Capital Improvement Program

Proposed FISCAL YEAR 2017

MASSACHUSETTS WATER RESOURCES AUTHORITY

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February 2016

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 2017. The MWRA's Board of Directors approved the transmittal of the Proposed CIP at its December 16, 2015 meeting. The FY17 Proposed CIP represents an update to the FY16 CIP approved by the Board in June 2015 and includes the latest cost estimates, revised schedules, and new projects.

The FY17 Proposed Capital Improvement Program projects $160.1 million spending for FY17, of which $87.3 million supports Wastewater System Improvements, $61.0 million supports Waterworks System Improvements, and $11.9 million is for Business and Operations Support.

The single largest change to the Program is the updated plan to address critical redundancy improvements for the City Tunnel, the City Tunnel Extension and the Dorchester Tunnel. For the past few years, the CIP has included funding for various alternatives to accomplish this, such as the rehabilitation of sections of the Weston Aqueduct Supply Mains and the sliplining of the Sudbury Aqueduct. The FY16 CIP included $518 million for these projects. Based on the current range of options, the placeholder value in the FY17 CIP increases that amount by $882 million to $1.4 billion. After extensive review and evaluation, staff are planning a series of presentations to the Board of Directors over the next several months - working closely with the Advisory Board - on project need, evaluation of alternatives, affordability and next steps in the hopes that a decision on whether to proceed and which option to pursue be reached by June, when the Final FY17 CIP is approved.

Another significant development in establishing the FY17 Proposed CIP was the acceleration of critical pipeline rehabilitation projects both in the Water and Wastewater systems. This is in direct response to the Advisory Board's recommendation to "replace" projects which might be delayed for a variety of reasons.

The FY17 Proposed CIP reaffirms the Authority's commitment of supporting the Financial Assistance Programs to the communities which include the Water Pipeline Program and the expanded Inflow and Infiltration Program.

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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FY17 Proposed Capital Improvement Program

Overview

The MWRA was created by the Massachusetts legislature in 1985 and since its inception has invested over $8.0 billion to modernize and improve the wastewater and waterworks systems serving its 61 member communities. The system serves 2.5 million people and more than 5,500 businesses. Major initiatives completed include the Boston Harbor Program, the MetroWest Water Supply Tunnel, the Carroll Water Treatment Plant, and completion of the remaining court-mandated projects, most notably the long-term Combined Sewer Overflow (CSO) Control Plan.

The five initiatives below account for nearly $6.0 billion or 75% of spending to date:

- Boston Harbor Project - $3.8 billion
- Combined Sewer Overflow - $891 million*
- MetroWest Tunnel - $697 million
- Carroll Water Treatment Plant - $418 million
- Covered Storage Facilities - $237 million

*In December 2015, the Authority achieved substantial completion of its court mandated CSO Control Plan, the last major milestone in the Clean Water Act at an approximate cost of $891 million.

As the MWRA reaches maturity as an agency, a greater proportion of its capital budget will be designated for Asset Protection, Water System Redundancy, Business System Support, and Pipeline Replacement and Rehabilitation. Of the $8.0 billion in capital spending to date, approximately 80% was for court-mandated projects. Capital expenditures for the MWRA have been trending down since the completion of the Boston Harbor project in 2001, but other spending spikes represent other mandated initiatives including the CSO program, Carroll Water Treatment Plant, and MetroWest Tunnel.

As the infrastructure modernization and new facilities construction phase of the MWRA is nearing completion and barring new mandates, the agency is approaching steady-state operations. Steady-state spending will focus on asset protection to preserve the Authority's capital assets and long-term water redundancy to reduce risks of service interruption. Long-term water redundancy will be the largest initiative with impacts on CIP spending in the future.

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, 2015, MWRA's total debt was $5.4 billion.

The Authority's debt service obligation as a percent of total expenses has increased from 36% in 1990 to over 61% in the FY16 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 FY17 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 FY17 Proposed Capital Improvement Program (CIP) represents an update to the program approved by the Board in June 2015 for FY16. 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 taking some risks while ensuring there is adequate support for the core operations to meet all regulatory operating permit requirements.

The FY17 Proposed Capital Improvement Program projects $160.1 million spending for FY17, of which $87.3 million supports Wastewater System Improvements, $61.0 million supports Waterworks System Improvements, and $11.9 million is for Business and Operations Support.

The single largest change to the Capital Program is the updated plan to address critical redundancy improvements for the City Tunnel, the City Tunnel Extension and the Dorchester Tunnel. For the past few years, the CIP has included funding for various alternatives to accomplish this, including the rehabilitation of sections of the Weston Aqueduct Supply Mains and the slip-lining of the Sudbury Aqueduct. The FY16 CIP included $518 million for these projects. Based on the current range of options, the placeholder value in the FY17 CIP increases that amount by $882 million to $1.4 billion.

After extensive review and evaluation, staff are planning a series of presentations to the Board of Directors over the next several months - working closely with the Advisory Board - on project need, evaluation of alternatives, affordability and next steps in the hopes that a decision on whether to proceed and which option to pursue be reached by June, when the Final FY17 CIP is approved.

Another significant development in establishing the FY17 Proposed CIP was the acceleration of critical pipeline rehabilitation projects both in the Water and Wastewater systems. This is in direct response to the Advisory Board's recommendation to "replace" projects which might be delayed for a variety of reasons.

In FY16 the Authority awarded large projects including the construction of the Wachusett Aqueduct Pump Station, the Alewife Brook Pump Station Rehabilitation, the NIH Section 89/29 Redundancy Construction, and the Deer Island Fuel System Modifications project, which will all contribute to higher spending in the next few years. The award of the Chelsea Headworks Upgrade Construction contract is scheduled for Spring of FY16.

The highest spending projects in FY17 account for over 56% of total annual spending and includes expenditures for Wachusett Aqueduct Pump Station Construction, Chelsea Creek Upgrade Construction, NIH Section 89/29, Alewife Brook Pump Station Rehabilitation, and the Deer Island North Main Pump Station variable frequency drives and valve Replacements.

It is important to note that the MWRA continues to reduce debt levels, reflecting the fact that debt financed capital expenditures are less than principle payments. This trend is expected to continue for the foreseeable future.

In FY16, the Authority will also reach a significant milestone as the court mandated Combined Sewer Overflow (CSO) program is nearing completion. Under the CSO program, CSO discharge volume has been reduced from 3.3 billion gallons in 1988 to 0.4 billion gallons, a reduction of 88%. Additionally, 93% of remaining discharge volume is treated at MWRA's four CSO facilities.

The Five-Year Spending Cap

MWRA established its first five-year 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 which resulted in a net change of $4.7 million (restated Cap would be ~$787.0 million).

Based on the FY17 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 account for a reduction of approximately $65.0 million.

FY17 Proposed Cap FY14-18 Comparison

FY17 Proposed		FY14	FY15	FY16	FY17	FY18	Total FY14-18
	Projected Expenditures	$102.2	$103.6	$118.3	$160.1	$194.6	$678.7
	Contingency	0.0	0.0	5.6	9.5	12.0	27.0
	Inflation on Unawarded Construction	0.0	0.0	2.1	5.3	11.1	18.5
	Less: I/I Program	0.0	(17.5)	(19.4)	(19.0)	(17.3)	(73.1)
	Less: Water Loan Program	0.0	1.4	1.4	2.0	(0.6)	4.3
	Less: Chicopee Valley Aqueduct Projects	(5.6)	(1.2)	(0.5)	(0.1)	(0.0)	(7.4)
	FY17 Proposed FY14-18 Spending	**$96.6**	**$86.3**	**$107.5**	**$157.9**	**$199.7**	**$648.0**

FY17 Proposed vs. FY14-18 Base-Line Cap		FY14	FY15	FY16	FY17	FY18	Total FY14-18
	Projected Expenditures	($40.3)	($43.9)	($31.1)	$18.3	$57.8	($39.3)
	Contingency	(7.6)	(9.5)	(4.5)	(0.3)	2.7	(19.1)
	Inflation on Unawarded Construction	(0.8)	(4.2)	(6.2)	(5.8)	(2.4)	(19.4)
	Less: I/I Program	0.0	(17.5)	(19.4)	(19.0)	(17.3)	(73.1)
	Less: Water Loan Program	0.0	1.4	1.4	2.0	(0.6)	4.3
	Less: Chicopee Valley Aqueduct Projects	(0.6)	0.9	0.9	1.2	0.4	2.9
	FY14-18 Cap ($ Change)	**($49.2)**	**($72.7)**	**($58.9)**	**($3.4)**	**$40.6**	**($143.7)**

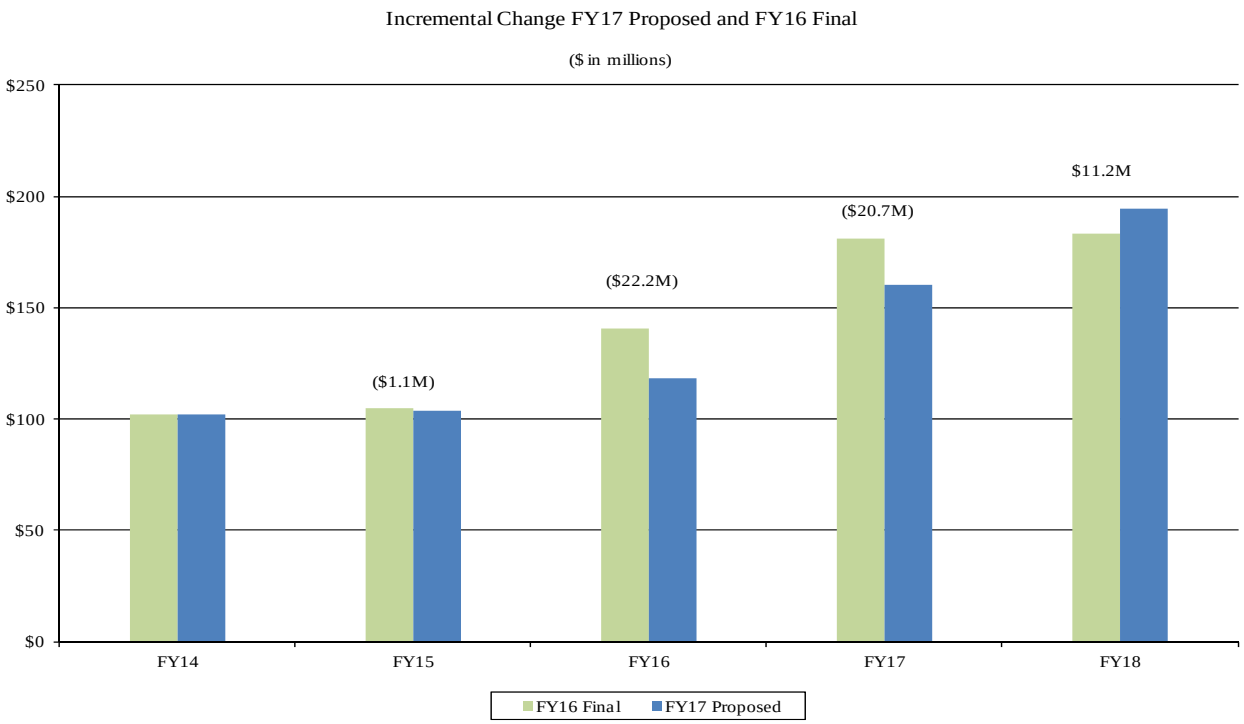
The FY14-18 Cap based on the FY17 Proposed CIP complies with the 5-year spending limit.

FY17 Proposed CIP Compared to the Final FY16 CIP by Program

The FY17 Proposed CIP increased by $975.1 million versus the Final FY16 CIP approved by the Board of Directors in June 2015, with most of the additional spending in years outside of the current Cap period. The increase is driven by expansion of the Long-Term Water Redundancy initiative.

	FY16 Final	FY17 Proposed	$ Change	% Change		FY16 Final FY14-18	FY17 Proposed FY14-18	FY14-18 $ Change	FY14-18 % Change
Total Wastewater	$ 2,974.6	$3,062.3	$ 87.7	2.9%		$ 419.3	$ 397.5	$ (21.8)	-5.2%
Total Waterworks	$ 2,909.4	$3,790.6	$ 881.1	30.3%		$ 251.3	$ 239.4	$ (11.9)	-4.7%
Business & Operations Support	$ 128.4	$ 134.7	$ 6.3	4.9%		$ 40.9	$ 41.8	$ 0.9	2.1%
Total MWRA	$ 6,012.4	$6,987.5	$ 975.1	16.2%		$ 711.5	$ 678.7	$ (32.8)	-4.6%

The chart below shows the incremental change between the FY17 Proposed CIP and the Final FY16 CIP by fiscal year.



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

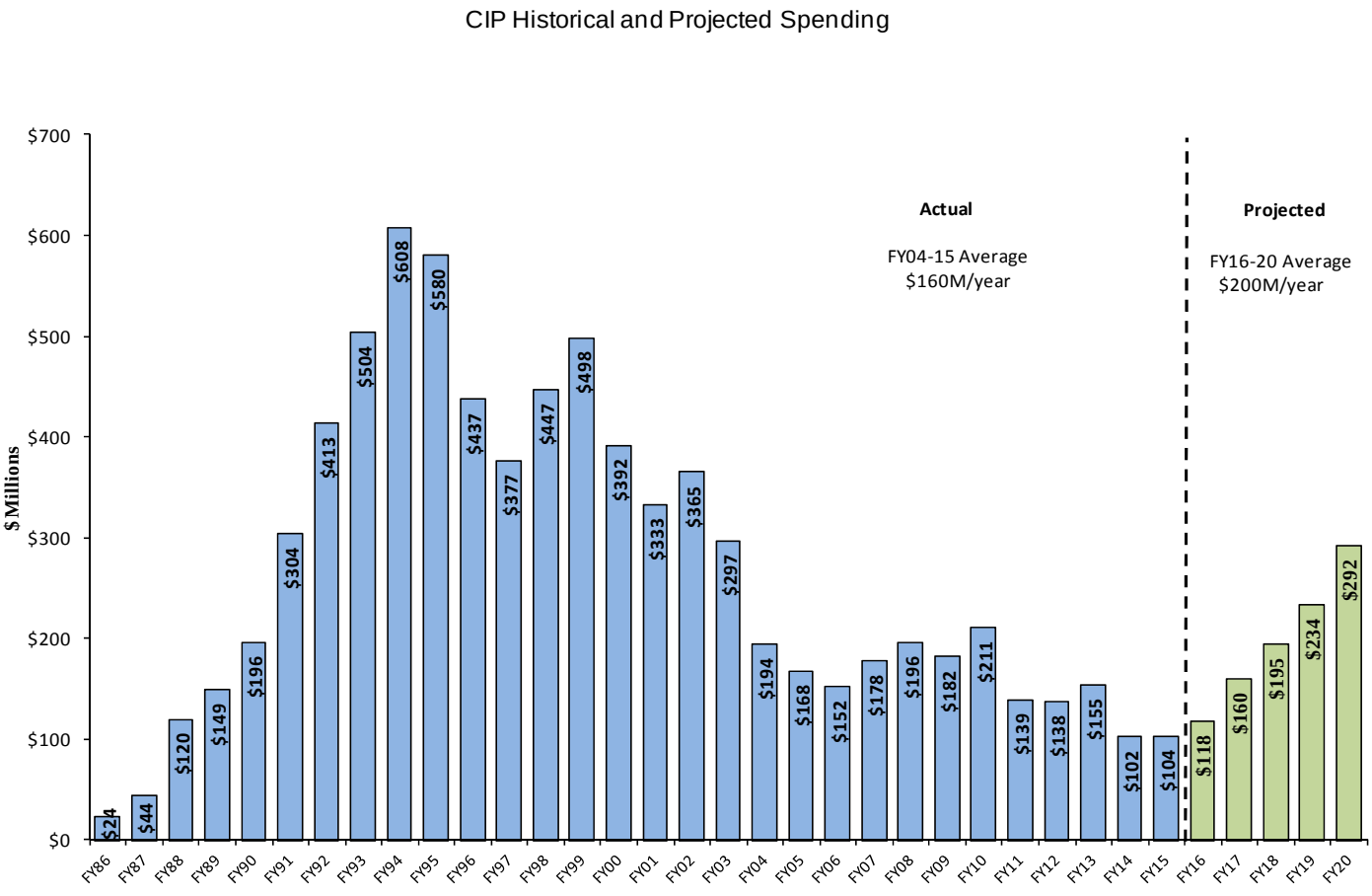
Major Planned Contract Awards for Fiscal Year 2017:

In FY17, 27 contracts totaling $101.7 million are projected to be awarded. The largest projected contract awards total $81.6 million, accounting for just over 80% of expected awards:

Project	Subphase	NTP	FY17 Proposed
NIH Redundancy & Storage	Sec 89 & 29 Redundancy Construction Phase 2	Jul-16	$21.4
Central Monitoring System	Waterworks SCADA/PLC Upgrades	Oct-16	$18.5
SEH Redundancy & Storage	Redundancy Pipleline Section III Contstruction 2	Jul-16	$10.8
Residuals Asset Protection	Residuals Facility Upgrade-Construction	Jul-16	$10.0
SEH Redundancy & Storage	Redundancy Pipleline Section III Contstruction 3	Oct-16	$7.4
DI Treatment Plant Asset Protection	Future Miscellaneous VFD Replacements-Construction	May-17	$5.3
Facility Asset Protection	IR-Construction 1 Reading Extension Sewer	Mar-17	$4.3
Applicat Improvement Program	Enterprise Content Management	Aug-16	$4.0
Top 10 Awards for FY17			$81.6
27 Contract Awards Planned for FY17			$101.7

Historical Spending

The chart on the following page captures the historical CIP spending through FY15 and projects spending to FY18 based on the FY17 Proposed CIP.



Changing Nature of the Capital Program - Shift from Mandated Projects

Since 1985, nearly 80% of the Authority's spending had been on court mandated projects. Going forward, the majority of spending will support Asset Protection, Water System Redundancy, Pipeline Replacement and Rehabilitation, and continued support for Community Assistance programs. Asset Protection and Water System Redundancy spending is projected to rise from past levels and currently accounts for 53.0% and 27.5% of FY14-18 capital expenditures respectively, a total of nearly $546.3 million of the $678.7 million projected to be spent over the 5-year period.

	Total Contract	FY09-13	FY14-18
Asset Protection	$2,335.7	$248.0	$359.8
Carroll WTP	438.1	38.5	15.0
Water Redundancy	2,772.3	134.7	186.5
CSO	881.9	315.5	65.9
Other	559.5	88.4	51.5
Total	**$6,987.5**	**$825.1**	**$678.7**
Asset Protection	**33.4%**	**30.1%**	**53.0%**
Carroll WTP	6.3%	4.7%	2.2%
Water Redundancy	**39.7%**	**16.3%**	**27.5%**
CSO	12.6%	38.2%	9.7%
Other	8.0%	10.7%	7.6%
Total	100.0%	100.0%	100.0%

As the capital improvement program advances over time, more projects will be included beyond the 10-year horizon from the long-term Master Plan and it is expected that Asset Protection will remain a significant spending initiative.

The FY17 Proposed projects total CIP spending of $3.1 billion starting in FY16.

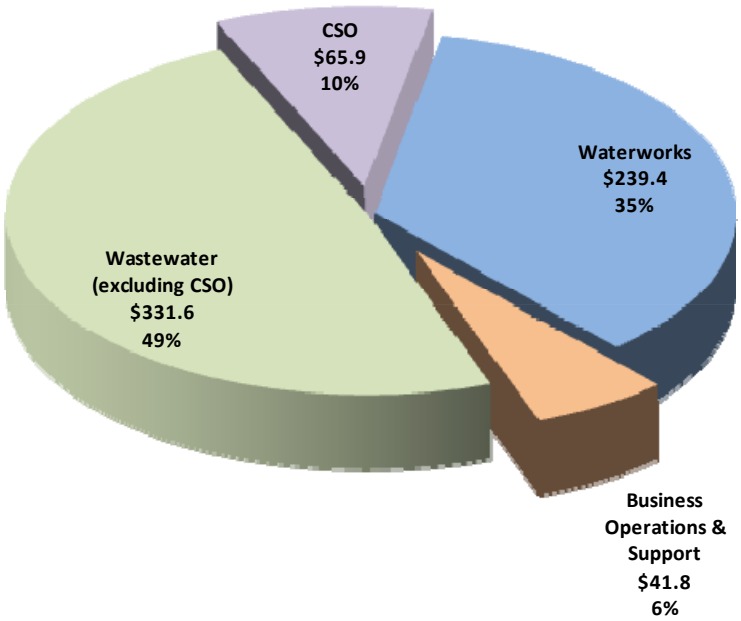
	Total Contract Amount	Payments Thru FY15	Projected Spending	Total FY14-18	Total FY19-23
Wastewater System Improvements	**$3,062.3**	**$1,867.1**	**$1,195.2**	**$397.5**	**$648.6**
Interception & Pumping	926.8	536.0	390.8	86.8	176.6
Treatment	818.4	239.6	578.9	163.1	413.5
Residuals	167.6	64.6	103.0	4.6	8.5
CSO	906.6	876.8	29.8	65.9	3.0
Other Wastewater	242.9	150.1	92.8	77.2	47.1
Waterworks System Improvements	**$3,790.6**	**$1,938.4**	**$1,852.2**	**$239.4**	**$536.3**
Drinking Water Quality Improvements	665.9	637.8	28.1	58.5	11.6
Transmission	2,285.7	762.0	1,523.7	73.9	373.1
Distribution & Pumping	768.5	386.5	382.0	100.0	180.2
Other Waterworks	70.4	152.1	(81.7)	6.9	(28.6)
Business & Operations Suppport	134.7	88.5	46.2	41.8	15.4
Total MWRA	**$6,987.5**	**$3,893.9**	**$3,093.6**	**$678.7**	**$1,200.4**

FY17 Proposed FY14-18 CIP Expenditures

Spending during the FY14-18 timeframe is projected to be $678.7 million. Yearly cash-flows for the proposed Cap period are shown below:

(000s)	FY14	FY15	FY16	FY17	FY18	Total FY14-18
Wastewater System Improvements	**$55.7**	**$75.4**	**$79.4**	**$87.3**	**$99.8**	**$397.5**
Interception & Pumping	6.9	8.6	10.7	29.3	31.2	86.8
Treatment	29.1	25.7	30.3	31.1	46.9	163.1
Residuals	0.1	-	-	2.9	1.6	4.6
CSO	15.6	23.6	19.0	5.0	2.8	65.9
Other Wastewater	4.0	17.5	19.4	19.0	17.3	77.2
Waterworks System Improvements	**$41.0**	**$22.7**	**$30.6**	**$61.0**	**$84.1**	**$239.4**
Drinking Water Quality Improvements	30.2	12.4	8.4	3.6	3.9	58.5
Transmission	4.5	2.5	7.5	23.2	36.3	73.9
Distribution & Pumping	4.8	8.9	14.1	31.5	40.6	100.0
Other Waterworks	1.5	(1.1)	0.6	2.7	3.4	6.9
Business & Operations Suppport	5.5	5.5	8.3	11.9	10.6	41.8
Total MWRA	**$102.2**	**$103.6**	**$118.3**	**$160.1**	**$194.6**	**$678.7**

The graph below illustrates a breakdown of the major program spending for the FY14-18 timeframe.



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

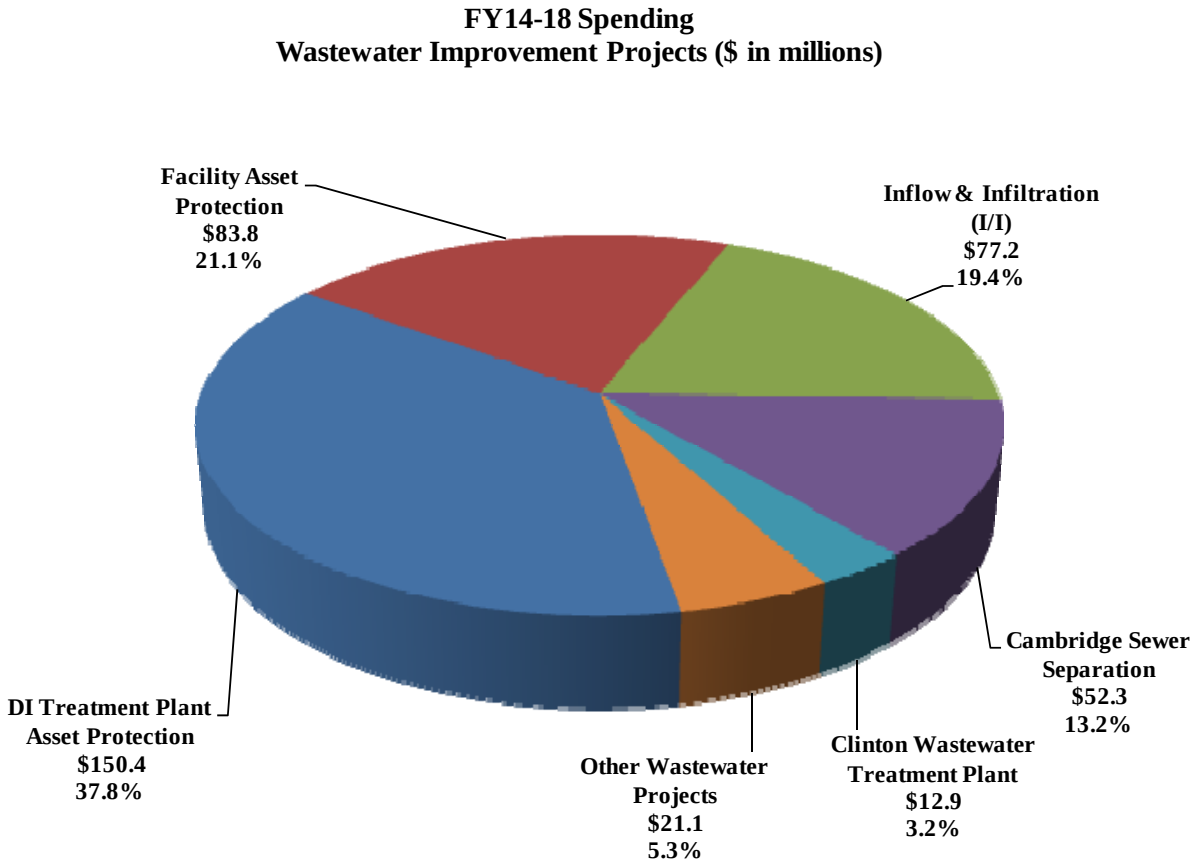
Top 10 Projects – FY14-18 Cap Period

Top 5 Projects in the Water and Wastewater Programs in the FY14-FY18 Cap Period

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 $376.5 million for FY14-18 period and represent 94.7% of the $397.5 million total program.

Wastewater Program

The breakdown of the $397.5 million Wastewater program by major project is illustrated below:



The FY14-18 sub-phases of projects with spending greater than $20 million along with a brief description of the scope of work are included below:

Infiltration/Inflow (I/I) Local Financial Assistance - $77.2 million – This program provides funding assistance for communities to rehabilitate their collection systems with the goal of structurally reducing I/I flow.

Chelsea Headworks Construction - $30.4 million ($62.0 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.

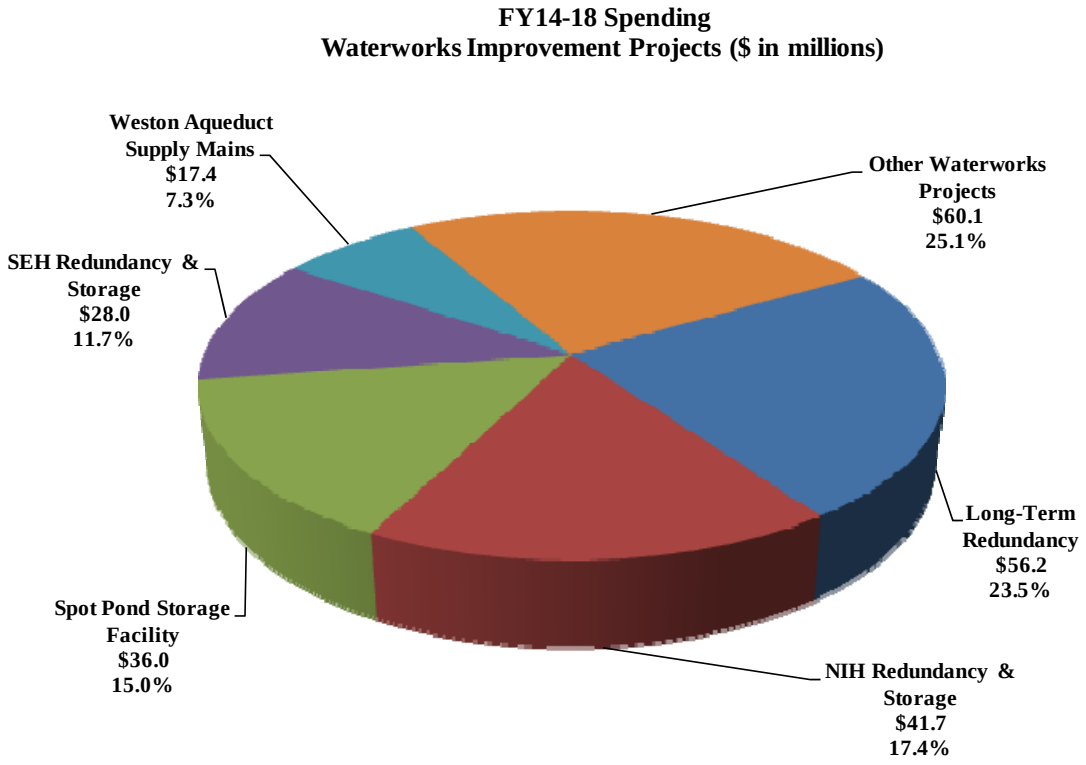
Cambridge Sewer Separation CSO Control Program Design and Construction- $52.3 million ($102.8 million total costs, $93.1 million already spent). This project, along with Cambridge Floatables Control at an additional cost and spending to date of $1.1 million, encompasses the wastewater system improvements implemented by the City of Cambridge to control CSO discharges to the Alewife Brook. Completed work includes the CAM004 Stormwater Outfall and Wetland Basin, Interceptor Connection Relief and Floatables Controls, Sewer Separation at Outfall CAM400, and all four contracts to complete CAM004 Sewer Separation, including Contract 8A (Huron Ave West), Concord Lane, Contracts 8B (Huron Ave East) and 9 (Concord). The CAM004 project separated combined sewers in a 211-acre area upstream of Outfall CAM004 in the Huron Avenue and Concord Avenue neighborhoods, east of Fresh Pond Parkway. The final element of the Contract 9 work redirected stormwater removed from the sewer system to the Alewife wetland basin and close Outfall CAM004. Schedule Seven of the Federal District Court Order required all CSO related work to be complete by December 2015.

Deer Island Scum Skimmer Replacement - $20.3 million - This is an asset protection project which proposes to replace degraded carbon steel tip tubes and drive mechanisms for 40 Primary Clarifier tanks and 54 Secondary Clarifier tanks with stainless steel components to improve the system reliability and overall maintenance.

Water program

Similarly, the top 5 projects for the Waterworks program total $179.3 million for FY14-18 and represent 74.9% of the $239.4 million total program.

The breakdown of the $239.4 million program by major project is illustrated below:



The FY14-18 sub-phases of projects with spending greater than $20 million along with a brief description of the scope of work are included below:

Wachusett Aqueduct Pump Station Design and Construction - $39.3 million ($53.6 million in total cost) - This is a redundancy project for construction of a 240 mgd 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.

Spot Pond Storage Facilities - $36.0 million ($60.6 million in total cost) - This project is for the construction of a 20 million-gallon drinking water storage facility and redundant pump station in Stoneham. The underground, concrete tanks provides drinking water storage for MWRA's Low Service area. Additionally, this project provides system redundancy for 21 communities in the Northern Intermediate High and Northern High service areas currently served by the Gillis Pump Station. In August 2015, the storage tanks were placed in service.

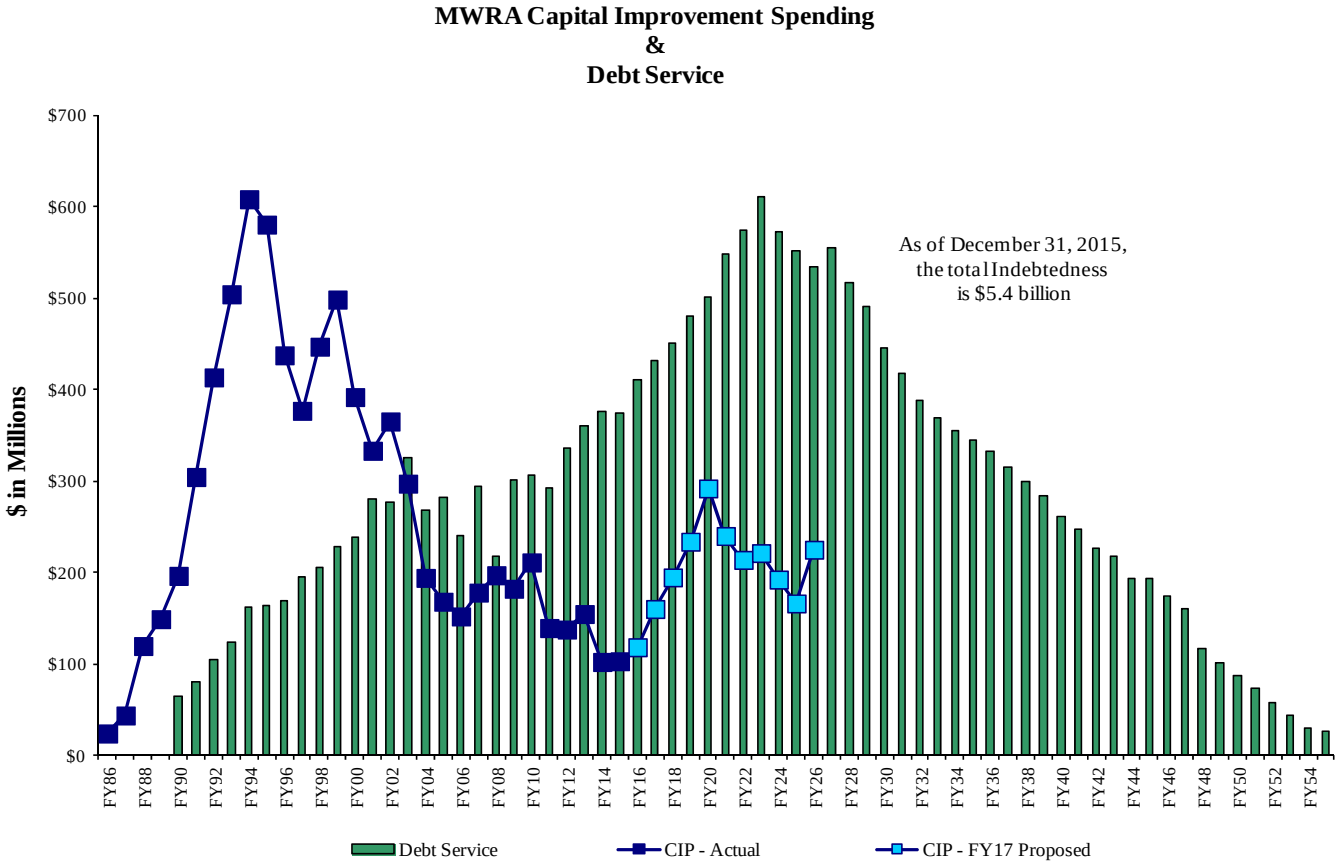
Northern Intermediate High (NIH) Section 89 & 29 Redundancy Construction Phases 1A-C & 2 - $22.7 million and $12.5 million respectively (total construction cost $22.7 million and $21.4 million) - This is a redundancy project for the MWRA's Northern Intermediate High service area. Currently, this area 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 and Phase 1B was awarded in November 2015.

