

# **Capital Improvement Program**

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## **FISCAL YEAR 2012**



**MASSACHUSETTS WATER RESOURCES AUTHORITY**

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### **Prepared under the direction of**

Frederick A. Laskey, Executive Director  
Michael J. Hornbrook, Chief Operating Officer  
Rachel C. Madden, Director, Administration & Finance

**together with the participation of MWRA staff.**



## MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129

Frederick A. Laskey  
Executive Director

Telephone: (617) 242-6000  
Fax: (617) 788-4899  
TTY: (617) 788-4971

August 2011

Katherine Haynes Dunphy, Chairwoman  
MWRA Advisory Board  
100 First Avenue  
Boston, MA 02129

Dear Chairwoman Dunphy:

This letter transmits to the Advisory Board the MWRA's Capital Improvement Program (CIP) for Fiscal Year 2012 as approved by the MWRA's Board of Directors on June 29, 2011.

The FY12 CIP represents an update to the FY11 CIP and includes staff's latest spending estimates and revised project schedules.

The future spending in the FY12 CIP is \$2.1 billion starting in FY12, with projected spending of \$165.5 million in FY12 and \$936.7 billion in the current FY09-13 Cap period. The FY12 Cap projection, including contingency and inflation, is \$954.7 million, which is \$189.1 million or 16.5% lower than the Base-Line Cap of \$1.144 billion established in FY08, and it is in compliance with both, the yearly, and the five-year overall Cap requirements.

The FY12 budget in comparison with the FY11 budget increased by \$135.5 million of which \$121.6 million is for new projects added to the program mostly related to wastewater and water asset protection projects. MWRA has benefitted from lower cost contract awards for projects such as the Reserved Channel Sewer Separation, Cambridge Sewer Separation, and Ultraviolet Disinfection at the Carroll Water Treatment Plant. Other significant changes include revised scope of two major projects, specifically the West Roxbury Tunnel Rehabilitation and the Headworks Upgrades.

The Combined Sewer Overflow (CSO) program continues to drive spending in the FY09-13 timeframe accounting for \$305.8 million or 32.6% of the total projected spending. Staff estimate that by the end of the Cap period approximately 97% of the total CSO program will be completed. Going forward, MWRA will continue to focus on critical asset protection and water system redundancy initiatives.

A copy of the FY12 Final document is available on-line at [www.mwra.com](http://www.mwra.com). Questions or comments on this document should be directed to the MWRA Budget Department.

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

Sincerely,

Frederick A. Laskey  
Executive Director

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## **FY12 Final Capital Improvement Program**

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### **Overview**

The MWRA was created by the Massachusetts legislature in 1985 and since that time has invested over \$7.4 billion to modernize and improve the wastewater and waterworks systems serving its member communities. Since its inception, the Authority has completed most of the major initiatives in the CIP, including the Boston Harbor Program, the MetroWest Water Supply Tunnel, the Carroll Water Treatment Plant, and has made significant progress in the remaining court-mandated projects, most notably the long-term Combined Sewer Overflow (CSO) Control Plan, as well as ongoing rehabilitation, repair, and maintenance of its infrastructure. These capital initiatives 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.

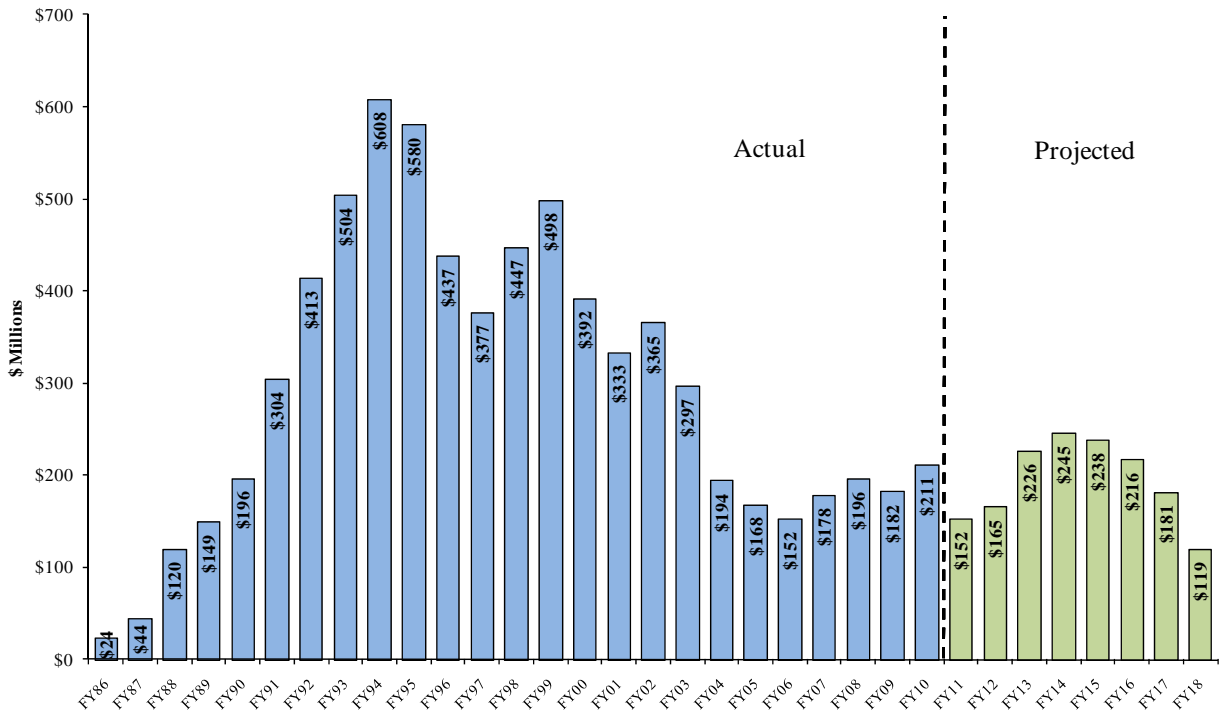
To arrive at the FY12 Final CIP, the Authority identified the needs of the programs taking into account the mandated project timeframes and the recommendations of the Master Plan. Of the total expended to date, nearly 80% has funded court mandated projects and the balance has supported waterworks treatment, transmission, distribution, and water supply protection improvements. As the MWRA matures as an agency, a greater proportion of its capital budget is designated for asset protection and water redundancy initiatives, absent new regulatory mandates, to preserve operating assets and insure uninterrupted service. This long-term strategy for capital work is identified in the Authority's Master Plan which was published in 2006 and serves as a road map for inclusion of projects in the CIP in every budget cycle.

The FY12 Final Capital Improvement Program (CIP) budget totals \$5.5 billion, of which \$3.3 billion has been expended through FY10 with a remaining balance of \$2.2 billion. It is important to note that the totals represented above do not include the Boston Harbor Project and some other smaller projects removed from the CIP upon completion. These projects totaled approximately \$4.1 billion dollars. As such, the overall Authority CIP budget since inception totals more than \$9.5 billion dollars of which \$7.4 billion has been spent through FY10.

The CSO program is the largest remaining program initiative in terms of spending with an FY12 budget of \$857.1 million of which \$710.9 million has been expended through FY10. The CSO Program accounts for \$305.8 million or 32.6% of projected Authority spending over the FY09-13 period.

The graph on the following page represents historical CIP spending through FY10 and projected spending to FY18 based on the FY12 Final CIP.

## MWRA Capital Spending



As indicated previously, of the total \$7.4 billion expended to date, nearly 80% has funded court mandated projects such as the Boston Harbor Project, the MetroWest Supply Tunnel, the Carroll Water Treatment Plant, and the Combined Sewer Overflow (CSO) program. Going forward, the mandated projects account for 39% of projected FY09-13 spending.

As presented in the table on the following page, Asset Protection and Water Redundancy initiatives account for 34.1% and 17.1% of FY09-13 spending. These percentages grow substantially to 57.2% and 35.4% respectively for the FY14-18 timeframe.

	<b>Total Contract</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond 18</b>
Asset Protection	\$1,889.7	\$319.6	\$572.2	\$362.6
Carroll WTP	\$426.8	\$33.4	\$20.6	\$0.0
Water Redundancy	\$1,799.6	\$160.3	\$344.9	\$431.7
CSO	\$832.4	\$305.8	\$28.7	\$0.4
Other	\$519.8	\$117.5	\$33.5	-\$126.0
<b>Total</b>	<b>\$5,468.3</b>	<b>\$936.6</b>	<b>\$999.8</b>	<b>\$668.8</b>
<b>Asset Protection</b>	<b>34.6%</b>	<b>34.1%</b>	<b>57.2%</b>	<b>54.2%</b>
Carroll WTP	7.8%	3.6%	2.1%	0.0%
<b>Water Redundancy</b>	<b>32.9%</b>	<b>17.1%</b>	<b>34.5%</b>	<b>64.6%</b>
CSO	15.2%	32.6%	2.9%	0.1%
Other	9.5%	12.5%	3.4%	-18.8%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

## Spending Cap

In June 2008, the Board of Directors established the FY09-13 Base-Line Spending Cap. The Spending Cap anticipated capital expenditures in the FY09-13 timeframe to total \$1.081 billion. Including \$64.8 million for contingency, \$22.4 million for inflation on un-awarded construction projects and a reduction of \$24.8 million for the Chicopee Valley Aqueduct (CVA) projects, the FY09-13 Cap is \$1.144 billion.

