	-	-	-	-
358 Morrissey Boulevard Drain	32,186	(161)	-	-	32,186	(161)	-	-	-	-	-	-
359 Reserved Channel Sewer Separation	70,749	10,709	-	-	70,613	10,573	-	-	(136)	(136)	-	-
360 Brookline Sewer Separation	24,715	(1,282)	-	-	24,715	(1,282)	-	-	-	-	-	-
361 Bulfinch Triangle Sewer Separation	9,054	(803)	-	-	9,054	(803)	-	-	-	-	-	-
339 North Dorchester Bay	221,600	(21)	-	-	221,510	(111)	-	-	(90)	(90)	-	-
347 East Boston Branch Sewer Relief	85,637	(9)	-	-	85,637	(9)	-	-	-	-	-	-
348 BOS019 Storage Conduit	14,288	-	-	-	14,288	-	-	-	-	-	-	-
349 Chelsea Trunk Sewer	29,779	-	-	-	29,779	-	-	-	-	-	-	-
350 Union Park Detention Treatment Facility	49,583	-	-	-	49,583	-	-	-	-	-	-	-
353 Upgrade Existing CSO Facilities	22,385	-	-	-	22,385	-	-	-	-	-	-	-
354 Hydraulic Relief Projects	2,295	-	-	-	2,295	-	-	-	-	-	-	-
355 MWR003 Gate & Siphon	4,445	3,796	-	-	4,445	3,796	-	-	-	-	-	-
357 Charles River CSO Controls	3,633	-	-	-	3,633	-	-	-	-	-	-	-
324 CSO Support	50,248	(720)	1,604	-	51,648	459	1,825	-	1,400	1,179	221	-
Other Wastewater	**242,866**	**69,538**	**54,689**	**(9,857)**	**242,866**	**73,061**	**52,180**	**(10,870)**	**-**	**3,523**	**(2,509)**	**(1,013)**
128 I/I Local Financial Assistance	242,585	69,538	54,689	(9,857)	242,585	73,061	52,180	(10,870)	-	3,523	(2,509)	(1,013)
138 Sewerage System Mapping Upgrade	281	-	-	-	281	-	-	-	-	-	-	-
Total Waterworks	**3,806,266**	**258,415**	**535,095**	**1,138,079**	**3,992,531**	**227,533**	**610,818**	**1,279,510**	**186,265**	**(30,884)**	**75,721**	**141,428**
Drinking Water Quality	**664,361**	**56,661**	**11,857**	**637**	**665,999**	**55,279**	**5,097**	**10,417**	**1,638**	**(1,382)**	**(6,760)**	**9,780**
542 Carroll Water Treatment Plant	436,904	13,599	11,460	637	438,984	12,262	5,097	10,417	2,080	(1,337)	(6,363)	9,780
543 Quabbin Water Treatment Plant	19,973	7,205	-	-	19,973	7,205	-	-	-	-	-	-
544 Norumbega Covered Storage	106,674	-	-	-	106,674	-	-	-	-	-	-	-
545 Blue Hills Covered Storage	40,557	198	397	-	40,083	120	-	-	(474)	(78)	(397)	-
550 Spot Pond Storage Facility	60,253	35,659	-	-	60,285	35,692	-	-	32	33	-	-

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Program and Project	FY17 Final				FY18 Proposed				Change from Final FY17			
	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23
Transmission	**2,291,472**	**81,970**	**364,993**	**1,089,470**	**2,451,654**	**68,261**	**352,983**	**1,275,377**	**160,182**	**(13,711)**	**(12,012)**	**185,904**
597 Winsor Station Pipeline	31,177	5,522	24,260	-	32,878	4,583	23,838	3,061	1,701	(939)	(422)	3,061
601 Sluice Gate Rehabilitation	9,158	-	-	-	9,158	-	-	-	-	-	-	-
604 MetroWest Tunnel	707,447	2,007	9,923	118	701,178	1,869	3,910	-	(6,269)	(138)	(6,013)	(118)
615 Chicopee Valley Aqueduct Redundancy	8,666	-	-	-	8,666	-	-	-	-	-	-	-
616 Quabbin Transmission System	15,957	1,254	7,500	-	16,406	1,303	7,900	-	449	49	400	-
617 Sudbury/Weston Aqueduct Repairs	6,553	2,548	3,345	-	6,453	2,430	3,363	-	(100)	(118)	18	-
620 Wachusett Reservior Spillway Improvement	9,287	-	-	-	9,287	-	-	-	-	-	-	-
621 Watershed Land	24,000	6,658	-	-	24,000	5,015	1,643	-	-	(1,643)	1,643	-
622 Cosgrove/Wachusett Redundancy	-	-	-	-	53,030	46,232	5,621	1	53,030	46,232	5,621	1
623 Dam Projects	4,538	546	907	-	4,538	546	907	-	-	-	-	-
625 Metro Tunnel Redundancy	1,474,687	63,435	319,058	1,089,353	1,357,686	3,591	151,111	1,201,319	(117,001)	(59,844)	(167,947)	111,966
628 Metro Redundancy Interim Improvements					213,372	2,076	140,302	70,994	213,372	2,076	140,302	70,994
630 Watershed Division Capital Improvements					15,000	614	14,386	-	15,000	614	14,386	-
Distribution & Pumping	**779,782**	**108,445**	**169,566**	**129,070**	**805,462**	**89,327**	**179,168**	**164,268**	**25,680**	**(19,118)**	**9,602**	**35,198**
618 Northern High NW Tran Sections 70 & 71	1,000	474	526	-	-	-	-	-	(1,000)	(474)	(526)	-
677 Valve Replacement	22,749	2,153	4,183	4,397	20,115	-	3,558	4,540	(2,634)	(2,153)	(625)	143
678 Boston Low Service-Pipe & Valve Rehabilitation	23,691	-	-	-	23,691	-	-	-	-	-	-	-
683 Heath Hill Road Pipe Replacement	19,358	-	-	-	19,358	-	-	-	-	-	-	-
689 James L. Gillis Pump Station Rehabilitation	33,419	-	-	-	33,419	-	-	-	-	-	-	-
692 NHS - Section 27 Improvements	1,097	183	790	-	1,134	28	983	-	37	(155)	193	-
693 NHS - Revere & Malden Pipeline Improvement	55,010	814	27,363	-	57,527	1,409	29,285	-	2,517	595	1,922	-
702 New Connect Mains-Shaft 7 to WASM 3	36,255	2,559	22,638	97	37,861	2,404	21,907	2,589	1,606	(155)	(731)	2,492
704 Rehabilitation of Other Pump Stations	55,058	253	5,868	18,879	50,258	-	1,321	18,879	(4,800)	(253)	(4,547)	-
706 NHS-Connecting Mains from Section 91	2,360	-	-	-	2,360	-	-	-	-	-	-	-
708 Northern Extra High Service New Pipelines	7,889	59	3,498	701	8,045	57	3,599	757	156	(2)	101	56
712 Cathodic Protection Of Distrubution Mains	1,656	418	1,097	-	1,704	218	1,345	-	48	(200)	248	-
713 Spot Pond Supply Mains Rehabilitation	68,810	4,564	3,214	50	66,928	4,670	1,276	-	(1,882)	106	(1,938)	(50)
714 Southern Extra High Sections 41 & 42	3,657	-	-	-	3,657	-	-	-	-	-	-	-
719 Chestnut Hill Connecting Mains	24,450	1,000	102	5,861	33,094	1,000	14,602	6	8,644	-	14,500	(5,855)
720 Warren Cottage Line Rehabilitation	1,205	-	-	-	1,205	-	-	-	-	-	-	-
721 South Spine Distribution Mains	74,985	369	3,964	33,961	76,281	369	4,042	35,179	1,296	-	78	1,218
722 NIH Redundancy & Storage	92,641	46,523	40,144	-	105,655	39,246	37,453	22,982	13,014	(7,277)	(2,691)	22,982
723 Northern Low Service Rehabilitation Section 8	23,441	44	20,036	1,041	52,678	914	27,730	21,715	29,237	870	7,694	20,674
724 Northern High Service - Pipeline Rehabilitation	-	-	-	-	-	-	-	-	-	-	-	-
725 Hydraulic Model Update	598	-	-	-	598	-	-	-	-	-	-	-
727 Southern Extra High Redundancy & Storage	101,694	31,452	8,866	54,619	107,885	22,016	22,459	56,653	6,191	(9,436)	13,593	2,034
730 Weston Aqueduct Supply Mains	109,811	16,679	18,209	8,879	81,564	15,164	357	-	(28,247)	(1,515)	(17,852)	(8,879)
731 Lynnfield Pipeline	5,626	(52)	-	-	5,626	(52)	-	-	-	-	-	-
732 Walnut St. & Fisher Hill Pipeline Rehabilitation	2,717	-	-	-	2,717	-	-	-	-	-	-	-

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Overview of the FY18 Proposed CIP and Changes from the FY17 Final CIP

Program and Project	FY17 Final				FY18 Proposed				Change from Final FY17			
	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23	Total Budget Amount	FY14-18	FY19-23	Beyond 23
733 NHS Pipeline Rehabilitation 13-18 & 48	-	-	-	-	-	-	-	-	-	-	-	-
734 Southern Extra High Pipelines-Sections 30, 39,40, & 44	-	-	-	-	-	-	-	-	-	-	-	-
735 Section 80 Rehabilitation	10,606	954	9,067	585	12,103	1,885	9,250	968	1,497	931	183	383
Other	**70,651**	**11,339**	**(11,321)**	**(81,100)**	**69,416**	**14,666**	**73,570**	**(170,554)**	**(1,235)**	**3,327**	**84,891**	**(89,454)**
753 Central Monitoring System	39,215	6,458	6,268	10,686	39,040	6,192	6,277	10,767	(175)	(266)	9	81
763 Distribution Systems Facilities Mapping	2,299	533	730	-	2,299	-	1,263	-	-	(533)	533	-
764 Local Water Infrastructure Rehabilitation Assistance	7,488	-	-	-	7,488	-	-	-	-	-	-	-
765 Local Water Pipeline Improvement Loan Program	-	1,797	(34,144)	(94,512)	-	5,454	49,770	(182,083)	-	3,657	83,914	(87,571)
766 Waterworks Facility Asset Protection	21,649	2,552	15,825	2,726	20,589	3,021	16,260	762	(1,060)	469	435	(1,964)
Business & Operations Support	**134,119**	**39,010**	**17,667**	**-**	**131,461**	**34,245**	**19,775**	**-**	**(2,658)**	**(4,765)**	**2,108**	**-**
881 Equipment Purchase	28,937	11,633	5,197	-	29,188	11,314	5,766	-	251	(319)	569	-
925 Technical Assistance	1,125	775	350	-	1,150	383	767	-	25	(392)	417	-
930 MWRA Facility - Chelsea	9,814	-	-	-	9,814	-	-	-	-	-	-	-
931 Business Systems Plan	24,528	76	-	-	24,528	76	-	-	-	-	-	-
932 Environmental Remediation	1,479	-	-	-	1,479	-	-	-	-	-	-	-
933 Capital Maintenance Planning	16,337	6,212	-	-	15,886	5,474	288	-	(451)	(738)	288	-
934 MWRA Facilities Management	2,151	-	1,780	-	2,151	-	1,780	-	-	-	-	-
935 Alternative Energy Initiatives	25,558	2,662	5,699	-	23,271	1,191	4,883	-	(2,287)	(1,471)	(816)	-
940 Applicat Improv Program	10,176	6,881	3,222	-	9,980	5,568	4,340	-	(196)	(1,313)	1,118	-
942 Info Security Program ISP	2,822	1,885	402	-	2,822	1,585	702	-	-	(300)	300	-
944 Info Tech Mgmt Program	923	893	30	-	923	893	30	-	-	-	-	-
946 IT Infrastructure Program	10,271	7,994	986	-	10,271	7,762	1,218	-	-	(232)	232	-

APPENDIX 5

Master Plan/CIP Status

Master Plan Priority Ratings - Wastewater

Priority One **Critical/Emergency** Risk moderate to high/Consequence very high

Projects which:

Resolve emergencies or critical threats to public health or worker health and safety

Prevent imminent failure of the system and significant loss of service

---

Priority Two **Essential Projects** Risk variable/Consequences high

Projects which are essential to:

Critical facility assessment

Fix existing reliability or capacity problems during dry weather flow conditions

Reduce sanitary sewer overflows from the MWRA system

Address facilities in poor condition where the ability to provide uninterrupted service or adequate flow is compromised.

Upgrade or maintain emergency backup facilities in poor condition

Meet minimum hydraulic performance requirements and service needs

Implement MWRA's approved CSO control plan

Maintain wastewater effluent and residuals quality

To comply with mandated legal, regulatory or statutory requirements

---

Priority Three **Necessary Projects** Risk moderate to high/Consequence moderate to low

Projects which are necessary to:

Improve public health and worker safety

Restore the system's infrastructure where it is seriously deteriorated

Improve hydraulic performance

Significantly improve the effectiveness, efficiency, or reliability of system operations and service delivery including where appropriate, the ability to monitor the system

Maintain consumer confidence

To comply with other legal, regulatory or statutory requirements

---

Priority Four **Important Projects** Risk moderate/Consequences low

Projects which are important to:

Maintain the integrity of the system's infrastructure

Produce significant cost savings or revenue gains for MWRA

Monitor system needs and plan appropriate longer-term responses

Provide acceptable working conditions at field sites and at maintenance support facilities

Implement the regional I/I plan

Priority Five **Desirable Projects** Risk/Consequence both low

Projects which are desirable because they would:

Yield worthwhile cost savings, revenue gains, or efficiency improvements for MWRA

Protect the long term value and usefulness of system assets

Solve future problems and conditions which are expected to arise in the latter half of the planning period

Be beneficial towards the improved operation of a local system

Master Plan Priority Ratings - Water

Priority One **Critical/Emergency** Risk moderate to high/Consequence very high

Projects which:

Resolve emergencies or critical threats to public health or worker health and safety

Prevent imminent failure of the system and significant loss of service

---

Priority Two **Essential Projects** Risk variable/Consequences high

Projects which are essential to:

Critical facility assessment

Fix existing reliability problems related to "single points of failure"

Upgrade or maintain emergency back-up facilities in operational condition

Address facilities in poor condition where the ability to provide uninterrupted service, sanitary protections or adequate flow is compromised.

Meet minimum hydraulic performance requirements and service needs including adequate distribution storage in areas with a critical shortfall of storage

To comply with mandated legal, regulatory or statutory requirements

---

Priority Three **Necessary Projects** Risk moderate to high/Consequences moderate to low

Projects which are necessary to:

Improve public health and worker safety

Restore the system's infrastructure where it is seriously deteriorated

Significantly improve the effectiveness, efficiency, or reliability of system operations and service delivery including where appropriate, the ability to monitor the system

Preserve water quality during distribution

Maintain consumer confidence

To comply with other legal, regulatory or statutory requirements

---

Priority Four **Important Projects** Risk moderate/Consequence low

Projects which are important to:

Maintain the integrity of the system's infrastructure

Improve hydraulic performance or add distribution storage

Produce significant cost savings or revenue gains for MWRA

Monitor system needs and plan appropriate longer-term responses

Provide acceptable working conditions at field sites and at maintenance support facilities

Maintain efforts to manage system demands

Provide broader environmental benefits

Priority Five **Desirable Projects** Risk/Consequence both low

Projects which are desirable because they would:

Yield worthwhile cost savings, revenue gains, or efficiency improvements for MWRA

Protect the long term value and usefulness of system assets

Solve future problems and conditions which are expected to arise in the latter half of the planning period

Be beneficial towards the improved operation of a local system

Appendix 5
Master Plan/CIP Status
(in 000s)

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY14-18	Beyond FY18	Comment
FY18 Proposed Budget Cycle									
S.723 Northern Low Section 8									
Section 57 Water Pipeline and Sect 21/20/19 Sewer Rehab Dessign/ESDC/REI	**3**	**FY18**	**2**	Jul-17	Nov-21	4,800	880	3,920	
Section 57 Water Pipeline and Sect 21/20/19 Sewer Rehab Construction	**3**	**FY18**	**2**	May-19	Nov-20	22,272	0	22,272	
FY18 Master Plan Totals - 2 projects						**$27,072**	**$880**	**$26,192**	
FY17 Budget Cycle									
No Projects from Master Plan Added									
FY16 Budget Cycle									
S. 137 Wastewater Central Monitoring									
Wastewater SCADA/PLC Upgrade	**2**	FY16	**2**	Oct-16	Oct-31	7,000	620	6,380	
S.753 Central Monitoring									
Waterworks SCADA/PLC Upgrade	**2**	FY16	**2**	Oct-16	Oct-31	18,500	1,594	16,906	
FY16 Master Plan Totals - 2 projects						**$25,500**	**$2,214**	**$23,286**	
FY15 Budget Cycle									
S.145 I&P Facility Asset Protection									
S.10501.7389 Cottage Farm Construction 1 (PCB)	**3**	FY15	**2**	Sep-15	Sep-16	2,101	2,101	0	
S.10520.7463 Cottage Farm Rehabilitation Construction 2	**3**	FY15	**2**	Jul-17	Jul-19	7,354	2,648	4,707	
S.10519.7462 Prison Point Rehabilitation - Construction	**3**	FY15	**2**	Jul-17	Jul-19	5,463	1,967	3,496	
S.60150.7472 Rosemary Brook Building Repair	**3**	FY15	**3**	Jul-15	Jun-16	1,527	1,527	0	
FY15 Master Plan Totals - 4 projects						**$16,446**	**$8,243**	**$8,203**	
FY14 Budget Cycle									
S.206 DI Treatment Plant Asset Protection									
S.40256.7449 Sodium Bisulfate Tanks Rehabilitation	**4**	FY14	**2**	Jan-15	Jun-16	2,543	2,543	0	
S.210 Clinton Wastewater Treatment Plant									
S.19405.7450 Clinton Roofing Rehabilitation	**3**	FY14	**2**	Sep-14	Sep-15	509	509	0	
S.19406.7451 Clinton Facilities Rehabilitation	**3**	FY14	**2**	Sep-17	Sep-22	4,069	467	3,602	
S.766 Waterworks Asset Protection									
S.75536.7453 Water Meter Upgrade & Replacement	**3**	FY14	**3**	Jun-15	Jun-17	1,000	1,000	0	
S.693 NHS Revere & Malden Pipeline									
S.75545.7454 Section 56 Replacement/Saugus	**2**	FY14	**2**	Jul-15	Jul-19	10,000	8,560	1,440	
S. 542 Carroll Water Treatment Plant									
S.75546.7455 CWTP Asset Protection	**3**	FY14	**3**	Jul-15	Jun-17	500	500	0	
FY14 Master Plan Totals - 6 projects						**$18,621**	**$13,579**	**$5,042**	

Appendix 5
Master Plan/CIP Status
(in 000s)

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY09-13	Beyond FY13	Comment
FY13 Budget Cycle									
S. 542 Carroll Water Treatment Plant									
S.75530.7406 Technical Assistance 7	2	FY13	2	Jan-13	Jan-15	563	70	493	
S.75530.7407 Technical Assistance 8	2	FY13	2	Jan-13	Jan-15	563	70	493	
FY13 Master Plan Totals - 2 projects						**$1,126**	**$140**	**$986**	
FY12 Budget Cycle									
S. 132 Corrosion and Odor Control									
S. 10491.7364 System Wide Odor Control Study	2	FY12	3	Jul-18	Jul-20	1,000	0	1,000	
S.145 I&P Facility Asset Protection									
S.10490.7362 Caruso PS HVAC & Fire Upgrade	3	FY12	2	Apr-12	Mar-14	1,000	500	500	
S.10488.7361 Delauri Pump Station Electrical Room Cooling	3	FY12	2	Jul-12	Jul-13	250	188	62	
S.10486.7359 Prison Point and Cottage Farm CSO Rehabilitation	3	FY12	2	Jul-13	Jun-18	1,000	45	955	
S.10485.7358 Prison Point Dry Weather Flow and Stripping Improvements	3	FY12	3	Jan-13	Dec-15	750	63	687	
S.10501.7389 Prison Point Gearbox Rebuilds	3	FY12	2	Jun-11	Dec-11	440	440	0	
S.10500.7375 Pump Station Rehabilitation - Preliminary Design and Study	3	FY12	2	Jul-14	Jun-19	750	0	750	
S.10503.7393 Section 156 Rehabilitation Design/Build	2	FY12	2	Jun-11	Jun-12	2,000	2000	0	
S.10502.7392 Section 156 Rehabilitation Owners Representative	2	FY12	2	Jun-11	Jun-12	200	200	0	
S.210 Clinton Wastewater Treatment Plant									
S.19950.7377 Phosphorous Removal	3	FY12	2	Jan-13	Jan-16	3,500	292	3,208	
S. 623 Dam Projects									
S.60131.7370 Goodnough Dike Drainage Improvements	3	FY12	2	Jul-13	Jul-14	1,000	0	1,000	
S. 704 Rehabilitation of Other Pump Stations									
S.75522.7383 Pump Station Rehabilitation	4	FY12	3	Jul-19	Jun-24	25,000	0	25,000	
S. Waterworks Facility Asset Protection									
S. 75520.7381 Shaft 9 Rehabilitation	2	FY12	3	Jul-13	Jul-16	2,000	0	2,000	
FY12 Master Plan Totals - 13 projects						**$ 38,890**	**$ 3,728**	**$ 35,162**	
FY11 Budget Cycle									
S.145 I&P Facility Asset Protection									
S.10481.7328 Interceptor # 5 Milton	2	FY11	2	Jul-13	Jul-16	4,000	0	4,000	
S.10482.7329 Interceptor Renewal # 6 Chelsea	2	FY11	2	Jul-13	Jul-16	11,000	0	11,000	
S.10469.7281 Cottage Farm Fuel System Upgr	3	FY11	3	Mar-11	Sep-11	300	300	0	
S.10484.7344 Som/Marginal Gate Replacement	3	FY11	3	Jul-10	Nov-10	300	300	0	
S.542 Carroll Water Treatment Plant									
S.53464.7315 Technical Assistance 5	2	FY11	2	Aug-10	Aug-12	563	563	0	
S.53465.7316 Technical Assistance 6	2	FY11	2	Aug-10	Aug-12	563	563	0	
S.713 Spot Pond Supply Mains - Rehab									
S.60116.7336 Section 50 Pipe Rehab Design /ESDC/RI	3	FY11	3	Jul-12	Jun-15	500	250	250	
S.60117.7337 Section 50 Pipe Rehab Const	3	FY11	3	Jul-13	Jun-14	1,500	0	1,500	
S.765 Local Water Pipeline Imp. Loan Program									
S.75513.7339 Local Water System Loans	3	FY11	3	Aug-10	Jan-00	200,000	35,000	165,000	
S.75514.7340 Local Water System Repayment	3	FY11	3	Aug-11	Jan-00	(200,000)	-3,000	-197,000	
S.753 Central Monitoring System									
S.75512.7338 Winsor Dam High Line Replacement	3	FY11	3	Jan-11	Dec-11	1,000	1,000	0	
FY11 Master Plan Totals - 9 projects						**$ 19,726**	**$ 34,976**	**$ (15,250)**	