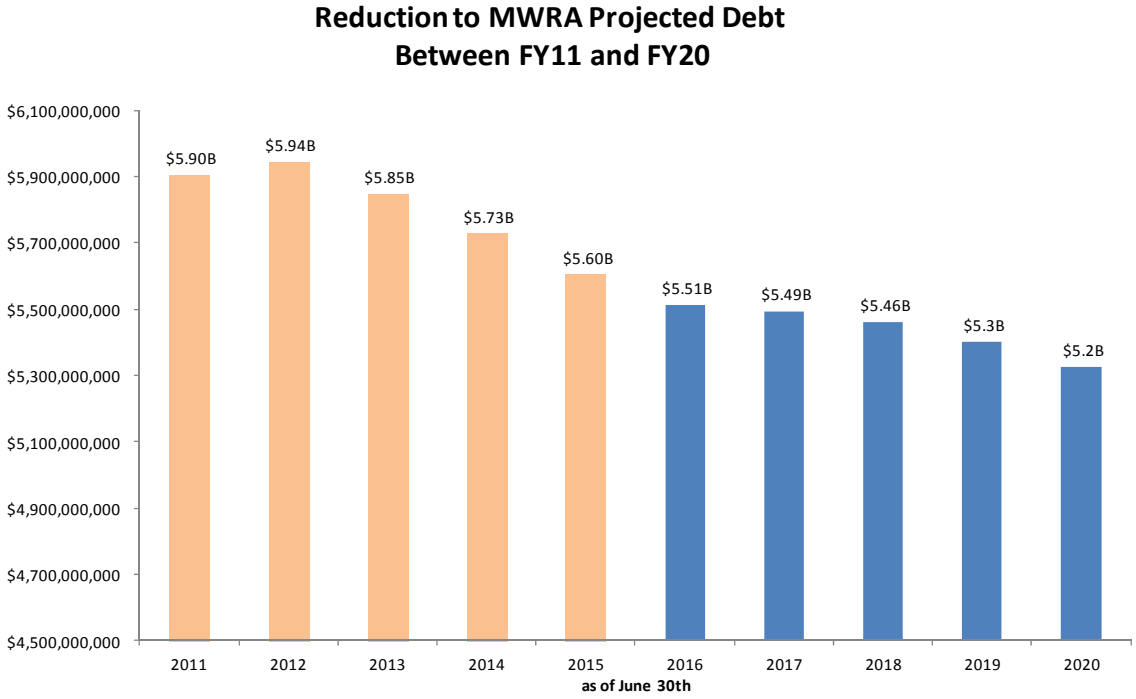
MWRA Capital Improvement Spending versus Debt Service

The following graph was updated with the FY17 Proposed CIP spending and debt service projections to illustrate the relationship between the MWRA's CIP and debt service.

As of December 31, 2015, MWRA's total debt was $5.4 billion. The Authority's debt service obligation as a percent of total expenses has increased from 36% in 1990 to over 62% in the Proposed FY17 Current Expense Budget.

The Proposed FY17 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.





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 projects and 15% for tunnel projects. The total contingency budget in the FY17 Proposed CIP is $180.0 million, with $27.0 million allocated over the FY14-18 period.

Future Risks

Going forward the largest decision that MWRA will have to make is pertaining to the Long-Term Redundancy project specifically the Sudbury Aqueduct alternatives plans. That decision will have a significant impact on the capital program for the next 15-17 years.

Project Level Budget Summaries and Detail of Changes

Information on individual project budgets and detail of changes is provided in the supplemental appendices attached to this document.

Capital Improvement Program

Proposed FISCAL YEAR 2017

APPENDICES

MASSACHUSETTS WATER RESOURCES AUTHORITY

APPENDIX 1

Project Budget Summaries and Detail of Changes

Wastewater System Improvements

Project Budget Summaries and Detail of Changes
Project Index

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
Design 1/CS/RI – Tunnel & IPS	Design of the tunnel and IPS. Includes completion of design modifications for sludge pumping facilities at Deer Island and residuals filtrate facilities at Fore River.
Sediment Tests	Tests required as part of the evaluation of marine pipeline option.
Design 2/CS/RI – Surface	Design of remaining construction including siphons and replacement pump station.
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.

Sub-phase	Scope
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.
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.
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.
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.
Rehab Section 624	Rehabilitation of 2,000 feet of Section 624 in North Weymouth.
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.
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.
Geotechnical Consultant	Consulting services related to the tunnel shaft excavation.
Communication System	Radio systems for the intermediate and replacement pump stations.
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.
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. This project includes a study to determine deficiencies and corrections for the grinder room odor control, grinder equipment, and wastewater pumps.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$232,455	$227,704	$4,750	$0	$0	$208	$4,543	$0

Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$232,455	$232,455	$0	Aug-20	Jun-21	10 mos.	$310	$208	($102)

Explanation of Changes

- Schedule and spending changed due to project priorities.

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 at structures at 29 siphon locations that are most inaccessible or in greatest need of repair.

Scope

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

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$6,669	$940	$5,729	$0	$0	$0	$5,729	$0

Project Status 11/15	14.1%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$6,635	$6,669	$34	Jun-21	Jun-21	None	$0	$0	$0

Explanation of Changes

- Project cost changed due 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
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.
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.
FES Tunnel Rehab Design CS/RI and Construction	Rehabilitation of the FES Tunnel.

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.
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.
Nut Island HVAC, Odor Control, and Energy Management Systems Evaluation, Design CS/RI and Construction	Evaluation, design, and upgrades to the existing odor control, HVAC, and Building Energy Management Systems. In addition, the replacement of certain mechanical and electrical equipment will be included in this project. Systems identified through service contracts have elevated operational and maintenance needs.
System-wide Odor Control	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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$23,367	$3,001	$20,365	$289	$301	$909	$19,457	$0

Project Status 11/15	13.0%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$19,782	$23,367	$3,585	Dec-20	Dec-20	None	$543	$909	$366

Explanation of Changes

- Cost increase is primarily due to updated cost estimates including NI System-Wide Odor Control Design Construction Administration/Resident Inspection and Construction, updated cost based on actual award amount for NI System Wide Odor Control Evaluation, and inflation adjustments.

- Spending and schedule changed as a result of updated cost estimates listed above.

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, immediately upstream of the tunnel, crosses beneath the VFW Parkway. 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
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.
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.
Construction	Rehabilitation of 1,000 feet of Section 138 and the West Portal. Completed in June 2002.
Tunnel Inspection	Inspection contract to monitor the conditions of the tunnel in 10 years

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$11,314	$10,314	$1,000	$0	$0	$0	$1,000	$0

Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	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
Planning	Development of a plan for a monitoring and control system for the MWRA wastewater transport system.
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.
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.).
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.

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.
Technical Assistance	Technical assistance work to support all subphases.
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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$27,482	$19,782	$7,700	$0	$0	$375	$2,910	$4,415

Project Status 11/15	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 Redundant Communications is expected to begin in July 2017.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$27,482	$27,482	$0	Oct-31	Oct-32	12 mos.	$760	$375	($385)

Explanation of Changes

- Project schedule and spending changed primarily due to revised schedule for Wastewater SCADA/PLC Upgrade.

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
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.
Sections 70 and 71 HLS Evaluation/ Construction	Initial evaluation and construction of recommended improvements.
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.
Milton Financial Assistance	Payment to the Town of Milton for local projects to mitigate downstream impacts from high flow conditions.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$4,939	$3,439	$1,500	$0	$0	$0	$1,500	$0

Project Status 11/15	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
Planning	Evaluate collection system and facility modification alternatives to maximize wastewater treatment and minimize operating and maintenance costs.
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.
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.
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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$10,389	$1,463	$8,926	$39	$0	$297	$5,168	$3,719

Project Status 5/15	14.5%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$10,383	$10,389	$6	Jun-25	Jun-27	24 mos.	$1,391	$297	($1,094)

Explanation of Changes

- Project spending changes due to updated schedule for Hydraulic Flood Engineering Design and Construction phase.

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
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).
Equipment Purchase/Installation	Purchase and installation of equipment.
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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$27,738	$5,138	$22,600	$0	$600	$1,200	$6,800	$14,600

Project Status 11/15	18.5%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$27,738	$27,738	$0	Jul-29	Jul-29	None	$6,436	$1,200	($5,236)

Explanation of Changes

- Project spending decreased due to updated meter replacement plan including updated schedules for Planning/Study Design, Construction, and Wastewater Meter System Equipment Replacement phases.

CEB Impacts

- Potential cost savings associated with this project have not yet been 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
Rehab of Section 93A Lexington	Rehabilitation of 4,000 linear feet of pipeline in Lexington (Section 93A). Completed in April 2004.
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.
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.
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.
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.
Interceptor Renewal #1 Reading Extension & Metropolitan Sewer Design CA/RI & Construction	#1 – Rehabilitation of 12,400 linear feet of the Reading Extension Sewer Sections 75, 74, 73, 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 Metropolitan Sewer Section 46 in Stoneham.
Interceptor Renewal 3 Dorchester Interceptor Sewer Design CA/RI and Construction	Rehabilitation of Dorchester Interceptor Sewer Sections 240, 241, and 242.

Sub-phase	Scope
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.
Design/ESDC 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.
Design/ESDC 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.
Malden & Melrose Hydraulics and Structural Study/Design and Construction	Rehabilitation of Melrose, Malden Sections 41,42,49,54 and 65.
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.
Interceptor Renewal #5 Milton Sections 607/609/610 Design CA/REI and Construction	Rehabilitation of portions of Sections 607/609/610 in Milton.
Interceptor Renewal #6 Chelsea Sections 12/14/15/62 Design CA/REI and Construction	Rehabilitation of portions of Sections 12/14/15/62 in Chelsea.
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.
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.
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.

Sub-phase	Scope
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.
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 will include 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.
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 will be performed under a separate contract.
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.
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.
Headworks Effluent Shaft Study	At each of the three remote Headworks, Chelsea Creek, Ward Street and Columbus Park, 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.

Sub-phase	Scope
Chelsea Headworks Upgrades Design CA/ESDC/REI and Construction, Columbus Park and Ward St. Headworks Upgrades Design 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. The final design of the Chelsea Creek Headworks Upgrade is ongoing, and will be followed by design and construction contracts for Ward Street and Columbus Park Headworks. Chelsea Creek Headworks REI will be performed under a separate contract.
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.
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.
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.
Prison Point Rehabilitation Design/CA/RI and Construction	The Prison Point CSO Facility was constructed in 1981. This contract 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, architectural updating of facility 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 in this contract.
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.

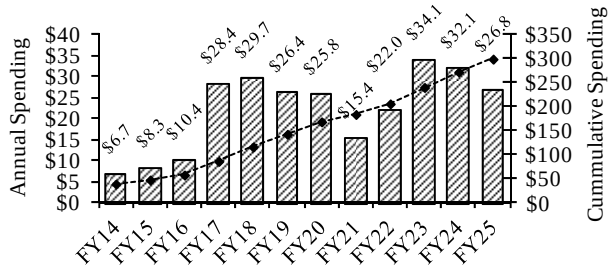
Sub-phase	Scope
Pump Station Rehab Preliminary Design/Study	Preliminary design/study for upgrades at Hayes, Hingham, Caruso, DeLauri Pump Stations, Wiggins-Castle Island Terminal, and the Somerville-Marginal CSO Facility. The project is to follow contract 7162, Pump Station and CSO Condition Assessment, 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.
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.
Caruso Pump Station Improvements Design, CA/RI, and Construction	This project would 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 will be 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. Due to the age of the fire detection /suppression system, frequent problems, the fire protection system needs to be replaced and/or upgraded. The existing security system is outdated and does not meet MWRA requirements.
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.
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.
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. Rehabilitated 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.
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.

Sub-phase	Scope
Cottage Farm PCB Abatement Design CA and Construction	Design and construction to remediate PCB containing paint by removal and encapsulation where appropriate in accordance with the PCB abatement plan at Cottage Farm.
DeLauri Pump Station Screens & Security	**This project replaces the existing catenary bar screens and installs security upgrades. Design for screens being done in-house and security portion 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.**

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$344,911	$32,446	$312,465	$10,381	$28,443	$83,764	$123,759	$120,134

I&P Asset Protection



Project Status 11/15	9.7%	Status as % is approximation based on project budget and expenditures. Chelsea Headworks Upgrades Final Design commenced in July 2012. Melrose Sewer work was completed in February 2011. NI Electrical & Grit/Screens Conveyance Design commenced in March 2011 and the construction contract was substantially complete in May 2015. Somerville/Marginal Influent Gate Replacement was substantially complete in November 2011. Prison Point HVAC Construction was substantially complete in March 2012. Hingham Pump Station Isolation Gate was substantially complete in June 2012. Caruso PS Improvements Design/CA/REI Notice to Proceed was issued in August 2012. Cottage Farm Fuel System Upgrade was substantially complete in April 2013. Chelsea Screenhouse Upgrades commenced in August 2015. Alewife Brook Pump Station Rehabilitation was awarded in November 2015. Prison Point/Cottage Farm Pumps, Engine, and Gearbox Rebuilds was substantially complete in December 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$311,791	$344,911	$33,120	Dec-31	Dec-31	None	$88,585	$83,764	($4,821)

Explanation of Changes

- Budget increased primarily due to updated cost estimates for Chelsea Creek Headworks Construction; Cambridge Branch Sewer phases; Sections 186, 4, 5, and 6 phases; Interceptor Renewal Dorchester Interceptor Design Construction Administration/Resident Engineer Inspection; Interceptor Renewal 5 Milton Design Construction Administration/Resident Engineer Inspection; Interceptor Renewal 6 Design Construction Administration/Resident Engineer Inspection; Caruso Pump Station Improvements Construction; and amendment for Chelsea Creek Headworks Design. Also, higher awards for Alewife Brook Pumping Station Construction, Chelsea Screenhouse Construction and Engineering Services During Construction, as well as new project for DeLauri Pump Station Screens & Security. These increases were partially offset by NI Fire Pump Study being deleted and reallocation of funds for NI Mechanical & Electrical Replacements phase.

- Schedule and spending changes primarily due to schedule changes for Chelsea Creek Upgrades Construction, Ward Street & Columbus Park Headworks Design/Construction Administration/Resident Inspection, Cottage Farm Design and Construction 1 (PCB), updated cost estimates, and new project for DeLauri Pump Station Screens & Security.

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
Tunnel Shaft Repairs Design & Construction	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, design, and construction of repairs.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$5,000	$0	$5,000	$0	$0	$0	$5,000	$0

Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	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
Study	Study to identify system improvements at Sewer Section 628 and Pearl Street Siphon.

Expenditure Forecast (in $000s) and Project Status

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

Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	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 (DITP) 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, 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.

Deer Island 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 Deer Island (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**
Equipment Replacement Projection (ERP)	Long-term placeholder for funding new projects and/or increases to existing projects. Funds for new projects identified during each CIP development phase are deducted from this placeholder and then shown under new sub-phases. In FY09 the funds were depleted due to cost increases in electrical projects and the primary/ secondary clarifier rehab project. Therefore, $25M was added for FY14 – FY18 to fund other projects added during this next cap period. In the FY12 Final CIP, this spending was all moved to the FY19-23 cap period.
Equipment Condition Monitoring	Installation of temperature & vibration-monitoring equipment in NMPS and Winthrop Terminal Facility (WTF). Completed in January 2005.
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.
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.
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.
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.
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.
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.
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.
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.
Centrifuge Back-drive Replacements	Replace the centrifuge back-drives, which have become obsolete. Commenced in February 2013 and reached substantial completion in March 2015.
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.

Sub-phase *Equipment Replacement:*	**Scope**
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 FY18-22 and approximately every 20 years thereafter.
HVAC Equipment Replacement – Design/ESDC & Construction	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.
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.
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-phases 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.
Cryogenics Chillers Replacement	Project to replace failing air chillers that require frequent maintenance in the oxygen generation plant. Construction began in October 2014, expect completion by October 2016.
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.
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 DI Digester Storage Tank project under "Specialties".
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 have begun to leak, indicating that the gaskets and seals are 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.

Sub-phase *Architectural:*	**Scope**
Study/Concept Design-Concrete Repairs	For installing a protective coating on concrete in secondary clarifiers and disinfection basins. Data indicates work not needed; dropped in FY11.

Sub-phase *Architectural:*	**Scope**
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 FY17-19.
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 FY17, construction work scheduled for FY19-20.
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.
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.
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 FY16 and barge berth/facility work in FY19, then on a 20-year cycle.
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.

Sub-phase *Utilities:*	**Scope**
Outfall Modifications	Inspection of the old outfall tunnels (decommissioned after startup of the new outfall tunnel). Inspection completed in July 2002.
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; Under the Master Plan, Phase 5 was added and is scheduled to start in FY19.
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 (FY16-19), 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, with expected completion by August 2016.
NMPS Harmonic Filter Replacement	The second phase of NMPS VFD and motor replacement is installation of new harmonic filters in FY18-20.

Sub-phase *Utilities:*	**Scope**
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.
Thermal Power Plant Modifications – REI	Project covers REI work on 7061A above, modifications in the Thermal Power Plant fuel system. Work now expected to be done in-house.
TPP Boiler Control Replacement	Replace boiler controls in the Thermal Power Plant that are becoming obsolete. Contract began in November 2014, with expected completion in two years.
Switchgear Replacements including future cycles added per the Master Plan	On-going program to sequentially replace obsolete electrical switchgear. Several buildings scheduled for FY18-20, others in FY21-22. Future cycles beyond that period are not currently funded.
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.
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 FY14 followed by two years of warranty; and may need to be repeated every 10-12 years.
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.
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.
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 FY19-21.
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.
Fuel Pipe Abandonment	To cement the existing fuel pipeline in place in FY13 instead of removing it. Project completed December 2012.
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.

Sub-phase *Utilities:*	**Scope**
North Main Pump Station Motor Control Center (MCC) Phase 2 Construction and ESDC/REI	New sub-phase, pulled from the project above. Second phase of the work, scheduled to be done in FY17-20.
CTG Rebuilds	Rebuilds of the combustion turbines in the Thermal Power Plant. Added from the Master Plan, scheduled for FY19-22 with repeat cycles every 15 years. With the addition of the "Combined Heat & Power" facility, this work may eventually be eliminated.
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.
DI Digester Flare #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 FY19-20.

Sub-phase *Support:*	**Scope**
DISC Application	Hardware, software, and contract services to implement a Deer Island plant-wide computerized database of all plant systems (electrical, gas, water, etc). Current systems deemed sufficient, remaining project removed in FY14.
Document Format Conversion	Conversion of Deer Island 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 FY17.
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 are expected to be awarded in FY16 at $1.6M each.
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.

Sub-phase *Specialties:*	**Scope**
Sodium Hypochlorite Tank Liner Removal	Removed the failed lining in tank #1 of the four sodium hypochlorite storage tanks. Completed in September 2006.
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.
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.

Sub-phase *Specialties:*	**Scope**
Future Sodium Hypo Tank Rehabilitation or Replacement	Based on condition, expect to start replacing one tank per year beginning in FY21.
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.
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.
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.
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.
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 FY16.
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.
Odor Control Rehabilitation Design/ESDC , Construction and REI	Odor Control Rehabilitation work which was previously in the Ancillary Modifications Design and Construction 4 sub-phases. Dropped the Preliminary Design phase and added ESDC/REI to the scope in FY11. The project involves modifications to the cryogenics facility and plant-wide odor control systems, including the digester gas systems and wet scrubber improvements. This project was moved here from the *Plant Optimization* project in FY10. Construction currently scheduled for FY19-23.
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, and was completed in July 2013.

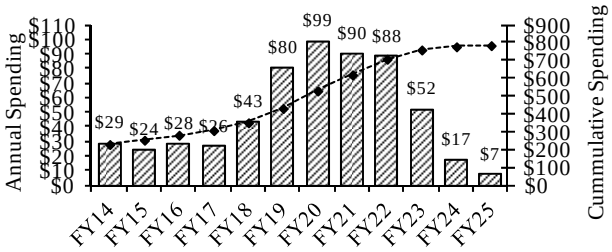
Sub-phase *Specialties:*	**Scope**
Clarifier Rehabilitation Phase 2 Design and Construction	Sub-phase pulled from the project above. This project is needed to correct deficiencies noted during the first Primary & Secondary Clarifier project. Influent gates not sealing off tanks adequately; effluent launders 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 FY18-21.
Scum Skimmer (Clarifier Tip Tube) Replacement	Sub-phase also pulled from the W3H flushing project above. Needed a separate project and schedule for replacing the scum tip tubes. Scum tip tubes not working results in scum build-up in primary tanks that has to be manually collected and transported to the gravity thickeners. Project began in FY14 and is expected to be completed in FY17; secondary tip tubes added to scope, increasing the cost.
DI Digester Storage Tank Design/ESDC and Rehabilitation Phase 2	The Deer Island 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 FY20.
Combined Heat & Power (CHP) Design and Construction	A study has been undertaken 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 able to handle the increased methane gas quantities associated with co-digestion. 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 design in FY16, construction by the end of FY18.
Digester Gas Pipeline Design and Construction	The existing DITP methane gas distribution system has no redundancy, and it needs to be added. If equipment in the current gas line fails, there is no way to get the methane to the thermal plant, so a second gas pipeline will be required. Project scope moved to Combined Heat & Power Design and Construction phases above during the FY16 Proposed CIP cycle, so this sub-phase is no longer needed.
Co-Digestion Design/ESDC/REI and Construction	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, then fed through the piping into the digesters. This project will only move forward if the pilot program proves the full scale operation is feasible and cost-effective.

Sub-phase *Specialties:*	Scope
Co-Digestion Temporary Facility	This project is for the "fast track" modifications to the digester piping and barge pumping systems needed to begin the co-digestion pilot program. Moved this sub-phase from the Residuals CIP to Deer Island in the FY16 Proposed budget cycle.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$763,925	$200,290	$563,635	$28,065	$26,167	$150,358	$409,356	$56,711

DI Asset Protection



Project Status 11/15	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, 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, and Centrifuge Backdrive Replacement. Contracts in process include the following: Secondary Reactor Batteries VFD Installation, NMPS VFD Replacement Construction, NMPS and WTF Valve & Piping Replacement, Electrical Upgrade Construction 4, Clarifier Phase 2 Design, Scum Skimmer Replacement, Cryo Chillers Replacement, HVAC Equipment Replacement Design, Thermal Power Plant Boiler Control Replacement, Fire Alarm System Replacement Design, Fuel System Modifications, and Digester Sludge Pump Phase 2 contracts. WTF VFD Replacement and Gravity Thickener Improvements are expected to start in FY16.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$720,365	$763,925	$43,560	Jun-48	Jun-48	None	$170,511	$150,358	($20,153)

Explanation of Changes

- The project cost increase is primarily due to updated cost estimate for Odor Control Rehabilitation Construction and Resident Engineer Inspection Services, Winthrop Terminal Facility Variable Frequency Drive Replacement, Gravity Thickener Replacement, HVAC Equipment Replacement, Cathodic Protection Design, Construction and Engineering Services During Construction, Sodium Bisulfite & Hypo Tanks Rehabilitation and Resident Engineer Inspection Services, and inflation adjustments. Increases are partially offset by lower award for Digester Sludge Pump Replacement Phase 2, and deleted work for Thermal Power Plant System Modifications Resident Engineer Inspection Services.

- Spending shifted primarily due to several schedule changes including Sodium Bisulfite & Hypochlorite Tanks Rehabilitation, Clarifier Rehabilitation 2 Construction, Fire Alarm Replacement Construction, Co-Digestion Design/Build, Digester & Storage Tank Rehabilitation Design/Engineering Services During Construction, DI Dystor Membrane Replacement, Future South System Pump Station VFD Replacement Construction, Odor Control Rehabilitation Design/Engineering Services During Construction, lower award for Digester Sludge Pump Replacement Phase 2, and deleted work for Thermal Power Plant System Modifications REI.

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: Electrical Equipment Upgrades 4 ($60,000 in FY18 and $60,000 in FY19), Winthrop Terminal Facility VFD Replacement ($30,000 in FY21), VFDs for Secondary Reactor Batteries ($141,000) and ($787,000) utility rebate in FY18, HVAC Equipment Replacement $200,000 in lab equipment in FY19, ($140,000 in FY21 and $50,000/yr in FY18-20), 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.

- 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.

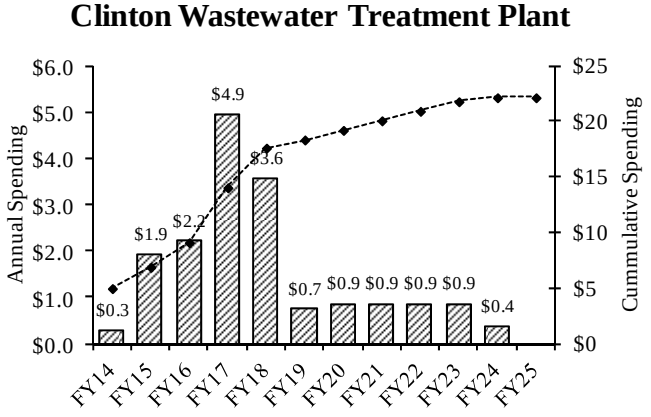
Scope

Sub-phase	Scope
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.
Clinton Permanent Standby Generator	Install a permanent standby generator at the Clinton Wastewater Treatment Plant. Completed in November 2007.
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 must be emptied, cleaned, and rehabilitated (replace covers, piping, valves, gas lancers, and mixers) to operate under the new permit. Cleaning the first digester was completed 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. These gates would allow for throttling back on the plant flow during extreme flow conditions to protect the treatment plant. The gates would be managed so the plant wet well does not overflow, and damage plant systems. As of FY14, the project scope also includes plant-wide concrete repairs. The concrete walls, walkways and structural support beams across the primary clarifiers are deteriorating to the point that rebar is exposed. The project involves repairing the walls and potentially replacing the walkways and equipment support beams that extend across the tops of the tanks. Construction began in late FY14 and is expected to take 2 years to complete.

Sub-phase	Scope
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 substantially complete in February 2013.
Phosphorus Reduction Design/ESDC and Construction	Latest draft NPDES permit includes lower phosphorus limits. The Authority expects the final permit to be issued soon, with four years allowed to achieve compliance. 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. In the FY16 Proposed CIP, construction of a natural gas pipeline into the plant was added to the scope, in order to save on energy costs by switching from oil to natural gas.
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 FY16.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$19,955	$4,716	$15,239	$2,207	$4,940	$12,901	$4,171	$358



Project Status 11/15	28.2%	Status as % is approximation based on project budget and expenditures. Phosphorus Reduction Design commenced in November 2013. Digester Rehabilitation construction began in April 2014 and Phosphorus Reduction Construction is expected to commence in February 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$20,511	$19,955	($556)	Sep-23	Sep-23	None	$13,483	$12,901	($582)

Explanation of Changes

- Project cost and spending decreased due to cost adjustment for Clinton Digester Rehabilitation partially offset by updated cost estimate for Phosphorus Reduction Construction.

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 labor, chemicals, utilities and maintenance by approximately $57,000 per year beginning FY18. This increase is offset by the estimated savings of $38,000 per year by switching from oil to natural gas.

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 2016, most of the major pieces of processing equipment will be 25 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 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 and Clinton) 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 proceeds with projects needed to further evaluate the benefits of that process. As a result, several projects were added to the Deer Island CIP to achieve that goal. 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 Deer Island 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 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.

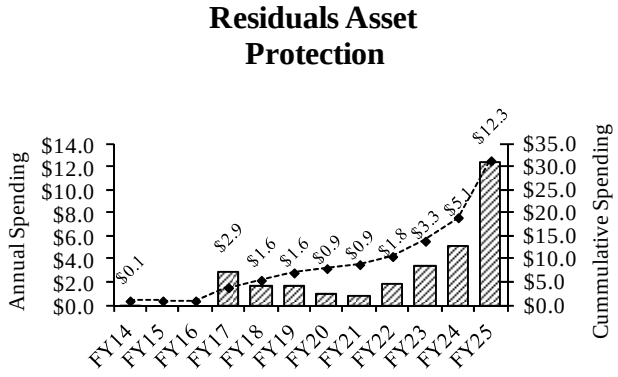
Scope

Sub-phase	Scope
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.
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.
Residuals Plant Upgrades – Phase 1 Design & Construction	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 $10M for various sub-phases, for the duration of 5 years. Design is currently scheduled to begin in FY18, for any projects requiring design by the MWRA. For FY17-21, the $10M in construction funds includes the $7M commitment to NEFCo as agreed to in the contract extension.

Sub-phase	Scope
Co-Digestion Pilot	New project for FY14, to evaluate the impacts of adding food waste, oils and greases to the digesters at Deer Island, and determine what changes in sludge characteristics may result that could have an impact on the residuals Plant processes. Moved to the DI Asset Protection Project, and changed the name to Co-digestion Temporary Facility in FY16.
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, (possibly encompassing projects from the list of placeholders below). 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.
Six Rotary Dryer Replacements-Construction	Replace the rotary dryers. As of FY14, $0 placeholder. The dryers are core equipment, and the most expensive items at the facility in terms of acquisition, installation, and operational costs.
Six Air Scrubber Replacements - Construction	Replacement of the air scrubbers/packed towers. As of FY14, $0 placeholder.
Plant MCC Construction	Replacement of the motor control center (MCC) equipment. As of FY14, $0 placeholder.
FRSA Pier Rehab Design & Construction	To complete a study, and then design for rehabilitation (or demolition) of piers at the Biosolids Processing Facility. This project was deleted in the FY10 cycle.
Rail System Rehab Construction	To rehabilitate portions of the rail system. As of FY14, $0 placeholder.
Replace 9 Pellet Storage Silos - Construction	To replace the pellet storage silos at the end of their expected useful life of 15 years. As of FY14, $0 placeholder.
Sludge Feed Conveyor Replacement - Construction	Replacement of the sludge feed conveyors and weigh scales (from the centrifuges to the rotary dryers). As of FY14, $0 placeholder.
Sludge Storage Tank Rehab	Rehabilitation of the sludge storage tanks and related valves. As of FY14, $0 placeholder.
Pumping Systems Upgrade - Construction	For the replacement or rehabilitation of the sludge, centrate, and chemical pumps. As of FY14, $0 placeholder.
Replace 12 Centrifuges – Construction	To replace the sludge thickening centrifuges at the end of their expected 18-year useful life. As of FY14, $0 placeholder.
Utility Upgrades - Construction	Upgrades to the water, sewer, electrical, and telephone systems. As of FY14, $0 placeholder.
Odor Control System Upgrade - Construction	Replacement of the pipelines and odor control equipment for treating the off-gases from the sludge storage tanks prior to release to the atmosphere. As of FY14, $0 placeholder.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$103,832	$832	$103,000	$0	$2,868	$4,570	$8,470	$90,067



Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$103,832	$103,832	$0	Jun-48	Jun-48	None	$4,570	$4,570	$0

Explanation of Changes

- N/A

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 in September 2013 (for Alewife Brook/Upper Mystic River) and October 2013 (for Lower Charles River Basin). These extensions are in effect until September and October 2016, respectively, when it is expected that DEP will issue new three-year extensions.

The Second CSO Stipulation replaces the stipulation entered in 1987 which 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 the CSO outfalls it owns and operates. These important conditions 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.

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, due to unforeseen subsurface conditions, utility conflicts and the need to manage traffic and community impacts in historical, densely populated neighborhoods. Notwithstanding these challenges, MWRA, working in cooperation with the Boston Water and Sewer Commission (BWSC and 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.

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

Receiving Water	CSO Discharge Goals (Typical Year Rainfall)		Projects*	Capital Cost* ($ million)
	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)	108.3
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 • Chelsea Trunk Sewer Replacement • Chelsea Branch Sewer Relief • CHE008 Outfall Repairs • East Boston Branch Sewer Relief (portion)	77.7
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 • BOS019 Storage Conduit • East Boston Branch Sewer Relief (portion)	61.8
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	253.8
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	50.2
TOTAL **Treated**		**410** **381**		**906.6**

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

MWRA's CSO program includes temporary flow metering and other efforts to gather 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 model simulations are essential to verify the predicted benefits of the CSO-related improvements as they are completed, to ensure 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.

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

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.
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.

Project	Purpose
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.
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.

Project	Purpose
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 FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$906,603	$876,839	$29,765	$18,982	$5,002	$65,923	$2,973	$0

Program Status 11/15	98.3%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$898,455	$906,603	$8,148	Dec-15	Dec-15	None	$57,747	$65,923	$8,176

Explanation of Changes

- **Community Managed +$8.1M**

  Project Changes: Cambridge Sewer Separation +$10.2M, Reserved Channel Sewer Separation ($2.1M).

CEB Impacts

- Completion and start-up of these projects will result in a total net increase of $350,000 starting in FY18 (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
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.
Tunnel Construction	Construction of the North Dorchester Bay tunnel, drop shafts, access shafts and CSO/stormwater diversion structures.
Dewatering Pump Station & Sewers Construction	Construction of the 15 mgd dewatering pump station at Conley Terminal and connecting sewers.
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.
Pleasure Bay Construction	Construction of Pleasure Bay drainage improvements.
Final Design ESDC/CSO Facilities	Final Design and engineering services during construction for the dewatering pump station, sewers and ventilation building.
Ventilation Building Construction	Construction of the ventilation building on DCR land at the upstream end of the tunnel.
Communications Systems	Installation of communications systems at the Dewatering Pumping Station and Ventilation Building to include antennas, repeaters and radios.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$221,597	$221,602	$0	$0	$0	($23)	$0	$0

Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$221,597	$221,597	$0	May-13	May-13	None	($23)	($23)	$0

Explanation of Changes

- N/A

CEB Impacts

- Estimate of $350,000 in FY18 and 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
Design	Design and engineering services during construction.
Construction 1	Interceptor connection relief and floatables controls at outfall SOM01A.
Construction 2	Automated gate and controls at MWR003, relief of MWRA's Rindge Ave. siphon, and floatables control.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$4,562	$4,001	$561	$555	$6	$3,914	$0	$0

Project Status 11/15	94.0%	Status as % is approximation based on project budget and expenditures. Design contract was awarded in March 2012. MWRA substantially completedInterceptor connection relief and floatables controls at outfall SOM01A in December 2013 and substantially completed MWR003/Rindge Ave in October 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$4,562	$4,562	$0	Oct-15	Oct-15	None	$3,914	$3,914	$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
Design	Design services for construction contracts to be bid, awarded, and managed by BWSC.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$64,174	$60,542	$3,631	($127)	$0	$1,650	$1,376	$0

Project Status 11/15	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$64,174	$ 64,174	$0	Jun-16	Dec-16	6 mos.	$1,287	$1,650	$363

Explanation of Changes

- Schedule and spending changed due to updated schedules from Boston Water & Sewer Commission.