**Table 1**

<b>Base-Line CAP</b>		<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>	<b>Total FY09-13</b>
		Projected Expenditures	\$230.0	\$251.7	\$224.3	\$196.7	\$178.7
Contingency	15.6	13.8	12.0	12.1	11.4	64.8	
Inflation on Unawarded Construction	0.0	0.5	2.8	7.8	11.3	22.4	
Less: Chicopee Valley Aqueduct Projects	(1.2)	(1.9)	(9.1)	(9.5)	(2.9)	(24.8)	
<b>FY09-13 CAP</b>		<b>\$244.4</b>	<b>\$264.1</b>	<b>\$230.0</b>	<b>\$207.0</b>	<b>\$198.4</b>	<b>\$1,143.8</b>

### *The FY12 Final CIP FY09-13 Cap Spending*

FY12 is the fourth year of the five-year Spending Cap. The FY12 Final CIP FY09-13 Cap cash flow totals \$954.7 million which is \$189.1 million or 16.5% lower than the approved Base-Line Cap. The FY09-13 expenditure forecast decreased by \$144.7 million, contingency and inflation decreased by \$44.6 million and \$16.2 million, respectively from the established FY09-13 Spending Cap.

The FY12 Final CIP Cap for FY09-13 complies with both the annual and 5 year overall Cap requirements. Please refer to Table 2 on the following page.



**Table 2**

FY12 Final		FY09	FY10	FY11	FY12	FY13	Total FY09-13
		Projected Expenditures	\$182.2	\$211.4	\$151.9	\$165.5	\$225.6
Contingency	0.0	0.0	0.0	8.4	11.9	20.3	
Inflation on Unawarded Construction	0.0	0.0	0.0	1.0	5.1	6.2	
Less: Chicopee Valley Aqueduct Projects	(0.6)	(0.5)	(0.6)	(0.4)	(6.2)	(8.4)	
<b>Total</b>		<b>\$181.6</b>	<b>\$210.9</b>	<b>\$151.3</b>	<b>\$174.5</b>	<b>\$236.4</b>	<b>\$954.7</b>

FY12 Final - Base-Line Cap		FY09	FY10	FY11	FY12	FY13	Total FY09-13
		Projected Expenditures	(\$47.8)	(\$40.2)	(\$72.4)	(\$31.2)	\$46.9
Contingency	(15.6)	(13.8)	(12.0)	(3.7)	0.5	(44.6)	
Inflation on Unawarded Construction	0.0	(0.5)	(2.8)	(6.7)	(6.1)	(16.2)	
Less: Chicopee Valley Aqueduct Projects	0.6	1.4	8.6	9.1	(3.3)	16.4	
<b>Total</b>		<b>(\$62.8)</b>	<b>(\$53.2)</b>	<b>(\$78.7)</b>	<b>(\$32.5)</b>	<b>\$38.0</b>	<b>(\$189.1)</b>
% Change		-25.7%	-20.1%	-34.2%	-15.7%	19.1%	-16.5%

*FY12 Final Cap Comparison to the FY11 Final Cap*

The FY12 Final CIP FY09-13 Cap cash flow decreased \$130.0 million or 12.0% from the FY11 Final CIP reflecting decreases of \$120.5 million, \$13.4 million, and \$6.9 million in projected expenditures, contingency funds, and inflation on un-awarded construction, respectively.

**Table 3**

FY11 Final		FY09	FY10	FY11	FY12	FY13	Total FY09-13
		Projected Expenditures	\$182.2	\$212.3	\$208.0	\$230.0	\$224.7
Contingency	0.0	0.0	10.3	11.0	12.4	33.7	
Inflation on Unawarded Construction	0.0	0.0	0.6	3.9	8.6	13.1	
Less: Chicopee Valley Aqueduct Projects	(0.6)	(0.6)	(2.0)	(6.6)	(9.3)	(19.2)	
<b>Total</b>		<b>\$181.6</b>	<b>\$211.6</b>	<b>\$216.9</b>	<b>\$238.3</b>	<b>\$236.3</b>	<b>\$1,084.8</b>

FY12 Final - FY11 Final		FY09	FY10	FY11	FY12	FY13	Total FY09-13
		Projected Expenditures	\$0.0	(\$0.8)	(\$56.1)	(\$64.5)	\$0.9
Contingency	0.0	0.0	(10.3)	(2.6)	(0.5)	(13.4)	
Inflation on Unawarded Construction	0.0	0.0	(0.6)	(2.9)	(3.4)	(6.9)	
Less: Chicopee Valley Aqueduct Projects	0.0	0.1	1.4	6.1	3.1	10.8	
<b>Total</b>		<b>\$0.0</b>	<b>(\$0.7)</b>	<b>(\$65.6)</b>	<b>(\$63.9)</b>	<b>\$0.1</b>	<b>(\$130.0)</b>
% Change		0.0%	-0.3%	-30.3%	-26.8%	0.1%	-12.0%

*Highlights of changes from FY11 Final for the FY09-13 Cap Period  
(please refer to Appendix 4 for detailed project information)*

**Wastewater System Improvements:**

Wastewater spending in the FY09-13 period decreased by \$69.7 million due to the combined impact of revised schedules and cost estimates of certain projects.

Interception and Pumping (I&P): (\$6.2) million

- West Roxbury Tunnel project FY09-13 spending decreased by \$6.0 million primarily due to a revised cost estimate for tunnel construction.
- I&P Asset Protection project spending increased by \$2.4 million primarily due to a revised cost estimate for Headworks Upgrades Construction. Also, new projects were added for Section 156 Rehabilitation Design/Build and Owner's Representative, Prison Point Gearbox Rebuilds, Caruso Pump Station HVAC & Fire Detection System Upgrade, DeLauri Pump Station Electrical Room Cooling, and revised schedule for Pump Station/CSO Condition Assessment. These increases were partially offset by estimates for Prison Point HVAC Upgrades, revised schedule for Alewife Brook Pump Station Rehabilitation, and revised costs and schedule changes on a variety of smaller projects.
- Braintree-Weymouth Relief Facilities project spending decreased by \$2.6 million due to a revised cost estimate for Rehabilitation of Section 624 based on a lower bid award and revised cost for land settlement. This decrease was partially offset by a new project for Braintree-Weymouth Improvements.
- Wastewater Process Optimization project spending decreased by \$2.1 million primarily due to a revised schedule for Hydraulic Flood Engineering Analysis (North System).

Treatment: (\$37.3) million

- Deer Island Treatment Plant Asset Protection project spending in the FY09-13 period decreased by \$36.3 million primarily due to revised schedules for North Main Pump Station (NMPS) Motor Control Construction, NMPS Variable Frequency Drives (VFD) Replacement Construction, Electrical Equipment Upgrades 4 and 5, Winthrop Terminal Facility VFD, Switchgear Replacement, Thickened Primary Sludge and Pump Replacement Construction, and revised cost estimate for Digester Module 1 and 2 Pipe Replacement contract. These decreases were partially offset by new projects for Clarifier Rehabilitation Phase 2, Digester and Storage Tank Rehabilitation Design/ESDC, and revised cost estimate for Expansion Joint Repair Construction 2.

Residuals: (\$2.3) million

- Residuals Asset Protection total project spending decreased by \$2.3 million primarily due to a revised schedule for Residuals Upgrade Design contract.

Combined Sewer Overflow: (\$31.2) million

- Reserved Channel Sewer Separation spending in the FY09-13 period decreased by \$11.9 million due to revised cost estimates for Contracts 1, 3A, 4, 7, and lower award amount for Contract 3B.
- Cambridge Sewer Separation project spending decreased by \$8.4 million due to a revised cost estimate for contract 12 based on actual bid amount.
- Brookline Sewer Separation spending decreased by \$3.7 million based on actual bid amount for the second construction contract.
- Morrissey Boulevard Storm Drain project spending decreased by \$3.3 million to reflect final contract costs.
- East Boston Branch Sewer Relief spending decreased by \$2.3 million due to reflect final costs for the East Boston Branch Relief Sewer and Resident Inspection Services contracts.

***Waterworks System Improvements:***

Waterworks System Improvements spending in the FY09-13 period decreased by \$45.1 million as project spending was shifted outside the Cap. This is primarily due to revised schedules and cost estimates for several projects in Drinking Water Quality Improvements, Transmission, and Distribution and Pumping programs.

Drinking Water Quality Improvements: (\$6.2) million:

- Carroll Water Treatment Plant project spending in the FY09-13 period decreased by \$5.7 million based on actual award for Carroll Ultra Violet Disinfection Construction and a revised schedule for Existing Facilities Modifications CP-7.
- Quabbin Water Treatment Plant project spending decreased by \$1.8 million due to a revised schedule and cost estimate for Quabbin Ultra Violet Water Treatment Plant Construction contract.
- Spot Pond Storage Facility project spending increased by \$1.6 million due to a revised cost estimate for the Storage Design/Build contract partially offset by revised land/easements cost.