Appendix 5
Master Plan/CIP Status
(in 000s)

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY09-13	Beyond FY13	Comment
FY10 Budget Cycle									
S.128 I/I Local Financial Assistance									
S.10471.7293 Grants-Phase VII	**3**	FY10	3	Aug-09	Jun-18	18,000	4,950	13,050	**One Initiative - 3 subphases**
S.10472.7294 Loans - Phase VII	**3**	FY10	3	Aug-09	Jun-18	22,000	6,050	15,950	
S.10473.7295 Repayments-Phase VII	**3**	FY10	3	Aug-10	Jun-23	(22,000)	(1,320)	(20,680)	
S.10474.7296 Grants-Phase VIII	**3**	FY10	3	Aug-13	Jun-21	18,000	0	18,000	**One Initiative - 3 subphases**
S.10475.7297 Loans - Phase VIII	**3**	FY10	3	Aug-13	Jun-21	22,000	0	22,000	
S.10476.7298 Repayments-Phase VIII	**3**	FY10	3	Aug-14	Jun-26	(22,000)	0	(22,000)	
S.210 Clinton Wastewater Treatment Plant									
S.32749.7277 Clinton Digester Cleaning & Rehabs	**3**	FY10	2	Nov-09	May-11	1,500	1,500	0	
S.32750.7278 Clinton Aeration Effciency Improvement	**3**	FY10	3	May-10	May-11	372	372	0	
S.145 I&P Facility Asset Protection									
S.32752.7280 Inter Ren # 4 Everett Sect 23/24/156	**2**	FY10	2	Jul-15	Jul-16	3,000	0	3,000	
S.32751.7279 Inter Ren # 3 Camb/Some Sect 26/27	**2**	FY10	2	Jul-13	Jul-14	5,000	0	5,000	
S.616 Quabbin Transmission System									
S.92366.7282 Ware River Intake Valve Replancement	**3**	FY10	3	Jul-14	Jul-17	1,200	0	1,200	
S.604 MetroWest Tunnel									
S.92367.7283 Valve Chamber Storage Tank Access Imp	**3**	FY10	2	Jul-11	Jul-13	3,000	2,500	500	
S.702 New Connecting Mains - Shaft 7 to WASM 3									
S.92368.7284 Section 75 Extension	**3**	FY10	3	Oct-15	Oct-19	4,400	0	4,400	
S.931 Business Systems Plan									
S.92434.7285 Cyber Security	**2**	FY10	2	Sep-11	Sep-12	1,200	1,200	0	
S.92435.7286 Lawson System Upgrade	**2**	FY10	2	Sep-13	Sep-15	1,550	0	1,550	
S.92436.7287 Laboratory Infor Mgmt Sys (LIMS)	**2**	FY10	2	Sep-14	Sep-16	600	0	600	
S.92437.7288 PRE-Treatment Infor Mgmt Sys (PIMS)	**2**	FY10	2	Sep-14	Sep-16	600	0	600	
S.92436.7289 Document Control System Software Application Replacement	**None**	FY10	1	Mar-10	Mar-11	250	250	0	**While specific mention of the need to replace the InfoStar record drawings indexing tool is made in the Wastewater and Waterworks Master Plan books (pgs. 13-11 & 13-12 and 9-7 & 9-8 respectively, there is no line item estimate provided in Attachment 2A which details dollar estimates for each new project in the Master Plan.**
FY10 Master Plan Totals - 14 projects						**$ 58,672**	**$ 15,502**	**$ 43,170**	

Appendix 5
Master Plan/CIP Status
(in 000s)

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY09-13	Beyond FY13	Comment
FY09 Budget Cycle									
S.145 I&P Facility Asset Protection									
S.10418.6936 Interceptor Renewal No. 2	2	FY09	2	Jul-12	Jul-14	5,429	1,953	3,476	
S.10457.7216 Interceptor Renewal #7 Study	2	FY09	2	Jul-08	Jun-09	300	300	0	
S.10458.7217 Interceptor Renewal #7 Constr	2	FY09	2	Jul-09	Jun-12	1,000	1,000	0	
S.10460.7219 NI Mech & Elec Replacements	3	FY09	3	Jun-09	Jun-12	3,800	3,800	0	
S.130 Siphon Structure Rehabilitation									
S.10293.6224 Design/CS/RI	2	FY09	3	Jun-12	Sep-16	476	114	362	**Lower consequence after review**
S.10294.6225 Construction	2	FY09	3	Sep-14	Sep-15	1,189	0	1,189	**Lower consequence after review**
S.147 Randolph Trunk Sewer Relief									
S.10461.7220 Study	3	FY09	3	Jul-11	Jun-13	750	656	94	
S.132 Corrosion & Odor Control									
S.10406.6919 FES/FERS Biofilters Design	3	FY09	3	Jul-09	Apr-13	995	995	0	
S.10456.7215 FES/FERS Biofilters Const.	3	FY09	3	Apr-11	Apr-12	2,140	2,140	0	
S.206 DI Treatment Plant Asset Protection									
S.19278.6967 STG System Modifications-Des	3	FY09	3	Oct-08	May-12	750	751	0	
S.19284.6973 STG System Mods-Constr	3	FY09	3	May-10	May-12	2,500	2,500	0	
S.616 Quabbin Transmission System									
S.60103.7229 Oakdale Phase 1A Elec Des	3	FY09	1	Jul-09	Oct-13	921	915	6	**Rising safety and other concerns**
S.60104.7230 Oakdale Phase 1A Elec Constr	3	FY09	1	Jan-11	Oct-12	2,150	2,150	0	**Rising safety and other concerns**
S.735 Section 80 Rehabilitation									
S.68250.6892 Section 80 Design CS/RI	3	FY09	3	Jan-11	May-15	1,524	962	562	
S.68249.6891 Section 80 Construction	3	FY09	3	May-13	May-15	6,096	0	6,096	
S.931 Business Systems Plan									
S.92410.7238 Laboratory Instrument Data Mgmt	3	FY09	3	Mar-09	Mar-10	250	250	0	
S.92411.7239 Major Laboratory Instrumentation	4	FY09	3	Mar-09	Mar-10	1,000	1,000	0	
FY09 Master Plan Totals - 11 projects						**$ 31,270**	**$ 19,486**	**$ 11,785**	
FY08 Budget Cycle									
S.104 Braintree-Weymouth Relief Facilities									
S.10060.5310 Rehab Sections 624 & 652	1	FY08	2	May-10	Jun-13	4,000	4,000	0	
S.10452.7193 Rehab of Section 624 Des	1	FY08	2	Jul-09	Jun-13	1,000	1,000	0	
S.132 Corrosion & Odor Control									
S.10405.6918 FES Tunnel Rehab	2	FY08	2	Dec-15	Jun-17	6,800	0	6,800	
S.10453.7196 FES Tunnel Rehab Des	2	FY08	2	Jul-15	Jun-17	1,700	0	1,700	
S.136 West Roxbury Tunnel									
S.10400.6897 Tunnel Design	1	FY08	1	Mar-08	Sep-10	16,000	8,500	7,500	
S.10401.6898 Tunnel Construction	1	FY08	1	Mar-11	Mar-17	64,000	24,900	39,100	
S.142 Wastewater Meter Sys-Equip Replace									
S.10451.7191 Wastewater Metering Asset Protection	2	FY08	2	Jul-15	Jan-00	20,000	0	20,000	
S.145 I&P Facility Asset Protection									
S.10444.7144 Nut Island Headworks Fire Alarm/Wire	1	FY08	1	Jul-09	Jun-10	200	200	0	
S.10445.7161 HW Fac. Plan Upgrades 3 Older HWKS	1	FY08	2	Jun-10	Dec-28	28,000	3,690	24,310	
S.10446.7162 PS/CSO Condition Assessment	2	FY08	2	Jul-11	Jun-14	3,000	1,900	1,100	
S.10447.7163 Interceptor AP-Interc Renewal Des #1	2	FY08	2	Feb-08	Dec-10	200	184	16	
S.10448.7164 Interceptor AP-Interc Renew #1 Const	2	FY08	2	Dec-10	Jun-11	1,600	1,600	0	
S.10455.7206 HW Facility Plan Upgrades Des	1	FY08	1	Jan-10	Dec-28	7,000	1,480	5,520	

Appendix 5
Master Plan/CIP Status
(in 000s)

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY09-13	Beyond FY13	Comment
S.146 D.I. Cross Harbor Tunnel									
S.10454.7199 Tunnel Shaft Repairs Plan/Des/Const	2	FY08	2	Jul-14	Jun-17	5,000	0	5,000	
S.200 DI Plant Optimization									
S.19311.7121 DI As needed Tech Design	1	FY08	1	Sep-13	Jun-27	26,450	0	26,450	
S.206 DI Treatment Plant Asset Protection									
S.19285.6974 Alternative Energy Initiatives	5	FY08	2	Jan-08	Dec-08	7,000	5,000	2,000	**Priority changed to reflect acceleration of green energy initiatives.**
S.19293.7055 Digester Mod 1&2 Pipe Replc.		FY08	1	Apr-08	Oct-09	8,000	6,000	2,000	
S.19312.7122 DI Digester Sludge Pump Repl Des	1	FY08	1	Jul-09	Nov-11	906	507	399	
S.19313.7123 DI Digester Sludge Pump Repl Const	1	FY08	1	Nov-10	Nov-11	3,624	2,023	1,601	
S.19314.7124 DI Elec Equip Upgrade Ph.5	1	FY08	1	Jan-12	Jan-14	20,662	2,635	18,027	
S.19315.7125 DI Equipment Replacement Projection	2	FY08	2	Jul-08	Jun-27	41,538	700	40,838	
S.19316.7126 Future SSPS VFD Replacements Des	1	FY08	1	Jul-15	Nov-18	4,800	0	4,800	
S.19317.7127 Future SSPS VFD Replacements Constr	1	FY08	1	Nov-16	Nov-18	19,200	0	19,200	
S.19318.7128 Future NMPS VFD Replacements Des	1	FY08	1	Jul-17	Nov-20	4,420	0	4,420	
S.19319.7129 Future NMPS VFD Replacements Constr	1	FY08	1	Nov-18	Nov-20	17,680	0	17,680	
S.19320.7130 Future Misc. VFD Replacements Des	1	FY08	1	Jul-17	Nov-20	1,333	0	1,333	
S.19321.7131 Future Misc. VFD Replacements Constr	1	FY08	1	Nov-18	Nov-20	5,334	0	5,334	
S.19322.7132 DI Switchgear Replacement Design	1	FY08	1	Jul-17	Apr-22	3,250	0	3,250	
S.19323.7133 DI Switchgear Replacement Constr	1	FY08	1	Apr-19	Apr-22	13,000	0	13,000	
S.19324.7134 DI PICS Replacement Construction	1	FY08	1	Jul-21	Jul-22	5,400	0	5,400	
S.19325.7135 DI Dystor Membrane Replacements	1	FY08	1	Jul-14	Oct-14	3,000	0	3,000	
S.19326.7136 DI CTG Rebuilds	1	FY08	1	Jul-14	Jul-16	6,000	0	6,000	
S.19327.7137 DI Centrifuge Replacements Des	1	FY08	1	Jul-13	Oct-15	4,160	0	4,160	
S.19328.7138 DI Centrifuge Replacements Constr	1	FY08	1	Oct-14	Oct-15	16,640	0	16,640	
S.19329.7139 DI Cryogenics Plant-Equip Repl Des	1	FY08	1	Jul-13	May-16	1,600	0	1,600	
S.19330.7140 DI Cryogenics Plant-Equip Repl Constr	1	FY08	1	Nov-14	May-16	6,400	0	6,400	
S.19331.7141 Laboratory As needed Tech Des		FY08	1	Jul-08	Jun-27	4,000	500	3,500	
S.19332.7142 Future Sodium Hypo Tank Rehab	1	FY08	1	Jul-16	Jul-18	10,000	0	10,000	
S.19333.7167 Leak Protection System Upgrade	2	FY08	2	Jul-08	Jul-09	1,138	1,139	-1	
S.19334.7168 Barge Berth and Fac. Replacement	2	FY08	2	Jul-10	Jun-27	2,265	1,265	1,000	
S.19335.7169 South Systm PS Lube System Repl	2	FY08	2	Dec-08	Dec-10	2,019	2,018	1	
S.19336.7170 DI Grit and Odor Control Air Handlers	3	FY08	2	Jan-09	Jan-10	3,265	1,265	2,000	**Condition determined to be worse than when Master Plan Priority Ratings assigned.**
S.19337.7171 Central Lab Fume Hood Replacement		FY08	2	Jul-08	Jul-12	1,632	1,631	1	
S.19338.7172 DI PICS Dist. Proc. Units Replac	2	FY08	2	Jul-14	Jul-16	8,000	0	8,000	
Deer Island Equipment & Replacement Drop-downs	2	FY08	2			20,572	25,904	-5,332	
S.271 Residuals Asset Protection									
S.26069.7143 Residual Plant System Reliability	1	FY08	1	Sep-07	Sep-09	870	580	290	
S.26070.7145 Residuals Pellet Plant Upgrade Design	1	FY08	1	Jul-10	Jun-18	4,000	4,000	0	
S.26071.7146 Residuals Pellet Plant Upgrade Constr	1	FY08	1	Jul-13	Jul-18	4,000	0	4,000	
S.26093.7187 Utility Upgrades Des.	1	FY08	1	Jan-00	Jan-00	0	0	0	
S.26094.7188 Utility Upgrades Const.	1	FY08	1	Jul-16	Jul-18	6,000	0	6,000	
S.26072.7147 Condition Assessment/Fac Plan	1	FY08	1	Jul-08	Jun-10	1,000	1,000	0	
S.26074.7149 Six Rotary Dryer Replacements Constr	1	FY08	1	Jul-13	Jul-16	60,000	0	60,000	

Appendix 5
Master Plan/CIP Status
(in 000s)

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY09-13	Beyond FY13	Comment
S.26076.7151 Six Air Scrubber Replacements Constr	1	FY08	1	Jul-15	Jul-17	9,000	0	9,000	
S.26078.7153 Plant MCC Replacements Const	1	FY08	1	Jul-16	Jul-18	4,500	0	4,500	
S.26079.7173 FRSA Pier Rehab Des	1	FY08	1	Dec-07	Jun-10	140	112	28	
S.26080.7174 FRSA Pier Rehab Const.	1	FY08	1	Dec-08	Jun-10	560	560	0	
S.26082.7176 Rehab Rail System Const.	1	FY08	1	Jul-16	Jul-18	3,000	0	3,000	
S.26084.7178 Replace 9 Pellet Storage Silos Const.	1	FY08	1	Jul-15	Jul-17	6,000	0	6,000	
S.26086.7180 Sludge Conveyor Replacement Const.	1	FY08	1	Jul-14	Jul-15	3,000	0	3,000	
S.26088.7182 Sludge Storage Tank Rehab	1	FY08	1	Jul-15	Jul-16	3,000	0	3,000	
S.26090.7184 Upgrade Pumping System Const.	1	FY08	1	Jul-14	Jul-16	6,000	0	6,000	
S.26092.7186 Replace 12 Centrifuges Const.	1	FY08	1	Jul-14	Jul-16	36,000	0	36,000	
S.26096.7190 Odor Control System Upgrade Const.	1	FY08	1	Jul-17	Jul-18	1,500	0	1,500	
S.542 John J. Carroll Water Treatment Plant									
S.53457.7085 Ancillary Mods Const 2	2	FY08	2	Jan-08	Jun-13	6,080	5,616	464	
S.53458.7192 Ancil Mods Design 3	2	FY08	2	Jan-08	Jan-10	750	613	137	
S.53459.7208 Ancillary Mods Design 4	2	FY08	2	Jan-08	Jan-10	750	613	137	
S.550 Low Service Storage Near Spot Pond									
S.53401.6456 Env Rev Con Des Owners Rep	2	FY08	2	Apr-09	Sep-14	2,500	2,152	348	
S.53402.6457 Design/Build	3	FY08	2	Apr-12	Apr-14	36,093	13,977	22,116	**Priority revised as project added to CIP**
S.53447.6868 Easement/Land Acquisition		FY08	2	Apr-09	Apr-14	630	563	67	
S.597 Winsor Dam Hydroelectric									
S.60033.6277 Detail Design	4	FY08	2	Jul-09	Feb-11	359	359	0	**Priority revised as project added to CIP**
S.60044.6526 Construction	4	FY08	2	Aug-10	Feb-11	1,406	1,406	0	**Priority revised as project added to CIP**
S.60077.7017 Design and Construction		FY08	2	Oct-07	Jun-09	2,000	1,750	250	
S.60087.7114 Winsor Power Station Pipe Des	1	FY08	2	Sep-08	Jun-12	1,012	1,012	0	
S.60088.7115 Winsor Power Station Pipe Constr Ph1	1	FY08	2	Apr-10	Jun-12	4,047	4,047	0	
S.60095.7197 Shft 12 Quabbin Aqdct Sluice Gate Des	2	FY08	2	Jul-08	Jun-12	400	400	0	
S.60096.7198 Shft 12 Quabbin Aqdct Sluice Gate Con	2	FY08	2	Jul-09	Jun-12	1,600	1,600	0	
S.60101.7212 Winsor Power St. Chapman Valve Repair		FY08	2	Mar-09	Dec-09	509	509	0	
S.614 Metropolitan Tunnel Loop									
S.60035.6273 Redundancy StudyTunnel Insp Fea Study	1	FY08	1	Mar-08	Feb-10	3,500	3,208	292	
S.618 Northern High NW Trans Sect 70-71									
S.60063.6895 Planning	2	FY08	2	Jul-10	Jun-12	1,000	1,000	0	
S.623 Dam Projects									
S.60089.7154 Engineering Studies for Dam Risk	1	FY08	1	Jul-07	Jun-09	460	230	230	
S.60094.7194 Immediate Repair Dams	2	FY08	2	Mar-10	Jun-11	3,255	3,255	0	
S.60100.7211 Immediate Repair Dams-Design	2	FY08	2	Jul-08	Jun-11	814	814	0	
S.624 Wachusett Aqueduct Pressurization									
S.60090.7156 Wachusett Aqueduct Pressurization Des	1	FY08	1	Jul-11	Jun-16	20,000	7,000	13,000	
S.60091.7157 Wachusett Aqueduct Pressurization Con	1	FY08	1	Jul-13	Jun-16	80,000	0	80,000	

Appendix 5
Master Plan/CIP Status
(in 000s)

Listing of Master Plan Projects	Original MP Rating	CIP Year	Rating when added to CIP	NTP	SC	Total Contract Amount	FY09-13	Beyond FY13	Comment
S.625 Long Term Redundancy									
S.60092.7159 Long Term Redundancy Des	1	FY08	1	Jul-13	Jun-23	20,000	0	20,000	
S.60093.7160 Long Term Redundancy Construction	1	FY08	1	Jul-14	Dec-23	80,000	0	80,000	
S.677 Valve Replacement									
S.68300.7195 Valve Replacement 8&9 Construction	2	FY08	2	Jul-10	Jun-16	5,000	2,500	2,500	
S.719 Chestnut Hill Connecting Mains									
S.68052.6302 Construction- Chp 149	2	FY08	2	Jul-10	Jul-12	3,431	3,431	0	
S.68267.6982 Construction-Chp 30	2	FY08	2	Jul-10	Jul-12	2,220	2,220	0	
S.721 Southern Spine Distribution Mains									
S.68299.7155 Southern Spine Sect 22 N Fac Plan/EIR	1	FY08	1	Jul-08	Jun-10	1,000	1,000	0	
S.722 NIH Redundancy & Covered Storage									
S.68252.6906 Section 89/29 Redundancy Design	1	FY08	1	Jul-08	Jun-13	5,059	5,000	59	
S.68282.7066 Sec 89&29 Redundancy Constr	1	FY08	1	Jul-10	Jun-13	19,224	14,949	4,275	
S.68283.7067 NIH Storage Fin Des/CS/RI	1	FY08	1	Jul-08	Sep-12	2,024	2,024	0	
S.68284.7068 NIH Storage Construction	1	FY08	1	Sep-10	Sep-12	8,094	8,094	0	
S.68294.7116 Section 89/29 Rehab Design	1	FY08	1	Jul-13	Jun-17	1,012	0	1,012	
S.68295.7117 Section 89/29 Rehab Construction	1	FY08	1	Jul-15	Jun-17	4,047	0	4,047	
S.68296.7118 NIH Gillis Redundancy Design	1	FY08	1	Jul-13	Jun-18	2,024	0	2,024	
S.68297.7119 NIH Gillis Redundancy Construction	1	FY08	1	Jul-15	Jun-18	8,094	0	8,094	
S.727 SEH Redundancy & Storage									
S.53397.6452 Concept Plan/Prelim Des/Env Rev	1	FY08	2	Feb-07	Aug-08	840	125	715	
S.53398.6453 SEH Storage Final Des/CS/RI	2	FY08	2	Jul-09	Jun-14	2,024	1,539	485	
S.53399.6454 SEH Storage Construction	2	FY08	2	Jul-12	Jun-14	8,094	4,550	3,544	
S.68135.6444 SEH Red Loop Final Des/CA/RI	2	FY08	2	Jul-09	Jun-14	4,047	3,217	830	
S.68136.6445 SEH Redund Loop Construction	2	FY08	2	Jul-11	Jun-14	21,248	12,634	8,614	
S.68292.7112 Design Sect 77/88 Rehab	2	FY08	2	Jul-18	Jun-23	1,012	0	1,012	
S.68293.7113 Section 77/88 Rehab	2	FY08	2	Sep-20	Jun-23	4,047	0	4,047	
S.931 Business Systems Plan									
S.92404.7200 Computer Center - OCC Infrastructure		FY08	2	Jul-14	Jun-16	1,500	0	1,500	
S.92405.7201 Net 2020		FY08	2	Jul-09	Jun-12	1,500	1,500	0	
S.92406.7203 SAN II		FY08	2	Jul-11	Jun-12	600	600	0	
S.92407.7204 SAN III		FY08	2	Jul-14	Jun-15	600	0	600	
S.92408.7205 Telecommunications		FY08	2	Jul-13	Jun-15	750	0	750	
FY08 Master Plan Totals - 67 projects						**$ 955,014**	**$ 217,800**	**$ 737,214**	

Total Projects from the Master Plan: **128**
Total $$ of Projects from the Master Plan **$1,165,265**

APPENDIX 6

Project Status Overview

Appendix 6
Project Status Overview

The following information presented below provides an approximation of status for design and construction phases in the current capital budget. Planned end dates are provided for ongoing phases. Planned start dates are provided for future phases. These dates are anticipated Notice-to-Proceed dates after the bid period. All dates are subject to change.

Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
104 Braintree-Weymouth Relief Facilities		**$234,493**	**$227,705**	**97.1%**	**97.1%**		
10001_5333	Geotechnical - Marine	443	443	Complete	100.0%		
10044_5332	Geotechnical - Land	8	8	Complete	100.0%		
10045_5311	Facilities Planning - Phase 1	331	331	Complete	100.0%		
10046_5312	EIR - Phase 1	514	514	Complete	100.0%		
10047_5313	Design 1/CS/RI	18,882	18,882	Complete	100.0%		
10048_5314	Land Acquisition	12,842	12,842	Complete	100.0%		
10049_5315	Tunnel Construction/Rescue	83,191	83,191	Complete	100.0%		
10050_5316	Intermediate Pump Station-Construction	47,445	47,445	Complete	100.0%		
10051_5303	North Weymouth Relief Interceptor	4,705	4,705	Complete	100.0%		
10052_5373	HDD Siphon - Construction	16,357	16,357	Complete	100.0%		
10054_5375	B-W Replacement Pump Station	17,728	17,728	Complete	100.0%		
10055_5308	Design - Rehab	24	24	Complete	100.0%		
10056_5309	Construction - Rehab	255	255	Complete	100.0%		
10057_5324	Final EIR/Facility Plan	1,111	1,111	Complete	100.0%		
10058_5331	Design 2/CS/RI	14,999	14,999	Complete	100.0%		
10060_5310	Rehabilitation of Section 624 - Const.	2,506	2,506	Complete	100.0%		
10061_5951	Technical Assistance	144	144	Complete	100.0%		
10251_6016	Sedimentation Testing	96	96	Complete	100.0%		
10263_6072	Legal	849	849	Complete	100.0%		
10265_6074	Hazardous Waste	8	8	Complete	100.0%		
10278_6119	Marine Pipeline - Design	1,100	1,100	Complete	100.0%		
10302_6368	Mill Cove Siphon - Construction	2,749	2,749	Complete	100.0%		
10354_6631	Community Technical Assistance	1,111	1,111	Complete	100.0%		
10375_6766	Geotechnical Consultant	56	56	Complete	100.0%		
10378_6792	IPS/RPS Communication System	225	225	Complete	100.0%		
10470_7290	Wetlands Replication	26	26	Complete	100.0%		
10479_7326	Mill Cove Siphon Sluice Gates-Design	788	0	Future	0.0%	Jul-17	
10480_7327	Mill Cove Sluice Gates - Construction	2,000	0	Future	0.0%	Mar-19	
10493_7366	B/W Improvements - Construct	3,200	0	Future	0.0%	Dec-19	
19567_9586	B/W Improvements - Des/CS/RI	800	0	Future	0.0%	Dec-17	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
128 I/I Local Financial Assistance		**$242,585**	**$163,391**	**67.4%**	**67.4%**		
10232_5300	Community I/I Grants	0	5,800	Complete	NA		
10233_5393	Community I/I Loans	0	17,278	Complete	NA		
10234_5394	Community I/I Loan Repayments	0	-17,278	Complete	NA		
10273_6084	Phase II - Grants	15,929	10,129	63.6%	63.6%		
10274_6085	Phase II - Loans	47,664	30,386	63.8%	63.8%		
10282_6170	Phase II - Repayments	-47,664	-30,386	63.8%	63.8%		
10315_6505	Phase III - Grants	0	16,650	Complete	NA		
10316_6506	Phase III - Loans	0	20,350	Complete	NA		
10317_6507	Phase III - Repayments	0	-20,350	Complete	NA		
10348_6609	Public Participation	6	6	Complete	100.0%		
10368_6736	Phase IV - Grants	34,650	18,000	51.9%	51.9%		
10369_6737	Phase IV - Loans	42,350	22,000	51.9%	51.9%		
10370_6738	Phase IV - Repayments	-42,350	-22,000	51.9%	51.9%		
10407_6925	Phase V - Grants	18,000	18,000	Complete	100.0%		
10408_6926	Phase V - Loans	22,000	22,000	Complete	100.0%		
10409_6927	Phase V - Repayments	-22,000	-21,619	98.3%	98.3%		May-17
10441_7107	Phase Vl - Grants	18,000	17,194	95.5%	95.5%		Jun-21
10442_7108	Phase Vl - Loans	22,000	21,015	95.5%	95.5%		Jun-21
10443_7109	Phase Vl - Repayments	-22,000	-16,650	75.7%	75.7%		Jun-26
10471_7293	Phase VII - Grants	18,000	15,574	86.5%	86.5%		Jun-21
10472_7294	Phase VII - Loans	22,000	19,035	86.5%	86.5%		Jun-21
10473_7295	Phase VII - Repayments	-22,000	-11,967	54.4%	54.4%		Jun-26
10474_7296	Phase VIII - Grants	18,000	12,676	70.4%	70.4%		Jun-21
10475_7297	Phase VIII - Loans	22,000	15,492	70.4%	70.4%		Jun-21
10476_7298	Phase VIII - Repayments	-22,000	-5,967	27.1%	27.1%		Jun-26
10560_7464	Phase IX Grants	60,000	15,549	25.9%	25.9%		Jun-21
10561_7465	Phase IX Loans	20,000	5,183	25.9%	25.9%		Jun-21
10562_7466	Phase IX Repayment	-20,000	-543	2.7%	2.7%		Jun-31
10563_7467	Phase X Grants	60,000	5,933	9.9%	9.9%		Jun-25
10564_7468	Phase X Loans	20,000	1,978	9.9%	9.9%		Jun-25
10565_7469	Phase X Repayment	-20,000	-75	0.4%	0.4%		Jun-35
130 Siphon Structure Rehabilitation		**$6,881**	**$940**	**13.7%**	**13.7%**		
10253_6017	Planning	938	938	Complete	100.0%		
10280_6165	Land Acquisition	50	2	4.0%	4.0%		Jun-20
10293_6224	Design/CS/RI	1,429	0	Future	0.0%	Jul-18	
10294_6225	Construction	4,464	0	Future	0.0%	Jul-20	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
132 Corrosion & Odor Control		**$27,879**	**$3,373**	**12.1%**	**12.1%**		
10279_6137	Planning/Study	587	587	Complete	100.0%		
10323_6549	Land Acquisition	12	12	Complete	100.0%		
10325_6551	Legal	2	2	Complete	100.0%		
10327_6553	Design/CS/RI	1,788	1,788	Complete	100.0%		
10373_6743	Interim Corrosion Control	621	621	Complete	100.0%		
10406_6919	FES/FERS Biofilters - Design	1,122	0	Future	0.0%	Jul-18	
10456_7215	FES/FERS Biofilters - Construction	1,837	0	Future	0.0%	Apr-19	
10491_7364	System-wide Odor Control - Study	1,000	0	Future	0.0%	Jul-18	
10492_7365	NI Mech & Elect Upg Des/CA/REI	1,570	0	Future	0.0%	Oct-17	
10495_7494	NI System-wide Odor Control - Evaluation	536	363	67.7%	67.7%		Feb-17
10496_7495	NI Mech & Elect Upg Construct	6,054	0	Future	0.0%	Mar-19	
10497_7517	NI Odor Ctrl & HVAC Des/CA/REI	2,750	0	Future	0.0%	Feb-17	
10498_7548	NI Odor Ctrl HVAC Imp Constr Ph 2	10,000	0	Future	0.0%	Dec-18	
136 West Roxbury Tunnel		**$11,314**	**$10,314**	**91.2%**	**91.2%**		
10299_6230	Inspection	344	344	Complete	100.0%		
10329_6566	Tunnel Easements & Permits	54	54	Complete	100.0%		
10330_6567	Legal	2	2	Complete	100.0%		
10331_6568	Land Acquisition	440	440	Complete	100.0%		
10332_6569	Construction	6,674	6,674	Complete	100.0%		
10333_6570	Design/CS/RI	1,417	1,417	Complete	100.0%		
10366_6709	Technical Assistance	8	8	Complete	100.0%		
10400_6897	Tunnel - Design	1,375	1,375	Complete	100.0%		
10401_6898	Tunnel Inspection	1,000	0	Future	0.0%	Sep-19	
137 Wastewater Central Monitoring		**$27,482**	**$19,782**	**72.0%**	**72.0%**		
10301_6232	Planning	563	563	Complete	100.0%		
10319_6532	Design and Integration Services	6,344	6,344	Complete	100.0%		
10320_6533	Construction 1 (CP1)	7,662	7,662	Complete	100.0%		
10321_6534	Construction 2 (CP2)	5,139	5,139	Complete	100.0%		
10322_6535	Technical Assistance	7	7	Complete	100.0%		
10356_6656	Wastewater SCADA/PLC Upg	7,000	0	Future	0.0%	Oct-17	
10398_6861	Equipment Prepurchase	65	65	Complete	100.0%		
10490_7363	Wastewater Redundant Communications	700	0	Future	0.0%	Jul-19	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
139 South System Relief Project		**$4,939**	**$3,439**	**69.6%**	**69.6%**		
10309_6419	Archdale - CS/RI	5	5	Complete	100.0%		
10310_6420	Archdale - Construction	211	211	Complete	100.0%		
10318_6519	Sections 70 & 71 HLS - Evaluation	215	215	Complete	100.0%		
10345_6595	Outfall 023 - Design	1	1	Complete	100.0%		
10346_6596	Outfall 023 - Cleaning	1,098	1,098	Complete	100.0%		
10347_6605	Land Acquisition/Easements	5	5	Complete	100.0%		
10349_6611	Sections 70 & 71 HLS - Construction	417	417	Complete	100.0%		
10350_6616	Milton Financial Assistance	1,488	1,488	Complete	100.0%		
10386_6801	Outfall 023 - Structural Impovements	1,500	0	Future	0.0%	Jan-19	
141 Wastewater Process Optimization		**$10,416**	**$1,502**	**14.4%**	**14.4%**		
10367_6733	Planning	930	930	Complete	100.0%		
10412_6930	North System Hydraulic Study	571	571	Complete	100.0%		
10413_6931	Somerville Sewer - Design	200	0	Future	0.0%	Oct-19	
10414_6932	Somerville Sewer - Construction	1,122	0	Future	0.0%	Mar-21	
10415_6933	Siphon - Planning	150	0	Future	0.0%	Nov-18	
19401_7412	Hydr Flood Engr Des & Cons N. Sys	7,442	0	Future	0.0%	Jan-19	
142 Wastewater Meter System-Equipment Replacement		**$28,438**	**$5,138**	**18.1%**	**18.1%**		
10371_6739	Planning / Study / Design	2,700	0	Future	0.0%	Jul-17	
10379_6793	Equipment Purchase & Installation	5,138	5,138	Complete	100.0%		
10411_6929	Construction	2,000	0	Future	0.0%	Mar-19	
10451_7191	WW Metering Asset Protect/Equip Purch	18,600	0	Future	0.0%	Apr-19	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
145 Facility Asset Protection		**$391,259**	**$38,670**	**9.9%**	**9.9%**		
10380_6795	Prison Point HVAC Upgrades-Construct.	2,764	2,764	Complete	100.0%		
10381_6796	Remote Headworks Heating Syst Upgrade	1,175	1,175	Complete	100.0%		
10382_6797	Alewife Brook Pump Stn Rehab - Const.	12,613	0	Future	0.0%	Jan-16	
10383_6798	Rehab of Section 93A Lexington	1,566	1,566	Complete	100.0%		
10387_6802	Chelsea Creek Upgrades - REI	3,633	0	Future	0.0%	Oct-16	
10392_6829	Technical Assistance	84	84	Complete	100.0%		
10394_6842	Sections 80 & 83	365	365	Complete	100.0%		
10395_6843	Section 160	1,581	1,581	Complete	100.0%		
10396_6857	Survey	11	11	Complete	100.0%		
10397_6858	Permits	13	13	Complete	100.0%		
10399_6886	Remote Headworks Concept Plan	670	670	Complete	100.0%		
10418_6936	Construction CB1 Sections 26 & 27	14,500	0	Future	0.0%	Sep-20	
10419_6937	Alewife Brook Pump Stn Rehab - Des/CA	223	223	Complete	100.0%		
10420_6938	Prison Point HVAC Upgrades - Design	441	441	Complete	100.0%		
10423_6987	93 A Force Main Replacement	462	462	Complete	100.0%		
10424_7004	Mill Brook Valley Sewer Section 79&92	542	542	Complete	100.0%		
10427_7033	Hingham Pump Stn Isolation Gate-Const	125	125	Complete	100.0%		
10428_7034	Alewife Brook PS Final Design/CA/REI	1,813	1,031	56.9%	56.9%		May-19
10431_7037	Caruso PS Improvements - Des/CA/REI	865	528	61.0%	61.0%		Jun-17
10440_7073	Land/Easements	103	103	Complete	100.0%		
10444_7144	Nut Island Headworks Fire Alarm/Wire	285	285	Complete	100.0%		
10445_7161	Chelsea Creek Upgrades - Construction	72,859	0	Future	0.0%	Nov-16	
10446_7162	Pump Stns & CSOs Condition Assessment	3,255	0	Future	0.0%	Dec-17	
10447_7163	Inter Ren 1, Reading Ext. - Des/CA/REI	1,156	250	21.6%	21.6%		Jun-19
10448_7164	Inter Ren 1, Read Ext. Sew. - Construct.	4,426	0	Future	0.0%	Mar-17	
10455_7206	Chelsea Creek Upgrades - Design/CA	8,787	5,481	62.4%	62.4%		Jun-21
10457_7216	Malden&Melrose Hydr&Struc-Study/Design	300	0	Future	0.0%	Jan-19	
10458_7217	Malden&Melrose Hydraulics&Struc-Const	1,000	0	Future	0.0%	Jul-20	
10463_7237	Headworks Effluent Shaft - Study	500	0	Future	0.0%	Jul-17	
10467_7279	Inter Ren 3, Dor Inter Sewer - Construct	4,146	0	Future	0.0%	Jan-19	
10468_7280	Construction CB2 Sections 23 & 24	10,000	0	Future	0.0%	Sep-22	
10469_7281	Cottage Farm Fuel System Upgrade	498	498	Complete	100.0%		
10477_7312	NI Elec & Grit/Sreenings Conveyance-Desi	1,249	1,233	Complete	98.7%		
10478_7313	NI Elec & Grit/Sreenings Conveyance-Cons	5,192	5,192	Complete	100.0%		
10481_7328	Interceptor Renewal No. 5 - Milton	10,000	0	Future	0.0%	Oct-19	
10482_7329	Interceptor Renewal No. 6 - Chelsea	11,000	0	Future	0.0%	Mar-21	
10483_7330	Prison Point/Cottage Farm Pump &GB /ESDC	320	407	Complete	127.2%		
10484_7344	Somer/Marginal Influent Gates Replace	367	367	Complete	100.0%		
10486_7359	Prison Point Rehab - Design/CA/RI	2,838	0	Future	0.0%	Jul-16	
10487_7360	System Relief & Contingency Planning	500	0	Future	0.0%	Jul-20	
10488_7361	DeLauri PS Screens Gates Valved&Security	1,079	0	Future	0.0%	Oct-17	

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10489_7362	Caruso Pump Station Impovements - Const.	4,485	579	12.9%	12.9%		Mar-17
10500_7375	Pump Station Rehab - Prelim. Design/Stud	750	0	Future	0.0%	Jul-19	
10503_7393	Sect 156 Rehab - Design/Build	2,563	2,563	Complete	100.0%		
10504_7410	Camb Branch Sect 26, 27 Des/ ESDC	3,600	0	Future	0.0%	Sep-18	
10505_7421	Sections 4, 5, 6, 186 - Design CA/RI	3,000	0	Future	0.0%	Nov-18	
10506_7422	Sections 4, 5, 6, 186 - Construction	16,000	0	Future	0.0%	Nov-20	
10507_7423	Sections 4, 5, 6, 186 - Study	1,832	0	Future	0.0%	Jan-17	
10510_7429	Ward St & Colum Pk Headworks Des/CA/REI	10,511	0	Future	0.0%	Jul-18	
10511_7430	Ward St & Columbus Park Headworks - Cons	103,064	0	Future	0.0%	Aug-20	
10512_7431	Chelsea Screenhouse Upgrades	5,037	3,374	67.0%	67.0%		Sep-16
10515_7452	PP/Cottage Farm Pump & Gearbox Rebuilds	6,439	6,439	Complete	100.0%		
10518_7459	Prison Point Piping Rehab	466	0	Future	0.0%	Oct-16	
10519_7462	Prison Point Rehab - Construction	5,823	0	Future	0.0%	Jul-18	
10520_7463	Cottage Farm Rehab - Construction	10,074	0	Future	0.0%	Jul-21	
10521_7490	Chelsea Screenhouse Upgrades - ESDC/REI	880	319	36.3%	36.3%		Sep-17
10522_7508	Cottage Farm Rehab - Design/CA/REI	2,015	0	Future	0.0%	Jul-19	
10523_7510	Chelsea Headworks-Caruso Pump Stn. Utili	32	0	Future	0.0%	Jul-16	
10524_7511	Cambridge Branch 23, 24, 26, 27 - Study	687	0	Future	0.0%	Oct-16	
10525_7512	Inter. Ren. 3 Dorch. Int Sewer Des CA/RI	1,000	0	Future	0.0%	Jan-17	
10526_7513	Cambr. Branch Sect 23, 24 Des/ESDC	2,500	0	Future	0.0%	Sep-20	
10527_7514	Intercep. Ren. 6 Chelsea - Design CA/REI	2,200	0	Future	0.0%	Mar-19	
10528_7515	Intercep. Renewal 5 Milton - Design CA/R	2,000	0	Future	0.0%	Oct-17	
10529_7534	Quin/Hing PS Fuel Stor Upg Const	580	0	Future	0.0%	Jan-17	
10530_7549	HW Effluent Sharft Des/CA/REI	2,038	0	Future	0.0%	Jan-19	
10531_7550	HW Effluent Sharft Rehab Const	10,191	0	Future	0.0%	Jul-20	
10532_7551	Wiggins Term PS Design	509	0	Future	0.0%	Sep-17	
10533_7552	Wiggins Term PS Construct	2,035	0	Future	0.0%	Apr-19	
10534_7553	Fuel Oil Tank Repl Design	1,529	0	Future	0.0%	Jul-17	
10535_7554	Fuel Oil Tank Repl Constr Ph 1	3,567	0	Future	0.0%	Jul-18	
10536_7555	Fuel Oil Tank Repl Constr Ph 2	2,548	0	Future	0.0%	Jan-19	
146 D.I. Cross Harbor Tunnel Inspection		**$5,000**	**$0**	**Future**	**0.0%**		
10454_7199	Tunnel Shaft Repairs - Plan/Des/Const	5,000	0	Future	0.0%	Jul-18	
147 Randolph Trunk Sewer Relief		**$750**	**$0**	**Future**	**0.0%**		
10461_7220	Study	750	0	Future	0.0%	Jul-18	