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 under 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 21, 2015, in compliance with Schedule Seven, Cambridge attained substantial completion of Contract 9. Releated surface restoration work is scheduled by Cambridge to continue through June 2017.

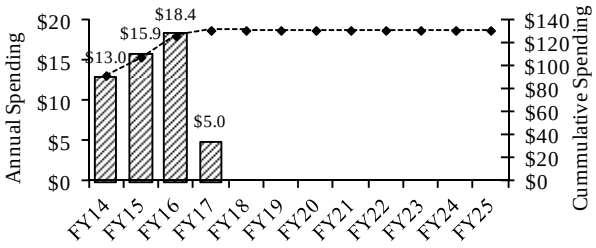
Scope

Sub-phase	Scope
Design CS/RI	Design services.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$102,765	$79,405	$23,360	$18,370	$4,990	$52,281	$0	$0

Cambridge CAM002-004
Sewer Separation



Project Status 11/15	90.6%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$92,563	$102,765	$10,202	Dec-15	Dec-15	None	$42,079	$52,281	$10,202

Explanation of Changes

- Project cost and spending increased primarily due to updated construction and engineering services during construction costs for Contracts 8B, 9, and water use charges.

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

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$32,186	$32,188	($2)	($2)	$0	($161)	$0	$0

Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	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, 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).

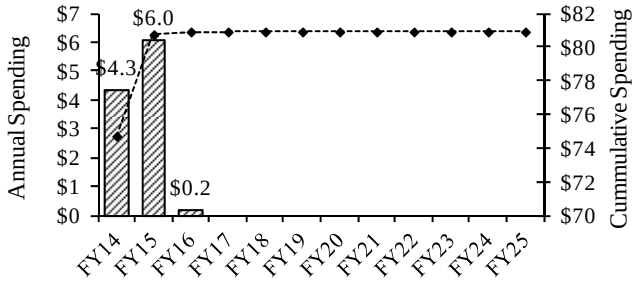
Scope

Sub-phase	Scope
Design CS/RI	Design services managed by BWSC for construction contracts to be bid, awarded and managed by BWSC.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$70,560	$70,395	$164	$164	$0	$10,520	$0	$0

Reserved Channel
Sewer Separation



Project Status 11/15	99.8%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$72,613	$70,560	($2,053)	Dec-15	Dec-15	None	$12,573	$10,520	($2,053)

Explanation of Changes

- Project cost and spending decreased primarily due to updated cost estimates for contracts 3B and 4, and 8.

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.

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.

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.

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

Scope

Sub-phase	Scope
Technical Assistance	Preliminary planning services prior to and in support of the 1988-90 Facilities Planning/EIR efforts.
Planning/EIR	Facilities planning and environmental review of CSO control alternatives (1990 Recommended CSO Control Plan).
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.
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.
Modeling	Receiving water quality modeling support to the Master Planning efforts.
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.
System Assessment	Temporary flow metering and other efforts to gather and evaluate new data on system performance.
Technical Review	Technical assistance for the entire CSO control plan including affordability analysis.
Land/Easements	Acquisition of land and easements for construction of MWRA-implemented projects. Also, permits not covered in design and construction contracts.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$50,248	$48,197	$2,051	$22	$6	($714)	$1,598	$0

Project Status 11/15	95.9%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$50,248	$50,248	$0	Dec-20	Dec-20	None	($378)	($714)	($336)

Explanation of Changes

- Project spending decreased due to updated expenditure projections.

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.

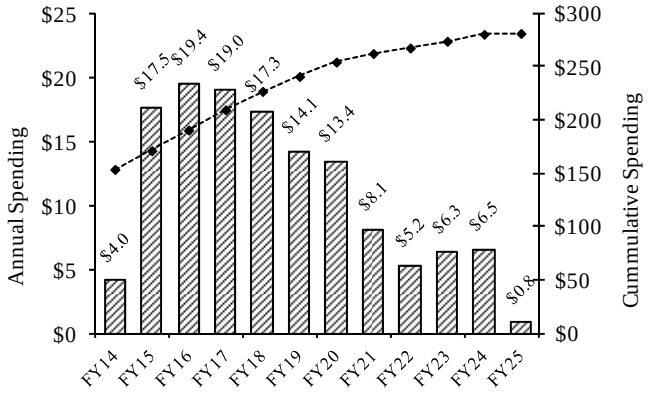
In August 1992, the Board of Directors approved $25 million to fund the initial phase of the I/I Local Financial Assistance Program. In June 1995, the Board approved $38.8 million to fund a second phase of the program. Both Phase1 and 2 funds were distributed as 25% grants and 75% interest-free loans. 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 FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$242,585	$149,769	$92,816	$19,387	$18,952	$77,182	$47,057	($9,869)

Project Distribution Status 11/15	64.3%	Through November 2015, MWRA has distributed $126.3 million in grants and $169.8 million in interest-free loans to fund over 491 separate projects in 43 communities under the I/I Local Financial Assistance Program.

I/I Local Financial Assistance



Project Repayment Status 11/15	65.7%	Through November 2015, a total of $143.1 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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$242,585	$242,585	$0	Jun-35	Jun-35	None	$75,009	$77,182	$2,173

Explanation of Changes

- Project spending increased 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 1986 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 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.

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 Sterns 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

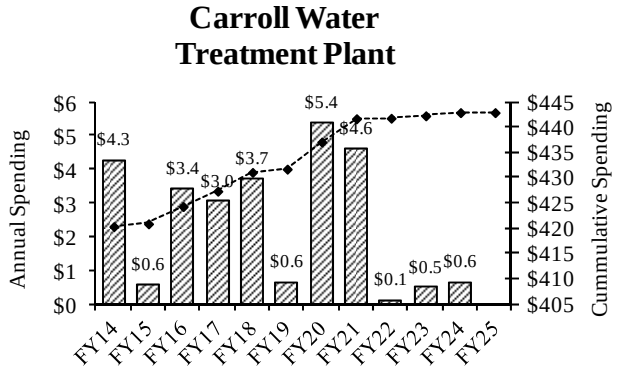
Sub-phase	Scope
Study 1	Investigation of the potential impacts of SDWA amendments on the MWRA system and evaluation of the need, feasibility, and benefits of improved treatment processes.
Study 2	Evaluation of alternative filtration, disinfection, and corrosion control processes to determine the most 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.
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.
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.
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.
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.
Immediate Disinfection-MECo	Massachusetts Electric Co. power line installation to support the disinfection process at the Cosgrove Disinfection Facility.
Distribution Water Consultant	To provide technical assistance related to distribution system management.
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.
Design/CS/RI: Walnut Hill WTP	Design and Engineering Services During Construction for the water treatment plant and associated components.
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.

Sub-phase	Scope
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.
WHCP3: Site Work and Storage Tank	Includes clearing and excavation, site access roads, yard piping, and construction of a 45-million gallon storage tank.
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.
WHCP6: Late Site Work	Final grading, landscaping, and paving of treatment facility site.
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.
Design Management Support	Professional services and value engineering support to MWRA in review of the water treatment plant design.
Construction Management/RI	Construction management and resident inspection during construction of the water treatment plant.
Cosgrove Disinfection Facility Underwater Improvements	Installation of underwater piping needed to apply sodium hypochlorite at Shaft A.
Community Chlorine Analyzers	Purchase of free chlorine residual analyzers for eight communities to work in association with interim chloramination facilities.
OCIP	Owner Controlled Insurance Program, providing pollution liability, workers' compensation, general liability, and excess loss coverage during construction of the CWTP.
Professional Services	As needed legal, insurance, design, and construction specialty services for the Carroll Water Treatment Plant.
Marlborough MOA	Agreement to mitigate the impacts of the construction of the Carroll Water Treatment Plant on Marlborough.
WHWTP – MECo	Relocation of electric power lines.
Site Security Services	Site security services at the Carroll Water Treatment Plant.
CSX Crossing	Railroad track improvements adjacent to CWTP.
Wachusett Algae Design and Construction	Design and Construction of automated chemical dispensing system for algae control.
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.
Security Equipment	Design and installation of card access, improved motion and intrusion alarm systems, video surveillance, and monitoring equipment for MWRA facilities.
WHCP8– Cosgrove Screens Design/CS/RI and Construction	Replace existing manual screens with finer automatically controlled traveling screens.

Sub-phase	Scope
AWWARF-Evaluation Ozone and UV	Study of the effects of ozone and ultraviolet treatment on cryptosporidium to ensure inactivation in Wachusett Reservoir.
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.
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.
As-Needed Technical Assistance #1 and #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.
Ancillary Modifications Construction 1	Follow-up construction from the As-Needed Technical Assistance contracts.
Ancillary Modifications Construction 2	Address improvements in reliability, optimization of plant performance and/or reduce plant operating costs.
Ancillary Mods Design 3 and 4	Additional As-Needed design services as a follow-up for additional improvements at the Carroll Water Treatment Plant.
Technical Assistance #5 and #6	Continuation of as-needed engineering technical assistance for ancillary modifications design and plant optimization.
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.
Technical Assistance #7 and #8	The next two phases of as-needed engineering technical assistance for ancillary modifications design and plant optimization.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$438,074	$416,046	$22,028	$3,419	$3,041	$15,019	$11,210	$637



Project Status 11/15	95.3%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$438,192	$438,074	($118)	Dec-20	Dec-20	None	$15,166	$15,019	($147)

Explanation of Changes

- Project cost and spending decreased due to updated cost estimate for Existing Facilities Modifications CP-7 sub-phase.

CEB Impact

- Impacts are reflected in the Field Operations FY17 CEB for utilities, maintenance, labor and chemicals for UV Disinfection. Expect $35,000 in FY21 and $35,000 in FY22 for Wachusett Algae Facility.

S. 543 Quabbin 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
Quabbin WTP: Design/CA/RI and Construction	System hydraulics study, design, construction administration, resident inspection, and construction of disinfection and CT monitoring facilities.
Ware Fire Department MOA	"First Responder" training and protective clothing for the Ware Fire Department for Quabbin Disinfection Facility emergency scenarios.
CVA Shea Ave Leak Repair	Repair of pipeline leak and replacement of 36-inch valve on the Chicopee Valley Aqueduct.
WQ Analysis Equipment	Water quality analysis equipment for the Quabbin Disinfection Facility in Ware.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$20,024	$19,576	$448	$448	$0	$7,256	$0	$0

Project Status 11/15	97.8%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$19,719	$20,024	$305	Oct-14	Oct-14	None	$6,951	$7,256	$305

Explanation of Changes

- Project cost and spending changed primarily due to an amendment for the Quabbin Ultraviolet Design Construction Administration/Resident Inspection sub-phase.

CEB Impact

- Impacts are included in the FY17 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 has 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
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.
Roadway Resurfacing Design & Construction	Design and Construction for Roadway paving adjacent to the site.
Design/Build Field Oversight	Field oversight and administration of the Design/Build contract will be performed by in-house staff.
Design/Build	Design/Build of a 20 million gallon covered storage facility.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$40,557	$40,083	$474	$78	$0	$198	$397	$0

Project Status 11/15	98.8%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$40,555	$40,557	$2	Jan-19	Jan-20	12 mos.	$228	$198	($30)

Explanation of Changes

- Project cost changed due to inflation adjustments
- Schedule and spending changed due to updated schedule for Roadway Resurfacing work.

CEB Impact

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

S. 550 Spot Pond 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 will be supplied through a pressure reducing valve on WASM 4 via the West Spot Pond Supply Main. At night, when water demand is low, the capacity of the Low Service transmission mains will be used to fill the Spot Pond Storage Facility by gravity. 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 backup pump station to provide redundancy to the Gillis Pump Station supplying the Northern High and Northern Intermediate High service areas.

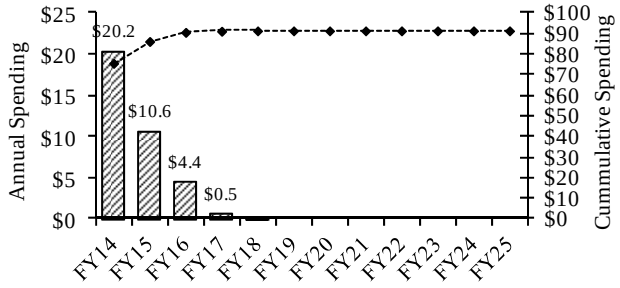
Scope

Sub-phase	Scope
Environmental Reviews and Conceptual Design (6455/6456)	Preliminary engineering for tank siting, environmental reviews and conceptual design.
Design/Build (6457)	Design and construction by a single contractor of a 20 million gallon water storage tank and pump station.
Owner's Representative (7233)	Provision of technical program management for the design/build contract procurement, monitoring, and administration.
Easements/Land Acquisition (6868)	To provide adequate land for construction of the water storage tank.
Early Construction Water Connection (7314)	Construction of piping and meter connection to replace existing water supply to be removed as part of tank construction.
Fells Reservoir Microwave Tower Replacement Construction (7506)	Install a microwave tower and a communication building to replace the existing microwave tower at Fells reservoir in Stoneham. The existing microwave tower is 92 feet tall which is not high enough to transmit signals for our current needs and therefore will be replaced with a tower that is 160 feet tall.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$60,615	$55,446	$5,170	$4,431	$544	$36,021	$0	$0

Spot Pond Storage Facility



Project Status 11/15	94.6%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$61,152	$60,615	($537)	Aug-16	Dec-16	4 mos.	$36,558	$36,021	($537)

Explanation of Changes

- Project cost and spending decreased primarily due to expected change orders for the Design/Build contract, partially offset by updated cost estimate for Fells Reservoir Microwave Tower Construction, land easements, and amendment for the Owners' Representative contract.

- Project schedule shifted due to updated schedule for Fells Reservoir Microwave Tower Construction.

CEB Impact

- Impacts included in FY17 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 roller gate to control flow in the Quabbin Aqueduct and inspect the Quabbin Tunnel and recommend maintenance or repairs. Make structural 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.

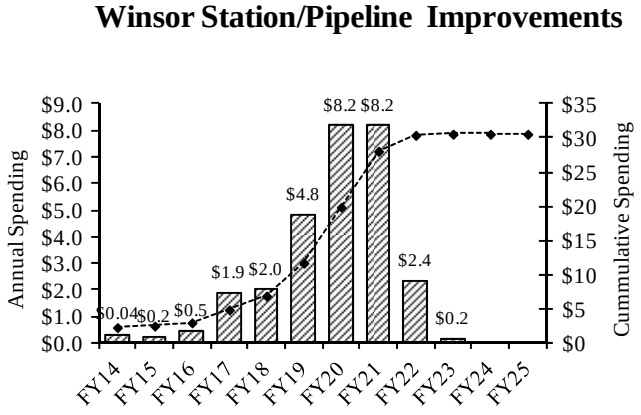
Scope

Sub-phase	Scope
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.
Quabbin Aqueduct Final Design CA/RI (7509) and Construction (7197)	Rehabilitation and improvements at Shafts 2 and 12 of the Quabbin Aqueduct. Installation of a roller gate to control flow at Shaft 12, the intake to the Quabbin Aqueduct, thereby improving safety and reliability of the transmission system.

Quabbin Aqueduct Inspection (6277)	TV inspection of the Quabbin Aqueduct.
Winsor Power Station Upgrades Design CA/RI (7460) and Construction (7115)	Construction to address piping improvements and building rehabilitation for water supply and Swift River discharge. Will also include improvements to the CVA Intake Structure.
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.
Winsor Station Chapman Valve Repair (7212)	Construction of replacement valving for the existing 36" Chapman Butterfly Valve (design by Technical Assistance consultant).
Purchase of Sleeve Valves (7234)	For replacing the damaged Chapman Butterfly Valve.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$30,020	$1,954	$28,066	$477	$1,886	$4,941	$23,683	$0



Project Status 11/15	7.6%	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 is expected to commence in February 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$27,883	$30,020	$2,137	Jan-20	Jul-21	18 mos.	$9,661	$4,941	($4,720)

Explanation of Changes

- Project cost increased primarily due to updated cost estimates for new Design/Construction Administration/Resident Inspection phases for Shaft 2 & 12 and Winsor Power Station, updated cost estimate for Hatchery Pipeline Construction, and inflation adjustments.

- Schedule and planned spending shift primarily due to updated schedules for Winsor Station Rehabilitation & Improvements, and Shaft 2 & 12 Construction.

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 includes 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 western 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.

With the MetroWest Tunnel and the John Carroll Water Treatment Plant now in service, the Hultman Aqueduct is being inspected and rehabilitated. Surface distribution facilities, including piping, valve chambers, and risers will connect the tunnel to the Hultman Aqueduct and local community services. Intermediate connections between the MetroWest Tunnel and the Hultman Aqueduct will 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
Study	Study of the aqueduct/tunnel system to determine the best alternative to improve hydraulic capacity and create redundancy.
Construction-Sudbury Pipe Bridge	Rehabilitation of the Siphon Pipe Bridge at the Weston Aqueduct which experienced significant leakage.
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.
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.

Sub-phase	Scope
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 will include construction of valve chambers and surface piping to allow connections to the Hultman Aqueduct and Norumbega Reservoir. The design at Shaft N includes provisions for future connections to the Norumbega Covered Storage Facility and the proposed Metropolitan Tunnel Loop.
Construction: Shaft 5A- CP3	Shaft 5A was excavated near the intersection of Route 128 and the Massachusetts Turnpike.
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.
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.
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 includes the disinfection and dechlorination of the Wachusett Aqueduct and the piping connections through Walnut Hill to MetroWest Shaft D.
Construction: Loring Road Covered Storage- CP8	Construction of surface facilities at the Shaft W site including a 20 million-gallon storage facility that replaces 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 will be 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 includes rehabilitation of 4,100 linear feet of 60-inch pipe and four master meters.
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.
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.
Hultman Leak Repair	Test pit excavation and leak repair on the Hultman Aqueduct.
Hultman Repair Bands	Purchase of external repair bands to be installed as part of Hultman investigation and repair.
Hultman Investigation and Repair	Evaluation of various segments of the Hultman Aqueduct and installation of repair bands at major leak sites.

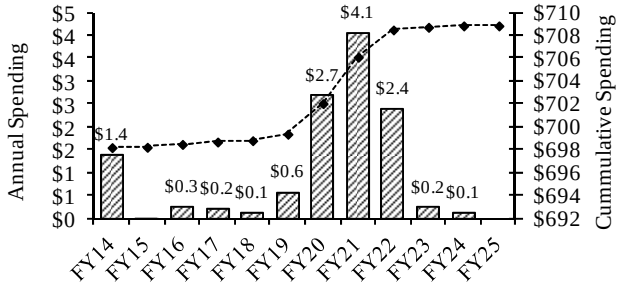
Sub-phase	Scope
Land Acquisition	Easements along the 17.5-mile tunnel construction route, as well as land at the Shaft W and Shaft L sites.
Professional Services	Services such as construction safety, contractor audit, legal services, risk management consulting services, and other miscellaneous services.
Framingham MOU	Agreement to mitigate the impacts of the construction on the Town of Framingham.
Weston MOU	Agreement to mitigate the impacts of the construction on the Town of Weston.
Southborough MOU	Agreement to mitigate the impacts of the construction on the Town of Southborough.
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.
Community Technical Assistance	Funds to assist communities with the redesign of utility plans.
Owner Controlled Insurance	Owner controlled insurance program providing workers' compensation, general liability, and pollution liability insurance for MetroWest construction.
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.
Construction: Hultman CP9	Construction of Valve Chamber E-3.
Interim Disinfection	Temporary disinfection related to CP-7 sub-phase.
Equipment prepurchase	Pre-purchased one 10-foot diameter butterfly valve for installation in Valve Chamber E3.
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.
Construction 6A Demolition	Demolition of existing chlorine storage building to allow for construction of a new valve chamber on the Hultman Aqueduct.
CP6 Easements	Easements for CP-6 Contract.
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.
Valve Chamber Modifications	Design and construction of an additional isolation valve on the Hultman Aqueduct to improve operational flexibility and reliability; and security hardening of key valve chambers.

Sub-phase	Scope
Shafts 5A/5 Surface Piping Cathodic Protection Construction (7477)	Construction to replace cathodic protection systems.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$707,421	$696,805	$10,616	$250	$205	$1,982	$9,923	$118

Metro West Tunnel



Project Status 11/15	98.5%	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.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$708,664	$707,421	($1,243)	Dec-22	Dec-22	None	$3,260	$1,982	($1,278)

Explanation of Changes

- Project cost and spending decreased primarily due to transfer of scope of work for the Shaft 5/5A Cathodic protection phases to the Cathodic Protection project.

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
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.
Oakdale Valves Phase 1	Study, design, and construction for the rehabilitation/replacement of two valves and miscellaneous support equipment at the Oakdale facility.
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.
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.

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.
CVA Intake Motorized Screen Replacement Design and Construction	Replace current motorized screens on the CVA Intake which are nearing the end of their useful life. The screens keep debris from entering CVA.
Rehabilitation of Oakdale Turbine	Rehabilitate turbine. Turbine was last rehabilitated in 1986 and we will be approaching thirty years which is the expected life of an overhaul.
Geo-thermal Heat Wachusett Gatehouse	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.
Rehabilitate Wachusett Gatehouse Chamber Piping & Bastion 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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$15,457	$7,457	$8,000	$0	$500	$773	$7,481	$0

Project Status 11/15	48.2%	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.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$15,457	$15,457	$0	Jun-22	Jun-22	None	$773	$773	$0

Explanation of Changes

- N/A

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 is 120 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 100 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
Hazardous Materials	Remove contaminated sediment from aqueduct.
Sudbury Aqueduct Inspection	Inspection of the Sudbury Aqueduct to identify need for future repair work.
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.
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).
Rosemary Brook Building Repair	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.
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.
Weston Aqueduct Flow Control Valve	Replacement of existing Golden Anderson valve that controls flow from the Hultman Aqueduct to the Weston Aqueduct. The valve is also used for CWTP half plant operation and for emergency redundancy for the Boston Low Service area.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$6,846	$660	$6,187	$199	$2,141	$2,841	$3,345	$0

Project Status 11/15	9.6%	Status as % is approximation based on project budget and expenditures. Inspection of Sudbury Aqueduct was completed in October 2006. Rosemary Brook Building repair is expected to begin in March 2016. Weston Aqueduct flow control valve to be replaced in FY17.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$7,149	$6,846	($303)	Jan-21	Jan-21	None	$3,146	$2,841	($305)

Explanation of Changes

- Project cost decreased due to updated cost estimate for the Weston Aqueduct Flow Control Valve partially offset by updated cost estimate for Rosemary Brook Building Repair contract.

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 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.

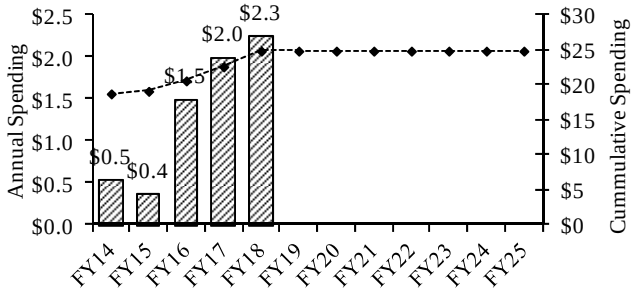
Scope

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

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$24,000	$18,248	$5,752	$1,500	$2,000	$6,658	$0	$0

Watershed Land



Project Status 11/15	77.2%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$24,000	$24,000	$0	Jun-18	Jun-18	None	$6,658	$6,658	$0

Explanation of Changes

- N/A

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
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.
Oakdale Dam Design/ESDC/RI and Construction	Provide final design, ESDC/RI, and construction for the removal of the Oakdale 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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$4,538	$3,093	$1,445	$495	$0	$546	$907	$0

Project Status 11/15	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$4,538	$4,538	$0	Dec-19	Dec-20	12 mos.	978	$546	($432)

Explanation of Changes

- Schedule and spending changed due to updated schedules for Quinapoxet Dam Design/Engineering Services During Construction/Resident Inspection and Construction contracts.

CEB Impacts

- None identified at this time.

S. 625 Long Term 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 planned distribution system storage projects like the Blue Hills and the Spot Pond Storage Facilities 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 will be presenting a recommended plan to the Board of Directors over the next few months. The recommended plan includes both northern and southern components. The northern and southern components are identified below in the Engineering Design & MEPA 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

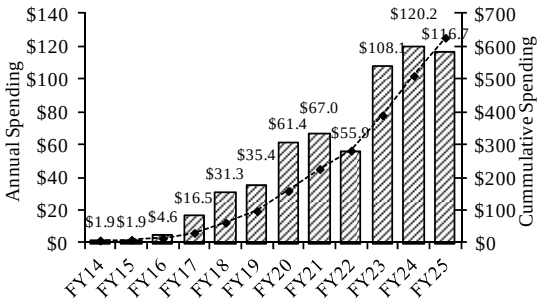
Sub-phase	Scope
Water Transmission Redundancy Plan (6273)	Evaluation and recommendations of alternatives for long term redundancy.
Wachusett Aqueduct Pump Station Design/ESDC/RI and Construction (7156/7517)	Design and construction of an emergency pump station to pump water from the Wachusett Aqueduct 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.
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 Building repair/stabilization.
Engineering Design & MEPA (7159)	Design, permitting and MEPA environmental review of the Northern and Southern Tunnel Loops, including renovations to the Chestnut Hill Emergency Pump Station.
Engineering Services During Construction (7356)	Engineering Services During Construction of the Northern and Southern Tunnel Loops, including connecting mains and Chestnut Hill Emergency Pump Station.
Tunnel Construction (7291)	Construction of the Northern and Southern Tunnel Loops.
Chestnut Hill Final Connections Construction (7353)	Chapter 30 and Chapter 149 final pipe connections.

Sub-phase	Scope
Chestnut Hill Emergency Pump Station Renovations Construction	Construction of renovations to the Chestnut Hill Emergency Pump Station, including the addition of a stand-by emergency generator.
WASM 3 Rehabilitation Construction (7160 and 7355)	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.
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.
Public Relations Legal and Administrative	Community agreements, land takings and Owner Controlled Insurance Program for the Northern and Southern Tunnel Loops.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$1,470,308	$6,681	$1,463,638	$4,600	$16,473	$56,207	$327,786	$1,083,483

Long Term Redundancy



Project Status 11/15	0.5%	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. Wachusett Aqueduct Redundancy Pump Station Design/ESDC/RI contract was awarded in January 2012. Sudbury Aqueduct MEPA Review was awarded in September 2012. Wachusett Aqueduct Pump Station Construction commenced in December 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$409,381	$1,470,318	$1,060,937	Dec-25	Jun-34	102 mos.	$54,336	$56,207	$1,871

Explanation of Changes

- Project cost increased primarily due to addition of a placeholder amount based on an average of two tunnel redundancy options (Alternatives 2A and 3D). The revised project cost also reflects a lower than budgeted award amount for the Wachusett Aqueduct Pump Station Construction contract.

- Spending changed primarily due to new Tunnel Engineering Design & MEPA phase partially offset lower award for the Wachusett Aqueduct Pump Station Construction and updated cash flow for Wachusett Pump Station Design contract.

CEB Impacts

- None identified at this time.

S. 618 Northern High Northwest Transmission Sections 70-71-79

Project Purpose and Benefits

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

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

To improve service reliability by completing a study to rehabilitate more than 10 miles of pipeline serving the northern high service area.

Project History and Background

The Northern High System Pipeline Sections 70, 71 and 79 are the primary distribution mains that supply water to seven north shore communities. These water mains are constructed of steel and cast-iron pipes installed in the 1950s. Rehabilitation of these pipelines will extend their useful life and postpone the need for more costly pipe replacement in the future. This project includes an initial planning phase that will assess the existing pipe condition and develop a sequence of work that would ensure uninterrupted service to the north shore communities while pipeline segments are out of service for rehabilitation. Future phases for design and construction of the rehabilitation will be added to this project based on the results of the planning phase.

Scope

Sub-phase	Scope
Planning (6895)	Planning phase for the rehabilitation of more than 10 miles of NHS Sections 70, 71 and 79.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$1,000	$0	$1,000	$0	$0	$474	$526	$0

Project Status 11/15	0.0%	Status as % is approximation based on project budget and expenditures. Planning is expected to begin in January 2018.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$1,000	$1,000	$0	Jan-19	Jan-19	None	$474	$474	$0

Explanation of Changes

- N/A

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 blowoff valves are cross-connected into sewers or drainage piping. To ensure there is no chance of contamination, DEP requires retrofiting 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 blowoffs 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
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.
Construction - Phase 1 (5126)	Purchase and installation of 27 blow-off valve retrofits.
Construction - Phase 2 (6105)	Purchase and installation of 10 blow-off valve retrofits and 10 main line valve replacements.
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.
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).

Sub-phase	Scope
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.
Design CA/RI Phases 8 & 9 (7417, 7418)	Design/Contract Administration/Resident Inspection for construction of Phases 8 and 9.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$22,749	$12,016	$10,733	$731	$975	$2,682	$3,654	$4,397

Project Status 11/15	52.8%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$22,702	$22,749	$47	Jun-28	Jun-28	None	$2,717	$2,682	($35)

Explanation of Changes

- Project cost increased due to inflation adjustments on unawarded contracts.
- Project spending changed due to updated cash flow for equipment purchases.

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 an adjacent pipeline, Section 35.

Scope

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

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$1,097	$124	$974	$4	$13	$183	$790	$0

Project Status 11/15	11.3%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$1,092	$1,097	$5	Nov-19	Nov-19	None	$178	$183	$5

Explanation of Changes

- Project cost and spending increased due to inflation adjustment.

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 pipeplays 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.
Construction of the Malden Section 53 and Revere Beach pipelines were substantially completed in September and October 1994, respectively. Sliplining of Section 53 Revere was completed in August 2009.

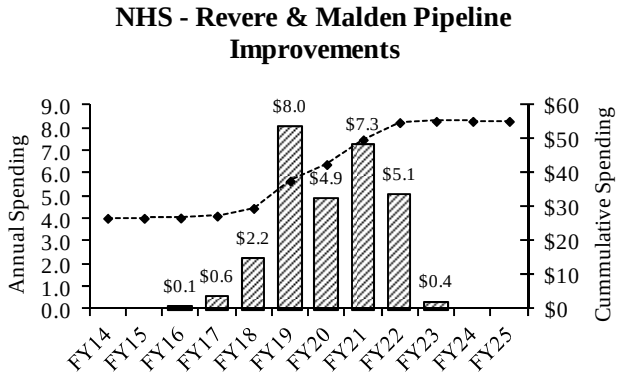
Scope

Sub-phase	Scope
Design/CS/RI – Revere/Malden	Design, construction services, and resident inspection for Section 53 in Malden and Sections 97 and 97A in Revere.
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.
Construction Malden Section 53 (5176)	Installation of 11,907 feet of 48-inch diameter pipeline in Malden on Section 53.
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.
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.
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.
Construction Control Valves (5191)	Installation of control valves needed to regulate water pressure and fill the Winthrop standpipe.
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.
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.
Final Design CA/RI and 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.
Shaft 9A-D Extension Design CA/RI and Construction (6958)	Design CA/RI, and 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.).

Sub-phase	Scope
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 30" 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.
NHS Area Study (7485)	A study of the NHS service area to look at hydraulics and redundancy in the distribution system in the Shaft 9A area.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$55,360	$26,833	$28,527	$100	$571	$2,910	$25,617	$0



Project Status 11/15	48.5%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$55,161	$55,360	$199	Nov-23	Apr-22	(19) mos.	$11,020	$2,910	($8,110)

Explanation of Changes

- Project cost increased primarily due to inflation adjustments.

- Schedule and spending changed due to restructuring and re-scheduling future phases including Section 53, Section 56, and Shaft 9A-D phases.

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 89-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 as well as a shorter 36-inch diameter pipe in Waltham from Meter 182 to the Waltham transmission system. The rehabilitation of Sections 23, 24, and 47 will proceed.

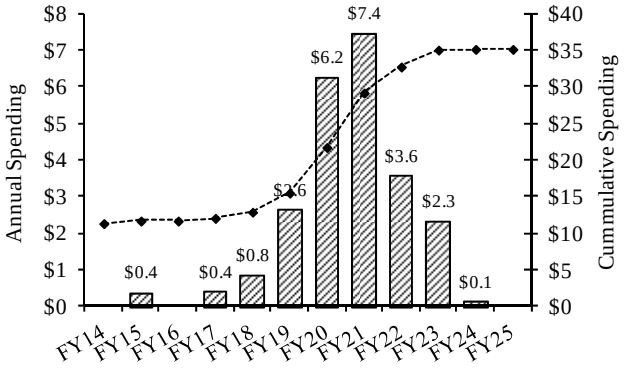
Scope

Sub-phase	Scope
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.
Routing Study (5163)	Identification of alternatives to determine the optimum approach for providing additional strong connections to WASM 3.
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.
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.
Design/CA/RI and Construction CP2 C&L Sections 59 & 60 (7086/6548)	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.
Design/CA/RI and Construction of South Segment CP3 (6385/6392)	Cleaning and lining of 20,500 linear feet of 20-inch diameter pipe (Sections 24 & 47) and 5,800 linear feet of 36-inch diameter pipe (Section 23).
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.
Design/CA/RI and Construction of Section 25 Replacement (6955/6956)	Replacement of existing Section 25 (approximately 4,800 linear feet of existing 16” pipe) with a new pipeline.
Design/CA/RI and Construction Section 75 Extension (7284/7484)	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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$34,765	$11,316	$23,449	$0	$360	$1,559	$22,148	$97

New Connecting Mains



	32.5%	Status as % is approximation based on project budget and expenditures. Northeast Segment CP-5 construction contract was completed in November 2011.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$34,296	$34,765	$449	May-25	Jan-23	(28) mos.	$403	$1,559	$1,156

Explanation of Changes

- Project cost increased primarily due to legal settlement for Northeast Segment Construction 5 and inflation adjustments on unawarded contracts.
- Schedule and spending changed due to accelerating future phases including Section 75, CP-3 South Segment, and Replacement of Section 25.

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 several years ago.

The Brattle Court, Reservoir Road, Hyde Park, Belmont, and Spring Street pump stations are between 40 and 80 years old and are 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 is inoperable, and system demand patterns have 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 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, Lexington Street, and Commonwealth Avenue pump stations.