Transmission: (\$1.2) million

- Metrowest Tunnel total project spending in the FY09-13 period increased by \$6.5 million due to schedule changes for CP-6A Lower Hultman Rehabilitation and CP-6B Upper Hultman Rehabilitation. This increase was partially offset by revised schedules for Valve Chamber Modifications and Valve Chamber Storage contracts.
- Long Term Redundancy total project spending decreased by \$4.5 million primarily due to redundancy initiatives being further defined and broken out into several sub-phases and re-phased with updated cost estimates and schedules.
- Winsor Dam Hydroelectric total project spending increased by \$2.8 million due to a revised cost estimate for Winsor Power Station and Improvements contract.
- Wachusett Reservoir Spillway Improvements/Winsor Dam Repairs total project spending decreased by \$2.4 million due to adjustment for Phase 2 PCB Material Remediation.

- Dam Projects total project spending decreased by \$2.0 million primarily due to revised cost estimate for Dam Safety Modifications and Repairs contract.
- Sudbury/Weston Aqueduct Repairs total project spending decreased by \$1.5 million due to a revised schedule for Sudbury Short-Term Repairs Phase 2.

Distribution and Pumping: (\$11.1) million

- Weston Aqueduct Supply Mains total project spending in the FY09-13 period decreased by \$4.1 million primarily due to the actual award amount for Design CA/RI Section 36/Watertown Section/Waltham Connection being less than engineer's estimate and revised construction schedule.
- Lynnfield Pipeline total project spending decreased by \$2.6 million due to the actual award amount for Construction 2 contract being less than originally anticipated.
- Southern Extra High (SEH) Redundancy and Storage total project spending decreased by \$2.4 million due to a revised schedule for the final design contract.

Other Waterworks: (\$26.5) million

- Local Water Pipeline Improvement Program total project spending decreased by \$25.7 million due to revised cash flows for Community Loan programs.

***Business and Operations Support:***

Business and Operations Support spending in the FY09-13 period decreased by \$5.7 million.

- MWRA Facilities Management and Planning total project spending in the FY09-13 period decreased by \$5.2 million due to deletion of the Marlborough Warehouse Records Center and Chelsea Annex from the budget.
- Alternative Energy Initiatives total project spending decreased by \$3.0 million primarily due to a new schedule for Deer Island Future Wind project (formerly named Nut Island Wind).
- Capital Maintenance and Planning project total project spending increased by \$2.8 million primarily due to additional phases added for As-Needed Design 9 and 10.

**Outstanding Debt and Debt Management**

*Capital Spending versus Debt Service*

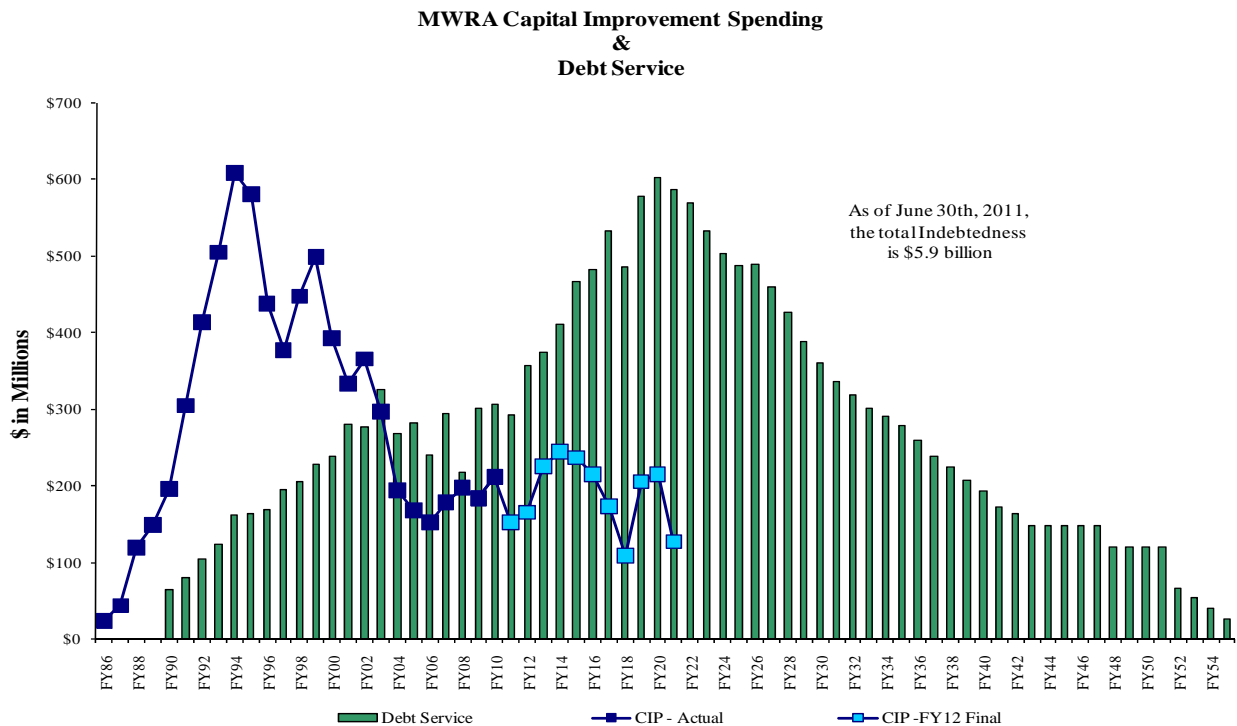
The \$7.4 billion spent on MWRA's modernization efforts to date, has relied heavily on debt financing. Total debt as of June 2011 reached \$5.9 billion consisting of senior and subordinated debt, as well as Tax-Exempt Commercial Paper. The MWRA enjoys strong unenhanced senior debt ratings of Aa1, AA+, and AA+ from Moody's, S&P, and Fitch, respectively.

The MWRA expects to finance the capital expenditures identified in the MWRA CIP through the issuance of its revenue bonds as provided in the MWRA Act, and from the proceeds of federal and state grants and operating revenues. As of June 30, 2011, the MWRA's indebtedness included \$3.4

billion of senior revenue bonds, \$1.2 billion of subordinated revenue bonds, \$1.1 billion of loans with the SRF, and \$144 million of tax-exempt commercial paper notes.

The following graph was updated with the FY12 Final CIP spending and debt service projections to illustrate the relationship between the MWRA’s CIP and debt service.

As of June 30<sup>th</sup>, MWRA’s total debt was \$5.9 billion which results in significant increases in debt service obligations in the upcoming years. The Authority’s debt service obligation as a percent of total expenses has increased from 36% in 1990 to nearly 60% in the FY12 Final Current Expense Budget.



Given that the majority of the Rate Revenue Requirement is driven by debt service increases, the coming years represent significant challenges for the Authority. Through FY21, the Rate Revenue Requirement increases an average of \$36 million per year of which approximately \$27 million annually is related to Capital Expenses.

The Authority has actively managed its debt structure to take advantage of favorable interest rates. Tools used by the MWRA to lower borrowing costs and manage rates include maximizing use of the subsidized State Revolving Fund (SRF) debt, issuance of variable rate debt, current and advanced refunding of outstanding debt, the use of surplus revenues to defease debt, and swap agreements. The MWRA also uses its Tax Exempt Commercial Paper program to minimize the financing cost of construction in process.

In June 2011, MWRA executed a \$32.5 million defeasance to achieve debt service reductions between FY12 and FY15. These actions resulting in debt service reductions of \$1.4 million in FY12 and FY13, \$26.4 million in FY14 and \$4.8 million in FY15.

The Fiscal Year 2012 Final capital financing costs total \$368.0 million after offsets. Debt service remains the largest portion of the MWRA's operating expenses, accounting for 60% of total expenses.

### FY12 Final CIP Expenditures

The MWRA's total capital budget is \$5.5 billion with \$3.3 billion spent through FY10 and \$2.2 billion remaining to be expended. Wastewater System Improvements represent \$1.1 billion or 51.2% of remaining spending while Waterworks System Improvements are \$1.0 billion or 46.6% of future spending. The FY12 Final CIP (without contingency) includes planned expenditures of \$165.5 million for FY12 and total projected expected expenditures of \$936.7 million for the FY09-13 timeframe.