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206 DI Treatment Plant Asset Protection		**$814,868**	**$224,644**	**27.6%**	**27.6%**		
18045_6196	DITP Roof Replacements	2,300	2,300	Complete	100.0%		
19162_6241	DISC Application	125	125	Complete	100.0%		
19176_6422	Pump Packing Replacement	732	732	Complete	100.0%		
19177_6423	Demineralizer Construction	51	51	Complete	100.0%		
19188_6538	Odor Control Rehab - Construction	30,571	0	Future	0.0%	Nov-21	
19191_6592	Odor Control Rehab - REI	3,775	0	Future	0.0%	Nov-21	
19193_6594	Equipment Condition Monitoring	1,777	1,777	Complete	100.0%		
19194_6598	NMPS WTF Valve & Piping - ESDC/REI	2,350	871	37.1%	37.1%		Oct-18
19204_6668	Expansion Joint Repair - Design	149	149	Complete	100.0%		
19205_6669	Expansion Joint Repair - Construct. 1	305	305	Complete	100.0%		
19217_6704	Expansion Joint Repair - Construct. 2	1,894	1,894	Complete	100.0%		
19218_6705	Expansion Joint Repair - Construction 3	2,014	0	Future	0.0%	Oct-17	
19220_6721	As-needed Design Phase 6-1	1,911	1,911	Complete	100.0%		
19221_6722	As-needed Design Phase 6-2	1,744	1,744	Complete	100.0%		
19222_6723	Eastern Seawall Design - 1	671	0	Future	0.0%	Jul-17	
19223_6724	Eastern Seawall Construction - 1	3,916	0	Future	0.0%	Jan-19	
19226_6727	Rip-rap Material DITP	310	0	Future	0.0%	Mar-17	
19227_6728	Digester Gas Flare No. 4 - Design	542	0	Future	0.0%	Jul-19	
19228_6729	Digester Gas Flare No. 4 - Construction	1,193	0	Future	0.0%	Dec-20	
19229_6730	CHP Design	6,000	0	Future	0.0%	Dec-18	
19230_S464	Roof Replacement - Phase I	2,750	2,750	Complete	100.0%		
19231_6742	Drive Chain Replacement	264	264	Complete	100.0%		
19236_6763	Busduct Replacement (2+22)	196	196	Complete	100.0%		
19237_6764	Reline Hypochlorite Tanks 1 & 3	1,691	1,691	Complete	100.0%		
19238_6765	CTG Modifications	482	482	Complete	100.0%		
19239_6767	Electrical Equipment Upgrade-Const 2	1,913	1,913	Complete	100.0%		
19241_6791	Document Format Conversion	145	68	46.9%	46.9%		Jun-20
19243_6811	Outfall Modification - Inspection	174	174	Complete	100.0%		
19244_6812	Secondary Clarifier Access	275	275	Complete	100.0%		
19245_6813	Transformer Replacement	1,703	1,703	Complete	100.0%		
19246_6821	DSL Pump Replacement - Phase 2	2,591	503	19.4%	19.4%		Jul-17
19247_6822	Co-Digestion Design/Build	5,000	0	Future	0.0%	Aug-21	
19250_6849	Reline Hypochlorite Tanks 2 & 4	2,242	2,242	Complete	100.0%		
19252_6851	Chemical Pipe Replacement - Design	651	0	Future	0.0%	Jun-20	
19253_6852	Chemical Pipe Replacement - Construction	2,170	0	Future	0.0%	Dec-21	
19256_6855	Electrical Equipment Upgrade-Const. 3	15,174	15,174	Complete	100.0%		
19258_6875	WTF VFD Replacement - Construction	11,945	0	Future	0.0%	Jun-16	
19259_6876	Heat Loop Pipe Replacement - Constr 1	615	615	Complete	100.0%		
19260_6877	Secondary Reactor VFDs	3,232	3,014	93.3%	93.3%		Aug-16
19263_6880	Cathodic Protection - Design/ESDC	1,000	0	Future	0.0%	Feb-17	
19264_6881	Grit Air Handler Replacements	2,029	2,029	Complete	100.0%		

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19265_6882	CEMS Equipment Replacement	100	100	Complete	100.0%		
19266_6883	Heat Loop Pipe Replacement - Const. 2	1,488	1,488	Complete	100.0%		
19267_6884	PICS Replacement - Construction	1,230	1,230	Complete	100.0%		
19268_6899	Primary&Second Clarifier Rehab-Const	56,787	56,787	Complete	100.0%		
19270_6901	Electrical Equipment Upgrade - Const 4	7,871	7,194	91.4%	91.4%		May-16
19271_6902	NMPS VFD Replacement - Design/ESDC	1,276	1,276	Complete	100.0%		
19272_6903	NMPS VFD Replacement - Construction	24,454	24,644	Complete	100.8%		
19273_6904	Fire Alarm System Replacemen - Design	2,079	173	8.3%	8.3%		Jan-23
19274_6963	CHP Alternatives Study	675	0	Future	0.0%	Jan-17	
19275_6964	Combined Heat & Power - Construction	83,000	0	Future	0.0%	Jun-21	
19276_6965	Primary&Second Clarifier Rehab-Design	1,678	1,678	Complete	100.0%		
19277_6966	Gravity Thickener Improvements-Constr	933	1,033	Complete	110.7%		
19278_6967	STG System Modifications - Design	-44	-44	Complete	100.0%		
19279_6968	Electrical Equipment Upgrade 3 - REI	1,112	1,112	Complete	100.0%		
19283_6972	NMPS Motor Control Center - Constr	914	914	Complete	100.0%		
19284_6973	STG System Modifications - Construct.	2,120	2,120	Complete	100.0%		
19287_7005	Digester Chiller Replacement	635	635	Complete	100.0%		
19288_7006	Dystor Tank Membrane Replacement	640	640	Complete	100.0%		
19289_7051	Fire Alarm System Replacement - Construc	20,000	0	Future	0.0%	Jul-18	
19290_7052	Digester & Storage Tank Rehab Design/ESD	3,000	0	Future	0.0%	Apr-18	
19291_7053	Digestr/Storage Tk REI	2,000	0	Future	0.0%	Oct-20	
19292_7054	Thick Primary Sludge Pump Repl-Constr	27	27	Complete	100.0%		
19293_7055	Digester Modules 1 & 2 Pipe Replacemt	7,096	7,096	Complete	100.0%		
19294_7056	Cathodic Protection - Construction	6,471	0	Future	0.0%	Feb-19	
19295_7057	Centrifuge Backdrive Replacement	3,965	3,965	Complete	100.0%		
19297_7059	Switchgear Replacement - Construction	8,000	0	Future	0.0%	Oct-17	
19298_7060	Power Consultant Recommned - Design	2,097	2,097	Complete	100.0%		
19299_7061	Power System Improvements - Construct.	10,177	6,965	68.4%	68.4%		May-17
19300_7062	NMPS VFD Replacement - REI	793	768	96.8%	96.8%		Jun-16
19301_7063	Heat Loop Pipe Replacement - Const. 3	11,546	11,549	Complete	100.0%		
19303_7088	Odor Control Rehab - Design/ESDC	4,640	0	Future	0.0%	May-19	
19304_7089	Sodium Hypo Tank Liner Removal	196	196	Complete	100.0%		
19305_7090	As-needed Design Phase 5-1	955	955	Complete	100.0%		
19306_7091	As-needed Design Phase 5-2	1,056	1,056	Complete	100.0%		
19307_7094	HVAC Equip Replac REI	2,000	0	Future	0.0%	Apr-17	
19309_7111	HVAC Equipment Replacement - Des/ESDC	1,981	1,196	60.4%	60.4%		Oct-20
19310_7110	HVAC Equipment Replacement - Construct.	29,500	0	Future	0.0%	Apr-17	
19311_7121	DI As-needed Technical Design	16,250	0	Future	0.0%	Jul-19	
19312_7122	Odor Ctrl Syst Study	750	0	Future	0.0%	May-17	
19313_7123	Digester Sludge Pump Replace - Construct	1,874	1,874	Complete	100.0%		
19314_7124	Electrical Equipment Upgrade Phase 5	23,162	0	Future	0.0%	Dec-19	
19316_7126	Future SSPS VFD Replacements - Design	4,800	0	Future	0.0%	Jan-18	

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19317_7127	Future SSPS VFD Replacements - Const.	19,200	0	Future	0.0%	Jul-19	
19318_7128	Future NMPS VFD Replacements - Design	4,420	0	Future	0.0%	Jun-24	
19319_7129	Future NMPS VFD Replacements - Const.	17,680	0	Future	0.0%	Dec-26	
19321_7131	Future Misc. VFD Replacements - Construc	5,334	0	Future	0.0%	May-17	
19322_7132	DI Switchgear Replacement - Design	4,500	0	Future	0.0%	Jul-20	
19323_7133	DI Switchgear Replacement - Construct.	16,000	0	Future	0.0%	Jul-22	
19324_7134	DI PICS Replacement - Construction	5,400	0	Future	0.0%	Feb-21	
19325_7135	DI Dystor Membrane Replacements	3,000	0	Future	0.0%	Jul-19	
19326_7136	DI CTG Rebuilds	8,000	0	Future	0.0%	Jul-20	
19327_7137	DI Centrifuge Replacements - Design	4,160	0	Future	0.0%	Dec-18	
19328_7138	DI Centrifuge Replacements - Construct.	16,640	0	Future	0.0%	Jun-20	
19329_7139	Cryogenics Plant Equipment Replace-Desig	1,600	0	Future	0.0%	Dec-18	
19330_7140	Cryogenics Plant Equip Replace - Const.	5,300	0	Future	0.0%	Dec-20	
19332_7142	Future Sodium Hypochlorite Tank Rehab	10,000	0	Future	0.0%	Jul-22	
19333_7167	Gas Protect System Replac	2,000	0	Future	0.0%	Nov-17	
19334_7168	Barge Berth and Facility Replacement	2,265	0	Future	0.0%	Dec-16	
19335_7169	South Systm PS Lube System Replace.	2,900	0	Future	0.0%	Jun-18	
19336_7170	E/W Odor Control Air Handler Replace.	2,000	0	Future	0.0%	Jun-25	
19338_7172	PICS Distributed Process Units Replace.	8,000	0	Future	0.0%	Feb-21	
19339_7275	NMPS & WTF Butterfly Valve Replace.	17,490	8,779	50.2%	50.2%		Jun-17
19345_7373	Digester & Storage Tank Rehab - Const.	30,000	0	Future	0.0%	Oct-20	
19346_7374	Clarif W3H Flush Syst	1,262	1,262	Complete	100.0%		
19347_7394	Clarifier Rehab Phase 2 - Design	2,281	536	23.5%	23.5%		Jan-23
19348_7395	Clarifier Rehab Phase 2 - Construction	80,000	0	Future	0.0%	Apr-18	
19349_7396	Scum Skimmer Replacement	20,394	20,138	Complete	98.7%		
19351_7397	Clarifier Rehab Phase 2 - REI	2,500	0	Future	0.0%	Apr-18	
19352_7398	Cryogenics Chillers Replacement	3,236	2,359	72.9%	72.9%		Oct-16
19353_7399	As-Needed Design 7-1	1,547	1,547	Complete	100.0%		
19354_7400	As-Needed Design 7-2	1,061	1,061	Complete	100.0%		
19355_7401	TPP Boiler Controls Replacement	1,629	1,629	Complete	100.0%		
19557_7414	NMPS Harmonic Filter Replacement	3,000	0	Future	0.0%	May-18	
19558_7415	Fuel Pipe Abandonment	230	230	Complete	100.0%		
19559_7416	Electrical Equipment Upgrades 4 - REI	765	672	87.8%	87.8%		Oct-16
19560_7419	NMPS Motor Cntrl Ctr Ph 2 Dsesign/ESDC/R	2,500	0	Future	0.0%	Feb-17	
19561_7420	NMPS Motor Control Ctr Phase 2 - Constru	10,586	0	Future	0.0%	Apr-19	
19562_7424	Roof Replacement Phase 3	611	611	Complete	100.0%		
19563_7426	Fire System Replacement - REI	1,800	0	Future	0.0%	Jul-18	
19564_7427	Grav Thick Ctr Col Repl	825	825	Complete	100.0%		
19565_7428	Gravity Thickener Rehab	14,500	0	Future	0.0%	Apr-18	
19566_7434	As-Needed Design 7-3	896	886	Complete	98.9%		
19600_7501	As-Needed Design 8-1	1,400	0	Future	0.0%	Jul-16	
19601_7502	As-Needed Design 8-2	1,400	0	Future	0.0%	Jul-16	

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19602_7503	As-Needed Design 8-3	1,400	0	Future	0.0%	Jul-16	
26073_7148	Co-Digestion Temporary Facilities	2,300	434	18.9%	18.9%		Sep-22
40256_7449	Sodium Hypochlorite&Bisulfite Tanks Reha	5,000	0	Future	0.0%	Jun-17	
210 Clinton Wastewater Treat Plant		**$22,419**	**$7,629**	**34.0%**	**34.0%**		
19302_7075	Clinton Soda Ash Replacement	267	267	Complete	100.0%		
19308_7095	Clinton Permanent Standby Generator	230	230	Complete	100.0%		
19340_7276	Clinton Concr Rpr - Design	63	63	Complete	100.0%		
19341_7277	Clinton Digester Cleaning & Rehab	3,441	3,417	Complete	99.3%		
19342_7278	Clinton Aeration Effciency Improvement	1,865	1,865	Complete	100.0%		
19350_7377	Phos Remov Des/ESDC	1,395	509	36.5%	36.5%		Sep-18
19400_7411	PhosRemov Constr	7,476	883	11.8%	11.8%		Sep-17
19405_7450	Clinton Roofing Rehab	1,214	0	Future	0.0%	Mar-17	
19406_7451	Clinton Facilities Rehab	4,477	0	Future	0.0%	Sep-18	
271 Residuals Asset Protection		**$103,832**	**$832**	**0.8%**	**0.8%**		
26069_7143	Residual Facility Plan / EIR	1,000	0	Future	0.0%	Jan-20	
26070_7145	Residuals Facility Upgrade - Design	2,000	0	Future	0.0%	Mar-18	
26071_7146	Residuals Facility Upgrade-Construct.	2,590	0	Future	0.0%	Jun-17	
26072_7147	Condition Assess/Tech & Reg Review	832	832	Complete	100.0%		
26074_7149	Resid Ph 2 Designs	15,000	0	Future	0.0%	Nov-21	
26075_7150	Resid Ph 2 Constr	75,000	0	Future	0.0%	Jan-23	
324 CSO Support		**$51,648**	**$48,203**	**93.3%**	**93.3%**		
32400_5790	Technical Assistance	228	228	Complete	100.0%		
32401_5791	Planning/EIR	10,769	10,769	Complete	100.0%		
32403_5716	Master Planning	21,763	21,763	Complete	100.0%		
32407_5970	Technical Assistance - Geotech	61	61	Complete	100.0%		
32409_5795	Modeling	300	300	Complete	100.0%		
32411_5767	SOP Program	773	773	Complete	100.0%		
32645_6036	Watershed Planning	877	877	Complete	100.0%		
32648_6150	Technical Review	1,933	529	27.4%	27.4%		Dec-20
32658_6169	Land Acquisition/Easement	12,875	12,835	Complete	99.7%		
32691_6372	System Assessment	669	69	10.3%	10.3%		Dec-20
339 North Dorchester Bay		**$221,510**	**$221,510**	**Complete**	**100.0%**		
10426_7032	North Dorchester Outfall-Design/CA/RI	425	425	Complete	100.0%		
32660_6220	Tunnel - Design/ESDC	22,945	22,945	Complete	100.0%		
32661_6244	Tunnel - Construction (Ch30)	147,511	147,511	Complete	100.0%		
32662_6245	Dewatering Pump Station & Sewers-Con	27,144	27,144	Complete	100.0%		
32726_6993	Tunnel & Facilities - CM Services	9,032	9,032	Complete	100.0%		
32732_7012	Pleasure Bay - Construction	3,195	3,195	Complete	100.0%		
32733_7013	Design/ESDC/Facilities	4,785	4,785	Complete	100.0%		
32744_7103	Tunnel Rescue/Emergency Response	793	793	Complete	100.0%		
32745_7259	Ventilation Building - Construction	5,462	5,462	Complete	100.0%		
32746_7345	Communication Systems	217	217	Complete	100.0%		

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
340 Dorchester Bay Sewer Separation (Fox Point)		**$54,626**	**$54,626**	**Complete**	**100.0%**		
32651_6155	Design	11,535	11,535	Complete	100.0%		
32664_6247	Construction	43,091	43,091	Complete	100.0%		
341 Dorchester Bay Sewer Separation (Commercial Point)		**$64,174**	**$60,542**	**94.3%**	**94.3%**		
32650_6154	Design	17,692	16,813	95.0%	95.0%		Dec-16
32665_6248	Construction	46,481	43,729	94.1%	94.1%		Dec-16
342 Neponset River Sewer Separation		**$2,549**	**$2,549**	**Complete**	**100.0%**		
32652_6156	Design/CS/RI	470	470	Complete	100.0%		
32653_6160	Construction	2,079	2,079	Complete	100.0%		
346 Cambridge Sewer Separation		**$104,448**	**$95,869**	**91.8%**	**91.8%**		
32654_6161	Design/CS/RI	33,844	31,346	92.6%	92.6%		Dec-17
32672_6255	Construction	70,604	64,524	91.4%	91.4%		Jun-17
352 Cambridge Floatables Control		**$1,127**	**$1,127**	**Complete**	**100.0%**		
32655_6162	Design	468	468	Complete	100.0%		
32684_6267	Construction	659	659	Complete	100.0%		
355 MWR003 Gate & Siphon		**$4,445**	**$4,279**	**96.3%**	**96.3%**		
32722_6952	Design	1,642	1,475	89.8%	89.8%		Oct-16
32723_6953	Construction 1	236	236	Complete	100.0%		
32755_7409	Construction 2	2,568	2,568	Complete	100.0%		
359 Reserved Channel Sewer Separation		**$70,613**	**$70,395**	**Complete**	**99.7%**		
32727_6994	Construction	55,355	56,009	Complete	101.2%		
32734_7014	Design	15,258	14,387	94.3%	94.3%		Jun-16

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542 Carroll Water Treatment Plant		**$438,984**	**$418,815**	**95.4%**	**95.4%**		
53293_5023	Study 1	444	444	Complete	100.0%		
53294_5024	Study 2	2,368	2,368	Complete	100.0%		
53296_5042	EIR / Conceptual Design	5,808	5,808	Complete	100.0%		
53300_5997	Technical Assistance	72	72	Complete	100.0%		
53301_5017	Wachusett WTP - Design/CS/RI	46,606	46,606	Complete	100.0%		
53304_5157	Permit Fees	87	86	Complete	98.9%		
53367_6118	Cryptosporidium Inactivation Study	150	150	Complete	100.0%		
53371_6134	Management Support - Design	1,730	1,730	Complete	100.0%		
53375_6182	AWWARF Study	650	650	Complete	100.0%		
53376_6206	Emerg Discharge Reserv Water Mgmt Stu	1,454	1,454	Complete	100.0%		
53377_6207	Wachusett and Cosgrove Intakes - CP1	15,489	15,489	Complete	100.0%		
53378_6208	Construction Management / RI	31,438	31,438	Complete	100.0%		
53390_6365	Cosgrove Disinfection - Phase II	2,169	2,169	Complete	100.0%		
53391_6397	Cosgrove Disinfection - Phase I	150	150	Complete	100.0%		
53392_6401	Distribution Water Consultant	3	3	Complete	100.0%		
53393_6406	Immediate Disinfection - MECO	10	10	Complete	100.0%		
53406_6479	Cosgrove Disinfection Fac. - Underwater	217	217	Complete	100.0%		
53410_6485	Community Chlorine Analyzers	49	49	Complete	100.0%		
53412_5522	Wachusett Aqueduct Interim Rehab. - CP2	23,400	23,400	Complete	100.0%		
53413_6488	Sitework & Storage Tanks - CP3	67,368	67,368	Complete	100.0%		
53414_6489	Treatment Facilities - CP4	145,761	145,761	Complete	100.0%		
53416_6491	Late Sitework - CP6	4,088	4,088	Complete	100.0%		
53418_6494	OCIP	5,107	5,107	Complete	100.0%		
53419_6495	Professional Services	2,752	2,752	Complete	100.0%		
53420_6497	Marlboro MOA	5,859	5,859	Complete	100.0%		
53421_6520	CWTP- MECO	128	128	Complete	100.0%		
53425_6613	Site Security Services	1,264	1,264	Complete	100.0%		
53426_6650	Existing Facilities Modifications - CP7	7,044	3,073	43.6%	43.6%		Apr-19
53427_6670	CSX Crossing	65	65	Complete	100.0%		
53428_6671	Wachusett Algae - Design CS/RI	450	0	Future	0.0%	Jul-24	
53432_6691	Public Health Research	1,703	1,703	Complete	100.0%		
53435_6756	Security Equipment	571	571	Complete	100.0%		
53437_6773	Cosgrove Screens, CP8 - Construction	3,238	3,238	Complete	100.0%		
53443_6815	AWWARF - Evaluation Ozone & UV	302	302	Complete	100.0%		
53445_6827	Fitout / Construction	1,500	545	36.3%	36.3%		Jun-19
53448_6889	Wachusett Algae - Construction	1,800	0	Future	0.0%	Feb-25	
53450_6923	CWTP Ultraviolet Disinfection-Des/ESDC/I	4,351	4,351	Complete	100.0%		
53451_6924	CWTP Ultraviolet Disinfection-Constr.	31,057	31,057	Complete	100.0%		
53452_6939	As-needed Technical Assistance #1	491	491	Complete	100.0%		
53453_6951	Existing Fac Modif., CP7 - Design	965	965	Complete	100.0%		
53455_6989	As-needed Technical Assistance	702	702	Complete	100.0%		