Scope

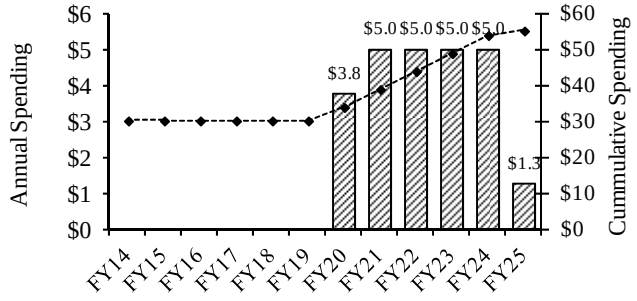
Sub-phase	Scope
Preliminary Design (5153)	Planning and conceptual design including inspection and evaluation of the HVAC systems, buildings, pipes, valves, and other systems at the pump stations; determination of the need for improvements; and preparation of a conceptual design report.
Design 1/CA/RI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

Sub-phase	Scope
Proprietary Equipment Purchases (6676)	Purchase of proprietary materials for SCADA system for Interim Instrumentation and Control.
Design 2 CS/RI (6980)	Final Design, construction services, and resident inspection for rehabilitation of five pump stations.
Pump Station Rehabilitation (7383)	Rehabilitation of the Gillis, Newton Street, Lexington Street, and Commonwealth Avenue pump stations. The pumps in these stations will be 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. Gillis, Lexington Street and Commonwealth Avenue, are the only pump stations for their respective service areas.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$55,058	$30,058	$25,000	$0	$0	$0	$18,750	$6,250

Rehab of Other Pump Stations



Project Status 11/15	54.6%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$55,058	$55,058	$0	Jun-24	Jun-24	None	$0	$0	$0

Explanation of Changes

- N/A

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
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, 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.
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).

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$7,889	$3,632	$4,257	$36	$23	$61	$3,495	$701

Project Status 11/15	46.0%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$7,893	$7,889	$26	Dec-23	Dec-23	None	$61	$61	$0

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
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.
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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$1,656	$141	$1,515	$150	$68	$418	$1,097	$0

Project Status 11/15	10.4%	Status as % is approximation based on project budget and expenditures. Project Planning phase is complete. Corrosion Control Program Testing Evaluation Program commenced in July 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$1,668	$1,656	($12)	Jul-23	Jan-20	(42) mos.	$509	$418	($91)

Explanation of Changes

- Project cost and spending decreased due to Cathodic Protection 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.

- Schedule accelerated due to updated schedule for Cathodic Protection Shafts E & L and Section W16 construction 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 will serve as distribution mains to the eight communities and will 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 will interconnect the new Spot Pond Covered Storage Facility to the system when it is completed in FY16.

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 have been significantly reduced as a result of the build up of rust deposits (tubercules) and other matter along the pipe walls, which also contributes to water quality deterioration in the Low Service System. The ability of the mains to withstand service pressures is drastically reduced in some areas due to exterior corrosion of pipes. In addition, inoperable or poorly operating valves along the mains make 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 Supply Mains 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 planned 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 will be 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 will be 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
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.
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.
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.
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).
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.
Construction 4 – 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 replacement.
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.
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 needs to be rehabilitated and is currently out of service due to pipe deflection and leakage. This project will return a currently isolated pipeline to service to provide redundancy.

Sub-phase	Scope
Section 50 Pipe Rehabilitation Design and Construction (7336/7337)	Section 50 is several hundred feet of 20-inch diameter cast iron main on exposed pilings which is need of rehabilitation.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$67,378	$61,696	$5,681	$1,975	$390	$3,282	$3,114	$0

Project Status 11/15	94.0%	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 commenced in May 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$66,807	$67,378	$571	Dec-21	Dec-21	None	2,713	$3,282	$569

Explanation of Changes

- Project and spending cost 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 newly constructed 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
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.
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.
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.
Boston Paving (6558)	Payment(s) to the City of Boston for paving work provided.
BECo Emergency Pump Connection (6623)	Payment to Boston Edison Company for installation of electrical service to meet special requirements.
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.
Demolition of Garages (6820)	Demolition of garages prior to transfer of property to the Commonwealth, at request of state Department of Capital Asset Management.
Design and Construction Shaft 7 Building (6302)	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.
Chestnut Hill Gatehouse Repairs (7382)	This project will provide structural stability of sub-structure of gatehouse which involves floatable fill and structural support walls.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$24,175	$17,487	$6,688	$0	$725	$725	$102	$5,861

Project Status 11/15	72.3%	Status as % is approximation based on project budget and expenditures. Chestnut Hill Gatehouse Repairs is expected to commence in FY17.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$32,035	$24,175	($7,860)	Jan-26	Jan-27	12 mos.	$316	$725	$409

Explanation of Changes

- Project decreased as a result of Emergency Generator/Electric Upgrades work transferred to the Long-Term Redundancy Project. This was partially offset by new project for Chestnut Hill Gatehouse Repairs.
- Schedule shifted due to updated schedule for Shaft 7 Building Design and Construction due to project priorities.
- Spending Increased due to new project for Chestnut Hill Gatehouse Repairs partially offset by Emergency Generator/Electric Upgrades Design work transferred to the Long-Term 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
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.
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.
Adams Street Bridge	Relocation of a pipeline made necessary by the reconstruction of this bridge by the MBTA.
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.
Section 22 North Facility Plan/EIR (7155)	Facility Plan/EIR for Section 22 North.
Section 22 North Design/ESDC (7120)	Design/ESDC for Section 22 North.

Sub-phase	Scope
Section 22 North Construction (6844)	Rehabilitation of 17,300 linear feet of 48-inch diameter Section 22 North.
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.
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.
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
Contract 1 A Construction (6885)	Rehabilitation of 4,400 linear feet of Section 22 South.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$74,983	$36,681	$38,302	$1	$1	$368	$3,963	$33,960

Project Status 11/15	48.9%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$74,773	$74,983	$210	May-27	May-27	None	$369	$368	($1)

Explanation of Changes

- Project cost increased primarily 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

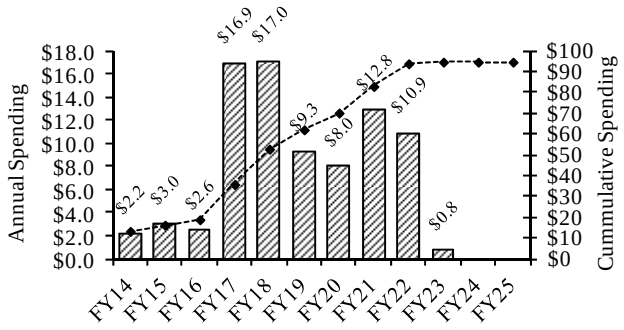
Sub-phase	Scope
Concept Plan, ENF, and Mobile Pump Unit	Developed a concept level plan to evaluate options to reduce the risk and the impacts of potential failures in Sections 29 and 89. Measures evaluated included valve improvements, improved community interconnections, pipeline redundancy, targeted 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.
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.
Design CA/RI and Construction	The Concept Plan has developed preliminary route alternatives in order to provide redundancy to Section 89. The route selected is under review with MWRA staff. Final route has been selected based on consultations with local elected officials, consideration

Section 89/29 Redundancy Phases 1A, 1B, 1C & 2	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.
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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$89,448	$11,149	$78,299	$2,577	$16,912	$41,661	$41,812	$0

NIH Redundancy & Covered Storage



Project Status 11/15	13.1%	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 was awarded in November 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$90,187	$89,448	($739)	Jun-22	Jun-22	None	$43,327	$41,661	($1,666)

Explanation of Changes

- Project cost decreased primarily due to award of Section 89/29 Redundancy Construction Phase 1B being less than budget estimate. This decrease was partially offset by inflation adjustments on unawarded contracts.
- Project spending changed primarily due to project cost changes above along with updated schedule for NIH Storage Design contract.

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, 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
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.
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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$23,441	$2,321	$21,120	$11	$14	$49	$20,031	$1,002

Project Status 11/15	9.9%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$23,334	$23,441	$107	Jul-22	Jul-23	12 mos.	$553	$49	($504)

Explanation of Changes

- Project cost increased primarily due to inflation adjustments for Section 8 Design and Construction.
- Schedule shifted due to project priorities for Section 8 Construction.
- Spending decreased due to updated schedules for Rehabilitation of Sections 37 & 46 Chelsea/Boston Design Construction Administration/Resident Inspection and Section 8 Design Construction Administration/Resident Inspection sub-phases.

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.

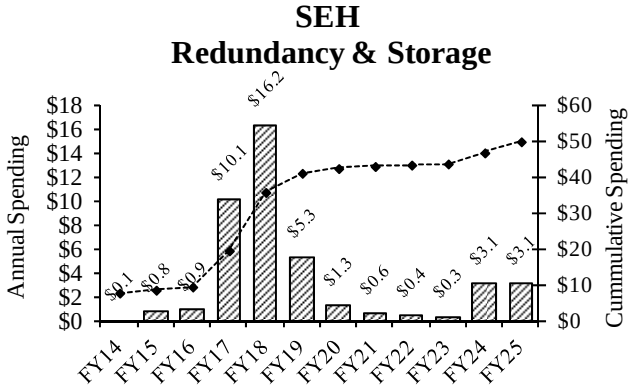
Scope

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

Sub-phase	Scope
Redundancy Pipeline Section 111 Design & Construction Ph 1 Contracts 1, 2, and 3	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.
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.
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.
Section 77/88 Design/Constr. (7112/7113)	Rehab of Sections 77 & 88 after redundant pipeline is in place.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$97,354	$7,621	$89,733	$884	$10,066	$28,039	$7,939	$54,619



Project Status 11/15	8.2%	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 is expected to commence in March 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.

$99,544	$97,354	($2,190)	Dec-35	Dec-35	None	$23,224	$28,039	$4,815

Explanation of Changes

- Overall project cost decreased due to updated cost estimate for Redundancy Pipeline Section 111 Construction 1. This decrease was partially offset by inflation adjustments on unawarded contracts.
- Project spending increased during the FY14-18 period due to accelerated schedules for Redundancy Pipeline Section 111 Construction Phases 2, and 3 partially offset by updated cost estimate for Construction 1.

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 build up 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 will be combined with the construction of new tunnels within the Metropolitan area to provide redundancy for the existing City Tunnel, the City Tunnel Extension and the Dorchester Tunnel. 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

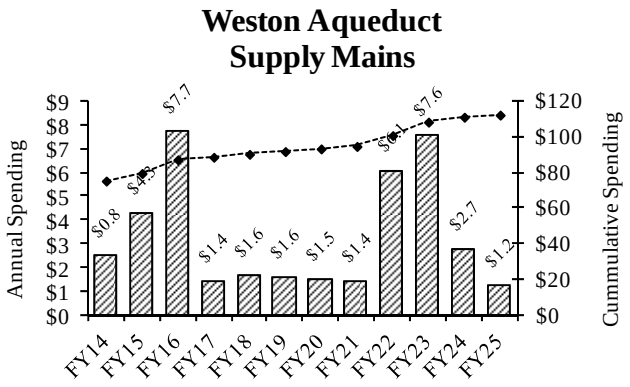
Sub-phase	Scope
Design/CA/RI – WASMs 1 & 2 (6142)	Design, construction administration, and resident inspection for the rehabilitation of WASM 1 and WASM 2 (construction contracts 6280 and 6281).

Sub-phase	Scope
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).
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.
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.
Design/CA/RI WASM 3 (6539)	Design, construction administration and resident inspection for construction phases CP2, CP3 and CP4.
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.
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.
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.
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.
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.
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).
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).

Sub-phase	Scope
Construction Watertown Section (7222)	Rehabilitation of approximately 5,795 linear feet of the Watertown Section.
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.
Construction Section 101/Watertown Section (7457)	Construction of 8,800 linear feet of a new connection to Waltham from the Northern Extra High Service Area.
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).

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY16	FY14-18	FY19-23	Beyond FY23
$109,605	$72,747	$36,859	$7,666	$1,396	$17,389	$18,060	$8,113



Project Status 11/15	70.6%	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. WASM 3 MEPA/Design/CA/RI commenced in July 2013. Watertown Section Rehabilitation was substantially complete in December 2013. Section 36/W11/S- 9-A11-A Valve commenced in November 2014.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		

FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$281,137	$109,605	($171,532)	Aug-25	Jun-23	(26) mos.	$19,422	$17,389	($2,033)

Explanation of Changes

- Project cost and schedule changed primarily due to WASM 3 Waltham CP2, Belmont CP3 and Arlington & Medford CP4 contracts transferred from Weston Aqueduct Supply Mains to the Long-Term Redundancy project.

- Project spending changed primarily due to updated cash flow for WASM 3 Design/Massachusetts Environmental Policy Act (MEPA)/Design Construction Administration/Resident Inspection.

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
Section 80 Design CA/RI and Construction (6892/6891)	Design and rehabilitation of approximately 16,197 feet of Section 80 along route 128/95.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$9,896	$0	$9,896	$0	$0	$247	$9,066	$583

Project Status 11/15	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$9,836	$9,896	$60	Dec-20	Jun-23	30 mos.	$558	$247	($311)

Explanation of Changes

- Project cost increased due to inflation adjustments.
- Project schedule and spending changed due to priorities and staffing.

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
Study	Study to determine the implementation phases.

Sub-phase	Scope
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.
Communications Structures	Installation of two radio towers, five antennas, one satellite dish, and an equipment shelter.
CS/Start-Up Services	Construction and startup services for the metropolitan Operations Control Center, as well as metering and monitoring construction.
Equipment Pre-Purchase	Purchase of instrumentation equipment, mechanical equipment, and new master meters.
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.
SCADA Implementation	Purchase of Supervisory Control and Data Acquisition System (SCADA) equipment for monitoring, control and metering sites.
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.
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.
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.
Study and Design – Waterworks Monitoring & Control Communications Network	Provision of microwave antennas and radio equipment at twelve facilities.
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.

Sub-phase	Scope
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.
Waterworks SCADA/PLC Upgrade	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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$39,106	$16,031	$23,076	$1,263	$3,409	$6,397	$6,220	$10,686

Project Status 11/15	41.6%	Status as % is approximation based on project budget and expenditures. Quabbin Power Communications & Security Design commenced in July 2014. Construction awarded in December 2015.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$39,006	$39,106	$100	Oct-31	Oct-31	None	$6,297	$6,397	$100

Explanation of Changes

- Project cost and spending increased primarily due to updated cost estimate for utility fees and permits.

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
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.
Data Purchase	Purchase of project related data from Boston Edison.
Records Development	Automation of MWRA record drawings.
Update of Record Drawings	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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$2,299	$1,036	$1,263	$0	$188	$533	$730	$0

Project Status 11/15	45.1%	Status as % is approximation based on project budget and expenditures. Update of Record Drawings is expected to begin in FY17.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY16**	**Chge.**
$2,299	$2,299	$0	Jan-19	Jan-20	12 mos.	$914	$533	($381)

Explanation of Changes

- Project schedule and spending shifted due to 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.

Scope

Sub-phase	Scope
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.
Community Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.
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.
Local Water System Assistance Program Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.
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.
CVA Repayments	Principal repayment over a ten-year period beginning one year after origination of the loans.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$0	$126,865	($126,865)	($1,416)	(1,996)	($2,814)	($50,948)	($73,097)

Project Status 11/15	73.4%	Through November 2015, $317.2 million in loans were distributed to member communities.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$0	$0	$0	Jun-30	Jun-30	None	($4,508)	($2,814)	$1,694

Explanation of Changes

- Spending shift is due to updated cash flows.

CEB Impact

- The annual interest paid for the Commercial Paper program supporting the Local Water Assistance Program initiative is over $307,080 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
Meter Vault Manhole Retrofits Design and Construction	Retrofit approximately 195 meter manholes.
Design and Construction Walnut Hill Tank	Full structural analysis of the Walnut Hill Elevated Tank based on corrosion discovered. Rehabilitation of the tank based on the structural analysis.
Waltham Pipe Bridge Replacement	Replacement of approximately 100 feet of 30-inch steel pipe over commuter rail tracks in Waltham including a bridge crossing.
Design and Construction Cosgrove Valve Replacement	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.
Transformer at Cosgrove Intake Building	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.
Covered Storage Tank Rehabilitation Design and Construction	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.
Elevated Water Storage Tank Repainting Design and Construction	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.

Sub-phase	Scope
Shaft 9 Rehabilitation Design and Construction	Ground water leakage is filling the access shaft. The piping and components in the access shaft need to be evaluated and repair work performed.
Electrical Distribution Upgrades at Southborough	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.
Water Meter Upgrade Replacement	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.
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. Project is currently under final design.
Cosgrove Flat Roof Replacement	Replace the damaged roof that leaks. In particular there are issues around roof penetrations and along the parapet wall.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$21,520	$646	$20,874	$727	$1,056	$2,823	$15,430	$2,721

Project Status 5/15	3.0%	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 is expected to begin in FY16.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$21,043	$21,520	$477	Aug-28	Aug-28	None	$5,058	$2,823	($2,235)

Explanation of Changes

- Project cost increased due to Updated cost estimate for Beacon Street Line Repair contract as well as inflation adjustments.

- Project spending changed primarily due to updated schedules for Elevated Water Storage Tank Repainting and Walnut Hill Tank Design and Construction, partially offset by cost changes above.

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
Security Equipment & Installation	Design and installation of security systems at various MWRA facilities and sites.
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.
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.
Vehicles:	
Closed Circuit TV Inspection Truck	Purchase of TV Inspection Truck to support Wastewater Pipeline Unit of Field Operations Department.
High Lift Fork Loader (Lull)	Purchase High Lift Fork Loader (Lull) to move equipment and materials at Deer Island.
Front-End Loader	Purchase front-end loaders to move equipment, sand, and gravel at Deer Island.
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.
Ramp Truck	Purchase of Ramp Truck to support Fleet Services.
Street Sweeper	Purchase of Street Sweeper to support MWRA facilities and community assistance.
FY11-13 Vehicle Purchases	Vehicle purchases planned for FY11-13.
FY14-18 Vehicle Purchases	Vehicle purchases planned for FY14-18.
FY19-23 Vehicle Purchases	Vehicle purchases planned for FY19-23.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$28,535	$16,709	$11,826	$2,556	$2,852	$10,823	$5,605	$0

Project Status 11/15	60.6%	Status as % is approximation based on project budget and expenditures. Purchase and installation of security equipment is in process and will continue through FY18.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$23,168	$23,535	$5,367	Mar-20	Jun-23	None	$10,063	$10,823	$760

Explanation of Changes

- Project cost increased primarily due to revised cost estimates for Vehicle Purchases and Security Equipment and Installation phases.
- Schedule shifted due to timing for vehicle purchases in the next five-year period.
- Project spending increased due to updated cost estimate for Security Equipment and Installation and updated cash flow for Major Laboratory Instrumentation.

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: mechanical, materials testing, surveying, hazardous materials assessment, instrumentation control, and wetland/environmental.

Status: MWRA uses technical assistance contracts in support of various CIP and CEB projects.

Expenditure Forecast (in $000s)

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$ 1,125	$0	$1,125	$0	$375	$750	$375	$0

Changes in Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$1,125	$1,125	$0	Jun-18	Jun-19	12 mos.	$1,125	$750	($375)

Explanation of Changes

- 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
Inventory & Evaluation Phases 1 & 2	Development of a comprehensive, strategic maintenance plan for MWRA. (Completed by July 2005).
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 1-16.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$16,447	$11,539	$4,908	$2,356	$1,392	$6,323	$0	$0

Project Status 11/15	72.9%	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 are expected to be awarded in January 2016.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
16,721	$16,447	($274)	Jan-18	Jan-18	None	$6,597	$6,323	($274)

Explanation of Changes

- Project cost and planned spending deceased due to updated cost estimates for As-Needed Design phases 14 and 15 and final cost estimate for phase 9.

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
Design & Engineering Services	Design and engineering services to support space plan.
Facilities Construction	Construction of modifications to MWRA facilities in accordance with space plan.
Facilities Fit-out	Purchase of furniture and other items to fit-out new and/or modified facilities.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$2,151	$371	$1,780	$0	$0	$0	$1,780	$0

Project Status 11/15	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 rehabilitate or demolish old Administration Building on DI.

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY14-18 Spending		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	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
DI Solar Residuals Odor Control (ROC)	Design and construction of 100 kw photovoltaic array. Projected annual output estimated at 105,000 kwh.
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.
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").
Future DI Wind (Battery D Location)	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.
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.
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.
Energy Adv Con Services	Consultant for comprehensive energy advisory services on throughout the Authority.
Technical Assistance	Various technical assistance contracts to aid solar, wind, and hydro initiatives.
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.
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

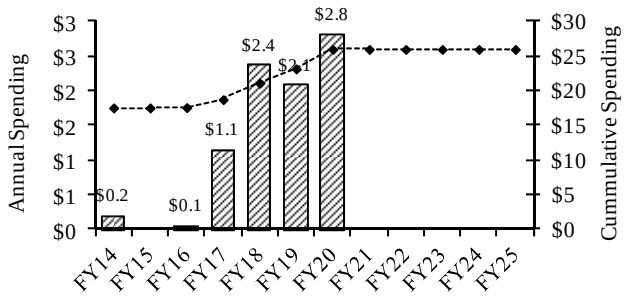
	program.

Sub-phase	Scope
DI Wind Phase 2 Construction	Installation of one 600 kw wind turbine at Deer Island. Projected annual output estimated at 1,150,000 kwh.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$25,838	$17,388	$8,450	$52	$1,147	$3,756	$4,885	$0

Alternative Energy Initiatives



Project Status 11/15	67.3%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$25,630	$25,838	$208	Dec-19	Dec-19	None	$3,576	$3,756	$180

Explanation of Changes

- Project cost and spending increased primarily due updated cost estimate for Fish Hatch Pipeline Hydro.

CEB Impacts

- Assume $30,000 in avoided costs in FY18 and $30,000 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 (Includes 4 subprograms) - These four subprograms will continue 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 (Includes 2 subprograms) - These two subprograms focus on the resiliency and sustainability of the MWRA's data security practices. They 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 (Includes 2 subprograms) -These two programs are intended to improve 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 Task Force Program to ensure that the business and technology priorities of the MWRA are aligned and are being met.

Information Technology Infrastructure Program (Includes 4 subprograms) - These four subprograms will assess and implement consolidated and optimized versions of core IT infrastructure elements and improve and optimize data management practices, including: storage, backup, archive and purge processes, and technologies. These improvements will 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, 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 credibility of the MWRA's data resources. It will further enhance the integrations and availability of data to provide a more holistic view of the overall operational status for seamless access to the detailed data.

The applications implementation program includes upgrades to applications such as Lawson, Maximo 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 FY19.

Scope – The table describes the CIP phases and associated projects.

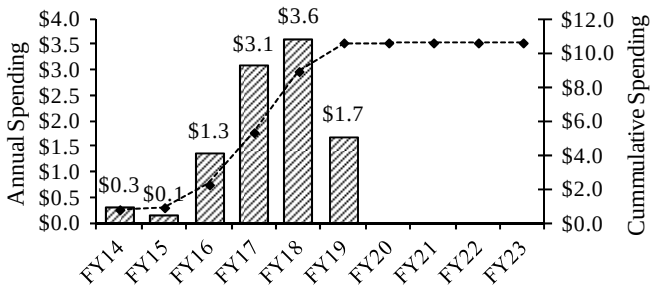
Sub-phase	Scope
GIS Applications & Integration	Expand role of GIS technology for scientific, environmental and engineering applications. Projected expenses include Hardware, Installations, Support, Software, Customizations and Technical Support. This project will assess the current state of the GIS Program and make recommendations for improvements in the future state.
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.
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.
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.
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.
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.

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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$10,176	$484	$9,692	$1,349	$3,062	$8,419	$1,684	$0

Application Improvements Program



Project Status 11/15	9.5%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$10,176	$10,176	$0	Mar-19	Mar-19	None	$8,437	$8,419	($18)

Explanation of Changes

- Project spending changed primarily due to updated schedule for Lawson Enhancements.

CEB Impacts

- Annual increased costs associated Lawson Enhancements of $100,000 in FY18 and $75,000 in FY20 for the Application Improvement Program.

S. 942 Information Security Program

Project Purpose

To develop, improve, and procure a new and improved oversight process for selecting and implementing Information technology solutions throughout the MWRA.

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 better compliant with Federal Standards than the Authority's existing decentralized activities.

This program is scheduled to be completed by FY19.

Scope – The table describes the CIP phases and associated projects.

Sub-phase	Scope
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. 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. 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. 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.
Electronic Security Implementation	Information Security Monitoring Program – Next phase of Cyber Security to provide new appliances, software upgrades, and hardware replacement in addition to the current 24 hour day monitoring to outfit the 2nd MIS Data Center. This project started in FY12 and will continue through FY16.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$3,365	$820	$2,546	$608	$749	$2,290	$541	$0

Project Status 11/15	24.4%	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		
FY16	FY17	Chge.	FY16	FY17	Chge.	FY16	FY17	Chge.
$2,385	$3,365	$980	Jan-19	Jan-19	None	$1,595	$2,290	$695

Explanation of Changes

- Project cost and spending increased due to updated cost estimate for Information Security Protection Infrastructure Upgrade.

CEB Impacts

- Annual increased costs are estimated at $30,000 in FY18.

S. 944 Information Technology Management Program

Project Purpose

To develop, improve, and procure management information systems (MIS) to adapt to the changing business needs associated with managing the waterworks and sewerage systems.

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 Task Force Program 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
Implement IT Task Force	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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$923	$0	$923	$0	$396	$850	$73	$0

Project Status 11/15	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$923	$923	$0	Jun-18	Jun-18	None	$863	$850	($13)

Explanation of Changes

- Project spending changed based on updated schedule for Service Delivery & Best Practices phase.

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.

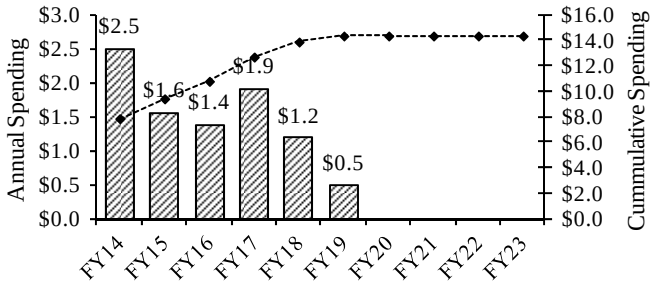
Sub-phase	Scope
IT Infrastructure Upgrades	IT System Architecture - This effort will focus on the development of a MWRA Technical Reference Model (TRM). The TRM will provide an architectural framework used to identify the standards, specifications and technologies that support the MWRA's computing environment. 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. was purchased in 2000/01 with the facility opening. All of 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.
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.
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.
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.

Expenditure Forecast (in $000s) and Project Status

Total Budget	Payments thru FY15	Remaining Balance	FY16	FY17	FY14-18	FY19-23	Beyond FY23
$10,271	$5,343	$4,928	$1,376	$1,899	$8,505	$475	$0

IT Infrastucture Program



Project Status 11/15	52.2%	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		
FY16	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**	**FY16**	**FY17**	**Chge.**
$10,271	$10,271	$0	Dec-18	Dec-18	None	$8,566	$8,505	($61)

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 FY18 and $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 Forecasts

Capital expenditure forecasts, sometimes referred to as project cashflows, are presented in this section of the FY17 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 FY15

Payments through FY15 includes actual and accrued expenditures since the inception of the contract through the end of FY15.

Remaining Balance

Remaining Balance is calculated by subtracting Payments through FY15 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
FY17 PROPOSED FIVE-YEAR CIP BY MAJOR PROGRAM CATEGORY
FY17 by Quarters

CAPITAL IMPROVEMENT PROGRAM													
EXPENDITURE FORECAST FY2014-2018													
($000)													
	Total Contract Amount	Project Payments Thr. FY15	Balance as of 6/30/15	FY14	FY15	FY16	QI FY17	QII FY17	QIII FY17	QIV FY17	FY17	FY18	5-Year Total FY14-18
Wastewater System Improvements	3,062,317	1,867,077	1,195,240	55,690	75,387	79,351	21,808	22,469	21,866	21,130	87,273	99,840	397,541
Waterworks System Improvements	3,790,556	1,938,353	1,852,203	40,966	22,705	30,607	11,215	17,436	18,073	14,234	60,958	84,138	239,374
Business & Operations Support	134,650	88,473	46,177	5,507	5,524	8,297	2,535	2,276	2,837	4,224	11,872	10,591	41,791
Total MWRA	6,987,524	3,893,904	3,093,620	102,163	103,616	118,254	35,557	42,180	42,775	39,589	160,103	194,571	678,706
Contingency	180,008		180,008			5,566	2,160	2,453	2,378	2,490	9,481	11,984	27,031
Total MWRA w/ Contingency	7,167,532	3,893,904	3,273,628	102,163	103,616	123,820	37,717	44,633	45,153	42,079	169,584	206,555	705,737

Massachusetts Water Resources Authority
FY17 Proposed Expenditure Forecast

Program/Project/Subphase	Contract No.	Notice To Proceed	Substan. Compl.	Total Contract Amount	Payments through FY15	Remaining Balance	FY16	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
Total MWRA				**6,987,524,240**	**3,893,903,967**	**3,093,620,273**	**118,253,886**	**160,102,230**	**194,569,611**	**678,704,788**	**1,200,390,321**	**1,420,304,197**
Wastewater				**3,062,317,439**	**1,867,077,488**	**1,195,239,951**	**79,350,544**	**87,271,974**	**99,840,057**	**397,539,420**	**648,643,045**	**280,134,323**
Interception & Pumping				**926,776,993**	**535,991,370**	**390,785,624**	**10,708,806**	**29,343,603**	**31,248,779**	**86,752,495**	**176,616,266**	**142,868,169**
102 Quincy Pump Facilities	**completed project**			**25,907,202**	**25,907,202**	**-**						
104 Braintree-Weymouth Relief Facilities				**232,454,622**	**227,704,621**	**4,750,001**			**207,500**	**208,189**	**4,542,500**	
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	-						
B-W 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	-						
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	-						
Wetlands Replication	10470_7290			25,607	25,606	-				1,262		
Mill Cove Siphon Sluice Gates - Design	10479_7326	Jul-17	Mar-21	150,000	-	150,000			40,000	40,000	110,000	
Mill Cove Sluice Gates - Construction	10480_7327	Mar-19	Mar-20	600,000	-	600,000					600,000	
B/W Improvements - Construction	10493_7366	Jun-19	Jun-21	3,200,000	-	3,200,000					3,200,000	
B/W Improvements - Design/CS/RI	19567_9586	Jul-17	Jun-22	800,000	-	800,000			167,500	167,500	632,500	
105 New Neponset Valley Relief Sewer	**completed project**			**30,300,303**	**30,300,303**	**-**						
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**	**-**						
127 Cummingsville Replacement Sewer	**completed project**			**8,998,768**	**8,998,768**	**-**						

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130 Siphon Structure Rehabilitation				**6,669,019**	**939,770**	**5,729,249**					**5,729,249**	
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	1,377,582	-	1,377,582					1,377,582	
Construction	10294_6225	Jul-20	Jun-21	4,303,767	-	4,303,767					4,303,767	
131 Upper Neponset Valley Sewer System	**completed project**			**54,174,078**	**54,174,078**	**-**						
132 Corrosion & Odor Control				**23,366,829**	**3,001,406**	**20,365,423**	**288,783**	**300,747**	**319,322**	**908,852**	**19,456,571**	
Planning/Study	10279_6137	Jan-97	Dec-98	587,422	587,422	-						
Land Acquisition	10323_6549	Aug-02	Jun-05	3,341	3,341	-						
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 Tunnel Rehab - Construction	10405_6918	Jul-19	Jun-20	6,800,000	-	6,800,000					6,800,000	
FES/FERS Biofilters - Design	10406_6919	Jul-18	Apr-21	1,143,532	-	1,143,532					1,143,532	
FES Tunnel Rehab - Design/CS/RI	10453_7196	Jul-18	Jun-21	1,700,000	-	1,700,000					1,700,000	
FES/FERS Biofilters - Construction	10456_7215	Apr-19	Apr-20	1,779,205	-	1,779,205					1,779,205	
System-wide Odor Control - Study	10491_7364	Jul-18	Jul-20	1,000,000	-	1,000,000					1,000,000	
NI System-wide Odor Control - Design/ESDC/REI	10492_7365	Feb-17	Dec-21	1,570,000	-	1,570,000		53,220	319,322	372,542	1,197,458	
NI System-wide Odor Control - Evaluation	10495_7494	Sep-15	Sep-16	536,310	-	536,310	288,783	247,527		536,310		
NI System-wide Odor Control Upgrages - Construction	10496_7495	Jul-18	Dec-20	5,836,376	-	5,836,376					5,836,376	
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**			**375,000**	**374,836**	**2,910,000**	**4,415,000**
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			235,000	235,000	2,350,000	4,415,000
Equipment Prepurchase	10398_6861	Apr-05	Dec-09	65,303	65,303	-				(165)		
Wastewater Redundant Communications	10490_7363	Jul-17	Mar-21	700,000	-	700,000			140,000	140,000	560,000	

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139 South System Relief Project				**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 Impovements	10386_6801	Jan-19	Dec-20	1,500,000	-	1,500,000					1,500,000	
141 Wastewater Process Optimization				**10,389,301**	**1,463,147**	**8,926,154**	**38,638**			**296,605**	**5,168,493**	**3,719,023**
Planning	10367_6733	Aug-01	Aug-04	930,308	930,308	-						
North System Hydraulic Study	10412_6930	Nov-11	Jun-15	571,477	532,839	38,638	38,638			296,605		
Somerville Sewer - Design	10413_6931	Oct-19	Mar-22	200,000	-	200,000					200,000	
Somerville Sewer - Construction	10414_6932	Mar-21	Mar-22	1,095,493	-	1,095,493					1,095,493	
Siphon - Planning	10415_6933	Nov-18	Jun-19	150,000	-	150,000					150,000	
Hydraulic Flood Engineering - Design & Const. 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 Replace.				**27,737,912**	**5,137,912**	**22,600,000**		**600,000**	**600,000**	**1,200,000**	**6,800,000**	**14,600,000**
Planning / Study / Design	10371_6739	Apr-16	Jul-19	2,000,000	-	2,000,000		600,000	600,000	1,200,000	800,000	
Equipment Purchase & Installation	10379_6793	Nov-03	Jun-08	5,137,912	5,137,912	-						
Construction	10411_6929	Jun-18	Jul-19	2,000,000	-	2,000,000					2,000,000	
WW Metering Asset Protection - Equipment Purchases	10451_7191	Jul-18	Jul-29	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				**344,910,590**	**32,445,794**	**312,464,797**	**10,381,386**	**28,442,856**	**29,746,957**	**83,764,013**	**123,759,453**	**120,134,146**
Prison Point HVAC Upgrades - Construction	10380_6795	Dec-10	Dec-13	2,912,188	2,912,181	-				466,377		
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	Nov-15	Mar-18	12,560,000	-	12,560,000	2,059,945	5,250,189	5,249,866	12,560,000		
Rehab of Section 93A Lexington	10383_6798	Jul-03	Apr-04	1,565,742	1,565,742	-						
Chelsea Creek Upgrades - REI	10387_6802	Mar-16	Apr-20	3,737,811	-	3,737,811	74,756	897,075	897,075	1,868,906	1,868,905	
Technical Assistance	10392_6829	Jul-02	Mar-22	81,916	48,285	33,631		5,605	5,605	11,610	22,421	
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	11,046	11,046	-				2,135		
Remote Headworks Concept Plan	10399_6886	May-08	Sep-09	670,436	670,436	-						
Construction CB1 Sections 26 & 27	10418_6936	Jul-20	Jul-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)		
93 A Force Main Replacement	10423_6987	May-06	Jan-07	461,962	461,962	-						
Mill Brook Valley Sewer Section 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 Rehab - Final Design/CA/REI	10428_7034	Mar-12	Mar-19	1,813,721	915,501	898,219	182,757	238,488	238,488	950,800	238,487	
Caruso PS Improvements - Design/CA/REI	10431_7037	Aug-12	Mar-18	925,096	424,245	500,851	142,415	179,218	179,218	701,655		
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	-						