Table 4 below represents the projected spending by the major program categories:

**Table 4**

Program (\$ in millions)	Total Contract Amount	Payments Thru FY10	Balance 6/30/10	FY09	FY10	FY11	FY12	FY13	5-Year Total FY09-13
<b>Wastewater System Improvements</b>	<b>\$2,625.4</b>	<b>\$1,494.0</b>	<b>\$1,131.4</b>	<b>\$123.7</b>	<b>\$152.7</b>	<b>\$100.6</b>	<b>\$87.6</b>	<b>\$110.2</b>	<b>\$574.9</b>
Interception & Pumping	\$814.7	\$497.5	\$317.2	\$6.8	\$2.5	\$16.3	\$10.4	\$24.6	\$60.7
Treatment	\$619.0	\$122.6	\$496.4	\$14.7	\$56.0	\$33.1	\$40.0	\$46.3	\$190.2
Residuals	\$211.7	\$64.2	\$147.6	\$0.0	\$0.4	(\$0.0)	\$0.7	\$1.3	\$2.3
CSO	\$857.1	\$710.9	\$146.2	\$99.4	\$89.3	\$46.3	\$34.7	\$36.1	\$305.8
Other	\$122.9	\$98.9	\$24.0	\$2.7	\$4.5	\$4.9	\$1.8	\$1.9	\$15.9
<b>Waterworks System Improvements</b>	<b>\$2,735.7</b>	<b>\$1,705.4</b>	<b>\$1,030.3</b>	<b>\$52.9</b>	<b>\$50.1</b>	<b>\$40.0</b>	<b>\$67.6</b>	<b>\$103.8</b>	<b>\$314.3</b>
Drinking Water Quality Improvements	\$663.5	\$538.9	\$124.7	\$17.8	\$12.4	\$2.5	\$26.1	\$41.1	\$100.0
Transmission	\$1,147.2	\$694.9	\$452.3	\$6.3	\$15.7	\$21.7	\$20.8	\$30.4	\$95.0
Distribution and Pumping	\$881.8	\$341.3	\$540.5	\$19.4	\$16.5	\$16.5	\$12.2	\$14.6	\$79.2
Other	\$43.2	\$130.3	(\$87.1)	\$9.3	\$5.5	(\$0.8)	\$8.5	\$17.6	\$40.2
<b>Business &amp; Operations Support</b>	<b>\$107.1</b>	<b>\$57.3</b>	<b>\$49.9</b>	<b>\$5.7</b>	<b>\$8.7</b>	<b>\$11.2</b>	<b>\$10.3</b>	<b>\$11.6</b>	<b>\$47.4</b>
<b>Total MWRA</b>	<b>\$5,468.3</b>	<b>\$3,256.7</b>	<b>\$2,211.6</b>	<b>\$182.2</b>	<b>\$211.4</b>	<b>\$151.9</b>	<b>\$165.5</b>	<b>\$225.6</b>	<b>\$936.7</b>

As shown above, the Combined Sewer Overflow (CSO) program continues to drive spending in the FY09-13 timeframe, accounting for \$305.8 million or 32.6% of total projected spending. Staff anticipates that by the end of the Cap period, more than 96% of the total CSO program will be completed.

## FY12 Master Plan

In every budget cycle, the Master Plan serves as a roadmap for inclusion of new projects. All projects included are high priority infrastructure improvement projects. During FY12, 13 new projects were added from the Master Plan totaling \$38.9 million, with only \$3.7 million to be expended in the FY09-13 timeframe.

The FY12 Final CIP includes a total of 114 new projects/sub-phases with an estimated cost of \$1.1 billion that have been added to the CIP since the Master Plan was adopted.

<b>Budget Cycle</b>	<b>Project/Sub-phases</b>	<b>\$ in Millions</b>
FY08 Final	67	\$955.0
FY09 Final	11	\$31.3
FY10 Final	14	\$58.7
FY11 Final	9	\$19.7
FY12 Final	13	\$38.9
<b>Total From Master Plan</b>	<b>114</b>	<b>\$1,103.6</b>

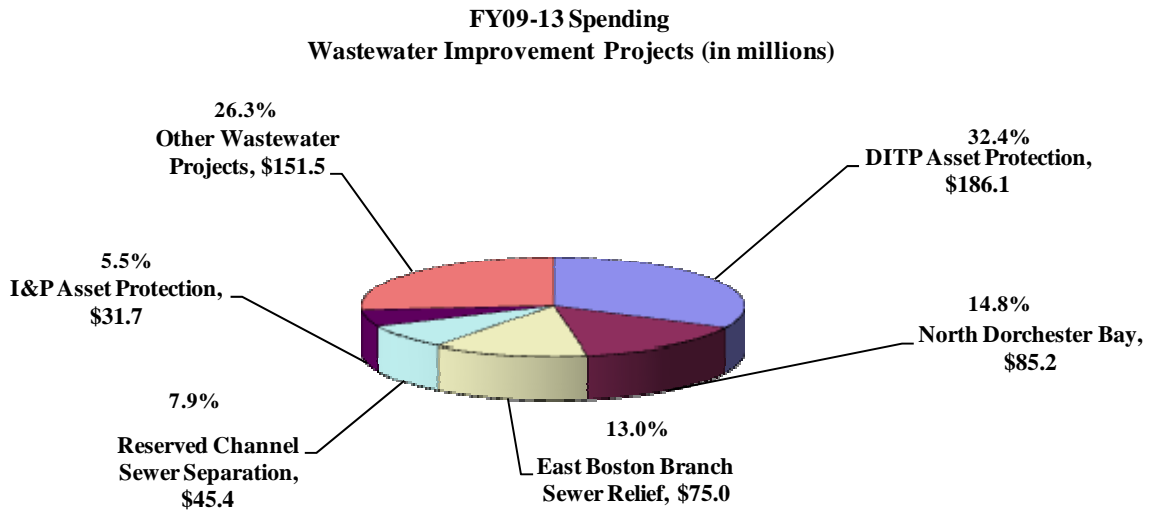
See Appendix 5 Master Plan/CIP Status for more details.

## FY12 CIP FY09-13 Spending

Wastewater System Improvements spending continues to drive CIP spending with \$574.9 million to be expended over the FY09-13 timeframe. The CSO program represents the largest program initiative in terms of spending, with \$305.8 million, or 32.6% of total spending during the FY09-13 period. This federally mandated program is scheduled to be completed by December 2015 followed by a performance report due December 2020. Waterworks System Improvements projects expenditures total \$314.3 million in the FY09-13 timeframe.

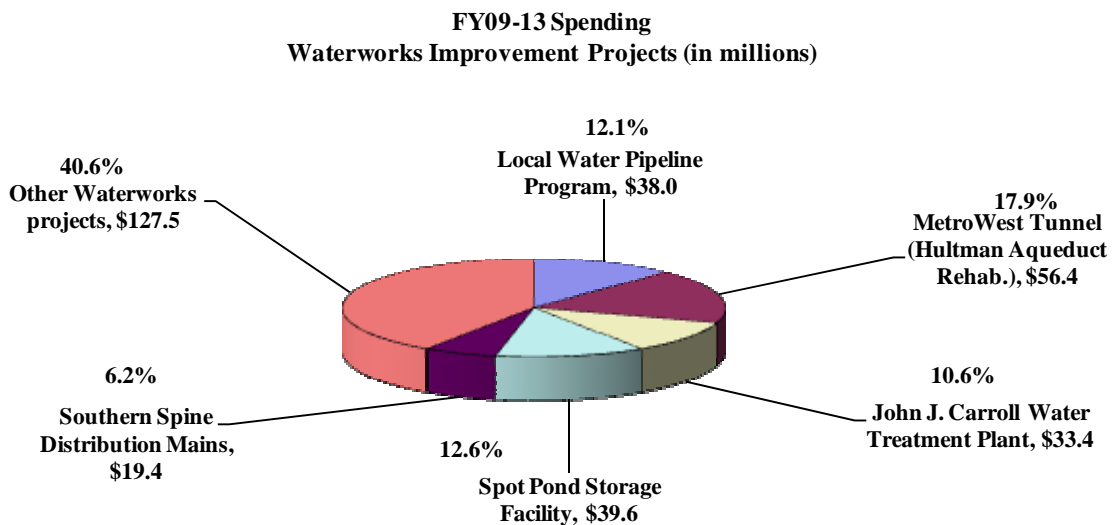
It is important to emphasize that the majority of spending within the Wastewater and Water capital programs is concentrated in several larger projects with significant spending in the FY09-13 timeframe. These projects are either currently under construction or soon to be awarded. The top five projects for the Wastewater program total \$423.4 million for FY09-13 period and represent 73.6% of the \$574.9 million total program.

The breakdown of the \$574.9 million program by the major projects is illustrated below:



Similarly, the top five projects for the Waterworks program total \$186.8 million for FY09-13 and represent 59.4% of the \$314.3 million total program.

The breakdown of the \$314.3 million program by the major projects is illustrated on the graph below:



Combined the Top 10 Wastewater and Water projects account for 65.1% of total FY09-13 spending.



## Major Planned Spending for Fiscal Year 2012

Capital spending in FY12 is estimated to be \$165.5 million. Spending will be driven by several large projects, including the 10 projects listed below, which account for nearly 78% of budgeted FY12 spending:

**Table 5**

<b>Project</b>	<b>FY12 Spending</b>
Deer Island Plant Asset Protection	\$ 38.3
Spot Pond Storage Facility	13.3
Reserved Channel Sewer Separation	13.1
MetroWest Tunnel (Hultman)	13.0
Carroll Water Treatment Plant	12.5
Brookline Sewer Separation	12.4
I&P Facility Asset Protection	7.4
Local Water Pipeline Improvement	7.2
Cambridge Sewer Separation	6.8
NIH Redundancy and Storage	4.3

<b>Top 10 Projects</b>	<b>\$ 128.3</b>
<b>Total FY12 Spending</b>	<b>165.5</b>
<b>Top 10 projects as a percent of FY12 Spending</b>	<b>77.5%</b>

### Highlights of Project Changes from the FY11 Final CIP to the FY12 Final CIP

The FY12 Final CIP represents updated spending and schedules for projects contained in the FY11 Final CIP and new spending on 32 projects and sub-phases which total \$121.6 million. These additional projects and sub-phases represent those capital initiatives outside of the FY11 Final CIP that staff recommends as most essential to ensure reliable service to MWRA's customers.