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53456_7084	Ancillary Modifications - Construct. 1	160	160	Complete	100.0%		
53457_7085	Ancillary Modifications - Construct. 2	8,691	4,854	55.9%	55.9%		Jun-24
53458_7192	Ancillary Modifications - Design 3	299	299	Complete	100.0%		
53459_7208	Ancillary Modifications - Design 4	527	527	Complete	100.0%		
53464_7315	Technical Assistance 5	255	255	Complete	100.0%		
53465_7316	Technical Assistance 6	408	408	Complete	100.0%		
53470_7376	CWTP Storage Tank Roof Drainage Sys.	7,000	0	Future	0.0%	Jan-24	
75530_7406	Technical Assistance 7	594	594	Complete	100.0%		
75531_7407	Technical Assistance 8	563	33	5.9%	5.9%		Jan-18
75546_7455	CWTP-Asset Protection	500	0	Future	0.0%	Jan-00	
543 Quabbin Water Treatment Plant		**$19,973**	**$19,973**	**Complete**	**100.0%**		
53363_6043	Quabbin WTP - Design/CA/RI	3,794	3,794	Complete	100.0%		
53380_6210	Permit Fees	55	55	Complete	100.0%		
53381_6211	Utilities	13	13	Complete	100.0%		
53382_6212	Construction	5,071	5,071	Complete	100.0%		
53405_6468	CVA Shea Ave Leak Repair	951	951	Complete	100.0%		
53433_6706	Ware Fire Department - MOA	25	25	Complete	100.0%		
53434_6711	Water Quality Analysis Equipment	49	49	Complete	100.0%		
53439_6775	Quabbin UVWTP - Design/CA/RI	2,274	2,274	Complete	100.0%		
53440_6776	Quabbin UVWTP - Construction	6,599	6,599	Complete	100.0%		
53442_6804	Quabbin UVWTP -Study/Pilot	1,142	1,142	Complete	100.0%		
550 Spot Pond Storage Facility		**$60,285**	**$59,401**	**Complete**	**98.5%**		
53400_6455	Environmental Review	233	233	Complete	100.0%		
53402_6457	Design / Build	50,559	49,864	Complete	98.6%		
53447_6868	Easement/Land Acquis/Permits	6,112	6,112	Complete	100.0%		
53462_7233	Owners' Representative	3,159	2,969	94.0%	94.0%		Feb-18
53463_7314	Early Construction Water Connection	222	222	Complete	100.0%		
597 Winsor Station Pipeline		**$32,878**	**$2,578**	**7.8%**	**7.8%**		
60032_6276	Preliminary Permit, Study & Licensing	39	39	Complete	100.0%		
60033_6277	Quabbin Aqueduct TV Inspection	3,061	0	Future	0.0%	Jul-23	
60077_7017	Hatchery Pipeline - Design/ESDC/RI	814	608	74.7%	74.7%		Sep-18
60087_7114	Quabbin Aqueduct & WPS Upg. Design/CA/RI	838	838	Complete	100.0%		
60088_7115	Winsor Station Rehab & Improvement	17,858	0	Future	0.0%	Jul-19	
60095_7197	Shaft 2 & 12 Construction	2,245	0	Future	0.0%	Jul-18	
60101_7212	Winsor Station Chapman Valve Repai	416	416	Complete	100.0%		
60105_7234	Purchase of Sleeve Valves	368	368	Complete	100.0%		
60106_7235	Hatchery Pipeline - Construction	2,658	308	11.6%	11.6%		Sep-17

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604 MetroWest Tunnel		**$701,178**	**$697,047**	**Complete**	**99.4%**		
59794_5043	Study	415	415	Complete	100.0%		
59795_5044	Design/EIR - Tunnel/ESDC	37,939	37,939	Complete	100.0%		
59796_5048	Sudbury Pipe Bridge - Construction	296	296	Complete	100.0%		
59798_6054	West Tunnel Segment - CP1	147,774	147,774	Complete	100.0%		
59799_5284	Construction Managementt/Resident Inspec	39,428	39,428	Complete	100.0%		
59804_5976	Technical Assistance	131	131	Complete	100.0%		
59805_5139	Land Acquisition	6,259	6,259	Complete	100.0%		
59806_5141	Hultman Study	1,864	1,864	Complete	100.0%		
60012_6037	DEP Permit Fees	58	56	96.6%	96.6%		Sep-14
60013_6055	Middle Tunnel Segment - CP2	245,809	245,809	Complete	100.0%		
60014_6056	MHD Salt Sheds - CP5	1,314	1,314	Complete	100.0%		
60015_6059	Shaft 5A - CP3	5,816	5,816	Complete	100.0%		
60017_6063	Local Supply Contingency - Design/CA/RI	859	859	Complete	100.0%		
60018_6067	Community Technical Assistance	297	297	Complete	100.0%		
60020_6117	Professional Services	731	731	Complete	100.0%		
60021_6122	OCIP	26,022	26,022	Complete	100.0%		
60022_6128	Hultman Leak Repair	307	307	Complete	100.0%		
60023_6129	Framingham MOU	2,444	2,444	Complete	100.0%		
60024_6130	Local Supply Contingency - Construction	4,298	4,298	Complete	100.0%		
60025_6131	Local Supply Contingency - Legal/Easemen	9	9	Complete	100.0%		
60026_6140	Hultman Repair Bands	28	28	Complete	100.0%		
60029_6203	Loring Road Storage Tanks - CP-8	41,368	41,368	Complete	100.0%		
60030_6204	Testing & Disinfection - CP7	3,612	3,612	Complete	100.0%		
60031_6205	Upper Hultman Rehab - CP6B	5,849	5,849	Complete	100.0%		
60038_6366	Southboro MOA	255	255	Complete	100.0%		
60039_6367	Weston MOA	1,006	1,006	Complete	100.0%		
60040_6374	East Tunnel Segment - CP3A	56,263	56,263	Complete	100.0%		
60042_6430	Hultman Investigation and Repair	1,604	1,604	Complete	100.0%		
60043_6492	Hultman Repair Bands 98-99	116	116	Complete	100.0%		
60053_6762	Wayland MOA	35	35	Complete	100.0%		
60054_6777	Equipment Prepurchase	198	198	Complete	100.0%		
60058_6856	Hultman Rehab - CP9	3,257	3,257	Complete	100.0%		
60059_6872	Interim Disinfection	1,245	1,245	Complete	100.0%		
60066_6911	Hultman Interconnect - Final Design/CA/R	5,732	5,732	Complete	100.0%		
60073_6975	Lower Hultman Rehab -CP6A	52,289	52,289	Complete	100.0%		
60083_7082	Hultman Interconnection - RI Services	1,870	1,870	Complete	100.0%		
60085_7105	CP6 Easements	33	33	Complete	100.0%		
60086_7106	CP6A Demolition	57	57	Complete	100.0%		
60109_7283	Valve Chamber & Storage Tank Improve Des	600	0	Future	0.0%	Oct-17	
60128_7367	Shaft 5 Electrical Upgrade	1,000	0	Future	0.0%	Jan-19	
60160_7476	Valve Chmbr & Stor Tank Access Impr Cons	2,400	0	Future	0.0%	Jul-19	

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60161_7477	Shaft 5A/5 Surface Piping Cathodic Prote	132	0	Future	0.0%	Nov-16	
60162_7507	Hultman Leak Shaft 5A	157	159	Complete	101.3%		
616 Quabbin Transmission System		**$16,406**	**$7,457**	**45.5%**	**45.5%**		
60055_6828	Facilities Inspection	1,005	1,005	Complete	100.0%		
60068_6940	Oakdale High Line Repl. Constr	500	0	Future	0.0%	Aug-18	
60075_7007	Equipment Pre-purchase	534	534	Complete	100.0%		
60103_7229	Oakdale Phase 1A Electrical - Design	776	776	Complete	100.0%		
60104_7230	Oakdale Phase 1A Electrical - Constructi	2,260	2,260	Complete	100.0%		
60108_7282	Ware River Intake Valve Replacement - De	300	0	Future	0.0%	Jul-18	
60113_7333	Rehab Wach GH/Bastion LGH Geo-Ther Des	1,000	0	Future	0.0%	Jul-18	
60135_7378	Rehabilitate Oakdale Turbine	1,000	0	Future	0.0%	May-20	
60137_7380	Reh Wach Gths/Bastion LGH Geo-Ther Const	4,000	0	Future	0.0%	Jul-20	
60138_7487	Ware Rver Intake Vlve Rep Const	900	0	Future	0.0%	Jul-20	
60139_7488	CVA Motorized Screens Replacement-Const	1,049	0	Future	0.0%	Nov-16	
60201_7545	Oakdale Turbine Rehab Des	200	0	Future	0.0%	May-19	
75491_6690	Oakdale Valves - Phase 1 Construction	1,811	1,811	Complete	100.0%		
75496_6831	Oakdale Valves - Phase 1 Study & Design	1,070	1,070	Complete	100.0%		
617 Sudbury/Weston Aqueduct Repairs		**$6,453**	**$1,372**	**21.3%**	**21.3%**		
60056_6838	Sudbury Aqueduct Inspection	370	370	Complete	100.0%		
60057_6839	Technical Assistance	25	25	Complete	100.0%		
60076_7016	Sudbury Short-Term Repairs	460	0	Future	0.0%	Jul-17	
60110_7317	Sudbury Short-Term Repairs - Phase 2	2,098	0	Future	0.0%	Jul-23	
60130_7369	Ash Street Sluice Gates - Construction	800	0	Future	0.0%	Jun-20	
60150_7472	Rosemary Brook Building Repair	1,746	712	40.8%	40.8%		Nov-16
60151_7473	Eval. of Farm Pond Bldgs-Waban Arches	339	0	Future	0.0%	Jul-16	
60152_7491	Ash Street Sluice Gates - Design	350	0	Future	0.0%	Jun-18	
75486_6617	Hazardous Material Sudbury Aqueduct	265	265	Complete	100.0%		
621 Watershed Land		**$24,000**	**$19,277**	**80.3%**	**80.3%**		
60081_7069	Land Acquisition	24,000	19,277	80.3%	80.3%		Jun-20
623 Dam Projects		**$4,538**	**$3,116**	**68.7%**	**68.7%**		
60094_7194	Dam Safety Modificat. & Repairs - Constr	2,055	2,055	Complete	100.0%		
60100_7211	Dam Safety Modificat. & Repairs Design/C	1,533	1,061	69.2%	69.2%		Jun-14
60118_7346	Oakdale Dam Permits	1	0	Future	0.0%	Jul-17	
60119_7347	Oakdale Dam - Design/ESDC/RI	200	0	Future	0.0%	Jul-17	
60120_7348	Oakdale Dam Removal - Construction	750	0	Future	0.0%	Jul-18	
622 Cosgrove Tunnel Redundancy		**$53,030**	**$9,132**	**17.2%**	**17.2%**		
60090_7156	Wachusett Aqueduct PS - Design/ESDC/RI	6,842	4,220	61.7%	61.7%		May-20
60091_7157	Wachusett Aqueduct Pump Station - Const.	46,173	4,906	10.6%	10.6%		Feb-19
60124_7354	Permits/Easements	15	6	40.0%	40.0%		Dec-25

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625 Metropolitan Tunnel Redundancy		**$1,357,686**	**$3,009**	**0.2%**	**0.2%**		
60035_6273	Water Transmission Redundancy Plan	1,397	1,397	Complete	100.0%		
60092_7159	Conceptual Design EIR	7,550	0	Future	0.0%	Jul-17	
60107_7291	Tunnel Construction	924,011	0	Future	0.0%	Jul-22	
60122_7352	Sudbury Aqueduct - MEPA Review	3,405	1,612	47.3%	47.3%		Jun-17
60126_7356	Construction Management	110,014	0	Future	0.0%	Jul-21	
60127_7357	Tops of Shafts Surface Construction	39,050	0	Future	0.0%	Jul-30	
60170_7516	Public Relations, Legal & Administration	160,696	0	Future	0.0%	Jul-18	
60172_7521	Top of Shaft Rehab Design/CA/RI	1,186	0	Future	0.0%	Jul-34	
60173_7522	Top of Shaft Rehab Construction	4,961	0	Future	0.0%	Jul-36	
60174_7556	Final Design/ESDC	99,228	0	Future	0.0%	Jul-19	
60176_7558	Shaft 7 Design CA/RI	1,237	0	Future	0.0%	Jun-33	
60177_7559	Shaft 7 Buildings Construction	4,950	0	Future	0.0%	Jan-35	
628 Metropolitan Redundancy Interim Improvements		**$213,372**	**$503**	**0.2%**	**0.2%**		
60200_7560	Metro Red Interim Des CA/RI	10,415	0	Future	0.0%	Jan-18	
60202_7561	Tops of Shaft Inter Impr Costr	6,114	0	Future	0.0%	Jan-19	
60203_7562	CHEPS Impr Construction	18,343	0	Future	0.0%	Jul-20	
60204_7563	WASM/SPSM West PRV Constr	8,153	0	Future	0.0%	Jul-19	
60205_7566	CHEPS Emrg Generator Constr	8,886	0	Future	0.0%	Jan-20	
68166_6539	WASM 3 - MEPA/Design/CA/RI	15,483	503	3.2%	3.2%		Oct-26
68170_6543	WASM 3 Sliplining	58,609	0	Future	0.0%	Jul-22	
68171_6544	WASM 3 Rehab	61,203	0	Future	0.0%	Jul-19	
68333_7457	Section 101/Watertown Section - Construc	12,826	0	Future	0.0%	Jul-23	
68334_7547	Section 101/Watertown Sect Des CA/RI	3,000	0	Future	0.0%	Jul-21	
75580_7523	Commn Ave PS Redund-Des/CA/RI	2,776	0	Future	0.0%	Dec-16	
75581_7524	Commn Ave PS Redund-Constr	7,563	0	Future	0.0%	Dec-18	
630 Watershed Division Capital Improvements		**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	
60300_7564	Quabbin Admin Bldg Rehab Des CA\RI	3,000	0	Future	0.0%	Jul-17	
60301_7565	Quabbin Admin Bldg Rehab Constr	12,000	0	Future	0.0%	Jul-19	

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677 Valve Replacement		**$20,115**	**$12,016**	**59.7%**	**59.7%**		
67559_5126	Construction 1	718	718	Complete	100.0%		
67560_5124	Technical Assistance	125	125	Complete	100.0%		
68005_6088	Equipment Purchase	1,112	1,112	Complete	100.0%		
68012_6105	Construction 2	1,357	1,357	Complete	100.0%		
68039_6278	Construction 3	1,338	1,338	Complete	100.0%		
68079_6345	Construction 4	1,540	1,540	Complete	100.0%		
68080_6346	Construction 5	1,389	1,389	Complete	100.0%		
68126_6435	Construction 6	1,572	1,572	Complete	100.0%		
68127_6436	Construction 7	2,859	2,859	Complete	100.0%		
68239_6859	Permits	3	3	Complete	100.0%		
68240_6860	Easements	6	6	Complete	100.0%		
68300_7195	Construction 8	3,374	0	Future	0.0%	Jan-21	
68307_7236	Construction 9	3,374	0	Future	0.0%	Jun-25	
68330_7417	Phase 8 Design/CA/RI	675	0	Future	0.0%	Jan-19	
68331_7418	Phase 9 Design/CA/RI	675	0	Future	0.0%	Jun-23	
692 NHS - Section 27 Improvements		**$1,134**	**$124**	**10.9%**	**10.9%**		
67769_6333	Section 27 - Construction	1,009	27	2.7%	2.7%		Nov-21
68192_6589	Easements	23	0	Future	0.0%	Apr-16	
68211_6712	Technical Assistance	64	60	93.8%	93.8%		Mar-18
68229_6809	Surveying	37	37	Complete	100.0%		

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693 NHS - Revere & Malden Pipeline Improvement		**$57,527**	**$26,955**	**46.9%**	**46.9%**		
67780_5185	Revere & Malden - Design/CS/RI	1,786	1,786	Complete	100.0%		
67781_5186	Revere Beach - Construction	6,314	6,314	Complete	100.0%		
67782_5176	Malden Section 53 - Construction	10,026	10,026	Complete	100.0%		
67784_5177	Revere Section 53 - Construction	2,938	2,938	Complete	100.0%		
67785_5191	Control Valves - Construction	949	949	Complete	100.0%		
67786_5179	DI Pipeline Cleaning & Lining - Construc	158	158	Complete	100.0%		
67787_5178	Winthrop Cleaning & Lining - Constructio	575	575	Complete	100.0%		
67790_6335	Section 53 Connections - Construction	12,306	0	Future	0.0%	Jan-20	
67791_5986	Technical Assistance	246	246	Complete	100.0%		
67792_5238	Linden Square - Construction	1,849	1,849	Complete	100.0%		
67793_5239	Linden Square - Construction Admin.	125	125	Complete	100.0%		
67996_6033	Road Restoration - Design/CA/RI	77	77	Complete	100.0%		
67997_6034	Road Restoration - Construction	1,714	1,714	Complete	100.0%		
68020_6113	Malden Section 53 - Landscaping	20	20	Complete	100.0%		
68033_6183	Sidewalk Restoration	54	54	Complete	100.0%		
68258_6958	Section 99 Conn-Const	3,136	0	Future	0.0%	Mar-20	
68265_6978	Easements	30	0	Future	0.0%	Jul-06	
68280_7049	Permits	5	0	Future	0.0%	Apr-05	
75545_7454	Section 56 Replacement/Saugus Des CA/I	2,000	0	Future	0.0%	Apr-18	
75548_7485	Sect 53 and 99 Conn-Des CA/RI	3,750	0	Future	0.0%	Jun-17	
75549_7486	Section 56 Replacement- Construction	8,300	0	Future	0.0%	Apr-20	
75565_7500	Section 56 Replacement Feasibility Study	247	122	49.4%	49.4%		Jun-17
75569_7535	Sec 56 Pipe Demo Des CA/RI	320	0	Future	0.0%	Jan-17	
75570_7536	Sec 56 Pipe Demo Constr	600	0	Future	0.0%	Sep-17	
702 New Connect Mains-Shaft 7 to WASM 3		**$37,861**	**$11,316**	**29.9%**	**29.9%**		
67846_5163	Routing Study	397	397	Complete	100.0%		
68035_6199	Watertown MOU	167	167	Complete	100.0%		
68110_6383	CP1- Design/CA/RI	3,533	3,533	Complete	100.0%		
68111_6384	Des/CA/RI DP2/4 Meter 120	1,278	1,278	Complete	100.0%		
68112_6385	CP3 (Sect 23,24,47)-Final Des/CA/RI	3,507	0	Future	0.0%	Jul-16	
68114_6387	CP1 A&B - Easements	17	17	Complete	100.0%		
68115_6388	CP3 - Easements	40	0	Future	0.0%	Jan-18	
68117_6390	CP5 - Easements	22	22	Complete	100.0%		
68119_6392	CP3-Sect 23,24,47, Rehab	8,084	0	Future	0.0%	Jul-18	
68121_6394	CP5 - Northeast Segment	5,903	5,903	Complete	100.0%		
68174_6548	CP2 - Clean & Line Sections 59&60 - Cons	5,432	0	Future	0.0%	Mar-22	
68175_6547	CP2 -Easements	33	0	Future	0.0%	May-17	
68255_6955	Repl Sect 25, 75, 59460 Des CA/RI	3,000	0	Future	0.0%	Jan-18	
68256_6956	Replacement of Section 25 - Construction	2,930	0	Future	0.0%	Jul-19	
68350_7484	Section 75 Extension - Construction	3,520	0	Future	0.0%	Mar-20	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
704 Rehabilitation of Other Pump Stations		**$50,258**	**$30,058**	**59.8%**	**59.8%**		
67885_5153	Preliminary Design	351	351	Complete	100.0%		
68017_6110	Design/CS/RI	2,546	2,546	Complete	100.0%		
68072_6304	Construction II & C	639	639	Complete	100.0%		
68102_6375	Rehab of 5 Pump Stations	21,848	21,848	Complete	100.0%		
68179_6557	Legal	6	6	Complete	100.0%		
68204_6676	Proprietary Equipment Purchases	158	158	Complete	100.0%		
68266_6980	Design 2 CS/RI	4,510	4,510	Complete	100.0%		
708 Northern Extra High Service New Pipelines		**$8,045**	**$3,632**	**45.1%**	**45.1%**		
67970_5242	Design/CA/RI	588	588	Complete	100.0%		
67972_6340	Construction	3,032	3,032	Complete	100.0%		
68162_6522	Sections 34 & 45 - Construction	3,627	0	Future	0.0%	Jul-20	
68176_6554	Public Participation	5	0	Future	0.0%	Jul-15	
68177_6555	Legal	5	0	Future	0.0%	Jul-15	
68210_6707	Technical Assistance	54	8	14.8%	14.8%		Jan-17
68215_6749	PLC Equipment Purchases	4	4	Complete	100.0%		
68281_7050	Permits	5	0	Future	0.0%		
75528_7404	Section 34 & 45 Design/CA/RI	725	0	Future	0.0%	Jul-18	
712 Cathodic Protection Of Distrubution Mains		**$1,704**	**$208**	**12.2%**	**12.2%**		
68002_6058	Planning Phase I	108	108	Complete	100.0%		
68129_6438	Corrosion Control Program - Task 1	218	67	30.7%	30.7%		Aug-17
68130_6439	Corrosion Control Program - Task 2	814	0	Future	0.0%	Apr-18	
68131_6440	Corrosion Control Program - Task 3	531	0	Future	0.0%	Jan-19	
68216_6751	Technical Assistance	33	33	Complete	100.0%		
713 Spot Pond Supply Mains Rehabilitation		**$66,928**	**$63,601**	**95.0%**	**95.0%**		
60114_7334	Sec 4 Webster Ave Bridge Pipe Rehab - De	686	543	79.2%	79.2%		Mar-17
60115_7335	Sec 4 Webster Ave Bridge Pipe Rehab - Co	3,861	2,005	51.9%	51.9%		Dec-16
60145_7483	Walnut St Bridge Trusses-Const	1,000	0	Future	0.0%	Oct-20	
68038_6223	Preliminary Design & Design/CA/RI	10,869	10,869	Complete	100.0%		
68059_6316	Easements & Paving - CP1	143	143	Complete	100.0%		
68060_6317	North (Medford/Melrose)	6,597	6,597	Complete	100.0%		
68106_6379	Easements - CP2	50	50	Complete	100.0%		
68107_6380	Easements - CP3	80	80	Complete	100.0%		
68108_6381	Middle (Medford/Somerville)	22,177	22,177	Complete	100.0%		
68109_6382	South (Cambridge/Boston)	17,590	17,590	Complete	100.0%		
68150_6475	Early Valve Replacement Contract	2,387	2,387	Complete	100.0%		
68151_6476	Easements - CP4	1	1	Complete	100.0%		
68153_6483	Early Valve Equipment Purchase	161	161	Complete	100.0%		
68209_6697	Walnut St Bridge Trusses-Design	326	0	Future	0.0%	Oct-18	
68225_6784	Easements - CP5	75	73	97.3%	97.3%		Jun-20
68274_7003	CA/RI - CP3	925	925	Complete	100.0%		