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Chelsea Creek Upgrades - Construction	10445_7161	Apr-16	Apr-20	62,020,952	-	62,020,952		15,188,805	15,188,805	30,377,610	31,643,342	
Pump Stations & CSOs Condition Assessment	10446_7162	Jul-17	Jul-19	3,138,000	-	3,138,000			1,429,680	1,429,680	1,708,320	
Interceptor Renewal 1, Reading Ext. - Design/CA/REI	10447_7163	Aug-15	Jun-19	1,156,116	-	1,156,116	230,230	284,888	284,888	800,006	356,110	
Interceptor Renewal 1, Reading Ext. Sewer - Construction	10448_7164	Mar-17	Jun-18	4,266,542	-	4,266,542		266,659	3,199,907	3,466,566	799,976	
Chelsea Creek Upgrades - Design/CA	10455_7206	Jul-10	Apr-21	8,489,631	4,691,564	3,798,067	693,492	730,488	730,488	4,554,819	1,643,599	
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-19	500,000	-	500,000			187,500	187,500	312,500	
Interceptor Renewal 3, Dorches. Intercept. Sewer - Const.	10467_7279	Jul-21	Jun-23	3,997,172	-	3,997,172					3,997,172	
Construction CB2 Sections 23 & 24	10468_7280	Jul-22	Jul-24	10,000,000	-	10,000,000					3,600,000	6,400,000
Cottage Farm Fuel System Upgrade	10469_7281	Jun-12	Apr-13	497,558	497,558	-						
NI Electrical & Grit/Sreenings Conveyance - Design	10477_7312	Mar-11	May-16	1,249,477	1,036,657	212,820	178,968	33,851		626,326		
NI Electrical & Grit/Sreenings Conveyance - Construction	10478_7313	Jul-13	May-15	5,192,243	5,016,554	175,689	175,689			5,192,244		
Interceptor Renewal No. 5 - Milton Sections 607, 609, 610	10481_7328	Sep-27	Dec-28	4,000,000	-	4,000,000						4,000,000
Interceptor Renewal No. 6 - Chelsea Sections 12, 14, 15, 62	10482_7329	Sep-30	Dec-31	11,000,000	-	11,000,000						11,000,000
Prison Pt./CF Pump and Gearbox Rebuilds -ESDC	10483_7330	Feb-14	Nov-16	361,988	261,671	100,317	69,291	31,027		361,989		
Somerville/Marginal Influent Gates Replacement	10484_7344	Jul-11	Nov-11	366,848	366,848	-						
Prison Point Rehab - Design/CA/RI	10486_7359	Jul-16	Mar-21	1,122,701	-	1,122,701		173,333	208,000	381,333	741,368	
System Relief & Contingency Planning	10487_7360	Jul-20	Jun-23	500,000	-	500,000					458,334	41,666
DeLauri Pump Station Screens & Security	10488_7361	Jul-16	Jul-17	1,029,700	-	1,029,700		772,000	257,700	1,029,700		
Caruso Pump Station Improvements - Construction	10489_7362	Dec-15	Mar-17	3,672,348	-	3,672,348	918,087	2,754,261		3,672,348		
Pump Station Rehab - Preliminary Design/Study	10500_7375	Jul-19	Jul-20	750,000	-	750,000					750,000	
Cottage Farm PCB Abatement - Construction 1	10501_7389	Jul-18	Jul-19	2,159,040	-	2,159,040					2,159,040	
Cottage Farm PCB Abatement - Design/CA	10502_7392	Jul-17	Jul-20	539,760	-	539,760			131,292	131,292	408,468	
Section 156 Rehab - Design/Build	10503_7393	Jul-11	Jul-12	2,562,778	2,562,773	-						
Cambridge Branch Sections 23, 24, 26, 27 - Design	10504_7410	Jul-18	Jul-23	3,600,000	-	3,600,000					3,363,000	237,000
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	Nov-16	Apr-18	1,000,000	-	1,000,000		278,000	667,000	945,000	55,000	
Ward Street & Columbus Park Headworks - Design/CA/REI	10510_7429	Jul-20	Jan-28	10,327,317	-	10,327,317					3,745,071	6,582,246
Ward Street & Columbus Park Headworks - Construction	10511_7430	Aug-22	Jan-27	101,003,430	-	101,003,430					14,963,472	86,039,958
Chelsea Screenhouse Upgrades	10512_7431	Aug-15	Aug-16	4,885,180	-	4,885,180	4,758,000	127,180		4,885,180		
PP/CF Pump and Gearbox Rebuilds	10515_7452	Oct-13	Nov-15	6,595,131	6,150,773	444,358	444,358			6,595,131		
Prison Point Piping Rehab	10518_7459	Dec-15	Aug-16	352,620	-	352,620	156,720	195,900		352,620		
Prison Point Rehab - Construction	10519_7462	Jul-18	Mar-20	5,613,504	-	5,613,504					5,613,504	
Cottage Farm Rehab - Construction	10520_7463	Jul-21	Jul-23	7,556,640	-	7,556,640					6,347,578	1,209,062
Chelsea Screenhouse Upgrades - ESDC/REI	10521_7490	Sep-15	Sep-17	880,000	-	880,000	296,666	388,889	194,445	880,000		
Cottage Farm Rehab - Design/CA/REI	10522_7508	Jul-19	Jul-24	1,400,000	-	1,400,000					1,032,786	367,214
Chelsea Headworks - Caruso Pump Station Utility	10523_7510	Jul-16	Jun-17	32,000	-	32,000		32,000		32,000		
Cambridge Branch Sections 23, 24, 26, 27 - Study	10524_7511	Jul-16	Dec-17	1,000,000	-	1,000,000		500,000	500,000	1,000,000		
Interceptor Renewal 3, Dor. Inter. Sewer - Design CA/RI	10525_7512	Sep-16	Sep-21	1,000,000	-	1,000,000		115,000	197,000	312,000	688,000	
Cambridge Branch Sections 24 & 23 - Design/ESDC	10526_7513	Jul-20	Jul-25	2,500,000	-	2,500,000					1,353,000	1,147,000
Interceptor Renewal 6, Chelsea - Design CA/REI	10527_7514	Jul-20	Jul-25	2,200,000	-	2,200,000					1,190,000	1,010,000
Interceptor Renewal 5, Milton - Design CA/REI	10528_7515	Jul-22	Jul-27	2,000,000	-	2,000,000					295,000	1,705,000
146 D.I. Cross Harbor Tunnel				**5,000,000**	**-**	**5,000,000**					**5,000,000**	
Tunnel Shaft Repairs - Planning/Design/Construction	10454_7199	Jul-18	Jun-20	5,000,000	-	5,000,000					5,000,000	

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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				**818,428,214**	**239,554,101**	**578,874,113**	**30,271,765**	**31,106,890**	**46,901,239**	**163,111,224**	**413,526,354**	**57,067,862**
182 DI Primary and Secondary Treatment	**completed project**			**(957,878)**	**(957,878)**	**-**						
200 DI Plant Optimization	**completed project**			**33,278,599**	**33,278,599**	**-**				**(148,080)**		
206 DI Treatment Pl Asset Protection				**763,924,744**	**200,289,874**	**563,634,873**	**28,065,111**	**26,167,336**	**43,336,400**	**150,358,143**	**409,355,688**	**56,710,334**
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	-						
Equipment Replacement Projection	19182_6478	Jul-18	Jun-23	25,000,000	-	25,000,000					25,000,000	
Odor Control Rehab - Construction	19188_6538	Dec-18	Dec-22	22,506,907	-	22,506,907					22,506,907	
Odor Control Rehab - REI	19191_6592	Dec-18	Mar-23	2,059,400	-	2,059,400					1,978,640	80,760
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	2,299,946	229,181	2,070,765	585,016	766,649	694,100	2,274,946	25,000	
Expansion Joint Repair - Design	19204_6668	Apr-99	Oct-04	149,421	149,421	-						
Expansion Joint Repair - Construction 1	19205_6669	Aug-02	Nov-03	304,726	304,726	-						
Expansion Joint Repair - Construction 2	19217_6704	Aug-12	Feb-14	1,893,500	1,893,500	-				1,207,968		
Expansion Joint Repair - Construction 3	19218_6705	May-17	May-19	1,941,426	-	1,941,426			964,853	964,853	976,573	
As-needed Design Phase 6-1	19220_6721	May-09	Oct-12	1,910,867	1,918,433	(7,566)	(7,566)			(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	Jan-17	Jan-20	647,142	-	647,142		107,206	214,412	321,618	325,524	
Eastern Seawall Construction - 1	19223_6724	Jan-19	Jan-20	3,774,995	-	3,774,995					3,774,995	
Digester Gas Flare No. 4 - Design	19227_6728	Jul-17	Jul-19	523,000	-	523,000			263,078	263,078	259,922	
Digester Gas Flare No. 4 - Construction	19228_6729	Jul-18	Jul-19	1,150,600	-	1,150,600					1,150,600	
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-17	145,275	68,110	77,165	38,582	38,583		89,577		
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	-						
DSL Pump Replacement - Phase 2	19246_6821	Dec-15	Jun-17	2,591,100	-	2,591,100	1,582,375	1,008,725		2,591,100		
Co-Digestion Design/Build	19247_6822	Aug-17	Feb-19	5,000,000	-	5,000,000			1,944,444	1,944,444	3,055,556	
Reline Hypochlorite Tanks 2 & 4	19250_6849	Apr-08	Oct-08	2,241,692	2,241,692	-						
Chemical Pipe Replacement - Design	19252_6851	Jun-18	Jun-21	627,600	-	627,600					627,600	
Chemical Pipe Replacement - Construction	19253_6852	Jun-19	Jun-21	2,091,860	-	2,091,860					2,091,860	
Sodium Hypochlorite Pipe Replacement - Design	19254_6853	Jun-16	Apr-22	1,800,000	-	1,800,000		231,428	625,715	857,143	942,857	
Electrical Equipment Upgrades - Construction 3	19256_6855	Feb-08	Aug-11	15,173,750	15,173,750	-						
WTF VFD Replacement - Construction	19258_6875	Jan-16	Oct-19	14,691,462	-	14,691,462	919,973	2,203,438	5,141,356	8,264,767	6,426,695	
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	3,175,694	1,182,451	1,993,243	1,051,622	941,621		2,243,243		

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Cathodic Protection - Design/ESDC	19263_6880	Sep-16	Mar-22	1,000,000	-	1,000,000		85,716	342,857	428,573	571,427	
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	Dec-17	1,302,198	1,090,063	212,135	194,969	17,166		370,369		
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	10,973,310	6,148,522	4,824,788	3,752,802	1,071,986		10,973,310		
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	24,468,369	22,459,078	2,009,291	2,009,292			17,922,305		
Fire Alarm System Replacement - Design	19273_6904	Nov-15	Aug-22	2,078,771	-	2,078,771	173,231	311,816	511,031	996,078	1,082,693	
Combined Heat & Power - Design	19274_6963	Mar-16	Jun-23	6,000,000	-	6,000,000		830,769	1,938,461	2,769,230	3,115,385	115,385
Combined Heat & Power - Construction	19275_6964	Jun-18	Jun-22	83,000,000	-	83,000,000					83,000,000	
Primary & Secondary Clarifier Rehab - Design	19276_6965	Mar-09	Sep-13	1,677,666	1,677,666	-				(13,326)		
Gravity Thickener Improvements - Construction	19277_6966	Apr-10	Jun-12	733,118	733,118	-						
STG 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		
STG System Modifications - Construction	19284_6973	May-10	Apr-11	2,569,673	2,569,673	-						
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	Feb-18	Aug-21	16,000,000	-	16,000,000					16,000,000	
Digester & Storage Tank Rehab - Design/ESDC	19290_7052	Oct-17	Oct-24	3,000,000	-	3,000,000			277,777	277,777	2,345,238	376,985
Thickened Primary Sludge Pump Replacement - Construct.	19292_7054	Oct-13	Jun-14	27,297	27,297	-						
Digester Modules 1 & 2 Pipe Replacemt	19293_7055	Aug-11	Aug-14	7,096,335	7,096,335	-				1,203,504		
Cathodic Protection - Construction	19294_7056	Sep-18	Mar-21	6,178,200	-	6,178,200					6,178,200	
Centrifuge Backdrive Replacement	19295_7057	Feb-13	Mar-15	3,965,205	3,965,204	-				3,644,286		
Switchgear Replacement - Design	19296_7058	Jun-16	Mar-21	1,617,855	-	1,617,855		291,214	493,746	784,960	832,895	
Switchgear Replacement - Construction	19297_7059	Dec-17	Mar-20	4,524,360	-	4,524,360			167,568	167,568	4,356,792	
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	9,972,664	5,422,658	4,550,006	1,275,000	1,820,000	1,455,006	4,550,006		
NMPS VFD Replacement - REI	19300_7062	Dec-12	Jun-16	1,321,624	547,474	774,150	258,264	515,887		1,278,868		
Heat Loop Pipe Replacement - Construction 3	19301_7063	Jun-09	Jun-11	11,435,558	11,435,558	-				96,758		
Odor Control Rehab - Design/ESDC	19303_7088	Jun-16	Dec-23	3,103,830	-	3,103,830		310,383	896,662	1,207,045	1,839,307	57,478
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 - Design/ESDC	19309_7111	Mar-14	Oct-20	1,956,297	528,501	1,427,796	466,397	125,841	346,177	1,466,916	489,381	
HVAC Equipment Replacement - Construction	19310_7110	Apr-16	Oct-19	25,000,000	-	25,000,000		3,214,286	7,142,857	10,357,143	14,642,857	
DI As-needed Technical Design	19311_7121	Dec-18	Dec-25	16,250,000	-	16,250,000					10,446,430	5,803,570
Digester Sludge Pump Replacement - Construction	19313_7123	Oct-09	Dec-14	1,923,723	1,780,794	142,929	142,928			417,219		
Electrical Equipment Upgrades Phase 5	19314_7124	Dec-18	Jun-26	23,161,875	-	23,161,875					12,980,830	10,181,045
Future SSPS VFD Replacements - Design	19316_7126	Jul-17	Jan-23	4,800,000	-	4,800,000			685,714	685,714	1,714,286	2,400,000
Future SSPS VFD Replacements - Construction	19317_7127	Jan-19	Jan-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			1,066,800	1,066,800	4,267,200	
DI Switchgear Replacement - Design	19322_7132	Jul-18	Jul-23	4,500,000	-	4,500,000					4,410,000	90,000
DI Switchgear Replacement - Construction	19323_7133	Jul-20	Jul-22	16,000,000	-	16,000,000					16,000,000	
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

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DI CTG Rebuilds	19326_7136	Jul-18	Jul-21	6,000,000	-	6,000,000					6,000,000	
DI Centrifuge Replacements - Design	19327_7137	Dec-18	Jun-24	4,160,000	-	4,160,000					3,536,000	624,000
DI Centrifuge Replacements - Construction	19328_7138	Jun-20	Jun-23	16,640,000	-	16,640,000					12,942,222	3,697,778
Cryogenics Plant Equipment Replacement - Design	19329_7139	Dec-18	Oct-21	1,600,000	-	1,600,000					1,600,000	
Cryogenics Plant Equipment Replacement - Construction	19330_7140	Apr-20	Oct-21	5,300,000	-	5,300,000					5,300,000	
Future Sodium Hypochlorite Tank Rehab	19332_7142	Jul-20	Jul-24	10,000,000	-	10,000,000					6,666,667	3,333,333
Barge Berth and Facility Replacement	19334_7168	Jan-16	Jun-16	2,264,750	-	2,264,750	750,000			750,000	1,514,750	
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 Replacements	19339_7275	Jun-14	Jun-17	17,211,730	2,972,829	14,238,901	3,916,186	4,531,517	5,791,198	17,211,730		
Digester & Storage Tank Rehab - Construction	19345_7373	Apr-20	Oct-23	21,700,000	-	21,700,000					17,050,000	4,650,000
Clarifier W3H Flushing Systtem	19346_7374	Jul-12	Jul-13	1,262,406	1,262,406	-				48,612		
Clarifier Rehab Phase 2 -Design	19347_7394	Jan-15	Apr-22	2,237,401	116,564	2,120,837	539,550	592,075	205,921	1,454,110	783,291	
Clarifier Rehab Phase 2 - Construction	19348_7395	Jul-17	Apr-21	35,000,000	-	35,000,000			4,666,667	4,666,667	30,333,333	
Scum Skimmerr Replacement	19349_7396	Oct-13	Oct-16	20,289,820	15,521,232	4,768,588	4,768,588			20,289,820		
Clarifier Rehab Phase 2 - REI	19351_7397	Jul-17	Jul-21	1,500,000	-	1,500,000			200,000	200,000	1,300,000	
Cryogenics Chillers Replacement	19352_7398	Oct-14	Oct-16	3,235,800	337,989	2,897,811	1,792,202	1,105,609		3,235,800		
As-Needed Design 7-1	19353_7399	Oct-12	Oct-15	1,520,818	1,454,311	66,507	66,507			1,068,486		
As-Needed Design 7-2	19354_7400	Oct-12	Apr-16	1,500,000	777,756	722,244	722,244			1,203,507		
Thermal Power Plant Boiler Controls Replacement	19355_7401	Nov-14	Nov-16	1,611,952	247,363	1,364,590	1,364,590			1,611,952		
Sodium Hypochlorite & Bisulfite Tanks Rehab - REI	19356_7413	Jun-18	Jul-21	1,000,000	-	1,000,000					1,000,000	
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	Aug-16	1,039,371	310,790	728,581	284,327	444,254		1,039,371		
NMPS Motor Control Center Phase 2 - Design/ESDC/REI	19560_7419	Jul-16	Apr-20	2,000,000	-	2,000,000		500,000	500,000	1,000,000	1,000,000	
NMPS Motor Control Center Phase 2 - Construction	19561_7420	Apr-18	Apr-20	6,085,725	-	6,085,725					6,085,725	
Roof Replacement Phase 3	19562_7424	Sep-13	Jul-14	610,500	610,500	-				610,500		
Fire System Replacement - REI	19563_7426	Feb-18	Nov-21	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 Rehab	19565_7428	Feb-16	Feb-19	14,100,000	-	14,100,000		2,585,000	4,700,000	7,285,000	6,815,000	
As-Needed Design 7-3	19566_7434	Oct-12	Apr-16	1,500,000	511,967	988,033	988,033			1,445,208		
As-Needed Design 8-1	19600_7501	Jan-16	Jan-19	1,500,000	-	1,500,000	60,000	300,000	700,000	1,060,000	440,000	
As-Needed Design 8-2	19601_7502	Jan-16	Jan-19	1,500,000	-	1,500,000	60,000	300,000	700,000	1,060,000	440,000	
As-Needed Design 8-3	19602_7503	Jan-16	Jan-19	1,500,000	-	1,500,000	60,000	300,000	700,000	1,060,000	440,000	
Co-Digestion Temporary Facililities	26073_7148	Sep-13	Sep-16	2,300,000	433,832	1,866,168	250,000	1,616,168		2,300,000		
Sodium Hypochlorite & Bisulfite Tanks Rehab	40256_7449	Jun-18	Apr-21	10,593,050	-	10,593,050					10,593,050	
210 Clinton Wastewater Treatment Plant				**19,955,076**	**4,715,835**	**15,239,242**	**2,206,654**	**4,939,553**	**3,564,839**	**12,901,161**	**4,170,666**	**357,528**
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	3,608,854	1,934,530	1,674,324	1,479,038	34,661	160,625	3,520,254		
Clinton Aeration Effciency Improvement	19342_7278	Apr-12	Feb-13	1,864,562	1,864,561	-				(12,283)		
Phosphorus Reduction - Design/ESDC	19350_7377	Nov-13	Aug-18	1,305,860	356,468	949,392	235,867	460,000	41,731	1,094,065	211,794	
Phosphorus Reduction - Construction	19400_7411	Feb-16	Aug-17	7,759,575	-	7,759,575	258,652	4,138,440	3,362,483	7,759,575		
Clinton Roofing Rehab	19405_7450	Feb-16	Feb-17	539,550	-	539,550	233,097	306,452		539,550		
Clinton Facilities Rehab	19406_7451	Sep-18	Sep-23	4,316,400	-	4,316,400					3,958,872	357,528

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211 Laboratory Services	**completed project**			**2,227,674**	**2,227,674**	**-**						
Residuals				**167,642,622**	**64,642,622**	**103,000,000**		**2,868,000**	**1,595,500**	**4,570,307**	**8,469,507**	**90,066,993**
261 Residuals	**completed project**			**63,810,848**	**63,810,848**	**-**						
271 Residuals Asset Protection				**103,831,775**	**831,775**	**103,000,000**		**2,868,000**	**1,595,500**	**4,570,307**	**8,469,507**	**90,066,993**
Residual 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	Jul-17	Dec-24	2,000,000	-	2,000,000			625,000	625,000	1,166,667	208,333
Residuals Facility Upgrades - Construction	26071_7146	Jul-16	Dec-24	10,000,000	-	10,000,000		2,868,000	970,500	3,838,500	5,073,673	1,087,827
Condition Assessment/Technology & Regulatory Review	26072_7147	May-09	Jan-14	831,775	831,775	-				106,807		
Residuals Phase 2 - Design	26074_7149	Jul-22	Jan-32	15,000,000	-	15,000,000					1,562,500	13,437,500
Residuals Phase 2 - Construction	26075_7150	Jan-24	Jan-32	75,000,000	-	75,000,000						75,000,000
CSO				**906,603,747**	**876,839,209**	**29,764,538**	**18,982,564**	**5,001,687**	**2,806,528**	**65,923,673**	**2,973,757**	
CSO MWRA Managed				**433,759,856**	**433,198,973**	**560,883**	**554,883**	**6,000**		**3,881,390**		
339 North Dorchester Bay	**completed project**			**221,597,299**	**221,597,299**	**-**				**(23,295)**		
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**	**29,779,319**	**-**						
350 Union Park Detention Treatment Facility	**completed project**			**49,583,406**	**49,583,406**	**-**						
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				**4,562,261**	**4,001,378**	**560,883**	**554,883**	**6,000**		**3,913,516**		
Design	32722_6952	Mar-12	Oct-16	1,641,643	1,304,609	337,034	331,035	6,000		992,899		
Construction 1	32723_6953	Sep-13	Jan-14	235,783	235,783	-				235,783		
Construction 2	32755_7409	Aug-14	Oct-15	2,684,835	2,460,987	223,848	223,848			2,684,835		
357 Charles River CSO Controls	**completed project**			**3,633,077**	**3,633,077**	**-**						

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CSO Community Managed				**422,595,771**	**395,442,852**	**27,152,919**	**18,405,472**	**4,989,687**	**2,381,528**	**62,756,103**	**1,376,229**	
340 Dorchester Bay Sewer Separation (Fox Point)	**completed project**			**54,625,590**	**54,625,590**	**-**				**473,295**		
341 Dorchester Bay Sewer Sep. (Commercial Point)				**64,173,625**	**60,542,452**	**3,631,173**	**(126,584)**		**2,381,528**	**1,650,246**	**1,376,229**	
Design	32650_6154	Jun-96	Dec-16	17,692,322	16,813,378	878,944	(126,584)		1,005,528	1,054,587	-	
Construction	32665_6248	Apr-99	Dec-16	46,481,303	43,729,074	2,752,229			1,376,000	595,659	1,376,229	
342 Neponset River Sewer Separation	**completed project**			**2,549,086**	**2,549,086**	**-**				**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**	**44,246,462**	**-**				**48,079**		
346 Cambridge Sewer Separation				**102,764,877**	**79,404,780**	**23,360,096**	**18,370,410**	**4,989,687**		**52,280,673**		
Design/CS/RI	32654_6161	Jan-97	Dec-17	33,113,505	27,804,943	5,308,562	3,585,757	1,722,805		11,878,158		
Construction	32672_6255	Jul-98	Jun-17	69,651,372	51,599,837	18,051,535	14,784,653	3,266,882		40,402,516		
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**	**11,917,090**	**-**				**(89,619)**		
358 Morrissey Boulevard Drain				**32,185,790**	**32,188,262**	**(2,472)**	**(2,473)**			**(160,998)**		
Construction	32713_6696	Dec-06	Jun-09	28,320,841	28,320,840	-				194		
Design	32735_7015	Jun-05	Jun-13	3,864,949	3,867,422	(2,473)	(2,473)			(161,193)		
359 Reserved Channel Sewer Separation				**70,559,596**	**70,395,476**	**164,119**	**164,119**			**10,519,694**		
Construction	32727_6994	May-09	Dec-15	55,256,131	56,008,843	(752,712)	(752,712)			7,847,586		
Design	32734_7014	Jul-06	Jun-16	15,303,465	14,386,634	916,831	916,831			2,672,108		
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**	**9,054,405**	**-**				**(803,052)**		

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CSO Planning & Support				**50,248,120**	**48,197,384**	**2,050,737**	**22,209**	**6,000**	**425,000**	**(713,820)**	**1,597,528**	
324 CSO Support				**50,248,120**	**48,197,384**	**2,050,737**	**22,209**	**6,000**	**425,000**	**(713,820)**	**1,597,528**	
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	2,278,585	528,932	1,749,653			292,000	292,000	1,457,653	
Land Acquisition/Easement	32658_6169	Jul-96	Jun-20	12,875,388	12,829,167	46,221	22,209	6,000	6,000	50,901	12,012	
System Assessment	32691_6372	May-97	Dec-20	323,500	68,637	254,863			127,000	127,000	127,863	
Other Wastewater				**242,865,861**	**150,050,187**	**92,815,674**	**19,387,409**	**18,951,795**	**17,288,011**	**77,181,721**	**47,057,161**	**(9,868,701)**
128 I/I Local Financial Assistance				**242,584,985**	**149,769,311**	**92,815,674**	**19,387,409**	**18,951,795**	**17,288,011**	**77,181,721**	**47,057,161**	**(9,868,701)**
Phase II - Grants	10273_6084	May-93	May-06	15,928,524	10,128,805	5,799,719	5,799,719			5,799,719		
Phase II - Loans	10274_6085	May-93	May-06	47,664,000	30,386,404	17,277,596	17,277,596			17,277,596		
Phase II - Repayments	10282_6170	May-94	May-11	(47,664,000)	(30,386,407)	(17,277,593)	(17,277,593)			(17,277,593)		
Public Participation	10348_6609	Feb-99	Jun-02	6,461	6,461	-						
Phase IV - Grants	10368_6736	Nov-99	May-10	34,650,000	18,000,000	16,650,000	16,650,000			16,650,000		
Phase IV - Loans	10369_6737	Nov-99	May-10	42,350,000	21,999,999	20,350,001	20,350,001			20,350,001		
Phase IV - Repayments	10370_6738	Nov-00	May-15	(42,350,000)	(21,999,991)	(20,350,009)	(20,350,009)			(20,937,971)		
Phase V - Grants	10407_6925	Aug-04	May-12	18,000,000	18,000,010	-				(10)		
Phase V - Loans	10408_6926	Aug-04	May-12	22,000,000	22,000,007	-				(7)		
Phase V - Repayments	10409_6927	Aug-05	May-17	(22,000,000)	(21,137,217)	(862,783)	(482,025)	(380,758)		(3,143,568)		
Phase VI - Grants	10441_7107	Nov-06	Jun-21	18,000,000	16,158,715	1,841,285	846,000	180,000	815,285	3,436,468		
Phase VI - Loans	10442_7108	Nov-06	Jun-21	22,000,000	19,749,541	2,250,459	1,034,000	220,000	996,459	4,200,127		
Phase VI - Repayments	10443_7109	Nov-07	Jun-26	(22,000,000)	(14,502,636)	(7,497,364)	(2,188,066)	(1,639,326)	(1,282,715)	(10,555,651)	(2,387,258)	
Phase VII - Grants	10471_7293	Aug-09	Jun-21	18,000,000	14,343,912	3,656,089	1,800,000	1,800,000	56,089	6,242,289		
Phase VII - Loans	10472_7294	Aug-09	Jun-21	22,000,000	17,531,449	4,468,552	2,200,000	2,200,000	68,551	7,629,462		
Phase VII - Repayments	10473_7295	Aug-10	Jun-26	(22,000,000)	(8,838,971)	(13,161,029)	(3,219,333)	(3,122,566)	(2,822,942)	(15,160,126)	(3,996,188)	
Phase VIII - Grants	10474_7296	Aug-12	Jun-21	18,000,000	11,303,358	6,696,642	1,381,950	2,137,500	2,479,950	13,114,440	697,242	
Phase VIII - Loans	10475_7297	Aug-12	Jun-21	22,000,000	13,815,216	8,184,784	1,689,050	2,613,050	3,031,050	16,029,310	851,634	
Phase VIII - Repayments	10476_7298	Aug-13	Jun-26	(22,000,000)	(3,309,202)	(18,690,798)	(2,763,043)	(3,258,043)	(3,780,653)	(13,110,941)	(8,889,059)	
Phase IX Grants	10560_7464	Jul-14	Jun-21	60,000,000	10,710,900	49,289,100	9,000,000	11,250,000	11,250,000	42,210,900	17,789,100	
Phase IX Loans	10561_7465	Jul-14	Jun-21	20,000,000	3,570,300	16,429,700	3,000,000	3,750,000	3,750,000	14,070,300	5,929,700	
Phase IX Repayment	10562_7466	Jul-15	Jun-31	(20,000,000)	(211,075)	(19,788,925)	(394,088)	(698,063)	(1,073,063)	(2,376,289)	(8,938,010)	(8,685,701)
Phase X Grants	10563_7467	Jul-16	Jun-25	60,000,000	-	60,000,000	5,612,500	3,000,000	3,000,000	11,612,500	37,500,000	10,887,500
Phase X Loans	10564_7468	Jul-16	Jun-25	20,000,000	-	20,000,000	1,870,500	1,000,000	1,000,000	3,870,500	12,500,000	3,629,500
Phase X Repayment	10565_7469	Jul-16	Jun-35	(20,000,000)	-	(20,000,000)		(100,000)	(200,000)	(300,000)	(4,000,000)	(15,700,000)
138 Sewerage System Mapping Upgrades	**completed project**			**280,876**	**280,876**	**-**						

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Waterworks				**3,790,556,487**	**1,938,353,443**	**1,852,203,045**	**30,606,561**	**60,958,382**	**84,138,413**	**239,374,395**	**536,329,799**	**1,140,169,874**
Drinking Water Quality Improvements				**665,945,031**	**637,824,475**	**28,120,556**	**8,375,782**	**3,584,622**	**3,916,277**	**58,493,604**	**11,606,864**	**637,009**
542 Carroll Water Treatment Plant				**438,074,295**	**416,046,024**	**22,028,271**	**3,419,454**	**3,040,532**	**3,721,277**	**15,018,761**	**11,210,000**	**637,009**
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	Mar-16	87,037	86,017	1,020	1,021			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	-						
Emerg. 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	Sep-17	6,540,310	-	6,540,310	2,518,308	2,570,532	1,451,470	6,540,310		
CSX Crossing	53427_6670	Aug-01	Dec-01	64,700	64,700	-						
Wachusett Algae - Design CS/RI	53428_6671	Jul-18	Dec-21	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 & UV	53443_6815	Jul-01	Jan-04	301,750	301,750	-						
Fitout / Construction	53445_6827	Oct-03	Jun-18	1,500,000	545,193	954,807		200,000	754,807	954,430		
Wachusett Algae - Construction	53448_6889	Feb-19	Dec-20	1,800,000	-	1,800,000					1,800,000	
CWTP Ultraviolet Disinfection - Design/ESDC/R	53450_6923	Jul-08	Apr-15	4,393,797	3,835,301	558,496	558,496			1,863,074		
CWTP Ultraviolet Disinfection - Construction	53451_6924	Apr-11	Feb-14	32,014,592	32,009,063	5,528	5,529			2,782,815		
As-needed Technical Assistance 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	8,255,510	4,853,643	3,401,867	14,858		1,040,000	1,275,070	1,710,000	637,009
Ancillary Modifications - Design 3	53458_7192	Mar-08	Sep-10	299,101	299,101	-						
Ancillary Modifications - Design 4	53459_7208	Mar-08	Sep-10	527,412	527,412	-						