The FY12 Final CIP increased \$135.5 million or 2.5% above the FY11 Final CIP approved by the Board in June 2010. The majority of the capital budget increase is due to the inclusion of \$121.6 million for new projects related to Deer Island, Interception and Pumping Asset Protection, and Waterworks Pump Station Rehabilitation. The balance reflects updated cost estimates and schedule changes. The vast majority of the increased spending is beyond the FY09-13 timeframe.

It is important to note that even with the substantial increase in the CIP between the FY11 Final and FY12 Final CIP, projected spending on projects in the FY09-13 Cap period decreased by \$120.5 million, associated with underspending in FY09, FY10, and FY11 and shifting expenditures to the FY14-18 timeframe.

Table 6 below describes the dollar and percent changes by major program between the FY11 Final and the FY12 Final CIP and for the FY09-13 timeframe.

**Table 6**

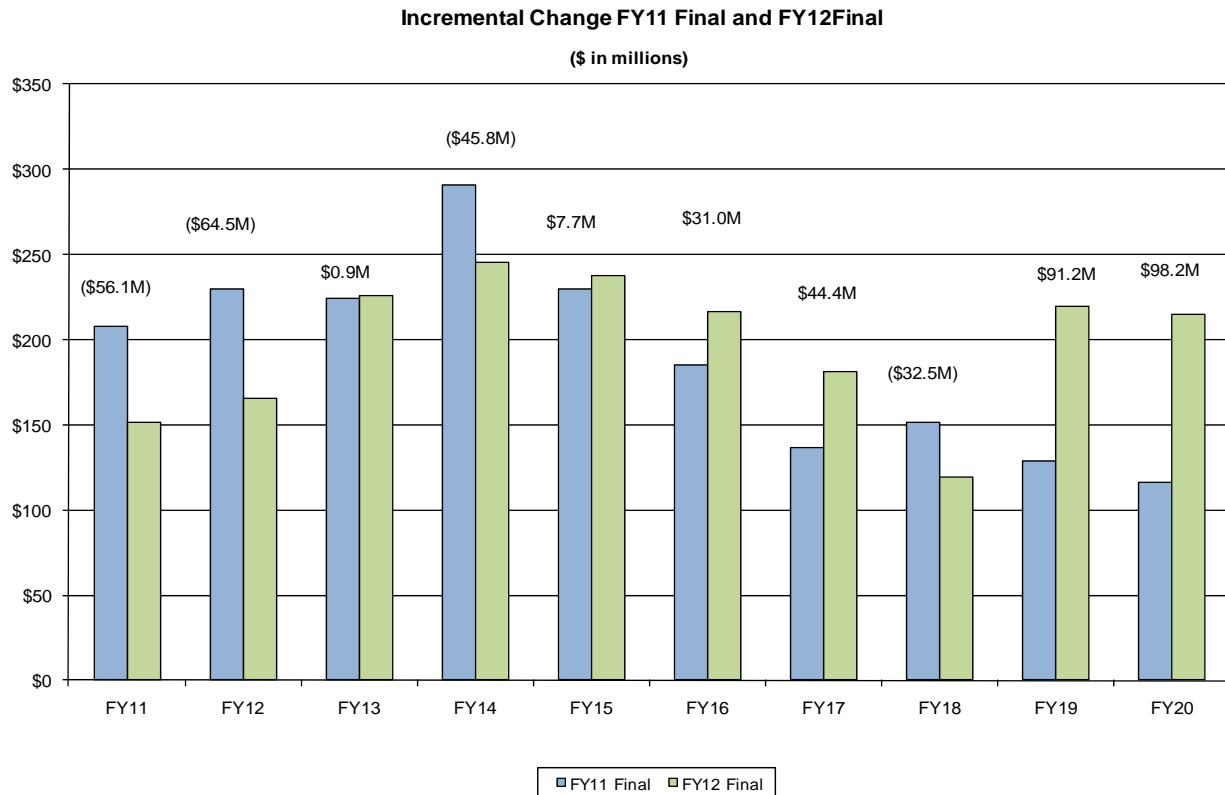
	FY11 Final	FY12 Final	\$ Change	% Change	FY11 FY09-13 Spending	FY12 FY09-13 Spending	\$ Change	% Change
Total Wastewater	\$ 2,574.7	\$ 2,625.4	\$ 50.7	2.0%	\$ 644.6	\$ 574.9	\$ (69.7)	-10.8%
Total Waterworks	2652.5	2735.7	\$ 83.2	3.1%	359.5	314.3	\$ (45.2)	-12.6%
Business and Operations Support	105.6	107.1	\$ 1.5	1.4%	53.1	47.4	\$ (5.7)	-10.7%
Total MWRA	\$ 5,332.8	\$ 5,468.3	\$ 135.5	2.5%	\$1,057.2	\$ 936.6	\$ (120.5)	-11.4%

The worksheet below describes the major dollar changes by project between the FY11 Final and the FY12 Final CIP and for the FY09-13 timeframe. The shaded projects represent the new projects added to the FY12 CIP.

**Comparison of Major Changes FY12 Final and FY11 Final CIP**

Project	FY11 Final	FY12 Final	Overall Impact	FY09-13 Impact	Beyond Cap	Notes
Clarifier Rehabilitation - Phase 2	\$0.0	\$28.5	\$28.5	\$4.8	\$23.7	New FY12 project
Rehabilitation of Water Pump Stations	\$0.0	\$25.0	\$25.0	\$0.0	\$25.0	New FY12 project
DI Digester & Storage Tank Design and Rehabilitation	\$0.0	\$23.0	\$23.0	\$1.5	\$21.5	New FY12 project
Covered Storage Tank Rehabilitation	\$0.0	\$5.0	\$5.0	\$0.0	\$5.0	New FY12 project
Elevated Storage Tank Painting	\$0.0	\$5.0	\$5.0	\$0.0	\$5.0	New FY12 project
Braintree Weymouth Improvements	\$0.0	\$4.0	\$4.0	\$1.0	\$3.0	New FY12 project
Clinton Phosphorous Removal	\$0.0	\$3.5	\$3.5	\$0.3	\$3.2	New FY12 project - regulatory compliance
Other FY12 new projects (smaller)	\$0.0	\$27.6	\$27.6	\$8.3	\$19.3	FY12 new projects - smaller \$
Cambridge Sewer Separation	\$64.0	\$55.7	-\$8.3	-\$8.4	\$0.1	Lower awards vs budget
Reserved Channel Sewer Separation	\$73.7	\$62.3	-\$11.4	-\$11.9	\$0.6	Lower awards vs budget
Brookline Sewer Separation	\$29.6	\$25.9	-\$3.7	-\$3.7	\$0.0	Lower awards vs budget
MWRA Facilites Management	\$7.3	\$2.2	-\$5.2	-\$5.2	\$0.0	Elimination of warehouse and records center funding.
Long Term Redundancy (various projects)	\$537.5	\$552.8	\$15.3	-\$13.6	\$28.9	Updated cost estimates and inflation
West Roxbury Tunnel	\$88.8	\$46.9	-\$41.9	-\$6.0	-\$35.9	Revised scope
Headworks Upgrades	\$81.3	\$125.5	\$44.2	\$6.3	\$37.9	Revised scope and updated cost estimate
Spot Pond Storage Facility	\$62.5	\$71.7	\$9.1	\$1.6	\$7.6	Revised scope and updated cost estimate
Other	\$0.0	\$0.0	\$15.6	-\$95.4	\$111.1	Revised scope, updated cost and inflation estimates, etc.
<b>TOTAL</b>	<b>\$944.7</b>	<b>\$1,064.6</b>	<b>\$135.5</b>	<b>-\$120.5</b>	<b>\$256.0</b>	

The following graph displays the variance by year of the projected spending in the FY10-FY20 timeframe between the FY11 Final CIP and the FY12 Final CIP, demonstrating the significant changes that occur during a year.



### Contingency

Contingency for each fiscal year is incorporated into the Capital Improvement Program to fund the uncertainties inherent in construction programs. MWRA uses a contingency budget to cover these costs in the event they exceed their estimated value. 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 for the CIP (FY12-FY21) is \$129.4 million, with \$20.3 million allocated to the FY09-13 timeframe.

	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	Total
<b>Contingency</b>	\$ 8.4	\$ 11.9	\$ 15.5	\$ 16.2	\$ 14.8	\$ 13.3	\$ 9.2	\$ 16.1	\$ 13.4	\$ 10.6	\$ 129.4

## **Future Risk Factors**

Due to the very nature of the Capital Improvement Program, there will be changes to projects over time due to schedule shifts, revisions to projects' scope, cost increases or decreases, environmental mandates, etc. In every budget cycle, the MWRA re-evaluates capital improvement needs and estimates project costs based on the latest available information. It is important to note that there are several risk factors which could increase spending.

There are still potential projects or required spending increases which are not yet funded as part of the FY12 Final CIP which are highlighted below:

- The Chelsea Creek dredging initiative could cost as much as \$10 million;
- Residual Asset Protection or the funding to rehabilitate or replace the existing Residuals Plant needs to be determined;
- The Brigham Pond Dam rehabilitation may cost as much as \$1 million; and
- New regulatory mandates always pose potential risk for increased future spending.

## **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**

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**FISCAL YEAR 2012**

**APPENDICES**



**MASSACHUSETTS WATER RESOURCES AUTHORITY**

# APPENDIX 1

## Project Budget Summaries and Detail of Changes

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**Project Budget Summaries and Detail of Changes**  
**Project Index**

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## 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 cannot handle the volume of sewage received. Sewage overflows are severe and 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.