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719 Chestnut Hill Connecting Mains		**$33,094**	**$17,487**	**52.8%**	**52.8%**		
68026_6141	Pump Stn. Potable Connect.-Design/CA/RI	1,360	1,360	Complete	100.0%		
68051_6301	Preliminary Engineering	457	457	Complete	100.0%		
68053_6303	Easements	81	81	Complete	100.0%		
68155_6501	Emergency Pump Relocation - Const.	6,502	6,502	Complete	100.0%		
68157_6503	Emergency Pump Relocation - Design/CA/RI	1,121	1,121	Complete	100.0%		
68180_6558	Boston Paving	133	133	Complete	100.0%		
68182_6560	Legal	1	1	Complete	100.0%		
68199_6623	BECo Emergency Pump Construction	431	431	Complete	100.0%		
68203_6651	Pump Station Potable Connection - Const	7,132	7,132	Complete	100.0%		
68230_6814	Equipment Pre-purchase	154	154	Complete	100.0%		
68231_6820	Demolition of Garages	72	72	Complete	100.0%		
68244_6869	Utilities	44	44	Complete	100.0%		
68267_6982	CH Final Conn Construction	12,176	0	Future	0.0%	Jul-20	
68268_6995	CH Final Conn Des ESDC/ REI	2,432	0	Future	0.0%	Jul-18	
75521_7382	Chestnut Hill Gatehouse # 1 Rep Constr	1,000	0	Future	0.0%	Apr-17	
721 South Spine Distribution Mains		**$76,281**	**$36,683**	**48.1%**	**48.1%**		
68083_6290	Sections 21, 43 & 22 - Design	7,115	7,115	Complete	100.0%		
68084_6291	Sections 21, 43 & 22 - Easements	107	107	Complete	100.0%		
68085_6292	Section 22 South - Construction	4,993	4,993	Complete	100.0%		
68089_6296	Section 20 & 58 - Design	3,149	0	Future	0.0%	Jun-23	
68090_6297	Section 20 & 58 - Easements	35	0	Future	0.0%	Sep-21	
68091_6298	Section 20 & 58 - Construction	14,821	0	Future	0.0%	Sep-25	
68122_6396	Adams Street Bridge	154	154	Complete	100.0%		
68193_6601	Southern High Public Participation	15	15	Complete	100.0%		
68194_6602	Southern High Extension Study	242	242	Complete	100.0%		
68228_6787	Boston Paving	3	3	Complete	100.0%		
68235_6844	Section 22 North - Construction	18,088	0	Future	0.0%	Jan-23	
68236_6845	Section 107 Phase 1 - Construction	6,184	6,184	Complete	100.0%		
68237_6846	Legal	5	1	20.0%	20.0%		May-27
68238_6847	Technical Assistance	28	28	Complete	100.0%		
68247_6885	Contract 1A - Construction	2,859	2,859	Complete	100.0%		
68290_7099	Section 107 Phase 2 - Construction	14,847	14,847	Complete	100.0%		
68291_7104	Milton Pressure Regulator Valve	135	135	Complete	100.0%		
68298_7120	Section 22 North - Design/ESDC	2,500	0	Future	0.0%	Jul-20	
68299_7155	Section 22 North - Facility Plan/EIR	1,000	0	Future	0.0%	Aug-17	

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722 NIH Redundancy & Storage		**$105,655**	**$15,345**	**14.5%**	**14.5%**		
53454_6954	Concept Plan	797	797	Complete	100.0%		
68093_6306	Easements	929	0	Future	0.0%	Jul-17	
68252_6906	Section 89/29 Redundancy - Design	6,172	3,123	50.6%	50.6%		Aug-20
68276_7026	Purchase Mobile Pump Unit	291	291	Complete	100.0%		
68277_7045	Short Term Improvements - Design/CA/RI	821	821	Complete	100.0%		
68278_7047	Permits	5	0	Future	0.0%	Jan-10	
68279_7048	Technical Assistance	18	0	Future	0.0%	Jan-10	
68282_7066	West St Pipe Reading Constr Ph1A	1,910	1,910	Complete	100.0%		
68283_7067	Sec 89 & 29 Redundancy Const. Phase 2	18,230	0	Future	0.0%	May-17	
68284_7068	NIH Storage - Construction	19,017	0	Future	0.0%	Jan-26	
68294_7116	Section 89 & 29 Rehab - Design	3,200	0	Future	0.0%	Jul-17	
68295_7117	Section 89 & 29 Rehab - Construction	16,000	0	Future	0.0%	Jan-20	
68309_7260	Gillis Pump Station Improvements	2,178	2,178	Complete	100.0%		
68310_7261	Reading/Stoneham Interconnections	3,467	3,467	Complete	100.0%		
68316_7311	NIH Storage - Design	3,859	0	Future	0.0%	Jan-24	
68317_7471	Sec 89/29 Redund Constr Ph 1B	10,943	2,759	25.2%	25.2%		Mar-18
68318_7478	Sec 89/29 Redund Constr Ph 1C	17,818	0	Future	0.0%	Dec-16	
723 Northern Low Service Rehabilitation Section 8		**$52,678**	**$2,321**	**4.4%**	**4.4%**		
68094_6321	Easements	80	0	Future	0.0%	Jul-15	
68095_6322	Section 8 - Construction	14,741	0	Future	0.0%	Jul-26	
68262_6962	Rehab Sects. 37 & 46 Chelsea/EB Constr.	3,200	0	Future	0.0%	Jul-25	
68263_6977	Permits	299	285	95.3%	95.3%		Jul-27
68264_6979	Technical Assistance	44	44	Complete	100.0%		
68275_7021	Section 97A - Construction	1,992	1,992	Complete	100.0%		
68287_7092	Section 8 - Design/CA/RI	2,948	0	Future	0.0%	Jul-23	
75529_7405	Rehab Sec 37&46 Chel/BosDes/CA/RI	802	0	Future	0.0%	Jul-23	
727 Southern Extra High Redundancy & Storage		**$107,885**	**$8,944**	**8.3%**	**8.3%**		
53397_6452	Concept Plan/Prelim. Design/Env. Review	633	633	Complete	100.0%		
53398_6453	Redundancy/Storage Ph 1 Final Des/CA/Rl	7,677	2,173	28.3%	28.3%		Aug-21
53399_6454	Red Pipl Sect III Cont 1	11,770	0	Future	0.0%	Jul-16	
68135_6444	Redundancy/Storage Ph 2 Final Des/CA/Rl	6,192	0	Future	0.0%	Jan-26	
68136_6445	University Avenue Water Main	6,137	6,137	Complete	100.0%		
68292_7112	Sections 77 & 88 Rehab - Design	1,426	0	Future	0.0%	Mar-21	
68293_7113	Sections 77 & 88 Rehab - Construction	5,702	0	Future	0.0%	Apr-23	
68305_7226	Easements/Agreements	300	0	Future	0.0%	Jul-14	
68306_7227	Permits/Utilities	300	1	0.3%	0.3%		Jul-27
68308_7245	Redundancy/Storage Phase 2 Construct.	30,962	0	Future	0.0%	Jan-28	
68311_7262	Phase 3, 2nd Tank - Construction	10,904	0	Future	0.0%	Jan-33	
68312_7263	Phase 3, 2nd Tank - Design	2,181	0	Future	0.0%	Jan-31	
68555_7504	Red Pipl Sect III Cont 2	13,700	0	Future	0.0%	Apr-17	
68556_7505	Red Pipl Sect III Cont 3	10,000	0	Future	0.0%	Jun-17	

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730 Weston Aqueduct Supply Mains		**$81,564**	**$79,586**	**97.6%**	**97.6%**		
59774_5034	Newton Water Mains - Construction	669	669	Complete	100.0%		
59776_5975	Technical Assistance	186	186	Complete	100.0%		
67865_5147	WASM 4 - Design/CA/RI	5,978	5,978	Complete	100.0%		
68027_6142	WASMs 1 & 2 - Design/CA/RI	5,060	5,060	Complete	100.0%		
68030_6174	Appraisal / Easement	753	449	59.6%	59.6%		Oct-18
68031_6175	WASM 1, 2 & 4 - Auburndale	4,001	4,001	Complete	100.0%		
68032_6176	Meter 103 - Construction	61	61	Complete	100.0%		
68041_6280	WASMs 1 & 2 - Newton	9,219	9,219	Complete	100.0%		
68042_6281	WASMs 1 & 2 - Boston	7,039	7,039	Complete	100.0%		
68069_6312	WASMs 2 & 4 - Newton	8,282	8,282	Complete	100.0%		
68070_6313	WASM 4 - Allston & Western Ave. Sewer	17,331	17,331	Complete	100.0%		
68166_6539	WASM 3 - MEPA/Design/CA/RI	15,483	503	3.2%	3.2%		Oct-26
68167_6540	Sect 36/WS/Waltham Conn. - Design/CA/RI	2,450	1,885	76.9%	76.9%		May-17
68173_6546	Section 28, Arlington - CP1	2,304	2,304	Complete	100.0%		
68245_6870	Survey	210	89	42.4%	42.4%		Oct-25
68269_6996	Arlington Pipe Work	401	401	Complete	100.0%		
68272_7000	WASM3 Section 12 Replacement - Constr.	2,114	2,114	Complete	100.0%		
68273_7001	WASM3 Section 12 Replacement - Design	265	265	Complete	100.0%		
68285_7083	Section 28 - Design/CA/RI	867	867	Complete	100.0%		
68301_7222	Watertown Sect Rehab	2,818	2,668	94.7%	94.7%		Dec-13
68332_7448	Sect 36/W11/S 9-All Valve	11,556	10,720	92.8%	92.8%		Dec-16
68333_7457	Section 101 Const	12,826	0	Future	0.0%	Jul-23	
731 Lynnfield Pipeline		**$5,626**	**$5,626**	**Complete**	**100.0%**		
68187_6584	Construction Phase 2	4,792	4,792	Complete	100.0%		
68196_6619	Easement, Legal, License & Permits	8	8	Complete	100.0%		
68251_6905	Design/CA/RI	553	553	Complete	100.0%		
68289_7096	Temporary Interconnect - Phase 1 Constr	272	272	Complete	100.0%		
735 Section 80 Rehabilitation		**$12,103**	**$0**	**Future**	**0.0%**		
68249_6891	Section 80 - Construction	8,212	0	Future	0.0%	Jul-19	
68250_6892	Section 80 - Design/CS/RI	2,053	0	Future	0.0%	Feb-18	

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753 Central Monitoring System		**$39,040**	**$17,805**	**45.6%**	**45.6%**		
75300_5025	Study	190	190	Complete	100.0%		
75301_5026	Design	2,651	2,651	Complete	100.0%		
75302_5027	Equipment Prepurchase	2,162	2,162	Complete	100.0%		
75303_5028	SCADA Implementation	2,101	2,035	96.9%	96.9%		Mar-17
75304_5160	Communications Structures	161	161	Complete	100.0%		
75305_5173	Construction & Start-up Services	352	352	Complete	100.0%		
75306_5171	Construction 1	209	209	Complete	100.0%		
75308_5849	Operations Center - Construction	1,499	1,499	Complete	100.0%		
75309_5987	Technical Assistance	386	386	Complete	100.0%		
75310_5218	Waterworks SCADA/PLC Upg	18,500	0	Future	0.0%	Oct-16	
75474_6125	Microwave Equipment	782	782	Complete	100.0%		
75488_6653	Microwave Comm System-Wide Backbone	1,694	1,694	Complete	100.0%		
75489_6654	Monitoring & Control - Study & Design	1,808	1,808	Complete	100.0%		
75494_6816	Microwave Communic for Waterworks Fac.	1,957	1,957	Complete	100.0%		
75495_6825	Ludlow Communications	41	41	Complete	100.0%		
75512_7338	Quabbin Power Comm & Secur	3,505	1,335	38.1%	38.1%		Apr-17
75540_7461	Quabbin Power Design	814	541	66.5%	66.5%		Sep-18
75541_7475	Utility Fees and Permits	228	2	0.9%	0.9%		Dec-17
763 Distribution Systems Facilities Mapping		**$2,299**	**$1,036**	**45.1%**	**45.1%**		
75458_5162	Planning and Design	936	936	Complete	100.0%		
75476_6152	Data Purchase	100	100	Complete	100.0%		
75484_6525	Records Development	763	0	Future	0.0%	Oct-19	
75600_7489	Update of Record Drawing	500	0	Future	0.0%	Apr-18	
764 Local Water Infrastructure Rehabilitation Assistance Progran		**$7,488**	**$7,488**	**Complete**	**100.0%**		
75477_6343	Loans	22,304	22,304	Complete	100.0%		
75478_6344	Loan Repayment	-22,304	-22,304	Complete	100.0%		
75479_6408	Grants	7,488	7,488	Complete	100.0%		
765 Local Water Pipeline Improvement Loan Program		**$0**	**$121,568**	**NA**	**NA**		
75485_6608	Community Loans	222,318	222,318	Complete	100.0%		
75493_6759	Community Repayment	-222,318	-179,106	80.6%	80.6%		Jun-23
75513_7339	Local Water System Assistance Loans	200,000	97,711	48.9%	48.9%		Jun-20
75514_7340	Local Water System Assistance Repayment	-200,000	-20,721	10.4%	10.4%		Jun-30
75515_7350	CVA Loans	10,000	2,085	20.9%	20.9%		Jun-20
75516_7351	CVA Repayments	-10,000	-719	7.2%	7.2%		Jun-30

Appendix 6
Project Status Overview

The following information presented below provides an approximation of status for design and construction phases in the current capital budget. Planned end dates are provided for ongoing phases. Planned start dates are provided for future phases. These dates are anticipated Notice-to-Proceed dates after the bid period. All dates are subject to change.

Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
766 Waterworks Facility Asset Protection		**$20,589**	**$726**	**3.5%**	**3.5%**		
75490_6689	Meter Vault Manhole Retrofits - Design	424	0	Future	0.0%	Sep-18	
75497_6832	Walnut Hill Tank - Design	800	0	Future	0.0%	Jul-17	
75498_6833	Walnut Hill Tank - Construction	1,000	0	Future	0.0%	Jul-18	
75501_6910	Waltham Bridge Pipe Replacement	238	238	Complete	100.0%		
75502_6920	Permits and Legal Fees	16	10	62.5%	62.5%		Jun-18
75505_7022	Cosgrove/Gillis PS/CF CSO Flat Roof Repl	900	0	Future	0.0%	Sep-17	
75509_7064	Cosgrove Valve Replacement - Constructio	1,899	0	Future	0.0%	Jul-20	
75510_7065	Cosgrove Valve Replacement - Design	223	0	Future	0.0%	Jul-19	
75511_7228	Transformer at Cosgrove Intake Building	299	299	Complete	100.0%		
75524_7385	Covered Storage Tank Rehab - Design CA/R	1,000	0	Future	0.0%	Jul-19	
75535_7425	Electrical Distrib. Upgrades at Southbor	400	0	Future	0.0%	Apr-18	
75536_7453	Water Meter Upgrade Replacement	1,000	0	Future	0.0%	Sep-20	
75537_7458	Beacon Street Line Repair - Construction	1,551	0	Future	0.0%	Jun-16	
75538_7474	Beacon Street Line Repair - Design/CA/RI	443	174	39.3%	39.3%		Dec-17
75550_7479	Meter Vault Manhole Retrofits - Construc	1,696	0	Future	0.0%	Sep-19	
75553_7482	Covered Storage Tank Rehab - Constructio	4,000	0	Future	0.0%	Jul-21	
75554_7542	Water Meter Upgr Des CA/RI	200	0	Future	0.0%	Sep-18	
77552_7493	Elevated Water Storage Tank Repaint Cons	4,500	0	Future	0.0%	Jul-19	
881 Equipment Purchase		**$29,188**	**$18,489**	**63.3%**	**63.3%**		
92374_6760	Security Equipment & Installation	11,102	8,604	77.5%	77.5%		Jun-18
92379_6808	ICP-MS Lab Testing Equipment	117	117	Complete	100.0%		
92411_7239	High Lift Fork Loader (Lull)	121	121	Complete	100.0%		
92416_7246	Ford Ramp Truck	122	122	Complete	100.0%		
92417_7247	Street Sweeper	182	182	Complete	100.0%		
98454_7306	Prior Vehicle Purchases	2,415	2,415	Complete	100.0%		
98455_7307	FY11-13 Vehicle Purchases	2,361	2,361	Complete	100.0%		
98456_7308	FY14-18 Vehicle Purchases	6,507	4,021	61.8%	61.8%		Jun-18
98457_7309	FY19-23 Vehicle Purchases	5,140	0	Future	0.0%	Jul-18	
98458_7310	FY14-18 Major lab Instrumentation	1,000	425	42.5%	42.5%		Mar-20
98467_7325	Front-End Loader	121	121	Complete	100.0%		
925 Technical Assistance		**$1,150**	**$0**	**Future**	**0.0%**		
77000_LAND	Land Appraisal	150	0	Future	0.0%		
80000_SURV	Surveying	100	0	Future	0.0%		
90000_HAZM	Hazardous Material	900	0	Future	0.0%		

Appendix 6
Project Status Overview

The following information presented below provides an approximation of status for design and construction phases in the current capital budget. Planned end dates are provided for ongoing phases. Planned start dates are provided for future phases. These dates are anticipated Notice-to-Proceed dates after the bid period. All dates are subject to change.

Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
933 Capital Maintenance Planning		**$15,886**	**$12,544**	**79.0%**	**79.0%**		
19175_6421	Inventory & Evaluation - 1 & 2	2,579	2,579	Complete	100.0%		
92387_6976	As-Needed Design Contract 1	313	313	Complete	100.0%		
92393_6988	As Needed Design Contract 2	318	318	Complete	100.0%		
92399_7070	As-Needed Design Contract 5	558	558	Complete	100.0%		
92402_7101	As-Needed Design Contract 3	579	579	Complete	100.0%		
92403_7102	As-Needed Design Contract 4	247	247	Complete	100.0%		
92413_7242	As-Needed Design Contract 6	704	704	Complete	100.0%		
92414_7243	As-Needed Design Contract 7	980	980	Complete	100.0%		
92415_7244	As-Needed Design Contract 8	1,044	1,044	Complete	100.0%		
98470_7390	As-Needed Design Contract 9	1,610	1,610	Complete	100.0%		
98471_7391	As-Needed Design Contract 10	1,873	1,870	Complete	99.8%		
98473_7436	As-Needed Design Contract 11	432	432	Complete	100.0%		
98474_7437	As-Needed Design Contract 12	935	730	78.1%	78.1%		Jul-16
98485_7456	As-Needed Design Contract 13	967	581	60.1%	60.1%		Aug-16
98487_7496	As-Needed Design Contract 14	1,425	0	Future	0.0%	Jun-16	
98488_7497	As-Needed Design Contract 15	1,323	0	Future	0.0%	Jun-16	
934 MWRA Facilities Management		**$2,151**	**$371**	**17.2%**	**17.2%**		
92389_6983	Design/Engineering Services	150	0	Future	0.0%	Jul-18	
92390_6984	Facilities Construction	2,001	371	18.5%	18.5%		Sep-20
935 Alternative Energy Initiatives		**$23,271**	**$17,454**	**75.0%**	**75.0%**		
19285_6974	Deer Island Solar	904	904	Complete	100.0%		
92428_6974C	DI Wind	4,063	4,063	Complete	100.0%		
92430_7270	Future DI Wind Constr (Battery D Locat)	4,883	0	Future	0.0%	Oct-19	
92432_6974E	Loring Road Hydro - Design	2	2	Complete	100.0%		
92439_7274	Technical Assistance - Solar	124	124	Complete	100.0%		
92440_6974B	Energy Advisory Consultant Services	46	46	Complete	100.0%		
92441_OP67	Wind Power Feasibility Study	346	346	Complete	100.0%		
92442_7292	DI Photovoltaic System Phase 1 - Const.	1,119	1,119	Complete	100.0%		
92443_7274A	Technical Assistance-Energy Efficiency	463	463	Complete	100.0%		
92444_7274B	Technical Assistance - Solar II	348	348	Complete	100.0%		
92445_7274C	Tech Assistance - Emerging Technology	101	101	Complete	100.0%		
92446_7274D	Technical Assistance - Wind	460	460	Complete	100.0%		
98450_7302	Charlestown Wind - Construction	5,125	5,125	Complete	100.0%		
98452_7304	John J. Carroll WTP Solar-Construction	2,367	2,367	Complete	100.0%		
98459_6974F	Loring Road Hydro - Construction	1,882	1,882	Complete	100.0%		
98463_7321	DI Wind Phase II Construction	37	37	Complete	100.0%		
98465_7323	Fish Hatch Pipeline Hydro	1,000	67	6.7%	6.7%		Sep-17

Appendix 6
Project Status Overview

The following information presented below provides an approximation of status for design and construction phases in the current capital budget. Planned end dates are provided for ongoing phases. Planned start dates are provided for future phases. These dates are anticipated Notice-to-Proceed dates after the bid period. All dates are subject to change.

Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY16	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
940 Application Improvement Program		**$9,980**	**$1,476**	**14.8%**	**14.8%**		
92420_7251	GIS Applications & Integration	350	22	6.3%	6.3%		Jun-18
92435_7286	Lawson Enhancements	1,750	0	Future	0.0%	Mar-17	
92436_7287	Maximo Upgrade	2,626	992	37.8%	37.8%		Dec-18
92437_7288	PIMS Enhancements	400	0	Future	0.0%	Jan-17	
92469_7386	Enterprise Performance mgmt Enhancements	200	81	40.5%	40.5%		Jun-18
98475_7438	Enterprise Content Mgmt	4,000	0	Future	0.0%	Sep-17	
98476_7439	Mobile Integrations	300	27	9.0%	9.0%		Jun-18
98484_7447	LIMS Enhancement	354	354	Complete	100.0%		
942 Information Security Program ISP		**$2,822**	**$1,181**	**41.8%**	**41.8%**		
92434_7285	IT Security Infrastructure/Equipment	501	501	Complete	100.0%		
92500_7499	Info Sec Prot Infrastructure Upg	1,456	361	24.8%	24.8%		Jun-19
98477_7440	Electronic Sec Impl	546	0	Future	0.0%	Sep-17	
98483_7446	IT Security Program (ISP) Development	318	318	Complete	100.0%		
944 Information Technology Management Program		**$923**	**$0**	**Future**	**0.0%**		
92421_7252	Service Delivery & Best Practices	111	0	Future	0.0%	Dec-16	
98472_7408	IT Project Management Methodology	200	0	Future	0.0%	Jan-17	
98478_7441	Software Devel Life Cycle (SDLC)	612	0	Future	0.0%	Mar-17	
946 IT Infrastructure Program		**$10,271**	**$5,374**	**52.3%**	**52.3%**		
92404_7200	IT System Architecture	1,009	1,009	Complete	100.0%		
92405_7201	Net 2020/Net 2020 DITP/Southborough	2,552	1,066	41.8%	41.8%		Jun-19
92406_7203	Storage Upgrades	1,575	892	56.6%	56.6%		Jun-19
92407_7204	Backup Upgrades	894	581	65.0%	65.0%		Jun-19
92408_7205	Server Management	500	267	53.4%	53.4%		Jun-19
98480_7443	Enterprise Applic Integr	2,091	468	22.4%	22.4%		Jun-19
98481_7444	E-Mail Upgrades	150	8	5.3%	5.3%		Jun-18
98482_7445	Enterprise Data Mgmt	1,500	1,083	72.2%	72.2%		Jun-19

APPENDIX 7

Municipality and Project Reference by Municipality

APPENDIX 7
PROJECT/MUNICIPALITY(s)

Project	Number/ Project	Community(s) Served
104	Braintree-Weymouth Relief Facilities	Braintree, Hingham, Holbrook, Randolph, Weymouth, Quincy
128	Infiltration/Inflow Local Financial Assistance Program	All Wastewater Communities
130	Siphon Structure Rehabiliation	All Wastewater Communities
131	Upper Neponset Valley Sewer System	Dedham, Boston, Brookline, Newton
132	Corrosion and Odor Control Study	All Wastewater Communities
136	West Roxbury Tunnel	Ashland, Framingham, Natick, Wellesley, Dedham, Boston, Brookline, Newton, Nedham, and
137	Wastewater Central Monitoring	All Wastewater Communities
139	South System Relief Project	Boston, Milton
141	Wastewater Process Optimization	All Wastewater Communities
142	Wastewater Metering System Equipment Replacement	All Wastewater Communities
145	Interception & Pumping Facility Asset Protection	All Wastewater Communities
146	D.I. Cross Harbor Tunnel	All Wastewater Communities
147	Randolph Trunk Sewer Relief	Braintree & Randolph
206	Deer Island Treatment Plant Asset Protection	All Wastewater Communities
210	Clinton Wastewater Treatment Plant	Clinton
211	Laboratory Services	All MWRA Communities
271	Residuals Asset Protection	All Wastewater Communities
324	CSO Support	Boston, Cambridge, Chelsea, Revere, Somerville
339	North Dorchester Bay & Reserve Channel Conduits/CSO	Boston
340	South Dorchester Bay Sewer Separation (Fox Point)	Boston
341	South Dorchester Bay Sewer Separation (Commercial Pt.)	Boston
346	Cambridge CAM002-004 Sewer Separation	Cambridge
347	East Boston Branch Sewer Relief	Boston, Chelsea, Everett
355	MWR003 Gate and Siphon	Boston, Cambridge
356	Fort Point Channel Sewer Separation	Boston
357	Charles River CSO Controls	Boston, Brookline, Cambridge
358	Morrisey Boulevard Drain	Boston
359	Reserved Channel Sewer Separation	Boston
360	Brookline Sewer Separation	Brookline
361	Bulfinch Triangle Sewer Separation	Boston
542	Walnut Hill Treatment Plant	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
543	Quabbin Water Treatment Plant	South Hadley, Chicopee, Wilbraham
545	Blue Hills Covered Storage	Boston, Canton, Milton, Norwood, Quincy, Brookline, Dedham, Westwood, Stoughton
550	Low Service Storage Near Spot Pond	Cambridge, Charlestown, Chelsea, East Boston, Everett, Malden, Medford, Somerville
597	Winsor Dam Hydroelectric	All Water Communities
604	MetroWest Tunnel	All Water Communities (except South Hadley Fire District #1, Chicopee, Wilbraham, Worcester, Clinton, and Leominster)
616	Quabbin Transmission System	Chicopee, South Hadley, Wilbraham
617	Sudbury/Weston Aqueduct Repairs	All Water Communities (except South Hadley Fire District #1, Chicopee, Wilbraham, Worcester, Clinton, and Leominster)
618	Northern High NW Trans Section 70-71	Stoneham, Wakefield, Melrose, Lynnfield, Saugus, Lynn, Peabody, Marblehead, Swampscott, Nahant
621	Watershed Land	All Water Communities
622	Cosgrove Tunnel Redundancy	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
623	Dam Projects	All Water Communities
625	Metro Tunnel Redundancy	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
628	Metro Redundancy Interim Improvements	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
630	Watershed Division Capital Improvements	All Water Communities
677	Valve Replacement	All Water Communities
692	Northern High Service Section 27 Improvements	Lynn, Marblehead, Nahant, Swampscott
693	Northern High Service Pipe Improvements - Revere/Malden	Boston, Lynn, Malden, Marblehead, Nahant, Peabody, Reading, Revere, Saugus, Winthrop
702	New Connecting Mains - Shaft 7 to WASM 3	Arlington, Bedford, Belmont, Boston, Lexington, Medford, Newton, Somerville, Waltham, Watertown, Winchester
704	Rehabilitation of Other Pump Stations	Arlington, Bedford, Belmont, Boston, Brookline, Canton, Lexington, Milton, Norwood, Waltham, Watertown, Winchester
708	Northern Extra High Service - New Pipelines	Arlington, Bedford, Lexington, Waltham
712	Cathodic Protection of Distribution Mains	All Water Communities
713	Spot Pond Supply Mains Rehabilitation	Arlington, Boston, Cambridge, Chelsea, Everett, Malden, Medford, Somerville
719	Chestnut Hill Connecting Mains	Boston, Brookline, Newton
721	Southern Spine Distribution Mains	Boston, Brookline, Canton, Milton, Norwood, Quincy, Dedham, Westwood, Stoughton

APPENDIX 7
PROJECT/MUNICIPALITY(s)

Project	Number/ Project	Community(s) Served
722	NIH Redundancy & Covered Storage	Reading, Stoneham, Wakefield, Winchester, Woburn
723	Northern Low Service Rehab. - Sections 8	Chelsea, Boston, Everett
727	SEH Redundancy & Storage	Boston, Brookline, Canton, Milton, Norwood, Dedham, Westwood, Stoughton
730	Weston Aqueduct Supply Mains	Weston, Newton, Boston, Watertown, Cambridge, Waltham, Belmont, Arlington, Somerville
731	Lynnfield Pipeline	Lynnfield, Saugus
735	Section 80 Rehabilitation	Wellesley and Needham
753	Central Monitoring System	All Water Communities
763	Distribution Systems Facilities Mapping	All Water Communities
765	Local Water Pipeline Imp. Loan Program	All Water Communities
766	Waterworks Facility Asset Protection	All Water Communities
881	Centralized Equipment Purchase	All MWRA Customers
925	Technical Assistance	All MWRA Customers
931	Business Systems Plan	All MWRA Customers
932	Environmental Remediation	All MWRA Customers
933	Capital Maintenance Planning/Development	All MWRA Customers
934	MWRA Facilities Management	All MWRA Customers
935	Alternative Energy Initiatives	All MWRA Customers
940	Application Improvement Program	All MWRA Customers
942	Information Security Program ISP	All MWRA Customers
944	Information Technology Management Program	All MWRA Customers
946	IT Infrastructure Program	All MWRA Customers

APPENDIX 8

Municipality and Project Reference by Project

APPENDIX 8
MUNICIPALITY/PROJECT(s)

Municipality / Project Number	Project
All MWRA COMMUNITIES	
211	Laboratory Services
881	Equipment Purchase
925	Technical Assistance
931	Business Systems Plan
932	Environmental Remediation
933	Capital Maintenance Planning/Development
934	MWRA Facilities Management
935	Alternatve Energy Initiatives
940	Application Improvement Program
942	Information Security Program ISP
944	Information Technology Management Program
946	IT Infrastructure Program
ALL WASTEWATER COMMUNITIES	
128	Infiltration/Inflow Local Financial Assistance Program
130	Siphon Structure Rehabiliation
132	Corrosion & Odor Control Study
137	Wastewater Central Monitoring
141	Wastewater Process Optimization
142	Wastewater Metering System Equipment Replacement
145	Interception & Pumping Facilities Asset Protection
146	D.I. Cross Harbor Tunnel
147	Randolph Trunk Sewer Relief
206	Deer Island Treatment Plant Asset Protection
271	Residuals Asset Protection
ALL WATER COMMUNITIES	
597	Winsor Dam Hydroelectric
621	Watershed Land
623	Dam Projects
630	Watershed Division Capital Improvements
677	Valve Replacement
712	Cathodic Protection of Distribution Mains
753	Central Monitoring System
763	Distribution Systems Facilities Mapping
765	Local Water Pipeline Improvement Loan Program
766	Watertown Facility Asset Protection
ALL WATER COMMUNITIES (except South Hadley, Chicopee, Wibraham, Worcester, Clinton, and Leominster)	
542	Walnut Hill Treatment Plant
544	Norumbega Covered Storage
604	MetroWest Tunnel
622	Cosgrove Tunnel Redundancy
625	Metro Tunnel Redundancy
628	Metro Redundancy Intrerim Improvements
Arlington	
702	New Connecting Mains - Shaft 7 to WASM 3
704	Rehabilitation of Other Pump Stations
708	Northern Extra High Service - New Pipelines
713	Spot Pond Supply Mains Rehabilitation
730	Weston Aqueduct Supply Mains
Ashland	
136	West Roxbury Tunnel
Bedford	
702	New Connecting Mains - Shaft 7 to WASM 3
704	Rehabilitation of Other Pump Stations
708	Northern Extra High Service - New Pipelines
Belmont	
702	New Connecting Mains - Shaft 7 to WASM 3
704	Rehabilitation of Other Pump Stations
730	Weston Aqueduct Supply Mains
Boston	
131	Upper Neponset Valley Sewer System
136	West Roxbury Tunnel
139	South System Relief Project
324	CSO Support
339	North Dorchester Bay & Reserve Channel Conduits/CSO
340	South Dorchester Bay Sewer Separation (Fox Point)
341	South Dorchester Bay Sewer Separation (Commercial Pt.)
347	East Boston Branch Sewer Relief
355	MWR003 Gate and Siphon
356	Fort Point Channel Sewer Separation
357	Charles River CSO Controlls
358	Morrisey Boulevard Drain
359	Reserved Channel Sewer Separation
361	Bulfinch Triangle Sewer Separation
545	Blue Hills Covered Storage
550	Spot Pond Covered Storage
693	Northern High Service Pipe Improvements - Revere/Malden
702	New Connecting Mains - Shaft 7 to WASM 3
704	Rehabilitation of Other Pump Stations
713	Spot Pond Supply Mains Rehabilitation
719	Chestnut Hill Connecting Mains
721	Southern Spine Distribution Mains
723	Northern Low Service Rehab. - Sections 8 & 57
727	SEH Redundancy & Storage
730	Weston Aqueduct Supply Mains
Braintree	
104	Braintree-Weymouth Relief Facilities
147	Randolph Trunk Sewer Relief

APPENDIX 8
MUNICIPALITY/PROJECT(s)

Municipality	Project Number/Project
Brookline	
	131 Upper Neponset Valley Sewer System
	136 West Roxbury Tunnel
	357 Charles River CSO Controls
	360 Brookline Sewer Separation
	704 Rehabilitation of Other Pump Stations
	719 Chestnut Hill Connecting Mains
	721 Southern Spine Distribution Mains
	727 SEH Redundancy & Storage
Burlington	
	127 Cummingsville Replacement Sewer
Cambridge	
	324 CSO Support
	346 Cambridge CAM002-004 Sewer Separation
	355 MWR003 Gate and Siphon
	357 Charles River CSO Controls
	550 Spot Pond Covered Storage
	713 Spot Pond Supply Mains Rehabilitation
	730 Weston Aqueduct Supply Mains
Canton	
	545 Blue Hills Covered Storage
	704 Rehabilitation of Other Pump Stations
	714 Southern Extra High - Sections 41, 42, and 74
	721 Southern Spine Distribution Mains
	727 SEH Redundancy & Storage
Chelsea	
	324 CSO Support
	347 East Boston Branch Sewer Relief
	550 Spot Pond Covered Storage
	713 Spot Pond Supply Mains Rehabilitation
	723 Northern Low Service Rehab. - Sections 8 & 57
Lynn	
	618 Northern High NW Trans Section 70-71
	692 Northern High Service Section 27 Improvements
	693 Northern High Service Pipe Improvements - Revere/Malden
Lynnfield	
	618 Northern High NW Trans Section 70-71
	731 Lynnfield Pipeline
Malden	
	550 **Spot Pond Covered Storage**
	693 Northern High Service Pipe Improvements - Revere/Malden
	713 Spot Pond Supply Mains Rehabilitation

Municipality	Project Number/Project
Chicopee	
	543 Quabbin Water Treatment Plant
	615 Chicopee Valley Aqueduct Redundancy
	616 Quabbin Transmission System
	753 Central Monitoring System
Clinton	
	210 Clinton Wastewater Treatment Plant
Dedham	
	131 Upper Neponset Valley Sewer System
	136 West Roxbury Tunnel
	727 SEH Redundancy & Storage
Dover	
	136 West Roxbury Tunnel
Everett	
	347 East Boston Branch Sewer Relief
	550 Spot Pond Covered Storage
	713 Spot Pond Supply Mains Rehabilitation
	723 Northern Low Service Rehab. - Sections 8 & 57
Framingham	
	136 West Roxbury Tunnel
	617 Sudbury/Weston Aqueduct
Hingham	
	104 Braintree-Weymouth Relief Facilities
Holbrook	
	104 Braintree-Weymouth Relief Facilities
	617 Sudbury/Weston Aqueduct
Lexington	
	702 New Connecting Mains - Shaft 7 to WASM 3
	704 Rehabilitation of Other Pump Stations
	708 Northern Extra High Service - New Pipelines
Nahant	
	618 Northern High NW Trans Section 70-71
	692 Northern High Service Section 27
	693 Northern High Service Pipe Improvements - Revere/Malden
Natick	
	136 West Roxbury Tunnel
	617 Sudbury/Weston Aqueduct Repairs
Needham	
	136 West Roxbury Tunnel
	735 Section 80 Rehabilitation

APPENDIX 8
MUNICIPALITY/PROJECT(s)

Municipality / Project Number	Project
Marblehead	
618	Northern High NW Trans Section 70-71
692	Northern High Service Section 27
693	Northern High Service Pipe Improvements - Revere/Malden
Medford	
547	Fells Covered Storage
550	Spot Pond Covered Storage
702	New Connecting Mains - Shaft 7 to WASM 3
713	Spot Pond Supply Mains Rehabilitation
Melrose	
618	Northern High NW Trans Section 70-71
Milton	
545	Blue Hills Covered Storage
704	Rehabilitation of Other Pump Stations
714	Southern Extra High - Sections 41, 42, and 74
721	Southern Spine Distribution Mains
727	SEH Redundancy & Storage
Quincy	
104	Braintree-Weymouth Relief Facilities
545	Blue Hills Covered Storage
721	Southern Spine Distribution Mains
Randolph	
104	Braintree-Weymouth Relief Facilities
147	Randolph Trunk Sewer Relief
Reading	
722	NIH Redundancy & Covered Storage
Revere	
349	Chelsea Trunk Sewer
693	Northern High Service Pipe Improvements - Revere/Malden
Saugus	
618	Northern High NW Trans Section 70-71
693	Northern High Service Pipe Improvements - Revere/Malden
731	Lynnfield Pipeline
Newton	
131	Upper Neponset Valley Relief Sewer
136	West Roxbury Tunnel
702	New Connecting Mains - Shaft 7 to WASM 3
719	Chestnut Hill Connecting Mains
730	Weston Aqueduct Supply Mains
Norwood	
545	Blue Hills Covered Storage
704	Rehabilitation of Other Pump Stations
714	Southern Extra High - Sections 41 and 42
721	Southern Spine Distribution Mains
727	SEH Redundancy & Storage
Peabody	
618	Northern High NW Trans Section 70-71
693	Northern High Service Pipe Improvements - Revere/Malden
721	Southern Spine Distribution Mains
722	NIH Redundancy & Storage
Wilbraham	
543	Quabbin Water Treatment Plant
616	Quabbin Transmission System
753	Central Monitoring System
Wakefield	
618	Northern High NW Trans Section 70-71
722	NIH Redundancy & Covered Storage
Waltham	
702	New Connecting Mains - Shaft 7 to WASM 3
704	Rehabilitation of Other Pump Stations
708	Northern Extra High Service - New Pipelines
730	Weston Aqueduct Supply Mains
Watertown	
702	New Connecting Mains - Shaft 7 to WASM 3
704	Rehabilitation of Other Pump Stations
730	Weston Aqueduct Supply Mains
Wellesley	
136	West Roxbury Tunnel
617	Sudbury/Weston Aqueduct Repairs
735	Section 80 Rehabilitation

APPENDIX 8
MUNICIPALITY/PROJECT(s)

Municipality	Project Number/Project
Somerville	
550	Spot Pond Covered Storage
702	New Connecting Mains - Shaft 7 to WASM 3
713	Spot Pond Supply Mains Rehabilitation
730	Weston Aqueduct Supply Mains
South Hadley	
543	Quabbin Water Treatment Plant
616	Quabbin Transmission System
753	Central Monitoring System
Stoneham	
618	Northern High NW Trans Section 70-71
722	NIH Redundancy & Covered Storage
Stoughton	
714	Southern Extra High - Sections 41, 42, and 74
721	Southern Spine Distribution Mains
727	SEH Redundancy & Storage
Sudbury	
617	Sudbury/Weston Aqueduct Repairs
Swampscott	
618	Northern High NW Trans Section 70-71
692	Northern High Service Section 27
West Roxbury	
131	Upper Neponset Valley Relief Sewer
Weston	
617	Sudbury/Weston Aqueduct Repairs
730	Weston Aqueduct Supply Mains
Westwood	
721	Southern Spine Distribution Mains
727	SEH Redundancy & Storage
Weymouth	
104	Braintree-Weymouth Relief Facilities
Winchester	
702	New Connecting Mains - Shaft 7 to WASM 3
704	Rehabilitation of Other Pump Stations
722	NIH Redundancy & Covered Storage
Winthrop	
693	Northern High Service Pipe Improvements - Revere/Malden
Woburn	
722	NIH Redundancy & Covered Storage

APPENDIX 9

MWRA Completed Projects

Appendix 9

MWRA Completed Projects
(as of December 31, 2016)

Project	Total Cost ($000)	Completion Date	Summary
Wastewater	$5,094,408		
Waterworks	$1,637,493		
Business and Operations Support	$67,141		
MWRA Total	$6,799,043		

Bolded items represent projects added since the last document.