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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	Apr-19	Nov-20	7,000,000	-	7,000,000					7,000,000	
Technical Assistance 7	75530_7406	Jun-13	Nov-15	748,000	494,757	253,243	253,242			748,000		
Technical Assistance 8	75531_7407	Jan-16	Jan-18	563,000	-	563,000	68,000	270,000	225,000	563,000		
CWTP Asset Protection	75546_7455	Jul-17	Jun-19	500,000	-	500,000			250,000	250,000	250,000	
543 Brutsch Water Treatment Facility				**20,023,993**	**19,575,769**	**448,224**	**448,221**			**7,255,749**		
Brutsch WTP - Design/CA/RI	53363_6043	May-95	Aug-01	3,793,701	3,793,701	-						
Permit Fees	53380_6210	Jan-98	Aug-14	56,171	55,060	1,111	1,111			20,175		
Utilities	53381_6211	Aug-98	Jan-12	13,400	13,400	-						
Construction	53382_6212	Nov-98	Sep-00	5,070,892	5,070,892	-						
CVA Shea Avenue Leak Repair	53405_6468	Mar-14	Oct-14	950,777	950,777	-				950,777		
Ware Fire Department - MOA	53433_6706	Oct-99	Jul-00	25,000	25,000	-						
Water Quality Analysis Equipment	53434_6711	Jan-01	Jun-06	48,620	48,620	-						
Brutsch UVWTP - Design/CA/RI	53439_6775	Dec-08	Jan-16	2,323,740	1,876,630	447,110	447,110			1,378,801		
Brutsch UVWTP - Construction	53440_6776	Jan-13	Sep-14	6,599,421	6,599,418	-				4,905,996		
Brutsch UVWTP -Study/Pilot	53442_6804	May-02	Dec-05	1,142,272	1,142,272	-						
544 Norumbega Covered Storage	**completed project**			**106,674,146**	**106,674,146**	**-**						
545 Blue Hills Covered Storage				**40,557,301**	**40,082,837**	**474,464**	**77,600**			**197,600**	**396,864**	
Technical Support & Permit Compliance	53385_6215	Apr-02	Dec-15	104,000	26,400	77,600	77,600			77,600		
Design / Build	53386_6216	Jan-07	Apr-10	37,664,524	37,664,524	-				120,000		
Roadway Resurfacing - Design	53460_7213	Jul-18	Jan-20	65,059	-	65,059					65,059	
Roadway Resurfacing - Construction	53461_7214	Apr-19	Jan-20	331,805	-	331,805					331,805	
EIR/Preliminary Design/OR	68025_6139	May-97	Jun-10	2,391,913	2,391,913	-						
550 Spot Pond Storage Facility				**60,615,295**	**55,445,699**	**5,169,596**	**4,430,507**	**544,090**	**195,000**	**36,021,494**		
Environmental Review	53400_6455	Apr-02	Feb-03	232,830	232,830	-						
Design / Build	53402_6457	Nov-11	Aug-15	50,266,353	47,205,114	3,061,239	2,896,239	45,000	120,000	32,674,623		
Easements/Land Acquisition/Permits	53447_6868	Oct-08	Dec-14	6,100,000	5,450,958	649,042	649,042			751,296		
Owners' Representative	53462_7233	Mar-10	Dec-16	3,184,096	2,334,780	849,316	774,316		75,000	1,985,575		
Early Construction Water Connection	53463_7314	Jul-11	Feb-12	222,016	222,016	-						
Fells Reservoir Microwave Tower Replacement Construct.	53467_7506	Feb-16	Dec-16	610,000	-	610,000	110,910	499,090		610,000		

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Transmission				**2,285,713,191**	**762,009,974**	**1,523,703,217**	**7,520,517**	**23,204,900**	**36,250,117**	**73,947,351**	**373,126,026**	**1,083,601,652**
597 Winsor Station Pipeline				**30,019,846**	**1,954,234**	**28,065,611**	**476,502**	**1,886,139**	**2,019,473**	**4,940,758**	**23,683,498**	
Preliminary Permit, Study & Licensing	60032_6276	Nov-97	Jun-99	38,454	38,382	73	73			173		
Quabbin Aqueduct TV Inspection	60033_6277	Jul-18	Oct-21	2,972,957	-	2,972,957					2,972,957	
Hatchery Pipeline - Design/ESDC/RI	60077_7017	Aug-13	Sep-19	814,577	325,182	489,395	199,048	116,139	116,139	756,364	58,069	
Quabbin Aqueduct & WPS Upgrades - Design/CA/RI	60087_7114	Feb-10	Aug-15	836,691	805,976	30,715	30,715			264,221		
Winsor Station Rehab & Improvement	60088_7115	Jan-19	Apr-21	9,899,509	-	9,899,509					9,899,509	
Shaft 2 & 12 Construction	60095_7197	Dec-17	Jul-21	9,092,963	-	9,092,963			826,000	826,000	8,266,963	
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	Feb-16	Aug-17	2,220,000	-	2,220,000	246,666	1,480,000	493,334	2,220,000		
Winsor Power Station - Final Design/CA/RI	60140_7460	Jan-17	Jul-22	1,860,000	-	1,860,000		85,000	338,000	423,000	1,437,000	
Quabbin Aqueduct - Final Design/CA/RI	60141_7509	Jun-16	Jul-22	1,500,000	-	1,500,000		205,000	246,000	451,000	1,049,000	
601 Sluice Gate Rehabilitation	**completed project**			**9,158,411**	**9,158,411**	**-**						
604 MetroWest Tunnel				**707,421,427**	**696,805,015**	**10,616,413**	**250,485**	**204,822**	**120,000**	**1,981,814**	**9,922,884**	**118,221**
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 Managementt/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	-				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	-						

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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 Interconnections- Final Design/CA/RI	60066_6911	Sep-05	Sep-14	5,883,901	5,653,115	230,786	230,785			646,691		
Valve Chamber Modifications - Design CA/RI	60072_6950	Jul-18	Dec-23	1,232,221	-	1,232,221					1,114,000	118,221
Lower Hultman Rehab - CP6A	60073_6975	Sep-09	May-13	52,288,838	52,286,138	2,700	2,700			476,851		
Hultman InterconnectION - RI Services	60083_7082	Jan-10	Jan-15	1,870,346	1,870,346	-				144,904		
CP6 Easements	60085_7105	Jan-08	Apr-14	32,865	32,865	-				814		
CP6A Demolition	60086_7106	Sep-08	Jan-09	57,222	57,222	-						
Valve Chamber & Storage Tank Improvements - Design	60109_7283	Jul-17	Jun-22	600,000	-	600,000			120,000	120,000	480,000	
Shaft 5 Electrical Upgrade	60128_7367	Jan-19	Jan-20	1,000,000	-	1,000,000					1,000,000	
Valve Chamber & Storage Tank Access Improve. - Const.	60160_7476	Jul-19	Jun-21	2,400,000	-	2,400,000					2,400,000	
Shaft 5A/5 Surface Piping &Sec. W16 Cathodic Protection	60161_7477	Mar-16	Mar-17	220,000	-	220,000	17,000	203,000		220,000	-	
Valve Chamber Modifications - Construction	75525_7755	Jan-20	Dec-22	4,928,884	-	4,928,884					4,928,884	
615 Chicopee Valley Aqueduct Redundancy	**completed project**			**8,666,292**	**8,666,292**	**-**						
616 Quabbin Transmission System				**15,456,914**	**7,456,913**	**8,000,000**		**500,000**	**18,750**	**773,199**	**7,481,250**	
Facilities Inspection	60055_6828	Oct-05	Oct-07	1,005,413	1,005,413	-						
Oakdale High Line Replacement	60068_6940	Aug-16	Feb-17	500,000	-	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	-				176,798		
Ware River Intake Valve Replacement - Design	60108_7282	Jul-18	Jun-23	300,000	-	300,000					300,000	
CVA Motorized Screens Replacement - Design	60112_7332	Jul-17	Jun-21	100,000	-	100,000			18,750	18,750	81,250	
Rehab Wachusett Gatehouse/Bastion - Design CA/RI	60113_7333	Jul-18	Jun-23	800,000	-	800,000					800,000	
Rehabilitate Oakdale Turbine	60135_7378	May-20	Jan-21	1,000,000	-	1,000,000					1,000,000	
Geo-Thermal Heat Wachusett Gatehouse	60136_7379	May-19	Nov-19	200,000	-	200,000					200,000	
Rehab Wachusett Gatehouse Chmbr Piping/Bastion-Const.	60137_7380	Jul-20	Jun-22	3,800,000	-	3,800,000					3,800,000	
Ware Rver Intake Valve Replacement - Construction	60138_7487	Jul-20	Jun-22	900,000	-	900,000					900,000	
CVA Motorized Screens Replacement - Constructiion	60139_7488	Jul-19	Jun-20	400,000	-	400,000					400,000	
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				**6,846,487**	**659,948**	**6,186,538**	**199,027**	**2,140,712**	**501,519**	**2,841,258**	**3,345,280**	
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	-						
Weston Aqueduct Flow Control Valve	60071_6948	Jul-16	Jul-17	400,000	-	400,000		276,924	123,076	400,000		
Sudbury Short-Term Repairs	60076_7016	Jul-17	Jun-18	443,480	-	443,480			323,700	323,700	119,780	
Sudbury Short-Term Repairs - Phase 2	60110_7317	Jul-18	Jul-19	2,098,000	-	2,098,000					2,098,000	
Ash Street Sluice Gates - Construction	60130_7369	Jan-20	Jan-21	800,000	-	800,000					800,000	
Rosemary Brook Building Repair	60150_7472	Mar-16	Dec-16	1,990,269	-	1,990,269	199,027	1,791,242		1,990,269		
Evaluation of Farm Pond Buildings-Waban Arches	60151_7473	Jul-16	Jul-17	104,789	-	104,789		72,546	32,243	104,789		
Ash Street Sluice Gates - Design	60152_7491	Jan-18	Jan-22	350,000	-	350,000			22,500	22,500	327,500	
Hazardous Material at 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**	**-**						

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621 Watershed Land				**24,000,000**	**18,248,400**	**5,751,600**	**1,500,000**	**2,000,000**	**2,251,600**	**6,657,600**		
Land Acquisition	60081_7069	Apr-06	Jun-18	24,000,000	18,248,400	5,751,600	1,500,000	2,000,000	2,251,600	6,657,600		
623 Dam Projects				**4,538,205**	**3,092,761**	**1,445,444**	**494,873**	**71**	**43,142**	**545,664**	**907,353**	
Dam Safety Modifications & Repairs - Construction	60094_7194	Aug-11	Sep-12	2,054,559	2,054,554	-						
Dam Safety Modifications & Repairs - Design/ESDC	60100_7211	Sep-09	Jun-14	1,532,646	1,037,773	494,873	494,873			502,377		
Quinapoxet Dam Permits	60118_7346	Jan-17	Dec-18	1,000	434	566		71	284	430	211	
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	
625 Long Term Redundancy				**1,470,318,149**	**6,680,538**	**1,463,637,610**	**4,599,630**	**16,473,156**	**31,295,633**	**56,207,058**	**327,785,761**	**1,083,483,431**
Water Transmission Redundancy Plan	60035_6273	Oct-08	Sep-11	1,396,572	1,396,572	-				(1,848)		
Wachusett Aqueduct Pump Station - Design/ESDC/RI	60090_7156	Feb-12	May-20	6,542,240	3,875,854	2,666,386	564,313	504,497	504,497	4,273,719	1,093,079	
Wachusett Aqueduct Pump Station - Construction	60091_7157	Dec-15	Jun-19	47,011,000	-	47,011,000	3,000,000	15,000,000	17,000,000	35,000,000	12,011,000	
Engineering Design & MEPA	60092_7159	Jul-17	Jun-22	81,821,198	-	81,821,198			13,789,990	13,789,990	68,031,208	
WASM 3 Sliplining	60093_7160	Jul-22	Jun-26	55,953,898	-	55,953,898					8,477,865	47,476,033
Tunnel Construction	60107_7291	Jul-22	Jun-34	882,143,988	-	882,143,988					76,708,173	805,435,815
Sudbury Aqueduct - MEPA Review	60122_7352	Oct-12	Dec-16	3,405,107	1,408,112	1,996,995	1,029,481	967,513		3,137,071		
Chestnut Hill Final Connection - Construction	60123_7353	Jul-21	Dec-23	11,738,717	-	11,738,717					8,217,103	3,521,614
Permits/Easements	60124_7354	Aug-15	Dec-25	15,000	-	15,000	5,835	1,146	1,146	8,127	5,730	1,143
WASM 3 Rehab	60125_7355	Jul-19	Jun-22	58,430,327	-	58,430,327					58,430,327	
Engineering Services During Construction	60126_7356	Jul-19	Jun-34	122,731,824	-	122,731,824					15,782,523	106,949,302
Tops of Shafts Surface Construction	60127_7357	Jul-30	Jun-33	37,280,287	-	37,280,287						37,280,287
Public Relations, Legal and Administrative	60170_7516	Jul-18	Jun-34	153,414,748	-	153,414,748					70,595,510	82,819,238
CHEPS Emergency Generator	60171_7517	Jul-19	Jun-20	8,433,243	-	8,433,243					8,433,243	
Distribution And Pumping				**768,485,280**	**386,452,802**	**382,032,478**	**14,136,668**	**31,512,863**	**40,596,936**	**99,995,692**	**180,164,491**	**115,621,515**
618 Northern High NW Transmission Section 70				**1,000,000**	**-**	**1,000,000**			**474,000**	**474,000**	**526,000**	
Planning	60063_6895	Jan-18	Jan-19	1,000,000	-	1,000,000			474,000	474,000	526,000	
677 Valve Replacement				**22,749,419**	**12,016,378**	**10,733,041**	**731,466**	**975,287**	**975,287**	**2,682,040**	**3,653,539**	**4,397,459**
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	4,037,670	1,111,804	2,925,866	731,466	975,287	975,287	2,682,040	243,826	
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	-						
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	3,252,988	-	3,252,988					2,910,015	342,973
Construction 9	68307_7236	Jun-25	Jun-28	3,252,988	-	3,252,988						3,252,988
Phase 8 - Design/CA/RI	68330_7417	Jan-19	Jun-24	650,598	-	650,598					499,698	150,900
Phase 9 - Design/CA/RI	68331_7418	Jun-23	Jun-27	650,598	-	650,598						650,598

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678 Boston Low Service - Pipe & Valve Rehab.	**completed project**			**23,690,864**	**23,690,864**	**-**						
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**	**33,419,007**	**-**						
692 Northern High Service - Section 27 Improvements				**1,097,441**	**123,646**	**973,795**	**4,014**	**12,952**	**166,413**	**183,379**	**790,416**	
Section 27 - Construction	67769_6333	Mar-18	Nov-19	972,870	26,581	946,289			155,873	155,873	790,416	
Easements	68192_6589	Apr-16	Mar-18	22,800	-	22,800	2,550	11,000	9,250	22,800		
Technical Assistance	68211_6712	Oct-99	Mar-18	64,500	59,794	4,706	1,464	1,952	1,290	4,706		
Surveying	68229_6809	Jun-01	Mar-17	37,271	37,271	-						
693 NHS - Revere & Malden Pipeline Improvements				**55,359,978**	**26,832,740**	**28,527,239**	**100,000**	**570,998**	**2,239,500**	**2,910,498**	**25,616,741**	
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	-						
DI 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	Apr-18	Apr-20	11,864,270	-	11,864,270			1,360,500	1,360,500	10,503,770	
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	-						
Shaft 9A-D Extension - Construction	68258_6958	Mar-20	Mar-22	3,022,971	-	3,022,971					3,022,971	
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		1,000	1,000	2,000	3,000	
Section 53 Connections - DesignCA/RI	75526_7402	Apr-16	Apr-23	2,858,000	-	2,858,000		418,000	418,000	836,000	2,022,000	
Section 56 Replacement/Saugus River - Design CA/RI	75545_7454	Apr-18	Apr-23	1,500,000	-	1,500,000			100,000	100,000	1,400,000	
NHS Area Study	75548_7485	Jul-17	Jul-19	700,000	-	700,000			350,000	350,000	350,000	
Section 56 Replacement/Saugus River - 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	Jan-16	Jul-17	246,998	-	246,998	100,000	146,998		246,998		

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702 New Connecting Mains-Shaft 7 to WASM 3				**34,765,084**	**11,315,807**	**23,449,277**		**360,000**	**844,000**	**1,559,000**	**22,147,945**	**97,331**
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	-						
DP2/4 Meter 120 - Design/CA/RI	68111_6384	Aug-02	Oct-08	1,277,722	1,277,722	-						
CP3 - Final Design/CA/RI	68112_6385	Jul-16	Jun-22	1,509,998	-	1,509,998		350,000	550,000	900,000	609,998	
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 - South Segment	68119_6392	Jul-18	Jun-21	7,793,100	-	7,793,100					7,793,100	
CP5 - Northeast Segment	68121_6394	Aug-09	Nov-11	5,902,607	5,902,606	-				355,000		
CP2 - Clean & Line Sections 59 & 60 - Construction	68174_6548	Jan-21	Jan-23	5,236,658	-	5,236,658					5,236,658	
CP2 -Easements	68175_6547	May-17	May-25	33,000	-	33,000		10,000	23,000	33,000		
Replacement of Section 25 - Design/CA/RI	68255_6955	Jul-17	Feb-22	564,865	-	564,865			99,000	99,000	465,865	
Replacement of Section 25 - Construction	68256_6956	Jul-19	Feb-21	2,824,324	-	2,824,324					2,824,324	
Section 59 & 60 - Design/CA/RI	68286_7086	Jul-18	Jan-24	1,047,331	-	1,047,331					950,000	97,331
Section 75 Extension - Design CA/DI	68315_7284	Jul-17	Jul-22	880,000	-	880,000			152,000	152,000	728,000	
Section 75 Extension - Construction	68350_7484	Jul-19	Jul-21	3,520,000	-	3,520,000					3,520,000	
704 Rehab of Other Pump Stations				**55,057,852**	**30,057,852**	**25,000,000**					**18,750,000**	**6,250,000**
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 Rehabilitation	75522_7383	Jul-19	Jun-24	25,000,000	-	25,000,000					18,750,000	6,250,000
706 NHS-Connecting Mains from Section 91	**completed project**			**2,360,194**	**2,360,194**	**-**						
708 Northern Extra High Service - New Pipelines				**7,888,833**	**3,632,119**	**4,256,714**	**36,400**	**22,714**	**2,000**	**61,114**	**3,495,000**	**700,601**
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	3,496,334	-	3,496,334					2,900,000	596,334
Public Participation	68176_6554	Jul-15	Dec-20	5,000	-	5,000	2,000	2,000	1,000	5,000		
Legal	68177_6555	Jul-15	Dec-20	5,000	-	5,000	2,000	2,000	1,000	5,000		
Technical Assistance	68210_6707	Nov-10	Jan-17	54,000	7,886	46,114	30,000	16,114		46,114		
PLC Equipment Purchases	68215_6749	Dec-99	Dec-00	4,219	4,220	-						
Permits	68281_7050	Nov-10	Jan-17	5,000	-	5,000	2,400	2,600		5,000		
Sections 34 & 45 - Design/CA/RI	75528_7404	Jul-18	Dec-24	699,267	-	699,267					595,000	104,267

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712 Cathodic Protection of Distribution Mains				**1,655,601**	**140,913**	**1,514,688**	**150,000**	**67,750**	**200,000**	**417,750**	**1,096,939**	
Planning Phase I	68002_6058	Apr-95	Dec-97	107,680	107,680	-						
Cathodic Protection Testing Evaluation Program	68129_6438	Jul-15	Jul-17	217,750	-	217,750	150,000	67,750		217,750		
Cath Prot Des Sh E&L Sec W 16	68130_6439	Jul-17	Jan-21	784,868	-	784,868			200,000	200,000	584,868	
Cath Prot Con Sh E&L Sec W 16	68131_6440	Jan-19	Jan-20	512,071	-	512,071					512,071	
Technical Assistance	68216_6751	Jan-00	May-09	33,233	33,233	-						
713 Spot Pond Supply Mains Rehab				**67,377,554**	**61,696,403**	**5,681,151**	**1,975,437**	**389,510**	**202,257**	**3,281,607**	**3,113,947**	
Section 4 Webster Ave. Bridge Pipe Rehab- Design	60114_7334	Oct-13	Mar-17	685,536	398,278	287,258	252,090	35,168		685,536		
Section 4 Webster Ave. Bridge Pipe Rehab - Construction	60115_7335	May-15	Dec-16	2,327,914	253,050	2,074,864	1,721,743	353,121		2,327,914		
Section 50 Pipe Rehab - Design/ESDC/RI	60116_7336	Jul-17	Jun-21	500,000	-	500,000			150,000	150,000	350,000	
Section 50 Pipe Rehab - Construction	60117_7337	Jul-19	Jun-20	1,500,000	-	1,500,000					1,500,000	
Bridge Trusses - Construction	60145_7483	Apr-20	Dec-21	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	-						
Bridge Trusses - Design	68209_6697	Apr-18	Dec-19	313,947	-	313,947			50,000	50,000	263,947	
Easements - CP5	68225_6784	Jul-14	Jun-20	70,000	64,918	5,082	1,604	1,221	2,257	68,157		
CA/RI - CP3	68274_7003	Sep-04	Apr-09	924,656	924,656	-						
714 Southern Extra High - Sections 41 & 42	**completed project**			**3,657,243**	**3,657,243**	**-**						
719 Chestnut Hill Connecting Mains				**24,174,658**	**17,486,675**	**6,687,983**		**725,000**		**725,000**	**102,000**	**5,860,983**
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	-						
Shaft 7 Building - Design & Construction	68052_6302	Jan-23	Jan-27	5,962,983	-	5,962,983					102,000	5,860,983
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 Gatehouse Repairs	75521_7382	Jul-16	Sep-16	725,000	-	725,000		725,000		725,000		
720 Warren Cottage Line Rehab	**completed project**			**1,204,822**	**1,204,822**	**-**						

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721 Southern Spine Distribution Mains				**74,983,108**	**36,681,373**	**38,301,735**	**952**	**1,269**	**376,270**	**368,216**	**3,963,126**	**33,960,118**
Sections 21, 43 & 22 - Design	68083_6290	Sep-00	May-13	7,113,087	7,113,087	-				(10,275)		
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	-						
Section 20 & 58 - Design	68089_6296	Jun-23	Nov-28	3,036,194	-	3,036,194						3,036,194
Section 20 & 58 - Easements	68090_6297	Sep-21	Sep-25	35,070	-	35,070					13,883	21,187
Section 20 & 58 - Construction	68091_6298	Sep-25	May-27	14,288,471	-	14,288,471						14,288,471
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	17,438,191	-	17,438,191					2,092,583	15,345,608
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	1,269	1,270	3,491	318	
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	Jul-17	Jun-19	1,000,000	-	1,000,000			375,000	375,000	625,000	
722 NIH Redundancy & Storage				**89,448,252**	**11,149,175**	**78,299,078**	**2,577,419**	**16,912,000**	**16,997,200**	**41,661,429**	**41,812,459**	
Concept Plan	53454_6954	Feb-06	Aug-10	796,748	796,748	-						
Easements	68093_6306	Jul-17	Jun-20	300,000	-	300,000			100,000	100,000	200,000	
Sections 89 & 29 Redundancy - Design	68252_6906	Mar-11	Aug-20	6,172,381	1,903,610	4,268,771	756,392	760,000	804,000	3,396,560	1,948,378	
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	825,171	820,733	4,438	4,438			232,392		
Permits	68278_7047	Jan-10	Dec-18	5,000	-	5,000	1,000	2,000	2,000	5,000		
Technical Assistance	68279_7048	Jan-10	Dec-18	18,000	-	18,000	4,000	5,000	7,000	16,000	2,000	
West St. Pipeline Reading Construction Phase 1A	68282_7066	Jun-14	May-15	1,921,952	1,693,043	228,909	228,909			1,921,952		
Sections 89 & 29 Redundancy Construction Phase 2	68283_7067	Jul-16	Jun-19	21,363,982	-	21,363,982		5,340,000	7,121,000	12,461,000	8,902,982	
NIH Storage - Construction	68284_7068	Jan-20	Jan-22	18,333,860	-	18,333,860					18,333,860	
Sections 89 & 29 Rehab - Design	68294_7116	Jan-17	Jun-23	1,548,290	-	1,548,290		75,000	275,000	350,000	1,198,290	
Sections 89 & 29 Rehab - Construction	68295_7117	Jul-19	Jun-22	7,739,035	-	7,739,035					7,739,035	
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-18	Jan-23	3,719,914	-	3,719,914			232,000	232,000	3,487,914	
Sections 89 & 29 Redundancy Construction Phase 1B	68317_7471	Nov-15	Dec-17	9,888,000	-	9,888,000	1,582,000	4,746,000	3,560,000	9,888,000		
Sections 89 & 29 Redundancy Construction Phase 1C	68318_7478	May-16	Dec-17	10,880,200	-	10,880,200		5,984,000	4,896,200	10,880,200		
723 Northern Low Service Rehab - Section 8				**23,441,424**	**2,320,986**	**21,120,437**	**10,500**	**14,000**	**24,088**	**48,588**	**20,031,171**	**1,040,679**
Easements	68094_6321	Jul-15	Jun-22	80,000	-	80,000	7,500	10,000	20,000	37,500	42,500	
Section 8 - Construction	68095_6322	Jul-21	Jul-23	14,211,177	-	14,211,177					13,412,733	798,444
Rehab Sections 37 & 46 Chelsea/East Boston - Construction	68262_6962	Jul-20	Jun-22	3,200,000	-	3,200,000					3,200,000	
Permits	68263_6977	Jul-05	Jul-18	299,000	284,912	14,088	3,000	4,000	4,088	11,088	3,000	
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-18	Jul-24	2,842,235	-	2,842,235					2,600,000	242,235
Rehab Sections 37 & 46 Chelsea/East Boston-Design/CA/RI	75529_7405	Jul-18	Jun-23	772,938	-	772,938					772,938	

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725 Hydraulic Model Update	**completed project**			**598,358**	**598,358**	**-**						
727 SEH Redundancy & Storage				**97,353,883**	**7,620,602**	**89,733,281**	**884,296**	**10,065,883**	**16,225,102**	**28,038,913**	**7,938,943**	**54,619,056**
Concept Plan/Preliminary Design/Environmental Review	53397_6452	Feb-07	Feb-14	632,519	632,520	-				13,161		
Redundancy/Storage Phase 1 - Final Design/CA/RI	53398_6453	Feb-14	Aug-21	7,677,305	850,471	6,826,834	856,720	1,360,626	1,403,000	4,470,817	3,206,488	
Redundancy Pipeline Section 111 Phase 1 - Construction	53399_6454	Mar-16	Mar-18	9,159,402	-	9,159,402		3,803,000	5,356,402	9,159,402		
Redundancy/Storage Phase 2 - Final Design/CA/RI	68135_6444	Jan-26	Dec-31	5,969,885	-	5,969,885						5,969,885
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	1,374,379	-	1,374,379					687,000	687,379
Sections 77 & 88 Rehab - Construction	68293_7113	Apr-23	Apr-25	5,497,516	-	5,497,516					-	5,497,516
Easements/Agreements	68305_7226	Jul-14	Jul-27	300,000	-	300,000	25,000	100,000	30,000	155,000	145,000	
Permits/Utilities	68306_7227	Aug-08	Jul-27	5,000	167	4,833	2,576	2,257		4,833		
Redundancy/Storage Phase 2 - Construction	68308_7245	Jan-28	Dec-30	29,849,425	-	29,849,425						29,849,425
Phase 3, 2nd Tank - Construction	68311_7262	Jan-33	Dec-35	10,512,376	-	10,512,376						10,512,376
Phase 3, 2nd Tank - Design	68312_7263	Jan-31	Dec-36	2,102,475	-	2,102,475						2,102,475
Redundancy Pipeline Section 111 Phase 2 - Contstruction	68555_7504	Jul-16	Jul-18	10,785,700	-	10,785,700		3,800,000	6,985,700	10,785,700		
Redundancy Pipeline Section 111 Phase 3 - Construction	68556_7505	Oct-16	Oct-18	7,350,455	-	7,350,455		1,000,000	2,450,000	3,450,000	3,900,455	
730 Weston Aqueduct Supply Mains				**109,605,168**	**72,746,641**	**36,858,527**	**7,666,185**	**1,395,500**	**1,623,819**	**17,388,851**	**18,060,265**	**8,112,757**
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	-						
WASM 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	440,117	312,883			127,500	233,240	185,383	
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	-						
WASM 1 & 2 - Newton	68041_6280	Mar-00	Jun-02	9,218,520	9,218,520	-						
WASM 1 & 2 - Boston	68042_6281	Feb-03	Jun-05	7,038,896	7,038,896	-						
WASM 2 & 4 - Newton	68069_6312	Apr-98	Mar-01	8,281,877	8,281,877	-						
WASM 4 - Allston & Western Ave. Sewer	68070_6313	Feb-02	Dec-04	17,330,800	17,330,800	-						
WASM 3 - MEPA/Design/CA/RI	68166_6539	Jul-13	Aug-29	15,482,625	446,017	15,036,608	500,000	500,000	1,195,000	2,641,017	6,275,000	6,566,608
Section 36/WS/Waltham Connection - Design/CA/RI	68167_6540	Jan-11	Dec-22	3,048,155	1,541,502	1,506,653	285,771	260,000	260,000	1,161,662	700,882	
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	-						
WASM 3 Section 12 Replacement - Construction	68272_7000	Oct-04	Sep-05	2,113,693	2,113,693	-						
WASM 3 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	2,668,298	2,668,297	-				2,009,526		
Section 36/W11/S 9-A11 Valve	68332_7448	Nov-14	May-17	11,302,086	3,786,173	7,515,914	6,880,414	635,500		11,302,087		
Section 101 Construction	68333_7457	Jul-21	Jun-23	12,365,149	-	12,365,149					10,819,000	1,546,149
731 Lynnfield Pipeline	**completed project**			**5,625,832**	**5,625,832**	**-**				**(51,693)**		
732 Walnut St. & Fisher Hill Pipeline Rehab	**completed project**			**2,717,140**	**2,717,140**							

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735 Section 80 Rehabilitation				**9,895,531**	**-**	**9,895,531**			**247,000**	**247,000**	**9,066,000**	**582,531**
Section 80 - Construction	68249_6891	Jul-19	Jun-23	7,916,425	-	7,916,425					7,421,000	495,425
Section 80 - Design/CS/RI	68250_6892	Jul-17	Jun-24	1,979,106	-	1,979,106			247,000	247,000	1,645,000	87,106
Other Waterworks				**70,412,986**	**152,066,192**	**(81,653,206)**	**573,595**	**2,655,997**	**3,375,083**	**6,937,748**	**(28,567,581)**	**(59,690,302)**
753 Central Monitoring System				**39,106,328**	**16,030,643**	**23,075,684**	**1,262,894**	**3,408,737**	**1,498,053**	**6,396,599**	**6,220,000**	**10,686,000**
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-15	2,101,110	1,912,416	188,694	188,694			188,694		
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		350,000	1,244,000	1,594,000	6,220,000	10,686,000
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	-						
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	Jan-16	Mar-17	3,400,000	-	3,400,000	680,000	2,720,000		3,400,000		
Quabbin Power, Communication & Security-Design/CA/RI	75540_7461	Jul-14	Dec-17	813,905	224,865	589,040	274,712	179,616	134,712	813,905		
Utility Fees and Permits	75541_7475	Jul-14	Dec-17	400,000	2,050	397,950	119,488	159,121	119,341	400,000		
763 Distribution Systems Facilities Mapping				**2,298,919**	**1,036,368**	**1,262,551**		**187,500**	**345,319**	**532,819**	**729,732**	
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	Jan-18	Jan-20	762,551	-	762,551			95,319	95,319	667,232	
Update of Record Drawings	75600_7489	Jul-16	Jun-18	500,000	-	500,000		187,500	250,000	437,500	62,500	
764 Local Water Infrastructure Rehab	**completed project**			**7,487,762**	**7,487,762**	**-**						
765 Local Water Pipeline Assistance Program				**-**	**126,865,175**	**(126,865,175)**	**(1,416,092)**	**(1,995,846)**	**591,711**	**(2,814,293)**	**(50,947,647)**	**(73,097,302)**
Community Loans	75485_6608	Aug-00	Jun-13	222,317,575	222,317,575	-						
Community Repayment	75493_6759	Aug-01	Jun-23	(222,317,575)	(165,868,462)	(56,449,113)	(13,395,462)	(11,726,517)	(9,128,960)	(66,781,631)	(22,198,174)	
Local Water System Assistance Loans	75513_7339	Aug-10	Jun-20	200,000,000	81,508,291	118,491,709	19,142,200	19,000,000	21,000,000	102,081,380	59,349,509	
Local Water System Assistance Repayment	75514_7340	Aug-11	Jun-30	(200,000,000)	(12,666,729)	(187,333,271)	(8,054,329)	(10,050,829)	(11,950,829)	(40,041,542)	(88,620,482)	(68,656,802)
CVA Loans	75515_7350	Nov-10	Jun-20	10,000,000	2,085,000	7,915,000	1,100,000	1,100,000	1,100,000	3,300,000	4,615,000	
CVA Repayments	75516_7351	Nov-11	Jun-30	(10,000,000)	(510,500)	(9,489,500)	(208,500)	(318,500)	(428,500)	(1,372,500)	(4,093,500)	(4,440,500)
766 Waterworks Facility Asset Protection				**21,519,976**	**646,243**	**20,873,733**	**726,793**	**1,055,606**	**940,000**	**2,822,624**	**15,430,334**	**2,721,000**
Meter Vault Manhole Retrofits Design	75490_6689	Sep-18	Jun-21	408,690	-	408,690					408,690	
Walnut Hill Tank - Design	75497_6832	Jul-17	Jul-20	300,000	-	300,000			113,000	113,000	187,000	
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	9,156	7,184	4,000	3,184		7,184		
Cosgrove Flat Roof Replacement	75505_7022	Sep-17	Mar-18	300,000	-	300,000			300,000	300,000		

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Program/Project/Subphase	Contract No.	Notice To Proceed	Substan. Compl.	Total Contract Amount	Payments through FY15	Remaining Balance	FY16	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
Cosgrove Valve Replacement - Construction	75509_7064	Jul-19	Dec-19	1,830,526	-	1,830,526					1,830,526	
Cosgrove Valve Replacement - Design	75510_7065	Jul-18	Dec-20	215,356	-	215,356					215,356	
Transformer at Cosgrove Intake Building	75511_7228	Jun-11	Jul-12	299,313	299,313	-						
Shaft 9 Rehab - Design CA/RI	75520_7381	Jul-25	Aug-29	400,000	-	400,000						400,000
Elevated Water Storage Tank Repainting - Design	75523_7384	Jul-17	Jun-21	500,000	-	500,000			125,000	125,000	375,000	
Covered Storage Tank Rehab - Design CA/RI	75524_7385	Jul-19	Jun-24	1,000,000	-	1,000,000					919,000	81,000
Electrical Distribution Upgrades at Southboro	75535_7425	Jul-17	Jun-18	400,000	-	400,000			400,000	400,000		
Water Meter Upgrade Replacement	75536_7453	Sep-18	Jun-21	1,000,000	-	1,000,000					1,000,000	
Beacon Street Line Repair - Construction	75537_7458	Jan-16	Sep-16	1,452,000	-	1,452,000	484,000	968,000		1,452,000		
Beacon Street Line Repair - Design CA/RI	75538_7474	Nov-14	Jul-17	425,440	100,225	325,215	238,793	84,422	2,000	425,440		
Meter Vault Retrofits Construction	75550_7479	Sep-19	Jun-21	1,634,762	-	1,634,762					1,634,762	
Shaft 9 Rehab - Construction	75551_7492	Mar-27	Aug-28	1,600,000	-	1,600,000						1,600,000
Covered Storage Tank Rehab - Construction	75553_7482	Jul-21	Jul-23	4,000,000	-	4,000,000					3,360,000	640,000
Elevated Water Storage Tank Repainting - Construction	77552_7493	Jul-18	Jun-20	4,500,000	-	4,500,000					4,500,000	
Business & Operations Support				**134,650,313**	**88,473,036**	**46,177,278**	**8,296,780**	**11,871,874**	**10,591,141**	**41,790,972**	**15,417,477**	
881 Equipment Purchase				**28,534,878**	**16,708,657**	**11,826,221**	**2,555,521**	**2,852,200**	**813,500**	**10,822,549**	**5,605,000**	
Security Equipment & Installation	92374_6760	Jan-01	Dec-17	10,444,950	8,257,885	2,187,065	1,076,365	982,200	128,500	3,777,573		
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	6,429,976	3,010,820	3,419,156	1,479,156	1,460,000	480,000	6,429,976		
FY19-23 Vehicle Purchases	98457_7309	Jul-18	Jun-23	5,220,000	-	5,220,000					5,220,000	
FY14-18 Major Lab Instrumentation	98458_7310	Mar-17	Mar-20	1,000,000	-	1,000,000		410,000	205,000	615,000	385,000	
Front-End Loader	98467_7325	Oct-10	Dec-10	121,221	121,221	-						
925 Technical Assistance				**1,125,000**	**-**	**1,125,000**		**375,000**	**375,000**	**750,000**	**375,000**	
Land Appraisal	77000_LAND			150,000	-	150,000		50,000	50,000	100,000	50,000	
Surveying	80000_SURV			75,000	-	75,000		25,000	25,000	50,000	25,000	
Hazardous Material	90000_HAZM			900,000	-	900,000		300,000	300,000	600,000	300,000	
930 MWRA Facility - Chelsea	**completed project**			**9,813,633**	**9,813,633**	**-**						
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)**		