### Scope

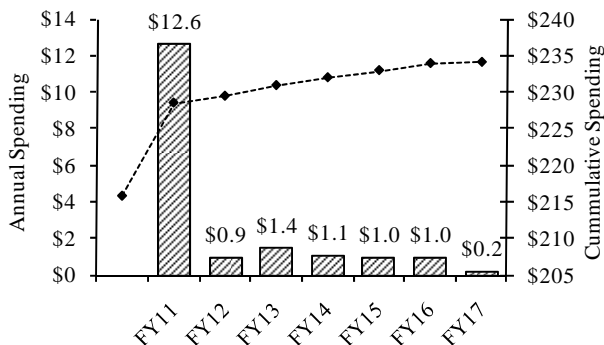
Sub-phase	Scope
Design 1/CS/RI – Tunnel & IPS	Design of the tunnel and IPS. Includes completion of design modifications for sludge pumping facilities at Deer Island and residuals filtrate facilities at Fore River.
Sediment Tests	Tests required as part of the evaluation of marine pipeline option.
Design 2/CS/RI – Surface	Design of remaining construction including siphons and replacement pump station.
Tunnel Construction & Rescue	Construction of a 2.9-mile, 12-foot 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.
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.

Sub-phase	Scope
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 Construction	Install gates which will allow staff to remotely flush out the site as needed, and will reduce odors.
<b>Braintree-Weymouth Improvements</b>	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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$234,002	\$215,885	\$18,117	\$12,610	\$922	\$15,830	\$3,140	\$0

#### Braintree-Weymouth Relief Facilities



Project Status 5/11	93.5%	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 and the Fore River Siphons contract. Substantial completion on the Replacement Pump Station was reached in April 2008. Rehabilitation of Section 624 was completed in December 2010.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$233,573	\$234,002	\$429	Jun-13	Jun-16	36 mos.	\$18,442	\$15,830	(\$2,611)

#### Explanation of Changes

- Project cost increased due to new project added for Braintree-Weymouth Improvements. This was partially offset by actual award amount of Rehabilitation of Section 624 and Land Acquisition costs being less than originally anticipated.
- Schedule changed due to the addition of new project for Braintree-Weymouth Improvements.
- Spending decreased due to actual award amount of Rehabilitation of Section 624 and Land Acquisition costs being less than originally anticipated. This was partially offset by new project added for Braintree-Weymouth Improvements.

#### CEB Impact

- No impacts identified at this time.

# S. 131 Upper Neponset Valley Sewer System

## Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Improves system operability and reliability*

*The Upper Neponset Valley Sewer is hydraulically deficient resulting in frequent community system back-ups and interceptor overflows during wet weather to adjacent residential areas and water bodies in Brookline, Boston, Newton, and Dedham. Construction of a new replacement interceptor will reduce chronic wastewater overflows and surcharging during wet weather and improve service and water quality.*

## Project History and Background

The Upper Neponset Valley Sewer constructed between 1896 and 1902, extends approximately four miles through West Roxbury and Newton, and receives wastewater from West Roxbury, Brookline, Newton, and a small portion of Dedham. Based on the results of the 1994 Combined Sewer Overflow Master Plan, work on Section 530 in Newton and West Roxbury has been added to this project because the hydraulic improvements are needed in this section.

The 1984 Wellesley Extension Sewer Facilities Plan/Environmental Impact document estimated that the UNVS overflowed an average of six to ten times per year with occurrences lasting as long as ten days. The Facilities Plan/EIR indicated that installation of a new interceptor would be the most cost-effective solution to these problems. With the increased capacity of the new interceptor, chronic wastewater overflows during wet weather will be reduced, improving water quality. The project will increase the hydraulic capacity in the Upper Neponset Valley Sewer by 8 mgd, through the construction of replacement sewers, to the level of service provided to all MWRA sewer member communities. The project will eliminate surcharging and overflows during the one-year, six-hour DEP designated design storm, with no increase in downstream overflows. It will also reduce overflows for 5-year and above storms. The project includes design and construction of sections 685 and 686 replacement sewers for sections 526 to 529. This construction contract was awarded in March 2005 and was completed in March 2008. The project also includes design and construction of Section 687 to replace Section 530 which was awarded in October 2006 and completed in November 2007.

## Scope

Sub-phase	Scope
Designs/CS/RI	Completion of design and provision of construction services during the construction phases.
Resident engineering & inspection	Resident engineering and inspection during construction of the two contracts
Boston Paving	Payment to the City of Boston for paving work on city streets.
Replacement Sewer Sections 685-686 construction	Installation of 15,780 feet of new sewers within public roadways to reduce overflows to adjacent residential areas and water bodies in West Roxbury.
Replacement Section 687 construction	Installation of 8,500 feet of new sewers to reduce overflows to adjacent residential areas and water bodies in West Roxbury and Newton

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$55,056	\$53,754	\$1,302	\$134	\$1,168	\$1,906	\$0	\$0

Project Status 5/11	97.7%	Status as % is approximation based on project budget and expenditures. Construction on Sections 685 and 686 was completed in March 2008. Section 687 was completed in November 2007.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$54,426	\$55,056	\$630	Mar-08	Mar-08	None	\$1,276	\$1,906	\$630

**Explanation of Changes**

- Project cost and spending increased due to revised cost estimate for easements.

**CEB Impact**

- No impacts 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. Wastewater detention time at many structures also contributes to serious odor problems.

MWRA completed a study in 1998 to evaluate rehabilitation of these structures to permit greater accessibility to provide regular maintenance in order 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 rehabilitate the most deteriorated structures.

### 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 up to 16 sites.
Construction	Construction for up to 16 sites.

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$2,685	\$940	\$1,745	\$0	\$0	\$88	\$1,657	\$0

Project Status 5/11	35.0%	Status as % is approximation based on project budget and expenditures. Initial Planning subphase was completed in 1998.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$2,613	\$2,685	\$72	Sep-15	Sep-15	None	\$84	\$88	\$4

**Explanation of Changes**

- Budget and spending changes due to revised ENR inflation index.

**CEB Impact**

- No impacts 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 of 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 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 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.



<b>FES/FERS Biofilters Design &amp; Construction</b>	FES/FERS Corrosion Control (Biofilters) is a design and construction project to make improvements in the MWRA sewers. Three air treatment systems (biofilters) 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.
<b>Nut Island Control System Evaluation and Design</b>	Odor control is now being reliably performed using carbon. Modifications to the existing system are required to improve long term performance and ability to quickly transfer to back-up system. Odor control system should be evaluated and redesigned to ensure odor control performance in order to avoid air quality violations and odor complaints.
<b>System-wide Odor Control</b>	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

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$16,782	\$3,003	\$13,780	\$0	\$0	\$275	\$12,504	\$1,000

Project Status 5/11	17.9%	Status as % is approximation based on project budget and expenditures.
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#### Changes to Project Scope, Budget, and Schedule

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$14,647	\$16,782	\$2,135	Jun-17	Jun-17	None	\$325	\$275	(\$50)

#### Explanation of Changes

- Cost increase primarily due to new projects for Nut Island Control System Evaluation Design and System-wide Odor Control.

#### CEB Impact

- CEB impact from the FERS Biofilters Project that was placed in the CIP. The cost of FERS chemicals (Nitrazyme and VX456) would be approximately reduced in half. The impact of this project would be approximately (\$35,000) in FY16.

# 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 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 was 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, the tunnel is not in need of immediate repair. Options to monitor the conditions in the tunnel and future rehabilitation are under evaluation.

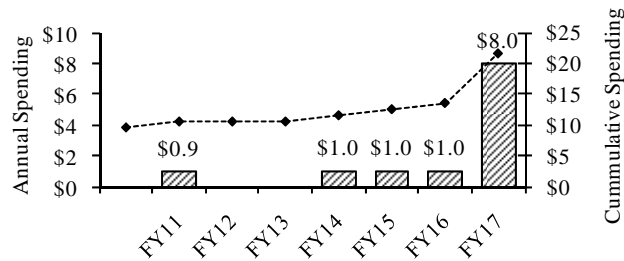
## Scope

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 Rehabilitation	Rehabilitation of 12,500 feet of deteriorated tunnel caused by high levels of hydrogen sulfide and sewer turbulence. Services to include inspection, design, and/or construction.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$46,934	\$9,539	\$37,395	\$949	\$0	\$1,608	\$21,100	\$15,347

**West Roxbury Tunnel**



Project Status 5/11	21.9%	Status as % is approximation based on project budget and expenditures. The design contract to rehabilitate the tunnel was awarded in February 2009.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$88,784	\$46,934	(\$41,850)	Dec-15	Jun-19	42 mos.	\$7,575	\$1,608	(\$5,968)

**Explanation of Changes**

- Budget, spending, and schedule changed due to revised cost and schedule for the tunnel rehabilitation.

**CEB Impacts**

- No impacts 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 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. CDM has since been working to design and procure three construction packages for SCADA implementation. 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 the older 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.
<b>Wastewater Redundant Communications</b>	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.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$20,839	\$19,784	\$1,056	\$156	\$250	\$6,842	\$50	\$0

Project Status 5/11	94.9%	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.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$19,939	\$20,839	\$900	Jul-09	Apr-13	45 mos.	\$5,992	\$6,842	\$850

#### Explanation of Changes

- Project cost and planned spending increased due to new project added for Wastewater Redundant Communications.