Italicized items represent a change in value to a closed project due to a determination that past retainage values no longer represent a liability to the Authority.

Wastewater System Improvements			
Boston Harbor Project	$3,512,332	Nov-01	BHP constructed to minimize the pollution of Boston Harbor. The new Deer Island Primary and Secondary Treatment Facilities are the largest components of the Project to comply with the requirements of the federal Clean Water Act and to improve the harbor for
S.101 Wastewater Metering System Upgrade	$7,516	Dec-93	Construction of system to provide accurate flow data.
S.102 Quincy Pump Facilities	$25,907	Sep-03	Constructed 3 new pump station and rehabbed force mains to ensure continuous pumping to treatment facilities.
S.103 Hingham Pump Station	$3,027	Apr-92	Elimination of untreated sewage discharges.
S.104 Braintree-Weymouth Relief Facilities	$227,705	Jun-10	Project reduces overflows into Weymouth Fore River during wet weather events.
S.105 New Neponset Valley Relief Sewer	$30,300	Jul-96	Relief facilities to correct structural and hydraulic deficiencies in the New Neponset Valley Interceptor Sewer System.
S.106 Wellesley Extension Replacement Sewer	$64,359	Jan-96	Construction of a replacement sewer and rehabilitation of sections of existing sewer lines to alleviate capacity restraints, improve the water quality of the Charles River, protect aquifers, and reduce back-ups in Needham and Dedham.
S.107 Framingham Extension Relief Sewer	$47,856	Sep-04	Installation of a new force main and gravity sewer and construction of a new pump station.
S.108 Alewife Brook Pkwy Pump St Rehab	$1,465	May-95	Replacement of equipment, construction of building addition and wet well modifications.
S.110 East Boston Pump Facilities	$48,234	Jan-93	Constructed to eliminate sewage back-ups.
S.112 Charlestown Pump Station Replacement	$32,533	Apr-93	New 93 mgd pump station to increase pumping efficiency and eliminate overflows to the Mystic River.
S.115 Reading Pump Station Replacement and Extension Relief Sewer	$412	Sep-87	Elimination of surcharges, reduction in staff requirements, and correction of safety hazards.

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S.118 Bell Isle Siphon Rehabilitation	$79	Apr-89	Reduction of salt water infiltration and increase in system capacity.
S.127 Cummingsville Replacement Sewer	$8,999	Jul-08	Replacement and rehabilitation of existing sewers to provide additional capacity for upstream communities.
S.129 North Metropolitan Trunk Sewer	$11,997	Mar-99	Rehabilitation of a 19,700 linear-foot 100-year old sewer line.
S.131 Upper Neponset Valley Sewer System	$54,175	Mar-08	Project anticipated to eliminate interceptor backups during wet weather events.
S.138 Sewerage System Mapping	$281	Apr-04	Updated and new GIS maps of sewer system.
S.143 Regional I/I Management Planning	$169	Jun-03	Reduction in infiltration and inflow water entering the MWRA system.
S.178 Deer Island Pump and Power Station Upgrade	$32,952	Feb-91	Constructed to prevent sewage surcharges and overflows in the upstream sewer system by improving flows to Deer Island Tunnel System and Plant.
S.179 Deer Island Remote Headworks Improvements	$26,081	Jul-99	Facility rehabilitation restored headworks capacity.
S.180 D.I. Sedimentation Tank System Improvements	$1,684	Jul-89	Restoration of operating efficiency by replacing 80 inlet sluice gates and baffles, rehabilitation of control building and other improvements.
S.181 D.I. Intermediate Upgrade	$9,474	Jun-92	Upgrade of the old Deer Island treatment plant.
S.184 Nut Island Immediate Upgrade	$1,206	Dec-86	Upgrade or replacement of equipment, including switch gear, sludge cross collectors and replacement of electric distribution substation to accommodate increased flows to Deer Island Treatment Plant.
S.185 Clinton Wastewater Treatment Plant	$36,747	Sep-92	Upgrade existing plant to improve water quality and met standards by rehabbing and new equipment.
S.187 Deer Island Sludge Thickeners Rebuilding	$114	Sep-88	Ensuring efficient operation of Deer Island treatment plant digesters.
S.189 DI Dual Fuel Engine	$281	Jan-06	Overhaul of five diesel engines.
S.190 Deer Island Electrical Equipment Upgrade	$28	Mar-88	Restoration of system operating efficiency.

S.191 DI Chlorination Facility Rehab	$4	Mar-89	Provision of effective disinfection operation and safe working environment.
S.194 Nut Island Intermediate Upgrade	$1,507	Dec-92	Improvements to ensure effective operation of the Nut Island treatment plant.
S.196 Other Wastewater	$92	Apr-90	Removal of hazardous materials from wastewater facilities and creation of on-going safety management programs.
S.197 Deer Island Treatment Plant Outfall Repair	$1,300	Sep-97	Repair of effluent discharge Outfall 002.
S.198 Boston Harbor Performance Certification	$1,275	Dec-02	Certification required for continuous federal grant and loan programs during construction.
S.200 DI Plant Optimization	$33,427	Sep-08	Capital investment to optimize the operation of the Deer Island Treatment Plant. Remaining initiatives rolled into DI Plant Asset Protection.
S.211 Laboratory Services	$2,228	Feb-12	Upgrade and restore the Central Laboratory
S.261 Residuals	$172,056	Dec-01	Phase 1 Feb - 92 - construction of the Residuals Treatment Facility at ore River Staging Area (FRSA). Termination of the sludge discharge to Boston Harbor. Phase 2 Dec-01 - To expand the residuals processing plate at the FRSA in Quincy to provide the capacity to process the sludge quantities produced by Deer Island.
S.325 Fox Point CSO Facility	$152	Apr-89	Elimination of untreated sewage discharges.
S.326 Commercial Point CSO Facility	$7,117	Feb-91	Improvements to water quality by reducing wet weather overflows via construction of a screening and disinfection facility.
S.327 Southwest Corridor CSO	-$6	Fall 86	Elimination of combined sewer overflows.
S.330 St. Mary's Street CSO Modifications	$17	Feb-87	Identification of solution for storm water detention.
S.332 Somerville Marginal CSO Rehabilitation	$98	Feb-89	Elimination of inadequately treated sewage discharges.
S.335 Moon Island	$1		
S.338 Cottage Farm CSO Ventilation System Repairs	$133	Sep-94	Rehabilitation of HVAC duct work.
S.339 North Dorchester Bay	*$221,510*	May-11	Eliminate CSO discharges and provide a high level of storm water control.
S.340 South Dorchester Bay Sewer Separation (Fox Pt.)	*$54,626*	Nov-06	Eliminate CSO discharges to South Dorchester Bay

S.342 Neponset River Sewer Separation	*$2,549*	Aug-02	Elimination of CSO discharges to the Neponset River.
S.343 Constitution Beach Sewer Separation	$3,731	Apr-02	Elimination of CSO discharges at the Constitution Beach CSO Facility.
S.344 Stony Brook Sewer Separation	*$44,247*	Sep-06	Minimize CSO discharges to the Stony Brook conduit and the Back Bay Fens.
S.347 East Boston Branch Sewer Relief	$85,638	Jul-10	To increase hydraulic capacity and provide long-term structural integrity to MWRA's East Boston Branch Sewer.
S.348 BOS019 Storage Conduit	$14,288	Mar-07	To reduce CSO activations and annual volume to the Little Mystic Channel.
S.349 Chelsea Trunk Sewer	$29,779	Jun-02	To control CSO discharges at outfalls CHE002, CHE003, CHE004, and CHE008.
S.350 Union Park Detention Treatment Facility	$49,583	Jun-07	To reduce the frequency and impacts of CSO discharges from outfall BOS070.
S.351 BWSC Floatables Controls	$946	Mar-02	Limit the discharge of floatable materials from 5 BWSC combined sewer outfalls.
S.352 Cambridge Floatables Controls	*$1,127*	Dec-08	Limit the discharge of floatable materials from Cambridge CSO outfalls.
S.353 Upgrade Existing CSO Facilities	$22,385	Aug-01	Minimize CSO impacts to the Lower Charles River, Upper Inner Harbor, Mystic/Chelsea Confluence, and South Dorchester Bay by upgrading 5 CSO treatment facilities.
S.354 Hydraulic Relief Projects	$2,295	Aug-00	Elimination of hydraulic restrictions between local and MWRA Systems.
S.356 Fort Point Channel Sewer Separation	*$11,917*	Dec-10	To minimize CSO discharges to Fort Point Channel by separating combined sewer systems tributary and implementing system optimization measures.
S.357 Charles River CSO Controls	$3,633	Oct-11	Implement wastewater system optimization measures, including structural and operational improvements.
S.358 Morrissey Boulevard Drain	*$32,188*	Jun-09	Reroute storm water from BOS087 area
359 ReservedChannel Sewer Separation	*$70,395*	Dec-15	To minimize SCO discharges to the Reserved Channel by separating combined sewer systems in the area of South Boston.
S.360 Brookline Sewer Separation	*$24,715*	Jul-13	Minimize discharges to Charles River by separating combined sewer systems in several areas.
S.361 Bulfinch Triangle Sewer Separation	*$9,054*	Jul-10	Minimize discharges to Charles River by separating combined sewer systems in several areas.
S.402 Comprehensive Safety Action Project	$891	Nov-90	Correction of safety hazards at MWRA facilities and establishment ongoing safety management program.
S.403 Sewerage Division Management Services	$1,930	Dec-86	Provision of engineering design and construction advice.

S.924 Harbor Environmental Studies	$1,666	Jun-92	Collection and study of harbor water quality data.
Sub-Total Wastewater System Improvements	**$5,094,408**		

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Waterworks System Improvements			
S.533 Local Sources of Supply	$2,112	Jul-95	Provision of assistance to communities to promote effective protection of existing local water supply sources and encourage development of additional local sources where feasible.
S.535 Reservoir Risk Assessment	$647	Jun-92	Development of maps and data to determine at risk areas.
S.537 Drinking Water Quality Improvement Wachusett	$8,330	Oct-95	To comply with Safe Drinking Water Act to strengthen quality standards for water supply from Wachusett.
S.538 Sudbury Reservoir Treatment Plant Study and EIR	$447	Sep-92	Evaluation of alternative uses of the Sudbury Reservoir.
S.539 Drinking Water Quality Improvement Quabbin	$307	Nov-98	To comply with Safe Drinking Water Act to strengthen quality standards for water supply from Quabbin.
S.541 Watershed Protection	$8,500	Dec-03	To develop watershed protection measures for the MWRA/MDC reservoir system.
S.542 Carroll Water Treatment Plant	*$418,372*	Jun-05	To provide high quality drinking water to MWRA communities and to ensure water meets the standards established by the federal Safe Drinking Water Act.
S.543 Quabbin Water Treatment Plant	*$19,973*	Oct-14	To improve the quality of drinking water to the three Chicopee Valley Aqueduct communities.
S.544 Norumbega Covered Storage	$106,674	Jun-08	Construction of a covered 115 million gallon reinforced concrete storage tank to meet the drinking water quality standards mandated by the federal Safe Drinking Water Act.
S.545 Blue Hills Covered Storage	$40,083	Apr-10	To ensure sufficient distribution storage for MWRA's Southern High Service Area.
S.547 Fells Covered Storage	$18,004	Jun-00	Covered storage for Northern High Service System.
S.548 Nash Hill Covered Storage	$14,296	Jul-99	To improve the quality of drinking water to the three Chicopee Valley Aqueduct communities.
S. 550 Spot Pond Storage Facility	**$59,655**	**Dec-15**	**Storage facility required to meet state and federal drinking water guidelines and provides 1 day's water demand.**
S.598 Wachusett Reservoir By-pass Tunnel	$15	Jan-89	Evaluation of the option of constructing a tunnel by-pass.
S.599 Dam Control Valve Replacement	$1,763	Jul-98	Valve replacement at Sudbury Reservoir in Southborough and Wachusett Dam.
S.600 Oakdale Power Station Generator Repair	$893	Sep-91	Repair of substation metering and transformer systems.

S.601 Sluice Gate Rehab	$9,158	Jun-05	Installation of motorized gates and 12 facilities rehabilitated.
S.602 Hultman – Weston Aqueduct Transfer for Hydropower	$593	May-89	Production of approximately 3,700,000 kW hours per year of electricity.
S.603 Transmission Maintenance Facility	$5,025	May-93	Construction of new waterworks maintenance facility in Southborough.
S.604 MetroWest Tunnel	$697,145	Jun-03	To provide transmission redundancy for the Hultman Aqueduct ensuring reliable water delivery and providing sufficient hydraulic capacity to support the new Carroll Water Treatment Plant and covered storage distribution facilities.
S.605 Echo Bridge Rehabilitation	$356	Sep-92	Repair and cleaning of bridge façade and construction of new surface topping.
S.606 Norumbega Chlorination Facility	$10	Mar-89	Provision of a new water disinfection facility.
S.607 Weston Reservoir Chlorination Facility	$2,539	Jun-93	Replacement of obsolete facility with new 4,000 sq. ft.. chlorination and ammonia feed facility.
S.615 Chicopee Valley Aqueduct. Redundancy	$8,666	Apr-08	To provide redundancy for water service for the three communities supplied by the Chicopee Valley Aqueduct (CVA) in case of a CVA failure or shutdown.
S.620 Wachusett Reservoir Spillway Improvement	$9,287	Jul-10	Provide the necessary improvements to the Wachusett Reservoir Dam.
S.675 Water Distribution Master Plan	$1,178	Mar-93	Development of data base and recommendations for master plan.
S.676 Water Meter Modernization	$12,482	Jun-90	Rehab of 139 revenue meters
S.678 Boston Low Service Pipe & Valve Rehab	$23,691	Sep-03	Improve the condition and operability of the pipelines serving the Boston Low Service System.
S.679 Nonantum Road Pipe Rehabilitation	$2,153	Mar-97	Rehabilitation and/or replacement of deteriorated pipeline.
S.680 Orient Heights Booster Pump Station	$3	Sep-90	Construction of a booster pump station to increase pressure throughout the Orient Height distribution system.

S.681 Southern Service Improvements	$14,450	Oct-99	Reliability and capability improvements to pipelines and pump stations serving the Southern service area.
S.683 Heath Hill Road Pipe Replacement	$19,358	Oct-07	Repair and improve pipelines and valves in Southern High and Southern Extra High Service areas.
S.684 Commonwealth Ave Pump Station	$8,503	Dec-99	Modernize and improve station serving a major portion of Newton.
S.685 Ward Street Pump Station	$24	Aug-89	Evaluation of the feasibility of pump station rehabilitation.
S.686 Dudley Road Pump Station	$55	Jun-91	Evaluation of the feasibility of pump station rehabilitation.
S.687 Lexington St Pump Station Rehabilitation	$3,985	Jun-99	Installation of larger capacity pumping units, backup power generation, and various electrical upgrades.
S.688 Northern Intermediate High Pipelines	$973	Nov-88	Increase in pipe capacity and pressure.
S.689 James L. Gillis Pump Station Rehab	$33,138	May-02	To improve and modernize pumping facilities.
S.690 Northern Low Service Pipeline Replacement	$714	Aug-99	Repair of Section 16W with replacement and pipe slip lining methods.
S.691 Northern High Service Improvements - Lynn Pipeline	$17,271	Jun-99	Installation of a new primary supply line for the northeast section of the Northern High Service System.
S.701 Northern Extra High Service – Bedford Pipeline	$71	Jan-92	Development of a plan to supply water to Bedford.
S.706 Northern High Service - Construction Mains from Section 91	$2,360	Jun-02	To integrate the new Section 91 pipeline with the existing grid network, improving service pressures and reliability to community meters.

S.714 Southern Extra High Sections 41 & 42	$3,657	Dec-00	To increase hydraulic capacity of the mains that carry water to the Bellevue Tanks.
S.715 Newton Service Improvements	$5,762	Nov-99	New supply to Newton's Oak Hill Tank replacing an antiquated pump station and providing some system redundancy in the area.
S.716 Water Main Relocation in Chelsea River	$10,648	Nov-00	Relocation of the Section 8 water main over the Chelsea River.
S.720 Warren Cottage Line Rehabilitation	$1,205	Dec-02	To improve the carrying capacity and internal condition of the Warren Cottage Line.
S.725 Hydraulic Model Update	$598	Jun-07	To modernize MWRA hydraulic and water quality modeling capabilities.
S.731 Lynnfield Pipeline	$5,626	Dec-12	Replace undersized water main to meet Lynnfield's high water demand
S.732 Walnut St. & Fisher Hill Pipeline Rehab.	$2,716	Mar-09	Improve water quality and hydraulic capacity of the pipeline serving City of Boston.
S.754 Domestic Device Retrofit	$9,928	Dec-93	Installation of water saving devices to reduce demand.
S.755 Leak Detection Survey	$751	Aug-90	Provision of data on the magnitude and location of water leaks.
S.756 Asbestos Abatement	$562	Aug-90	Elimination of asbestos in MWRA facilities.
S.757 PCB Abatement	$432	Aug-91	Replacement of equipment with unacceptable levels of PCB concentrations.
S.758 Rehabilitation of Existing Facilities	$14,173	Nov-02	Upgrade various facilities in need of significant capital improvement.
S.759 Municipal Toilet Replacement	$127	Dec-90	Reduction in water consumption.
S.760 Chestnut Hill Pump Station REH	$559	Oct-94	Rehab of pump station.
S.764 Local Water Infrastructure Rehabilitation Assistance Program	$7,488	Jun-04	To provide financial support to MWRA waterworks communities to replace, rehabilitate, and maintain their waterworks system infrastructures.
Sub-Total Water System Improvements	**$1,637,493**		

Appendix 9

Business & Operations Support			
S.901 Charlestown Headquarters	$4,548	Jun-91	Provision of office equipment at MWRA headquarters.
S.921 Management Information Service	$21,423	Dec-92	Enhancement to information systems to support more effective management of MWRA business activities.
S.922 Fore River Preservation	$4,946	Nov-97	Modify FRSA for on-going construction and operational support.
S.929 Affirmative Action	$403	Mar-91	Evaluation of minority participation in the MWRA procurement process.
S.930 MWRA Facility - Chelsea	$9,815	Mar-08	To improve MWRA operations by consolidating facilities.
S.931 Business System Planning	$24,528	Jun-11	Develop, improve, and procure management information systems.
S.932 Environmental Remediation	$1,479	Oct-10	Implement remedial programs necessary to protect the environment and to ensure compliance with the Clean State Initiative.
Sub-Total Business & Operations Support	**$67,141**		

APPENDIX 10

Expected Useful Life of Capital Projects

APPENDIX 10

EXPECTED USEFUL LIFE OF CAPITAL PROJECTS

The estimated useful life of the MWRA's capital projects are summarized below:

Type of Capital Improvement	Estimated Useful Life (in years)
Buildings (includes all substantial above ground structures or enclosures)	40
Mechanical Equipment (includes pumps, chains, fans, HVAC, valves, etc.)	20
Electrical Equipment (motors, generators, motor control centers, lighting, conduit, etc)	20
Control Systems (computers, SCADA, PLCs, programming, etc)	10
Water Pipes	50 – 75
Water Pipe appurtenances (blow offs, air valves)	40
Sewer Pipes – gravity	50
Sewer Pipes – pressure	50
Sewer Pipe appurtenances (manholes, chambers)	50
Tunnels – Water	100
Tunnels – Wastewater	100
Tunnel appurtenances (shafts, control valves)	40
Distribution Reservoirs – above ground	40
Distribution Reservoirs – below ground	75 -100
Dams and Dam improvements	100
Motor Vehicles	10 – 15
Furniture and Fixtures	5 – 15
Leasehold Improvements	Period of lease
Study	5
Design – if constructed	20
Design – if not used	5
Inflow/Infiltration - Repair	20
Inflow/Infiltration - Replacement	50
Covered Storage	50