Massachusetts Water Resources Authority
FY17 Proposed Expenditure Forecast

Program/Project/Subphase	Contract No.	Notice To Proceed	Substan. Compl.	Total Contract Amount	Payments through FY15	Remaining Balance	FY16	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
933 Capital Maintenance Planning & Development				**16,446,993**	**11,539,126**	**4,907,867**	**2,355,866**	**1,392,000**	**1,160,000**	**6,322,752**		
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	1,865,598	1,865,598	-				504,198		
As-Needed Design Contract 11	98473_7436	Feb-14	Aug-15	550,000	384,832	165,168	165,167			550,000		
As-Needed Design Contract 12	98474_7437	Jan-14	Jan-16	1,100,000	279,701	820,299	820,299			1,100,000		
As-Needed Design Contract 13	98485_7456	Feb-14	Feb-16	1,100,000	77,600	1,022,400	1,022,400			1,100,000		
As-Needed Design Contract 14	98487_7496	Jan-16	Jan-18	1,450,000	-	1,450,000	174,000	696,000	580,000	1,450,000		
As-Needed Design Contract 15	98488_7497	Jan-16	Jan-18	1,450,000	-	1,450,000	174,000	696,000	580,000	1,450,000		
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				**25,838,007**	**17,387,564**	**8,450,443**	**52,000**	**1,147,000**	**2,365,988**	**3,755,748**	**4,885,450**	
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-18	Dec-19	4,707,450	-	4,707,450					4,707,450	
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	-						
John J. Carroll WTP Solar - Construction	98452_7304	Jan-10	Aug-11	2,367,287	2,367,287	-						
Rewewable Energy Technical Assistance - Wind/Solar	98453_7305	Jan-16	Jan-19	650,000	-	650,000	52,000	210,000	210,000	472,000	178,000	
Loring Road Hydro - Construction	98459_6974F	Jan-10	May-11	1,882,218	1,882,218	-						
DI Wind Phase II - Construction	98463_7321	Jan-17	Mar-18	2,500,000	37,080	2,462,920		492,000	1,970,920	2,462,920		
Fishery Hatchery Pipeline Hydro	98465_7323	Feb-16	Aug-17	630,068	-	630,068		445,000	185,068	630,068		

Massachusetts Water Resources Authority
FY17 Proposed Expenditure Forecast

Program/Project/Subphase	Contract No.	Notice To Proceed	Substan. Compl.	Total Contract Amount	Payments through FY15	Remaining Balance	FY16	FY17	FY18	FY14 - FY18	FY19-FY23	Beyond FY23
940 Application Improvement Program				**10,175,904**	**484,231**	**9,691,673**	**1,349,223**	**3,061,780**	**3,597,019**	**8,419,128**	**1,683,651**	
GIS Applications & Integration	92420_7251	Jan-14	Jun-17	350,000	22,272	327,728	122,898	163,864	40,966	350,000		
Lawson Enhancements	92435_7286	Mar-16	Jun-18	1,750,000	-	1,750,000	62,500	750,000	750,000	1,562,500	187,500	
Maximo Upgrade	92436_7287	Jul-15	Mar-19	2,625,904	-	2,625,904	894,594	577,103	577,103	2,048,800	577,104	
PIMS Enhancements	92437_7288	Jun-16	Sep-18	400,000	-	400,000		142,857	171,429	314,286	85,714	
Enterprise Performance Management Enhancements	92469_7386	Mar-16	Aug-17	200,000	80,900	119,100	6,617	79,400	33,083	126,875		
Enterprise Content Management	98475_7438	Aug-16	Dec-18	4,000,000	-	4,000,000		1,166,667	2,000,000	3,166,667	833,333	
Mobile Integrations	98476_7439	Apr-14	Jul-16	300,000	26,569	273,431	189,297	84,134		300,000		
LIMS Enhancement	98484_7447	Mar-15	Jun-17	550,000	354,490	195,510	73,317	97,755	24,438	550,000		
942 Information Security Program (ISP)				**3,365,411**	**819,825**	**2,545,586**	**607,748**	**748,649**	**648,649**	**2,289,681**	**540,540**	
IT Security Infrastructure/Equipment	92434_7285	Sep-11	Jun-14	647,000	501,414	145,586	145,586			145,586		
Information Security Protection Infrastructure Upgrade	92500_7499	Mar-16	Jan-19	2,000,000	-	2,000,000	162,162	648,649	648,649	1,459,460	540,540	
Electronic Security Plan Implementation	98477_7440	Jun-14	Jun-16	400,000	-	400,000	300,000	100,000		400,000		
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**		**396,480**	**453,550**	**850,030**	**72,610**	
Implement IT Task Force	92412_7240	Jun-16	Nov-17	100,000	-	100,000		55,557	44,443	100,000		
Service Delivery & Best Practices	92421_7252	Jun-16	Jun-18	110,640	-	110,640		44,257	53,107	97,364	13,276	
Reorganize MIS Department	92422_7253	Jul-16	Jun-18	150,000	-	150,000		62,500	75,000	137,500	12,500	
IT Project Management Methodology	98472_7408	Jun-16	Jun-18	200,000	-	200,000		83,333	100,000	183,333	16,667	
Software Development Life Cycle (SDLC)	98478_7441	Jun-16	Jun-18	362,000	-	362,000		150,833	181,000	331,833	30,167	
946 IT Infrastructure Program				**10,271,000**	**5,343,155**	**4,927,845**	**1,376,421**	**1,898,765**	**1,177,435**	**8,504,805**	**475,224**	
IT System Architecture	92404_7200	Sep-12	Oct-15	1,009,341	1,008,141	1,200	1,200			546,568		
Net 2020/Net 2020 DITP/Southborough	92405_7201	Mar-11	Jun-17	2,551,659	1,065,036	1,486,623	557,484	743,312	185,827	1,850,632		
Storage Upgrades	92406_7203	Jul-13	Jun-18	1,575,000	891,532	683,468	170,868	227,823	227,823	1,398,881	56,954	
Backup Upgrades	92407_7204	Jul-13	Sep-18	894,000	580,658	313,342	72,309	96,413	96,413	845,793	48,207	
Server Management	92408_7205	Oct-13	Jun-18	500,000	254,441	245,559	61,389	81,853	81,853	479,536	20,464	
Enterprise Application Integration	98480_7443	Jul-14	Dec-18	2,091,000	452,336	1,638,664	356,799	466,133	466,133	1,741,401	349,599	
E-Mail Upgrades	98481_7444	Jun-16	Dec-17	150,000	8,006	141,994		74,733	67,261	141,994		
Enterprise Data Management	98482_7445	Jan-14	Jun-17	1,500,000	1,083,005	416,995	156,372	208,498	52,125	1,500,000		

APPENDIX 3

New Capital Projects Added During the FY17 Proposed CIP

APPENDIX 3
New Projects Added to the FY17 CIP

Program	Project	Subphase	Total Contract Amount	FY17	FY18	FY14-18	Total Expenditures
Interception & Pumping	Facility Asset Protection	DeLauri Pump Station Screens and Security	$ 1,029,700	$ 772,000	$ 257,700	$ 1,029,700	$ 1,029,700
Distribution and Pumping	Chestnut Hill Connecting Mains	Chestnut Hill Gatehouse Repairs	725,000	725,000	-	725,000	725,000
SUMMARY:							
Total Wastewater Projects			**$ 1,029,700**	**$ 772,000**	**$ 257,700**	**$ 1,029,700**	**$ 1,029,700**
Total Waterworks Projects			**725,000**	**725,000**	**-**	**725,000**	**725,000**
Total Projects			**$ 1,754,700**	**$ 1,497,000**	**$ 257,700**	**$ 1,754,700**	**$ 1,754,700**

APPENDIX 4

Overview of the FY17 Proposed CIP and Changes from the FY16 Final CIP

APPENDIX 4

Overview of the FY17 Proposed and Changes from the FY16 Final CIP

Program and Project	Final FY16				FY17 Proposed				Change from Final FY16			
	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	**6,012,395**	**711,532**	**1,223,762**	**388,976**	**6,987,519**	**678,703**	**1,200,390**	**1,420,302**	**975,124**	**(32,829)**	**(23,372)**	**1,031,326**
Wastewater	**2,974,567**	**419,344**	**634,899**	**184,324**	**3,062,316**	**397,538**	**648,643**	**280,132**	**87,749**	**(21,806)**	**13,744**	**95,808**
Interception & Pumping	**890,031**	**98,024**	**224,870**	**46,598**	**926,776**	**86,752**	**176,616**	**142,867**	**36,745**	**(11,272)**	**(48,254)**	**96,269**
102 Quincy Pump Facilities	25,907	-	-	-	25,907	-	-	-	-	-	-	-
104 Braintree-Weymouth Relief Facilities	232,455	310	4,441	-	232,455	208	4,543	-	-	(102)	102	-
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	6,635	-	5,695	-	6,669	-	5,729	-	34	-	34	-
131 Upper Neponset Valley Sewer	54,174	-	-	-	54,174	-	-	-	-	-	-	-
132 Corrosion & Odor Control	19,782	543	16,238	-	23,367	909	19,457	-	3,585	366	3,219	-
136 West Roxbury Tunnel	11,314	-	1,000	-	11,314	-	1,000	-	-	-	-	-
137 Wastewater Central Monitoring	27,482	760	2,910	4,030	27,482	375	2,910	4,415	-	(385)	-	385
139 South System Relief Project	4,939	-	1,500	-	4,939	-	1,500	-	-	-	-	-
141 Wastewater Process Optimization	10,383	1,391	5,817	1,970	10,389	297	5,168	3,719	6	(1,094)	(649)	1,749
142 Wastewater Meter System-Equipment	27,738	6,436	1,564	14,600	27,738	1,200	6,800	14,600	-	(5,236)	5,236	-
143 Regional I/I Management Planning	169	-	-	-	169	-	-	-	-	-	-	-
145 Facility Asset Protection	311,791	88,585	179,955	25,999	344,911	83,764	123,759	120,134	33,120	(4,821)	(56,196)	94,135
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	**775,573**	**183,994**	**352,083**	**54,773**	**818,429**	**163,111**	**413,527**	**57,067**	**42,856**	**(20,883)**	**61,444**	**2,294**
182 DI Primary and Secondary	**(958)**	-	-	-	(958)	-	-	-	-	-	-	-
200 DI Plant Optimization	33,427	-	-	-	33,279	(148)	-	-	(148)	(148)	-	-
206 DI Treatment Plant Asset Protection	720,365	170,511	347,938	54,416	763,925	150,358	409,356	56,710	43,560	(20,153)	61,418	2,294
210 Clinton Wastewater Treat Plant	20,511	13,483	4,145	358	19,955	12,901	4,171	358	(556)	(582)	26	-
211 Laboratory Services	2,228	-	-	-	2,228	-	-	-	-	-	-	-
Residuals	**167,643**	**4,570**	**8,470**	**90,067**	**167,643**	**4,570**	**8,470**	**90,067**	**-**	**-**	**-**	**-**
261 Residuals	63,811	-	-	-	63,811	-	-	-	-	-	-	-
271 Residuals Asset Protection	103,832	4,570	8,470	90,067	103,832	4,570	8,470	90,067	-	-	-	-

APPENDIX 4

Overview of the FY17 Proposed and Changes from the FY16 Final CIP

Program and Project	Final FY16				FY17 Proposed				Change from Final FY16			
	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	**898,455**	**57,747**	**3,001**	**-**	**906,603**	**65,923**	**2,973**	**-**	**8,148**	**8,176**	**(28)**	**-**
340 Dorchester Bay Sewer Separation (Fox Point)	54,626	473	-	-	54,626	473	-	-	-	-	-	-
341 Dorchester Bay Sewer Separation (Commercial Point)	64,174	1,287	1,740	-	64,174	1,650	1,376	-	-	363	(364)	-
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	92,563	42,079	-	-	102,765	52,281	-	-	10,202	10,202	-	-
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	72,613	12,573	-	-	70,560	10,520	-	-	(2,053)	(2,053)	-	-
360 Brookline Sewer Separation	24,716	(1,282)	-	-	24,715	(1,282)	-	-	(1)	-	-	-
361 Bulfinch Triangle Sewer Separation	9,054	(803)	-	-	9,054	(803)	-	-	-	-	-	-
339 North Dorchester Bay	221,597	(23)	-	-	221,597	(23)	-	-	-	-	-	-
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	4,562	3,914	-	-	4,562	3,914	-	-	-	-	-	-
357 Charles River CSO Controls	3,633	-	-	-	3,633	-	-	-	-	-	-	-
324 CSO Support	50,248	(378)	1,262	-	50,248	(714)	1,598	-	-	(336)	336	-
Other Wastewater	**242,866**	**75,009**	**46,475**	**(7,114)**	**242,866**	**77,182**	**47,057**	**(9,869)**	**-**	**2,173**	**582**	**(2,755)**
128 I/I Local Financial Assistance	242,585	75,009	46,475	(7,114)	242,585	77,182	47,057	(9,869)	-	2,173	582	(2,755)
138 Sewerage System Mapping Upgrade	281	-	-	-	281	-	-	-	-	-	-	-
Total Waterworks	**2,909,436**	**251,266**	**578,835**	**204,653**	**3,790,554**	**239,374**	**536,329**	**1,140,171**	**881,118**	**(11,892)**	**(42,506)**	**935,518**
Drinking Water Quality	**666,292**	**58,903**	**12,161**	**20**	**665,944**	**58,494**	**11,607**	**637**	**(348)**	**(409)**	**(554)**	**617**
542 Carroll Water Treatment Plant	438,192	15,166	11,797	20	438,074	15,019	11,210	637	(118)	(147)	(587)	617
543 Quabbin Water Treatment Plant	19,719	6,951	-	-	20,024	7,256	-	-	305	305	-	-
544 Norumbega Covered Storage	106,674	-	-	-	106,674	-	-	-	-	-	-	-
545 Blue Hills Covered Storage	40,555	228	364	-	40,557	198	397	-	2	(30)	33	-
550 Spot Pond Storage Facility	61,152	36,558	-	-	60,615	36,021	-	-	(537)	(537)	-	-

APPENDIX 4

Overview of the FY17 Proposed and Changes from the FY16 Final CIP

Program and Project	Final FY16				FY17 Proposed				Change from Final FY16			
	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	**1,224,185**	**78,812**	**275,900**	**114,434**	**2,285,713**	**73,948**	**373,125**	**1,083,600**	**1,061,528**	**(4,864)**	**97,225**	**969,166**
597 Winsor Station Pipeline	27,883	9,661	16,827	-	30,020	4,941	23,683	-	2,137	(4,720)	6,856	-
601 Sluice Gate Rehabilitation	9,158	-	-	-	9,158	-	-	-	-	-	-	-
604 MetroWest Tunnel	708,664	3,260	9,888	118	707,421	1,982	9,923	118	(1,243)	(1,278)	35	-
615 Chicopee Valley Aqueduct Redundancy	8,666	-	-	-	8,666	-	-	-	-	-	-	-
616 Quabbin Transmission System	15,457	773	7,481	-	15,457	773	7,481	-	-	-	-	-
617 Sudbury/Weston Aqueduct Repairs	7,149	3,146	3,343	-	6,846	2,841	3,345	-	(303)	(305)	2	-
620 Wachusett Reservior Spillway Improvement	9,287	-	-	-	9,287	-	-	-	-	-	-	-
621 Watershed Land	24,000	6,658	-	-	24,000	6,658	-	-	-	-	-	-
622 Cosgrove/Wachusett Redundancy	-	-	-	-	-	-	-	-	-	-	-	-
623 Dam Projects	4,538	978	475	-	4,538	546	907	-	-	(432)	432	-
625 Long Term Redundancy	409,381	54,336	237,886	114,317	1,470,318	56,207	327,786	1,083,483	1,060,937	1,871	89,900	969,166
Distribution & Pumping	**949,123**	**105,791**	**324,977**	**145,651**	**768,484**	**99,994**	**180,165**	**115,622**	**(180,639)**	**(5,797)**	**(144,812)**	**(30,029)**
618 Northern High NW Tran Sections 70 & 71	1,000	474	526	-	1,000	474	526	-	-	-	-	-
677 Valve Replacement	22,702	2,717	3,619	4,351	22,749	2,682	3,654	4,397	47	(35)	35	46
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	1,092	178	790	-	1,097	183	790	-	5	5	-	-
693 NHS - Revere & Malden Pipeline Improvement	55,161	11,020	16,607	702	55,360	2,910	25,617	-	199	(8,110)	9,010	(702)
702 New Connect Mains-Shaft 7 to WASM 3	34,296	403	17,111	5,821	34,765	1,559	22,148	97	469	1,156	5,037	(5,724)
704 Rehabilitation of Other Pump Stations	55,058	-	18,750	6,250	55,058	-	18,750	6,250	-	-	-	-
706 NHS-Connecting Mains from Section 91	2,360	-	-	-	2,360	-	-	-	-	-	-	-
708 Northern Extra High Service New Pipelines	7,863	61	3,495	675	7,889	61	3,495	701	26	-	-	26
712 Cathodic Protection Of Distrubution Mains	1,668	509	763	254	1,656	418	1,097	-	(12)	(91)	334	(254)
713 Spot Pond Supply Mains Rehabilitation	66,807	2,713	3,112	-	67,378	3,282	3,114	-	571	569	2	-
714 Southern Extra High Sections 41 & 42	3,657	-	-	-	3,657	-	-	-	-	-	-	-
719 Chestnut Hill Connecting Mains	32,035	316	10,156	4,076	24,175	725	102	5,861	(7,860)	409	(10,054)	1,785
720 Warren Cottage Line Rehabilitation	1,205	-	-	-	1,205	-	-	-	-	-	-	-
721 South Spine Distribution Mains	74,773	369	4,037	33,676	74,983	368	3,963	33,960	210	(1)	(74)	284
722 NIH Redundancy & Storage	90,187	43,327	40,885	-	89,448	41,661	41,812	-	(739)	(1,666)	927	-
723 Northern Low Service Rehabilitation Section 8	23,334	553	20,459	-	23,441	49	20,031	1,041	107	(504)	(428)	1,041
724 Northern High Service - Pipeline Rehabilitation	-	-	-	-	-	-	-	-	-	-	-	-
725 Hydraulic Model Update	598	-	-	-	598	-	-	-	-	-	-	-
727 Southern Extra High Redundancy & Storage	99,544	23,224	15,274	54,289	97,354	28,039	7,939	54,619	(2,190)	4,815	(7,335)	330
730 Weston Aqueduct Supply Mains	281,137	19,422	160,114	35,557	109,605	17,389	18,060	8,113	(171,532)	(2,033)	(142,054)	(27,444)
731 Lynnfield Pipeline	5,626	(52)	-	-	5,626	(52)	-	-	-	-	-	-
732 Walnut St. & Fisher Hill Pipeline Rehabilitation	2,717	-	-	-	2,717	-	-	-	-	-	-	-
733 NHS Pipeline Rehabilitation 13-18 & 48	-	-	-	-	-	-	-	-	-	-	-	-
734 Southern Extra High Pipelines-Sections 30, 39,40, & 44	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX 4

Overview of the FY17 Proposed and Changes from the FY16 Final CIP

Program and Project	Final FY16				FY17 Proposed				Change from Final FY16			
	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
735 Section 80 Rehabilitation	9,836	558	9,278	-	9,896	247	9,066	583	60	(311)	(212)	583
Other	**69,836**	**7,760**	**(34,203)**	**(55,454)**	**70,413**	**6,938**	**(28,568)**	**(59,690)**	**577**	**(822)**	**5,635**	**(4,236)**
753 Central Monitoring System	39,006	6,297	6,220	10,686	39,106	6,397	6,220	10,686	100	100	-	-
763 Distribution Systems Facilities Mapping	2,299	914	348	-	2,299	533	730	-	-	(381)	382	-
764 Local Water Infrastructure Rehabilitation Assistance	7,488	-	-	-	7,488	-	-	-	-	-	-	-
765 Local Water Pipeline Improvement Loan Program	-	(4,508)	(53,490)	(68,861)	-	(2,814)	(50,948)	(73,097)	-	1,694	2,542	(4,236)
766 Waterworks Facility Asset Protection	21,043	5,058	12,719	2,721	21,520	2,823	15,430	2,721	477	(2,235)	2,711	-
Business & Operations Support	**128,393**	**40,922**	**10,029**	**-**	**134,650**	**41,791**	**15,419**	**-**	**6,257**	**869**	**5,390**	**-**
881 Equipment Purchase	23,168	10,063	997	-	28,535	10,823	5,605	-	5,367	760	4,608	-
925 Technical Assistance	1,125	1,125	-	-	1,125	750	375	-	-	(375)	375	-
930 MWRA Facility - Chelsea	9,814	-	-	-	9,814	-	-	-	-	-	-	-
931 Business Systems Plan	24,552	101	-	-	24,528	76	-	-	(24)	(25)	-	-
932 Environmental Remediation	1,479	-	-	-	1,479	-	-	-	-	-	-	-
933 Capital Maintenance Planning	16,721	6,597	-	-	16,447	6,323	-	-	(274)	(274)	-	-
934 MWRA Facilities Management	2,151	-	1,780	-	2,151	-	1,780	-	-	-	-	-
935 Alternative Energy Initiatives	25,630	3,576	4,857	-	25,838	3,756	4,885	-	208	180	28	-
940 Applicat Improv Program	10,176	8,437	1,666	-	10,176	8,419	1,684	-	-	(18)	18	-
942 Info Security Program ISP	2,385	1,595	255	-	3,365	2,290	541	-	980	695	286	-
944 Info Tech Mgmt Program	923	863	59	-	923	850	73	-	-	(13)	14	-
946 IT Infrastructure Program	10,271	8,566	414	-	10,271	8,505	475	-	-	(61)	61	-

APPENDIX 5

Master Plan/CIP Status

Appendix 5
Master Plan/CIP Status
(in 000's)

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
FY17 Proposed 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 000's)

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 000's)

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 000's)

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 000's)

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 000's)

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
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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. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
104 Braintree-Weymouth Relief Facilities		**$232,455**	**$227,705**	**98.0%**	**98.0%**		
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	150	0	Future	0.0%	Jul-17	
10480_7327	Mill Cove Sluice Gates - Construction	600	0	Future	0.0%	Mar-19	
10493_7366	B/W Improvements - Construct	3,200	0	Future	0.0%	Jun-19	
19567_9586	B/W Improvements - Des/CS/RI	800	0	Future	0.0%	Jul-17	

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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. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
128 I/I Local Financial Assistance		**$242,585**	**$149,769**	**61.7%**	**61.7%**		
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	-21,137	96.1%	96.1%		May-17
10441_7107	Phase Vl - Grants	18,000	16,159	89.8%	89.8%		Jun-21
10442_7108	Phase Vl - Loans	22,000	19,750	89.8%	89.8%		Jun-21
10443_7109	Phase Vl - Repayments	-22,000	-14,503	65.9%	65.9%		Jun-26
10471_7293	Phase VII - Grants	18,000	14,344	79.7%	79.7%		Jun-21
10472_7294	Phase VII - Loans	22,000	17,531	79.7%	79.7%		Jun-21
10473_7295	Phase VII - Repayments	-22,000	-8,839	40.2%	40.2%		Jun-26
10474_7296	Phase VIII - Grants	18,000	11,303	62.8%	62.8%		Jun-21
10475_7297	Phase VIII - Loans	22,000	13,815	62.8%	62.8%		Jun-21
10476_7298	Phase VIII - Repayments	-22,000	-3,309	15.0%	15.0%		Jun-26
10560_7464	Phase IX Grants	60,000	10,711	17.9%	17.9%		Jun-21
10561_7465	Phase IX Loans	20,000	3,570	17.9%	17.9%		Jun-21
10562_7466	Phase IX Repayment	-20,000	-211	1.1%	1.1%		Jun-31
10563_7467	Phase X Grants	60,000	0	Future	0.0%	Jul-16	
10564_7468	Phase X Loans	20,000	0	Future	0.0%	Jul-16	
10565_7469	Phase X Repayment	-20,000	0	Future	0.0%	Jul-16	
130 Siphon Structure Rehabilitation		**$6,669**	**$940**	**14.1%**	**14.1%**		
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	1,378	0	Future	0.0%	Jul-18	
10294_6225	Construction	4,304	0	Future	0.0%	Jul-20	

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Project Status Overview

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
132 Corrosion & Odor Control		**$23,367**	**$3,001**	**12.8%**	**12.8%**		
10279_6137	Planning/Study	587	587	Complete	100.0%		
10323_6549	Land Acquisition	3	3	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%		
10405_6918	FES Tunnel Rehab - Construction	6,800	0	Future	0.0%	Jul-19	
10406_6919	FES/FERS Biofilters - Design	1,144	0	Future	0.0%	Jul-18	
10453_7196	FES Tunnel Rehab - Design/CS/RI	1,700	0	Future	0.0%	Jul-18	
10456_7215	FES/FERS Biofilters - Construction	1,779	0	Future	0.0%	Apr-19	
10491_7364	System-wide Odor Control - Study	1,000	0	Future	0.0%	Jul-18	
10492_7365	NI System-wide Odor Cntrl Des ESDC/REI	1,570	0	Future	0.0%	Feb-17	
10495_7494	NI System-wide Odor Cntrl-Eval	536	0	Future	0.0%	Sep-15	
10496_7495	NI System-wide Odor Cntrl Upg Const	5,836	0	Future	0.0%	Jul-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-17	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY15	**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		**$10,389**	**$1,463**	**14.1%**	**14.1%**		
10367_6733	Planning	930	930	Complete	100.0%		
10412_6930	North System Hydraulic Study	571	533	93.3%	93.3%		Jun-15
10413_6931	Somerville Sewer - Design	200	0	Future	0.0%	Oct-19	
10414_6932	Somerville Sewer - Construction	1,095	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		**$27,738**	**$5,138**	**18.5%**	**18.5%**		
10371_6739	Planning / Study / Design	2,000	0	Future	0.0%	Apr-16	
10379_6793	Equipment Purchase & Installation	5,138	5,138	Complete	100.0%		
10411_6929	Construction	2,000	0	Future	0.0%	Jun-18	
10451_7191	WW Metering Asset Protect/Equip Purch	18,600	0	Future	0.0%	Jul-18	

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145 Facility Asset Protection		**$344,911**	**$32,446**	**9.4%**	**9.4%**		
10380_6795	Prison Point HVAC Upgrades-Construct.	2,912	2,912	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.	12,560	0	Future	0.0%	Nov-15	
10383_6798	Rehab of Section 93A Lexington	1,566	1,566	Complete	100.0%		
10387_6802	Chelsea Creek Upgrades REI	3,738	0	Future	0.0%	Mar-16	
10392_6829	Technical Assistance	82	48	58.5%	58.5%		Mar-22
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	11	11	Complete	100.0%		
10399_6886	Remote Headworks Concept Plan	670	670	Complete	100.0%		
10418_6936	Constr CB1 Sect 27,26	14,500	0	Future	0.0%	Jul-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 Des/CA/REI	1,814	916	50.5%	50.5%		Mar-19
10431_7037	Caruso PS Improve Des/CA/REI	925	424	45.8%	45.8%		Mar-18
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 Upgr Construction	62,021	0	Future	0.0%	Apr-16	
10446_7162	Pump Stns & CSOs Condition Assessment	3,138	0	Future	0.0%	Jul-17	
10447_7163	Inter Ren 1-Des/CA/REI	1,156	0	Future	0.0%	Aug-15	
10448_7164	IR-Cons 1 Read Ext Sew	4,267	0	Future	0.0%	Mar-17	
10455_7206	Chelsea Creek Upgr Design/CA	8,490	4,692	55.3%	55.3%		Apr-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	IR 3 Dor Int Sewer Constr	3,997	0	Future	0.0%	Sep-18	
10468_7280	Constr CB2 Sect 24,23	10,000	0	Future	0.0%	Jul-22	
10469_7281	Cottage Farm Fuel System Upgrade	498	498	Complete	100.0%		
10477_7312	NI Elec & Grit/Sreens Conveyance-Des	1,249	1,037	83.0%	83.0%		May-16
10478_7313	NI Elec & Grit/Sreens Conveyance-Con	5,192	5,017	96.6%	96.6%		May-15
10481_7328	Interceptor Renewal No. 5 - Milton	4,000	0	Future	0.0%	Sep-27	
10482_7329	Interceptor Renewal No. 6 - Chelsea	11,000	0	Future	0.0%	Sep-30	
10483_7330	Prison PT/CF GB Pump/ESDC	362	262	72.4%	72.4%		Nov-16
10484_7344	Somer/Marginal Influent Gates Replace	367	367	Complete	100.0%		
10486_7359	Prison Point Des/CA/RI	1,123	0	Future	0.0%	Jul-16	
10487_7360	System Relief & Contingency Planning	500	0	Future	0.0%	Jul-20	
10488_7361	DeLauri PS Screens & Security	1,030	0	Future	0.0%	Jul-16	
10489_7362	Caruso PS Impovements - Const	3,672	0	Future	0.0%	Dec-15	

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10500_7375	Pump Stn. Rehab-Prelim. Design/Study	750	0	Future	0.0%	Jul-19	
10501_7389	Cottage Farm Construction 1 (PCB)	2,159	0	Future	0.0%	Jul-18	
10502_7392	CF PCB Abatement Design/CA	540	0	Future	0.0%	Jul-17	
10503_7393	Sect 156 Rehab - Design/Build	2,563	2,563	Complete	100.0%		
10504_7410	Des ESDC Camb Brch Sect 27,26	3,600	0	Future	0.0%	Jul-18	
10505_7421	Design CA/RI Sects 186,4,5,6	3,000	0	Future	0.0%	Nov-18	
10506_7422	Construction Sects 186,4,5,6	16,000	0	Future	0.0%	Nov-20	
10507_7423	Study Sects 186,4,5,6	1,000	0	Future	0.0%	Nov-16	
10510_7429	Ward St & Colu Park HWKS Des/CA/REI	10,327	0	Future	0.0%	Jul-20	
10511_7430	Ward St & Columbus Park HWKS Const	101,003	0	Future	0.0%	Aug-22	
10512_7431	Chelsea Screenhouse Upgrades	4,885	0	Future	0.0%	Aug-15	
10515_7452	PP/CF Engine Pumps Gearbox	6,595	6,151	93.3%	93.3%		Nov-15
10518_7459	Prison Point Piping Rehab	353	0	Future	0.0%	Dec-15	
10519_7462	Prison Point Rehab - Const	5,614	0	Future	0.0%	Jul-18	
10520_7463	Cottage Farm Rehab Const	7,557	0	Future	0.0%	Jul-21	
10521_7490	Chelsea Screenhouse ESDC/REI	880	0	Future	0.0%	Sep-15	
10522_7508	CF Rehab Design/CA/REI	1,400	0	Future	0.0%	Jul-19	
10523_7510	Chelsea Hdwk-Caruso PS Utility	32	0	Future	0.0%	Jul-16	
10524_7511	Study Cambr Branch 27,26,24,23	1,000	0	Future	0.0%	Jul-16	
10525_7512	IR 3 Dor Int Sew Des CA/RI	1,000	0	Future	0.0%	Sep-16	
10526_7513	Des ESDC Cambr Brch Sect 24, 23	2,500	0	Future	0.0%	Jul-20	
10527_7514	IR 6 Des CA/REI Chelsea	2,200	0	Future	0.0%	Jul-20	
10528_7515	IR 5 Des CA/REI Milton	2,000	0	Future	0.0%	Jul-22	
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		**$763,925**	**$200,290**	**26.2%**	**26.2%**		
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%		
19182_6478	Equipment Replacement Projection	25,000	0	Future	0.0%	Jul-18	
19188_6538	Odor Ctrl Rehab Constr	22,507	0	Future	0.0%	Dec-18	
19191_6592	Odor Ctrol Rehab REI	2,059	0	Future	0.0%	Dec-18	
19193_6594	Equipment Condition Monitoring	1,777	1,777	Complete	100.0%		
19194_6598	NMPS WTF ESDC/REI	2,300	229	10.0%	10.0%		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 - Construct. 3	1,941	0	Future	0.0%	May-17	
19220_6721	As-needed Design Phase 6-1	1,911	1,918	Complete	100.4%		
19221_6722	As-needed Design Phase 6-2	1,744	1,744	Complete	100.0%		
19222_6723	Eastern Seawall Design - 1	647	0	Future	0.0%	Jan-17	
19223_6724	Eastern Seawall Construction - 1	3,775	0	Future	0.0%	Jan-19	
19227_6728	Digester Gas Flare #4 - Design	523	0	Future	0.0%	Jul-17	
19228_6729	Digester Gas Flare #4 - Construction	1,151	0	Future	0.0%	Jul-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-17
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 Repi Ph 2	2,591	0	Future	0.0%	Dec-15	
19247_6822	Co-Digestion Des/Bld	5,000	0	Future	0.0%	Aug-17	
19250_6849	Reline Hypochlorite Tanks 2 & 4	2,242	2,242	Complete	100.0%		
19252_6851	Chemical Pipe Replacement - Design	628	0	Future	0.0%	Jun-18	
19253_6852	Chemical Pipe Replacement - Construct	2,092	0	Future	0.0%	Jun-19	
19254_6853	Sodium Hypo Pipe Replacement - Design	1,800	0	Future	0.0%	Jun-16	
19256_6855	Electrical Equipment Upgrade-Const. 3	15,174	15,174	Complete	100.0%		
19258_6875	WTF VFD Replacement - Construction	14,691	0	Future	0.0%	Jan-16	
19259_6876	Heat Loop Pipe Replacement - Constr 1	615	615	Complete	100.0%		
19260_6877	Secondary Reactor VFDs	3,176	1,182	37.2%	37.2%		Aug-16
19263_6880	Cathodic Protection Des/ESDC	1,000	0	Future	0.0%	Sep-16	
19264_6881	Grit Air Handler Replacements	2,029	2,029	Complete	100.0%		
19265_6882	CEMS Equipment Replacement	100	100	Complete	100.0%		