#### CEB Impact

- Future operating budgets will reflect further optimization beyond staffing for chemicals and utility usage as a result of SCADA implementation.

## S. 139 South System Relief

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### **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. BWSC has cleaned the upstream portion of the conduit and MWRA has cleaned the outfall from the 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 proportion of the project has been moved out to fiscal year 2017. 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 rerouted 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$4,939	\$3,439	\$1,500	\$0	\$0	(\$1)	\$938	\$563

Project Status 5/11	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 FY17.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$4,940	\$4,939	(\$1)	Dec-18	Dec-18	None	\$0	(\$1)	(\$1)

**Explanation of Changes**

- N/A

**CEB Impact**

- No impacts 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 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.
Manhole Structure Flood Protection Design and Construction	Evaluate, design and construct modifications to manholes and backflows preventers at some CSO locations to prevent elevated rivers, streams and flood zones from back-flowing into the MWRA's regional collection system. During the recent March 2010 storm events, flood waters were documented well above the rim elevation of many MWRA structures that was suspected to contribute to system capacity limitations and extended periods of high flows.
Hydraulic Flood Engineering Analysis - North System	Evaluate the hydraulic benefit and feasibility of constructing emergency relief points in the Northern Collection system to better manage flows during extreme storm events with the goals of minimizing risk to public health and minimizing property damage.



**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$10,248	\$930	\$9,318	\$0	\$583	\$1,000	\$7,693	\$625

Project Status 5/11	9.1%	Status as % is approximation based on project budget and expenditures. The Notice-to-Proceed for the Hydraulic flood Engineering Analysis is scheduled for September 2011.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$10,310	\$10,248	(\$62)	Jun-15	Jun-18	36 mos.	\$3,103	\$1,000	(\$2,103)

**Explanation of Changes**

- Project schedule and spending changed due to project priorities.

**CEB Impact**

- No impacts 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 2004-2005. 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 6<sup>th</sup> year. Plans will be developed to evaluate new wastewater metering technology for our 3<sup>rd</sup> generation of meters. Meter replacement will be phased in rather than entire system replacement. Certain key meters will be supplied electric power instead of battery resulting in more civil, electrical and construction costs.

### Scope

Sub-phase	Scope
Planning	Development of a long-term plan to upgrade or replace the existing wastewater metering system (technology, hardware, software, telemetry).
Equipment Purchase/Installation	Purchase and installation of equipment.
Permanent Site Improvements Design and Constr	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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$26,578	\$5,138	\$21,441	\$141	\$60	\$1,443	\$8,892	\$11,153

Project Status 5/11	19.3%	Status as % is approximation on project budget and expenditures. The purchase and installation of 2 <sup>nd</sup> generation of meters is complete. Planning for the next replacement will soon be underway.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$26,578	\$26,578	\$0	Jul-25	Jul-25	None	\$790	\$1,444	\$654

**Explanation of Changes**

- Project spending changed due to revised cash flow.

**CEB Impact**

- Potential cost savings associated with this project have not yet been quantified.

## **S. 145 Interception and Pumping Facility Asset Protection**

<p><b>Project Purpose and Benefits</b></p> <p style="text-align: center;"> <input checked="" type="checkbox"/> <i>Extends current asset life</i>  <input checked="" type="checkbox"/> <i>Improves system operability and reliability</i> </p> <p><i>To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems.</i></p>
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### **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.).

While the current schedule indicates a completion date of 2011 for rehabilitation of interceptors, the Interception and Pumping Asset Protection project will be ongoing throughout the useful life of the facilities.

### **Scope**

<b>Sub-phase</b>	<b>Scope</b>
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. Contract awarded in April 2007. 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 Design & Construction	#1 – Rehabilitation of Dorchester Sections 240, 241 and 242.
Interceptor Renewal #2 Design & Construction	#2 – Rehabilitation of portions of Sections 163 and 164 in Brighton.
Interceptor Renewal #3 Cambridge /Somerville Sections 26/27 Design & Construction	#3 – Rehabilitation of portions of Sections 26 and 27 in Cambridge and Somerville.

Sub-phase	Scope
Interceptor Renewal #4 Everett Sections 23/24/156 Design & Construction	#4 – Rehabilitation of portions of Sections 23, 24 and 156 in Everett.
Malden & Melrose Hydraulics and Structural Study and Construction	#7 – 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	#5 - Rehabilitation of portions of Sections 607/609/610 in Milton.
Interceptor Renewal #6 Chelsea Sections 12/14/15/62	#6 - Rehabilitation of portions of Sections 12/14/15/62 in Chelsea.
Prison Point HVAC Upgrades, Design & Construction	The HVAC system improvements include the replacement of components for the HVAC system. The ductwork, air handling equipment, dampers, louvers, and odor control are in need of upgrade. An assessment was performed to develop the scope of the project and more accurately estimate the cost of construction. 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. The contract for Design services for the HVAC system was awarded in December 2007. The construction Notice to Proceed was issued in December 2010.
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 contract to replace the existing heating system at the Chelsea Creek Headworks was awarded in April 2005 and completed in May 2006. The systems at Ward Street and Columbus Park will be replaced under the Remote Headworks Upgrade Project.
Remote Headworks Concept Design	A Concept Design will be 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 will include a Condition Assessment of all equipment and non-equipment assets to establish a basis for improvements or upgrades to meet business goals and objectives. The contract was awarded in April 2008 and completed in September 2009.
Hingham Pump Station Isolation Gate Construction	The Hingham Pump Station was built without an influent gate. The station services the Town of Hingham and presently has no direct means to isolate the flow to this station. Presently, labor intensive and inefficient means using stop logs, sand bags, sewer plugs and pumps are required to isolate and divert flow. This project will include the design and installation of a sluice gate in a diversion chamber, to isolate the station and bypass flow to allow maintenance to take place in the station without interruption of service. Design is complete and the contract was advertised for bid in June 2011.

Sub-phase	Scope
Alewife Brook Pump Station Rehabilitation Design and Construction	The Alewife Brook Pump Station was built in 1951 and the pumps are original equipment. The rehabilitation will include replacing the larger pumps, motors, and piping, increasing pump reliability and efficiency at this facility, replacing the two climber screens and grinders, updating the HVAC system, upgrading the electrical system, and modifying the building interior to meet current building codes. The design contract was awarded in April 2010, and the preliminary design report was completed in March 2011.
Caruso Pump Station Generator Replacement	The Caruso Pump Station generator, which is currently 13 years old, is one of a few existing generators of this type made by Wakesha. The manufacturer is no longer making spare parts and there is only a limited quantity of available spare parts at this time, which may not be readily available in the future. This project is to replace the generator, due to obsolescence, with a newer model with readily available parts to ensure reliable back-up power at this facility. The replacement design will be performed under Task Order No. 15 (Contract 7244) which was executed in December 2010.
Chelsea Screenhouse Sluice Gate Engineering Study	The Chelsea Screenhouse has seven hydraulic gates used to control flow within the facility, and direct flow to either the Caruso Pump Station or the Chelsea Headworks. These gates are critical to the operation of the facility. A preliminary evaluation was conducted using the As-Needed Design Services contract. The Task Order scope of services combined both the Chelsea Screenhouse and Framingham Pump Station. A report was issued that identified some maintenance and operational issues. Additional preliminary engineering evaluations have been added via a task order within the Remote Headworks Upgrades Design contract. A recommendation for final design and construction will be developed.
Prison Point & Cottage Farm Washdown System Piping Design and Construction	At both the Prison Point and Cottage Farm CSO Facilities the piping system that provides water for washing down the detention tanks, wet wells and screen room areas after storm activations is made of PVC and cast iron. The glued joints in the plastic pipe are problematic. The pipe and associated hangers and hardware are twenty years old in some instances. The replacement of these systems will include upgrading existing materials, connections, and installing necessary pressure controls.
Framingham Pump Station Sluice Gates Condition Assessment	There are three 48-inch sluice gates at the Framingham Pump Station that control flow into the station and the Framingham Extension Sewer. The sluice gates have been in operation 5-6 years. A preliminary evaluation was conducted using the As-Needed Design Services contract after severe deterioration of the number 3 gravity sewer line gate and structure was discovered. The Task Order scope of services combined both the Framingham Pump Station and Chelsea Screenhouse. A report was issued to identify any maintenance and operational issues for all other gates. The report provided sufficient information about their condition, and there is no need for additional engineering studies. Corrective actions can be taken under the CEB.
Caruso Pump Station Shaft Replacement Construction	Caruso Pump Station has seven pumps that are fourteen years old, four 21 MGD pumps and three 50 MGD pumps. The vertical shafts of the four 21 MGD rated pumps are worn from use and corrosion. Of these four pumps, one was outfitted with a mechanical seal. The four (21 MGD) pumps are used 24 hours/day, 7 days/week and it is recommended that they have mechanical seals installed to replace the conventional pump packing. This project is to replace all worn, corroded shafts and sleeves and install mechanical seals to reduce operational & maintenance costs. Included in the scope will be a task to assess the pumps and rotating assemblies for potential maintenance issues.
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.