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19266_6883	Heat Loop Pipe Replacement - Const. 2	1,488	1,488	Complete	100.0%		
19267_6884	PICS Replacement - Construction	1,302	1,090	83.7%	83.7%		Dec-17
19268_6899	Primary&Second Clarifier Rehab-Const	56,787	56,787	Complete	100.0%		
19270_6901	Electrical Equipment Upgrade-Const 4	10,973	6,149	56.0%	56.0%		May-16
19271_6902	NMPS VFD Replacement - Design/ESDC	1,276	1,276	Complete	100.0%		
19272_6903	NMPS VFD Replacement - Construction	24,468	22,459	91.8%	91.8%		Mar-16
19273_6904	Fire Alarm System Replacement-Design	2,079	0	Future	0.0%	Nov-15	
19274_6963	Combined Heat & Power Design	6,000	0	Future	0.0%	Mar-16	
19275_6964	Combined Heat & Power Constr	83,000	0	Future	0.0%	Jun-18	
19276_6965	Primary&Second Clarifier Rehab-Design	1,678	1,678	Complete	100.0%		
19277_6966	Gravity Thickener Improvements-Constr	733	733	Complete	100.0%		
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.	2,570	2,570	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 - Const	16,000	0	Future	0.0%	Feb-18	
19290_7052	Digester & Storage Tank Rehab Des/ESDC	3,000	0	Future	0.0%	Oct-17	
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 Constr	6,178	0	Future	0.0%	Sep-18	
19295_7057	Centrifuge Backdrive Replacement	3,965	3,965	Complete	100.0%		
19296_7058	Switchgear Replacement - Design	1,618	0	Future	0.0%	Jun-16	
19297_7059	Switchgear Replacement - Construction	4,524	0	Future	0.0%	Dec-17	
19298_7060	Power Consultant Recommned - Design	2,097	2,097	Complete	100.0%		
19299_7061	Power System Improvements - Construct	9,973	5,423	54.4%	54.4%		May-17
19300_7062	NMPS VFD Replacement - REI	1,322	547	41.4%	41.4%		Jun-16
19301_7063	Heat Loop Pipe Replacement - Const. 3	11,436	11,436	Complete	100.0%		
19303_7088	Odor Ctrl Rehab Des/ESDC	3,104	0	Future	0.0%	Jun-16	
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%		
19309_7111	HVAC Equipment Replacement - Des/ESDC	1,956	529	27.0%	27.0%		Oct-20
19310_7110	HVAC Equipment Replacement - Const.	25,000	0	Future	0.0%	Apr-16	
19311_7121	DI As-needed Technical Design	16,250	0	Future	0.0%	Dec-18	
19313_7123	Digester Sludge Pump Repl - Construct	1,924	1,781	92.6%	92.6%		Dec-14
19314_7124	Electrical Equipment Upgrade Phase 5	23,162	0	Future	0.0%	Dec-18	
19316_7126	Future SSPS VFD Replacements - Design	4,800	0	Future	0.0%	Jul-17	
19317_7127	Future SSPS VFD Replacements - Const.	19,200	0	Future	0.0%	Jan-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-Const.	5,334	0	Future	0.0%	May-17	

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19322_7132	DI Switchgear Replacement - Design	4,500	0	Future	0.0%	Jul-18	
19323_7133	DI Switchgear Replacement - Construct	16,000	0	Future	0.0%	Jul-20	
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	6,000	0	Future	0.0%	Jul-18	
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-Equip Replace-Design	1,600	0	Future	0.0%	Dec-18	
19330_7140	Cryogenics Plant-Equip Replace-Const.	5,300	0	Future	0.0%	Apr-20	
19332_7142	Future Sodium Hypo Tank Rehab	10,000	0	Future	0.0%	Jul-20	
19334_7168	Barge Berth and Facility Replacement	2,265	0	Future	0.0%	Jan-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 Replac	8,000	0	Future	0.0%	Feb-21	
19339_7275	NMPS & WTF Butterfly Valve Replace.	17,212	2,973	17.3%	17.3%		Jun-17
19345_7373	Digester & Storage Tank Rehab - Const.	21,700	0	Future	0.0%	Apr-20	
19346_7374	Clarif W3H Flush Syst	1,262	1,262	Complete	100.0%		
19347_7394	Clarifier Ph 2 Des	2,237	117	5.2%	5.2%		Apr-22
19348_7395	Clarif Rehab2 Const	35,000	0	Future	0.0%	Jul-17	
19349_7396	Scum Skimr Replac	20,290	15,521	76.5%	76.5%		Oct-16
19351_7397	Clarif Rehab Ph 2 REI	1,500	0	Future	0.0%	Jul-17	
19352_7398	Cryo Chillers Replac	3,236	338	10.4%	10.4%		Oct-16
19353_7399	As-Needed Des 7-1	1,521	1,454	95.6%	95.6%		Oct-15
19354_7400	As-Needed Des 7-2	1,500	778	51.9%	51.9%		Apr-16
19355_7401	TPP Boiler Ctrl Replac	1,612	247	15.3%	15.3%		Nov-16
19356_7413	Sod Hypo Repl REI	1,000	0	Future	0.0%	Jun-18	
19557_7414	NMPS Harmonic Filter Repl	3,000	0	Future	0.0%	May-18	
19558_7415	Fuel Pipe Abandonment	230	230	Complete	100.0%		
19559_7416	Electr Equip Upgr 4 REI	1,039	311	29.9%	29.9%		Aug-16
19560_7419	NMPS MCC Ph 2 DES/ESDC/REI	2,000	0	Future	0.0%	Jul-16	
19561_7420	NMPS MCC Ph 2 Const	6,086	0	Future	0.0%	Apr-18	
19562_7424	Roof Replacement Phase 3	611	611	Complete	100.0%		
19563_7426	Fire Systm Repl REI	1,800	0	Future	0.0%	Feb-18	
19564_7427	Grav Thick Ctr Col Repl	825	825	Complete	100.0%		
19565_7428	Grav Thicknr Rehab	14,100	0	Future	0.0%	Feb-16	
19566_7434	As-Needed Des 7-3	1,500	512	34.1%	34.1%		Apr-16
19600_7501	As-Needed Des 8-1	1,500	0	Future	0.0%	Jan-16	
19601_7502	As-Needed Des 8-2	1,500	0	Future	0.0%	Jan-16	
19602_7503	As-Needed Des 8-3	1,500	0	Future	0.0%	Jan-16	
26073_7148	Co-Digest Temp Facil	2,300	434	18.9%	18.9%		Sep-16
40256_7449	Sodium Bisulf & Hypo Tks Rehab	10,593	0	Future	0.0%	Jun-18	

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210 Clinton Wastewater Treat Plant		**$19,955**	**$4,716**	**23.6%**	**23.6%**		
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	3,609	1,935	53.6%	53.6%		Apr-17
19342_7278	Clinton Aeration Effciency Improvement	1,865	1,865	Complete	100.0%		
19350_7377	Phos Remov Des/ESDC	1,306	356	27.3%	27.3%		Aug-18
19400_7411	PhosRemov Constr	7,760	0	Future	0.0%	Feb-16	
19405_7450	Clinton Roofing Rehab	540	0	Future	0.0%	Feb-16	
19406_7451	Clinton Facilities Rehab	4,316	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%	Jul-17	
26071_7146	Residuals Facility Upgrade-Construct.	10,000	0	Future	0.0%	Jul-16	
26072_7147	Condition Assess/Tech & Reg Review	832	832	Complete	100.0%		
26074_7149	Resid Ph 2 Designs	15,000	0	Future	0.0%	Jul-22	
26075_7150	Resid Ph 2 Constr	75,000	0	Future	0.0%	Jan-24	
324 CSO Support		**$50,248**	**$48,197**	**95.9%**	**95.9%**		
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	2,279	529	23.2%	23.2%		Dec-20
32658_6169	Land Acquisition/Easement	12,875	12,829	Complete	99.6%		
32691_6372	System Assessment	324	69	21.3%	21.3%		Dec-20
339 North Dorchester Bay		**$221,597**	**$221,597**	**Complete**	**100.0%**		
10426_7032	North Dorchester Outfall-Design/CA/RI	422	422	Complete	100.0%		
32660_6220	Tunnel - Design/ESDC	23,035	23,035	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%		
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%		

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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		**$102,765**	**$79,405**	**77.3%**	**77.3%**		
32654_6161	Design/CS/RI	33,114	27,805	84.0%	84.0%		Dec-17
32672_6255	Construction	69,651	51,600	74.1%	74.1%		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		**$4,562**	**$4,001**	**87.7%**	**87.7%**		
32722_6952	Design	1,642	1,305	79.5%	79.5%		Oct-16
32723_6953	Construction 1	236	236	Complete	100.0%		
32755_7409	Construction 2	2,685	2,461	91.7%	91.7%		Oct-15
359 Reserved Channel Sewer Separation		**$70,560**	**$70,395**	**Complete**	**99.8%**		
32727_6994	Construction	55,256	56,009	Complete	101.4%		
32734_7014	Design	15,303	14,387	94.0%	94.0%		Jun-16
542 Carroll Water Treatment Plant		**$438,074**	**$416,046**	**95.0%**	**95.0%**		
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 Stuc	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%		

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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	6,540	0	Future	0.0%	Aug-15	
53427_6670	CSX Crossing	65	65	Complete	100.0%		
53428_6671	Wachusett Algae - Design CS/RI	450	0	Future	0.0%	Jul-18	
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-18
53448_6889	Wachusett Algae - Construction	1,800	0	Future	0.0%	Feb-19	
53450_6923	CWTP Ultraviolet Disinfection-Des/ESDC/F	4,394	3,835	87.3%	87.3%		Apr-15
53451_6924	CWTP Ultraviolet Disinfection-Constr.	32,015	32,009	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%		
53456_7084	Ancillary Modifications - Construct. 1	160	160	Complete	100.0%		
53457_7085	Ancillary Modifications - Construct. 2	8,256	4,854	58.8%	58.8%		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%	Apr-19	
75530_7406	Technical Assistance 7	748	495	66.2%	66.2%		Nov-15
75531_7407	Technical Assistance 8	563	0	Future	0.0%	Jan-16	
75546_7455	CWTP-Asset Protection	500	0	Future	0.0%	Jan-00	
543 Quabbin Water Treatment Plant		**$20,024**	**$19,576**	**97.8%**	**97.8%**		
53363_6043	Quabbin WTP - Design/CA/RI	3,794	3,794	Complete	100.0%		
53380_6210	Permit Fees	56	55	98.2%	98.2%		Aug-14
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	2,324	1,877	80.8%	80.8%		Jan-16
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%		

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550 Spot Pond Storage Facility		**$60,615**	**$55,446**	**91.5%**	**91.5%**		
53400_6455	Environmental Review	233	233	Complete	100.0%		
53402_6457	Design / Build	50,266	47,205	93.9%	93.9%		Aug-15
53447_6868	Easement/Land Acquis/Permits	6,100	5,451	89.4%	89.4%		Dec-14
53462_7233	Owners' Representative	3,184	2,335	73.3%	73.3%		Dec-16
53463_7314	Early Construction Water Connection	222	222	Complete	100.0%		
53467_7506	Fells Res Mic Tow Repl Cons	610	0	Future	0.0%	Feb-16	
597 Winsor Station Pipeline		**$30,020**	**$1,954**	**6.5%**	**6.5%**		
60032_6276	Preliminary Permit, Study & Licensing	38	38	Complete	100.0%		
60033_6277	Quabbin Aqueduct TV Inspection	2,973	0	Future	0.0%	Jul-18	
60077_7017	Hatchery Pipeline - Design/ESDC/RI	815	325	39.9%	39.9%		Sep-19
60087_7114	Quabbin Aqueduct & WPS Upg. Design/CA/RI	837	806	96.3%	96.3%		Aug-15
60088_7115	Winsor Station Rehab & Improvement	9,900	0	Future	0.0%	Jan-19	
60095_7197	Shaft 2 & 12 Construction	9,093	0	Future	0.0%	Dec-17	
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	2,220	0	Future	0.0%	Feb-16	
604 MetroWest Tunnel		**$707,421**	**$696,805**	**98.5%**	**98.5%**		
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 Inspe	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/Easemer	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%		

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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/I	5,884	5,653	96.1%	96.1%		Sep-14
60072_6950	Valve Chamber Modifications - Design CA/	1,232	0	Future	0.0%	Jul-18	
60073_6975	Lower Hultman Rehab -CP6A	52,289	52,286	Complete	100.0%		
60083_7082	Hultman Interconnect - 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 Impr Des	600	0	Future	0.0%	Jul-17	
60128_7367	Shaft 5 Electrical Upgrade	1,000	0	Future	0.0%	Jan-19	
60160_7476	Valve Ch & Sto Tank Access Impr Const	2,400	0	Future	0.0%	Jul-19	
60161_7477	Shaft 5A/5 Surf Pip Cathodic Prot	220	0	Future	0.0%	Mar-16	
75525_7755	Valve Chamber Modifications - Constructi	4,929	0	Future	0.0%	Jan-20	
616 Quabbin Transmission System		**$15,457**	**$7,457**	**48.2%**	**48.2%**		
60055_6828	Facilities Inspection	1,005	1,005	Complete	100.0%		
60068_6940	Oakdale High Line Repl	500	0	Future	0.0%	Aug-16	
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 Rvr Intake Vlve Rpt-DES	300	0	Future	0.0%	Jul-18	
60112_7332	CVA Motorized Screens Rep-DES	100	0	Future	0.0%	Jul-17	
60113_7333	Rehab Wach Gateh Des CA/RI	800	0	Future	0.0%	Jul-18	
60135_7378	Rehabilitate Oakdale Turbine	1,000	0	Future	0.0%	May-20	
60136_7379	Geo-Thermal Heat Wachusett Gatehouse	200	0	Future	0.0%	May-19	
60137_7380	Rehab Wach Gths Pip HAC-Const	3,800	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 Repl-Const	400	0	Future	0.0%	Jul-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%		

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617 Sudbury/Weston Aqueduct Repairs		**$6,846**	**$660**	**9.6%**	**9.6%**		
60056_6838	Sudbury Aqueduct Inspection	370	370	Complete	100.0%		
60057_6839	Technical Assistance	25	25	Complete	100.0%		
60071_6948	Weston Aqued Flow Contr Valve	400	0	Future	0.0%	Jul-16	
60076_7016	Sudbury Short-Term Repairs	443	0	Future	0.0%	Jul-17	
60110_7317	Sudbury Short-Term Repairs - Phase 2	2,098	0	Future	0.0%	Jul-18	
60130_7369	Ash Street Sluice Gates-Const	800	0	Future	0.0%	Jan-20	
60150_7472	Rosemary Brook Building Repair	1,990	0	Future	0.0%	Mar-16	
60151_7473	Eval Farm Pond Bldgs-Waban Arches	105	0	Future	0.0%	Jul-16	
60152_7491	Ash St Sluice Gates Design	350	0	Future	0.0%	Jan-18	
75486_6617	Hazardous Material Sudbury Aqueduct	265	265	Complete	100.0%		
618 Northern High NW Tran Sections 70 & 71		**$1,000**	**$0**	**Future**	**0.0%**		
60063_6895	Planning	1,000	0	Future	0.0%	Jan-18	
621 Watershed Land		**$24,000**	**$18,248**	**76.0%**	**76.0%**		
60081_7069	Land Acquisition	24,000	18,248	76.0%	76.0%		Jun-18
623 Dam Projects		**$4,538**	**$3,093**	**68.2%**	**68.2%**		
60094_7194	Dam Safety Modificat. & Repairs - Constr	2,055	2,055	Complete	100.0%		
60100_7211	Dam Safety Modificat. & Repairs Design/C	1,533	1,038	67.7%	67.7%		Jun-14
60118_7346	Oakdale Dam Permits	1	0	Future	0.0%	Jan-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	
625 Long Term Redundancy		**$1,470,318**	**$6,681**	**0.5%**	**0.5%**		
60035_6273	Water Transmission Redundancy Plan	1,397	1,397	Complete	100.0%		
60090_7156	Wachusett Aqueduct PS Des/ESDC/RI	6,542	3,876	59.2%	59.2%		May-20
60091_7157	Wachusett Aqueduct PS Const	47,011	0	Future	0.0%	Dec-15	
60092_7159	Engineering Design & MEPA	81,821	0	Future	0.0%	Jul-17	
60093_7160	WASM 3 Slip lining	55,954	0	Future	0.0%	Jul-22	
60107_7291	Tunnel Const	882,144	0	Future	0.0%	Jul-22	
60122_7352	Sudbury Aqueduct - MEPA Review	3,405	1,408	41.4%	41.4%		Dec-16
60123_7353	Chestnut Hill Final Connection - Constru	11,739	0	Future	0.0%	Jul-21	
60124_7354	Permits/Easements	15	0	Future	0.0%	Aug-15	
60125_7355	WASM 3 Rehab	58,430	0	Future	0.0%	Jul-19	
60126_7356	Engineering Svcs During Const	122,732	0	Future	0.0%	Jul-19	
60127_7357	Tops of Shafts Surface Const	37,280	0	Future	0.0%	Jul-30	
60170_7516	PR Legal & Admin	153,415	0	Future	0.0%	Jul-18	
60171_7517	CHEPS Emerg Generator	8,433	0	Future	0.0%	Jul-19	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
677 Valve Replacement		**$22,749**	**$12,016**	**52.8%**	**52.8%**		
67559_5126	Construction 1	718	718	Complete	100.0%		
67560_5124	Technical Assistance	125	125	Complete	100.0%		
68005_6088	Equipment Purchase	4,038	1,112	27.5%	27.5%		Jun-18
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	3,253	0	Future	0.0%	Jan-21	
68307_7236	Construction 9	3,253	0	Future	0.0%	Jun-25	
68330_7417	Phase 8 Design/CA/RI	651	0	Future	0.0%	Jan-19	
68331_7418	Phase 9 Design/CA/RI	651	0	Future	0.0%	Jun-23	
692 NHS - Section 27 Improvements		**$1,097**	**$124**	**11.3%**	**11.3%**		
67769_6333	Section 27 - Construction	973	27	2.8%	2.8%		Nov-19
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		**$55,360**	**$26,833**	**48.5%**	**48.5%**		
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	Sect 53 Connections Constr	11,864	0	Future	0.0%	Apr-18	
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	Shaft 9A-D Extension - Construction	3,023	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	
75526_7402	Sect 53 Connections Des CA/RI	2,858	0	Future	0.0%	Apr-16	
75545_7454	Sections 56 Repl/Saugus Des CA/RI	1,500	0	Future	0.0%	Apr-18	
75548_7485	NHS Area Study	700	0	Future	0.0%	Jul-17	
75549_7486	Sections 56 Const	8,300	0	Future	0.0%	Apr-20	
75565_7500	Section 56 Feasibility Study	247	0	Future	0.0%	Jan-16	
702 New Connect Mains-Shaft 7 to WASM 3		**$34,765**	**$11,316**	**32.5%**	**32.5%**		
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 - Final Design/CA/RI	1,510	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 - South Segment	7,793	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 - Constr	5,237	0	Future	0.0%	Jan-21	
68175_6547	CP2 -Easements	33	0	Future	0.0%	May-17	
68255_6955	Replacement of Section 25 - Design/CA/RI	565	0	Future	0.0%	Jul-17	
68256_6956	Replacement of Section 25 - Construction	2,824	0	Future	0.0%	Jul-19	
68286_7086	Section 59 & 60 - Design/CA/RI	1,047	0	Future	0.0%	Jul-18	
68315_7284	Section 75 Ext Design CA/DI	880	0	Future	0.0%	Jul-17	
68350_7484	Section 75 Ext-Const	3,520	0	Future	0.0%	Jul-19	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
704 Rehabilitation of Other Pump Stations		**$55,058**	**$30,058**	**54.6%**	**54.6%**		
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%		
75522_7383	Pump Station Rehabilitation	25,000	0	Future	0.0%	Jul-19	
708 Northern Extra High Service New Pipelines		**$7,889**	**$3,632**	**46.0%**	**46.0%**		
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	3,496	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	699	0	Future	0.0%	Jul-18	
712 Cathodic Protection Of Distrubution Mains		**$1,656**	**$141**	**8.5%**	**8.5%**		
68002_6058	Planning Phase I	108	108	Complete	100.0%		
68129_6438	Corrosion Control Program - Task 1	218	0	Future	0.0%	Jul-15	
68130_6439	Corrosion Control Program - Task 2	785	0	Future	0.0%	Jul-17	
68131_6440	Corrosion Control Program - Task 3	512	0	Future	0.0%	Jan-19	
68216_6751	Technical Assistance	33	33	Complete	100.0%		

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713 Spot Pond Supply Mains Rehabilitation		**$67,378**	**$61,696**	**91.6%**	**91.6%**		
60114_7334	Sec 4 Webster Ave Bridge Pipe Rehab Des	686	398	58.0%	58.0%		Mar-17
60115_7335	Sec 4 Webster Ave Bridge Pipe Rehab Con	2,328	253	10.9%	10.9%		Dec-16
60116_7336	Section 50 Pipe Rehab - Design/ESDC/RI	500	0	Future	0.0%	Jul-17	
60117_7337	Section 50 Pipe Rehab - Construction	1,500	0	Future	0.0%	Jul-19	
60145_7483	Bridge Trusses-Const	1,000	0	Future	0.0%	Apr-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	Bridge Trusses Design	314	0	Future	0.0%	Apr-18	
68225_6784	Easements - CP5	70	65	92.9%	92.9%		Jun-20
68274_7003	CA/RI - CP3	925	925	Complete	100.0%		
719 Chestnut Hill Connecting Mains		**$24,175**	**$17,487**	**72.3%**	**72.3%**		
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%		
68052_6302	Shaft 7 Building - Design & Construct.	5,963	0	Future	0.0%	Jan-23	
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%		
75521_7382	Chestnut Hill Gatehouse Repairs	725	0	Future	0.0%	Jul-16	

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	Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
721 South Spine Distribution Mains		**$74,983**	**$36,681**	**48.9%**	**48.9%**		
68083_6290	Sections 21, 43 & 22 - Design	7,113	7,113	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	3,036	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	14,288	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	17,438	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%	Jul-17	
722 NIH Redundancy & Storage		**$89,448**	**$11,149**	**12.5%**	**12.5%**		
53454_6954	Concept Plan	797	797	Complete	100.0%		
68093_6306	Easements	300	0	Future	0.0%	Jul-17	
68252_6906	Section 89/29 Redundancy - Design	6,172	1,904	30.8%	30.8%		Aug-20
68276_7026	Purchase Mobile Pump Unit	291	291	Complete	100.0%		
68277_7045	Short Term Improvements - Design/CA/RI	825	821	Complete	99.5%		
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	1,922	1,693	88.1%	88.1%		May-15
68283_7067	Sec 89 & 29 Redundancy Const. Phase 2	21,364	0	Future	0.0%	Jul-16	
68284_7068	NIH Storage - Construction	18,334	0	Future	0.0%	Jan-20	
68294_7116	Section 89 & 29 Rehab - Design	1,548	0	Future	0.0%	Jan-17	
68295_7117	Section 89 & 29 Rehab - Construction	7,739	0	Future	0.0%	Jul-19	
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	3,720	0	Future	0.0%	Jan-18	
68317_7471	Sec 89/29 Redund Constr Ph 1B	9,888	0	Future	0.0%	Nov-15	
68318_7478	Sec 89/29 Redund Constr Ph 1C	10,880	0	Future	0.0%	May-16	

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723 Northern Low Service Rehabilitation Section 8		**$23,441**	**$2,321**	**9.9%**	**9.9%**		
68094_6321	Easements	80	0	Future	0.0%	Jul-15	
68095_6322	Section 8 - Construction	14,211	0	Future	0.0%	Jul-21	
68262_6962	Rehab Sects. 37 & 46 Chelsea/EB Constr.	3,200	0	Future	0.0%	Jul-20	
68263_6977	Permits	299	285	95.3%	95.3%		Jul-18
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	2,842	0	Future	0.0%	Jul-18	
75529_7405	Rehab Sec 37&46 Chel/BosDes/CA/RI	773	0	Future	0.0%	Jul-18	
727 Southern Extra High Redundancy & Storage		**$97,354**	**$7,621**	**7.8%**	**7.8%**		
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	850	11.1%	11.1%		Aug-21
53399_6454	Red Pipl Sect III Cont 1	9,159	0	Future	0.0%	Mar-16	
68135_6444	Redundancy/Storage Ph 2 Final Des/CA/Rl	5,970	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	1,374	0	Future	0.0%	Mar-21	
68293_7113	Sections 77 & 88 Rehab - Construction	5,498	0	Future	0.0%	Apr-23	
68305_7226	Easements/Agreements	300	0	Future	0.0%	Jul-14	
68306_7227	Permits/Utilities	5	0	Future	0.0%	Aug-08	
68308_7245	Redundancy/Storage Phase 2 Construct.	29,849	0	Future	0.0%	Jan-28	
68311_7262	Phase 3, 2nd Tank - Construction	10,512	0	Future	0.0%	Jan-33	
68312_7263	Phase 3, 2nd Tank - Design	2,102	0	Future	0.0%	Jan-31	
68555_7504	Red Pipl Sect III Cont 2	10,786	0	Future	0.0%	Jul-16	
68556_7505	Red Pipl Sect III Cont 3	7,350	0	Future	0.0%	Oct-16	

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730 Weston Aqueduct Supply Mains		**$109,605**	**$72,747**	**66.4%**	**66.4%**		
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	440	58.4%	58.4%		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	446	2.9%	2.9%		Aug-29
68167_6540	Sect 36/WS/Waltham Conn. - Design/CA/RI	3,048	1,542	50.6%	50.6%		Dec-22
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	2,668	2,668	Complete	100.0%		
68332_7448	Sect 36/W11/S 9-All Valve	11,302	3,786	33.5%	33.5%		May-17
68333_7457	Section 101 Const	12,365	0	Future	0.0%	Jul-21	
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		**$9,896**	**$0**	**Future**	**0.0%**		
68249_6891	Section 80 - Construction	7,916	0	Future	0.0%	Jul-19	
68250_6892	Section 80 - Design/CS/RI	1,979	0	Future	0.0%	Jul-17	

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Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
753 Central Monitoring System		**$39,106**	**$16,031**	**41.0%**	**41.0%**		
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	1,912	91.0%	91.0%		Mar-15
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	3,400	0	Future	0.0%	Jan-16	
75540_7461	Quabbin Power Design	814	225	27.6%	27.6%		Dec-17
75541_7475	Utility Fees and Permits	400	2	0.5%	0.5%		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%	Jan-18	
75600_7489	Update of Record Drawing	500	0	Future	0.0%	Jul-16	
764 Local Water Infrastructure Rehabilitation Assistance Program		**$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**	**$126,865**	**NA**	**NA**		
75485_6608	Community Loans	222,318	222,318	Complete	100.0%		
75493_6759	Community Repayment	-222,318	-165,868	74.6%	74.6%		Jun-23
75513_7339	Local Water System Assistance Loans	200,000	81,508	40.8%	40.8%		Jun-20
75514_7340	Local Water System Assistance Repayment	-200,000	-12,667	6.3%	6.3%		Jun-30
75515_7350	CVA Loans	10,000	2,085	20.9%	20.9%		Jun-20
75516_7351	CVA Repayments	-10,000	-511	5.1%	5.1%		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. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
766 Waterworks Facility Asset Protection		**$21,520**	**$646**	**3.0%**	**3.0%**		
75490_6689	Meter Vault Manhole Retrofits Design	409	0	Future	0.0%	Sep-18	
75497_6832	Walnut Hill Tank - Design	300	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	9	56.3%	56.3%		Jun-18
75505_7022	Cosgrove Flat Roof Repl	300	0	Future	0.0%	Sep-17	
75509_7064	Cosgrove Valve Replacement - Constr	1,831	0	Future	0.0%	Jul-19	
75510_7065	Cosgrove Valve Replacement - Design	215	0	Future	0.0%	Jul-18	
75511_7228	Transformer at Cosgrove Intake Building	299	299	Complete	100.0%		
75520_7381	Shaft 9 Rehab Des CA/RI	400	0	Future	0.0%	Jul-25	
75523_7384	Elevated Water Sto Tank Repaint Design	500	0	Future	0.0%	Jul-17	
75524_7385	Covered Stor Tank Rehab Des CA/RI	1,000	0	Future	0.0%	Jul-19	
75535_7425	Electrical Distr Upgr Southboro	400	0	Future	0.0%	Jul-17	
75536_7453	Water Meter Upgrade Repl	1,000	0	Future	0.0%	Sep-18	
75537_7458	Beacon ST Line Repair	1,452	0	Future	0.0%	Jan-16	
75538_7474	Beacon St Repair Design CA/RI	425	100	23.5%	23.5%		Jul-17
75550_7479	Meter Vault Retrofits Const	1,635	0	Future	0.0%	Sep-19	
75551_7492	Shaft 9 Rehab Const	1,600	0	Future	0.0%	Mar-27	
75553_7482	Covered Stor Tank Rehab Const	4,000	0	Future	0.0%	Jul-21	
77552_7493	Elevated Water Stor Tank Repaint Const	4,500	0	Future	0.0%	Jul-18	
881 Equipment Purchase		**$28,535**	**$16,709**	**58.6%**	**58.6%**		
92374_6760	Security Equipment & Installation	10,445	8,258	79.1%	79.1%		Dec-17
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	6,430	3,011	46.8%	46.8%		Jun-18
98457_7309	FY19-23 Vehicle Purchases	5,220	0	Future	0.0%	Jul-18	
98458_7310	FY14-18 Major lab Instrumentation	1,000	0	Future	0.0%	Mar-17	
98467_7325	Front-End Loader	121	121	Complete	100.0%		
925 Technical Assistance		**$1,125**	**$0**	**Future**	**0.0%**		
77000_LAND	Land Appraisal	150	0	Future	0.0%		
80000_SURV	Surveying	75	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. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
933 Capital Maintenance Planning		**$16,447**	**$11,539**	**70.2%**	**70.2%**		
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	1,866	1,866	Complete	100.0%		
98473_7436	As-Needed Design Contract 11	550	385	70.0%	70.0%		Aug-15
98474_7437	As-Needed Design Contract 12	1,100	280	25.5%	25.5%		Jan-16
98485_7456	As-Needed Design Contract 13	1,100	78	7.1%	7.1%		Feb-16
98487_7496	As-Needed Design Contract 14	1,450	0	Future	0.0%	Jan-16	
98488_7497	As-Needed Design Contract 15	1,450	0	Future	0.0%	Jan-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		**$25,838**	**$17,388**	**67.3%**	**67.3%**		
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)	4,707	0	Future	0.0%	Oct-18	
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%		
98453_7305	Rew Energy TA-Wind-Solar	650	0	Future	0.0%	Jan-16	
98459_6974F	Loring Road Hydro - Construction	1,882	1,882	Complete	100.0%		
98463_7321	DI Wind Phase II Construction	2,500	37	1.5%	1.5%		Mar-18
98465_7323	Fish Hatch Pipeline Hydro	630	0	Future	0.0%	Feb-16	

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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. FY15	**Status** Based on % of Budget Expended	**% Complete**	Planned Start	Planned End
940 Application Improvement Program		**$10,176**	**$484**	**4.8%**	**4.8%**		
92420_7251	GIS Applications & Integration	350	22	6.3%	6.3%		Jun-17
92435_7286	Lawson Enhancements	1,750	0	Future	0.0%	Mar-16	
92436_7287	Maximo Upgrade	2,626	0	Future	0.0%	Jul-15	
92437_7288	PIMS Enhancements	400	0	Future	0.0%	Jun-16	
92469_7386	Enterprise Performance mgmt Enhancements	200	81	40.5%	40.5%		Aug-17
98475_7438	Enterprise Content Mgmt	4,000	0	Future	0.0%	Aug-16	
98476_7439	Mobile Integrations	300	27	9.0%	9.0%		Jul-16
98484_7447	LIMS Enhancement	550	354	64.4%	64.4%		Jun-17
942 Information Security Program ISP		**$3,365**	**$820**	**24.4%**	**24.4%**		
92434_7285	IT Security Infrastructure/Equipment	647	501	77.4%	77.4%		Jun-14
92500_7499	Info Sec Prot Infrastructure Upg	2,000	0	Future	0.0%	Mar-16	
98477_7440	Electronic Sec Impl	400	0	Future	0.0%	Jun-14	
98483_7446	IT Security Program (ISP) Development	318	318	Complete	100.0%		
944 Information Technology Management Program		**$923**	**$0**	**Future**	**0.0%**		
92412_7240	Implement IT Task Force	100	0	Future	0.0%	Jun-16	
92421_7252	Service Delivery & Best Practices	111	0	Future	0.0%	Jun-16	
92422_7253	Reorganize MIS Department	150	0	Future	0.0%	Jul-16	
98472_7408	IT Project Management Methodology	200	0	Future	0.0%	Jun-16	
98478_7441	Software Devel Life Cycle (SDLC)	362	0	Future	0.0%	Jun-16	
946 IT Infrastructure Program		**$10,271**	**$5,343**	**52.0%**	**52.0%**		
92404_7200	IT System Architecture	1,009	1,008	Complete	99.9%		
92405_7201	Net 2020/Net 2020 DITP/Southborough	2,552	1,065	41.7%	41.7%		Jun-17
92406_7203	Storage Upgrades	1,575	892	56.6%	56.6%		Jun-18
92407_7204	Backup Upgrades	894	581	65.0%	65.0%		Sep-18
92408_7205	Server Management	500	254	50.8%	50.8%		Jun-18
98480_7443	Enterprise Applic Integr	2,091	452	21.6%	21.6%		Dec-18
98481_7444	E-Mail Upgrades	150	8	5.3%	5.3%		Dec-17
98482_7445	Enterprise Data Mgmt	1,500	1,083	72.2%	72.2%		Jun-17

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
623	Dam Projects	All Water Communities
625	Long Term Redundancy	All Water Customers (except Chicopee, Wilbraham, South Hadley Fire District #1, Worcester, Clinton, and Leominster)
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
625	Long-Term Redundancy
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
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

Municipality	Project Number/Project
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, 2015)

Project	Total Cost ($000)	Completion Date	Summary
Wastewater	$5,094,523		
Waterworks	$1,556,791		
Business and Operations Support	$67,141		
MWRA Total	$6,718,455		

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.
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	*$221,600*	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	$3,769	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	$933	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	**$5,094,523**		

Appendix 9

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	*$417,512*	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.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.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	$696,931	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	**$1,556,791**		

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