<b>Sub-phase</b>	<b>Scope</b>
Nut Island Fire Pump Building Study	Study to identify cause and offer remedy to the settlement of the Fire Pump Building at the Nut Island Headworks. Damage has occurred to the building structure and underground interconnecting utilities. This project is to fully investigate the problem and offer steps to stabilize the structure and protect utilities from future damage.
Nut Island Mechanical & Electrical Replacements	Project to identify the portions of the mechanical and electrical systems that are failing or reached the end of their useful life. Electrical systems will be evaluated through service contract maintenance, which often reveal obsolescence and/or potential for future failure. Mechanical systems have exhibited operational and maintenance difficulties that require close review for design improvement and replacement. Planning, design, and construction is recommended for the FY09-13 timeframe.
NIH Electrical & Grit/Screenings Conveyance System Design & 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 conveyance system which has alignment and operations problems, at the Nut Island Headworks. Based on concept design reports, recommendations will be made to improve or replace these systems. These recommendations will be included in design and construction contracts. The design contract was awarded in February 2011.
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. Concrete spawling from the interior of the shaft falls down into the tunnel. There is concern this may cause additional problems at Deer Island. To-date, there has 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.
Remote Headworks Upgrades Design & Construction	The Remote Headworks Concept Design proposed recommendations to upgrade the Chelsea Creek, Columbus Park and Ward Street Headworks, which will be included in design, construction, and construction management contracts. The recommendations include replacement/upgrade to the screens, grit collection system, grit and screenings handling systems, odor control, HVAC, mechanical, plumbing, instrumentation, and electrical systems, as well as antenna towers. The design/CA contract was awarded in June 2010. A task order has been developed within this contract to perform preliminary design services for the Chelsea Screenhouse.
Pump Station/CSO Condition Assessment	This project would provide professional engineering services (via an RFQ/P process) including planning, design review, inventory, evaluation, identification and prioritization of rehabilitation/replacement projects and operational processes for the older pump stations and CSO facilities.
New Neponset VFD Replacement	Replace Variable Frequency Drive at the New Neponset Pump Station.
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.

Sub-phase	Scope
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 initiated under Task Order No. 20 (Contract 7070) in January 2010.
<b>Prison Point/Cottage Farm CSO Preliminary Design/Study</b>	Preliminary design/study to replace and/or upgrade mechanical, electric, chemical feed, and instrumentation equipment. Additionally, need to replace diesel driven pumps with VFD electric pumps. This project will look to add more redundancy at Prison Point to ensure proper CSO discharge treatment. Design and Construction phases will be added to a future CIP cycle.
<b>Pump Station Rehab Preliminary Design/Study</b>	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, NTP of July 2011, 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. Design and Construction phases will be added to a future CIP cycle.
<b>Prison Point Dry Weather Flow &amp; Stripping Pump Improvements</b>	This project is designed to determine the feasibility of replacing two dry weather pumps and adding a second wetwell stripping pump to ensure facility reliability and to pump down the wetwell at a faster rate.
<b>System Relief &amp; Contingency Planning Study</b>	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 severe wet weather. Project will be designed to create increased capacity within the collection system in order to decrease SSO discharges.
<b>DeLauri Pump Station Electrical Room Cooling</b>	During wet weather conditions when multiple pumps are operating, the Variable Frequency Drives overheat causing a reduction in pumping capacity. This problem is magnified during summer months, causing undesirable high temperatures in the electrical room. An HVAC evaluation was performed and recommendations made for additional electrical room cooling to eliminate VFD overheating and protect electrical equipment from damage. A task order is being developed for final design recommendations made.
<b>Caruso Pump Station HVAC &amp; Fire Detection System Upgrade</b>	This project would replace the HVAC system and the fire detection system at the Caruso Pump Station. Technical Support evaluated the HVAC system and determined it was in need of replacement. Some issues include the number of air exchangers, the corrosion of the rooftop units, and the condition of the pneumatic control system. Due to the age of the fire detection system, frequent problems and false alarms have occurred over the past few years. The fire protection system needs to be replaced.

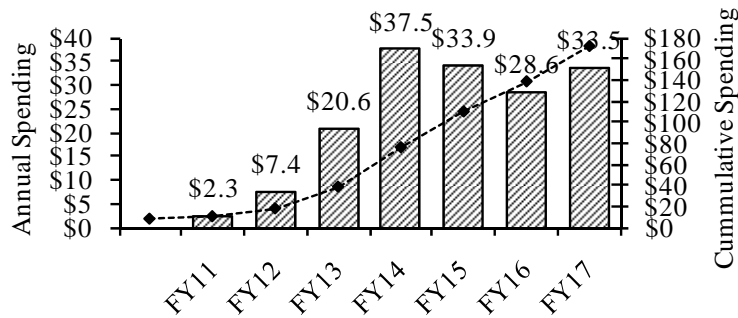


Sub-phase	Scope
<b>Prison Point Gearbox Rebuilds</b>	Refurbishment of the Prison Point CSO Gearboxes based on an inspection report performed in May 2010 that indicated that the current gearbox condition could result in bearing failures. It is critical during major wet-weather events to have all four pumps operational which are driven by gearboxes to provide maximum station capacity and provide redundancy at this critical CSO facility.
<b>Section 156 Owner's Representative</b>	Field oversight and administration of the design/build contract.
<b>Section 156 Design/Build</b>	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 was awarded in June 2011.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$213,329	\$7,509	\$205,820	\$2,345	\$7,418	\$31,672	\$156,205	\$19,242

**I&P Asset Protection**



Project Status 5/11	4.5%	Status as % is approximation based on project budget and expenditures. The Remote Headworks Concept Design was completed in September 2009. Work on Section 160 was completed in December 2008. Melrose Sewer work was completed in February 2011. Prison Point HVAC Construction commenced in December 2010. NI Electrical & Grit/Screens Conveyance Design commenced in March 2011. Remote Headworks Upgrades Design commenced in July 2010.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$159,934	\$213,329	\$53,745	Jul-17	Jun-21	47 mos.	\$29,294	\$31,672	\$2,379

### Explanation of Changes

- Budget increased primarily due revised cost estimates for Headworks Upgrades Construction, Alewife Brook Pump Station Rehab, Interceptor Renewal #1 contracts, new projects added for Section 156 Design/Build, Section 156 Owner's Representative, Prison Point/Cottage Farm CSO Rehabilitation Preliminary Design/Study, Pump Station Rehab Preliminary Design/Study, Prison Point Dry Weather Flow & Stripping Pump Improvements, System Relief & Contingency Planning Study, DeLauri Pump Station Electrical Room Cooling, Caruso Pump Station HVAC & Fire Detection System Upgrade, Prison Point Gearbox Rebuilds. This was partially offset by actual award of Prison Point HVAC Upgrades and Headworks Upgrades Design being less than originally anticipated.
- Schedule and spending changed primarily due to revised schedule for Headworks Upgrades Construction , new projects and updated cost estimates above, and several schedule changes including Prison Point/Cottage Farm CSO Rehab Preliminary Design/Study and Pump Station/CSO Condition Assessment contracts.

### CEB Impact

- CEB impacts for this project have not yet been identified.

## 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$5,000	\$0	\$5,000	\$0	\$0	\$0	\$5,000	\$0

Project Status 11/10	0.0%	Status as % is approximation based on project budget and expenditures.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$5,000	\$5,000	\$0	Jun-17	Jun-17	None	\$0	\$0	\$0

### Explanation of Changes

- N/A

### CEB Impact

- No additional impacts 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 FY09	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$750	\$0	\$750	\$0	\$0	\$0	\$750	\$0

Project Status 11/10	0.0%	Status as % is approximation based on project budget and expenditures.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$750	\$750	\$0	Jun-15	Jun-15	None	\$0	\$0	\$0

## Explanation of Changes

- N/A

## CEB Impact

- No additional impacts 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 facility 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 (and subsequent updates), 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 (DITP) was one of the largest wastewater projects ever undertaken in the United States. DITP construction was a 12-year, \$3.5 billion effort (not including the cost of off-island residuals facilities) started in 1988. MWRA commenced primary disinfection at the new plant in 1995 and secondary disinfection in July 1997. With the completion of the Effluent Outfall Tunnel in September 2000 the plant discharges treated effluent 9.5 miles offshore in Massachusetts Bay through a series of 55 diffusers spaced along the last 1.5 miles of the tunnel.*

### **Project History and Background**

The Deer Island Treatment Plant Asset Protection program was formerly titled “Facilities Asset Management Program” (FAMP). Since the Facilities Asset Management Program was expanded to include other Operations units throughout MWRA, this Deer Island project was renamed. An initial component of the program, Inventory and Evaluation phases 1 and 2 (previously a part of this project), were placed under the Capital Maintenance Planning and Development project in the *Business Operations and Support* capital budget in a prior budget cycle.

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. This project encompasses five 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**

<b>Sub-phase</b>	<b>Scope</b>
<i>Equipment Replacement:</i>	
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.

<b>Sub-phase</b>	<b>Scope</b>
<i>Equipment Replacement:</i>	
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. Substantially completed by 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.
LOCAT Scrubber Replacement Design & Construction	Replace the Thermal Plant's high-maintenance digester gas wet scrubber system with a dry scrubber system. The first phase of the project (to replace boiler control systems) is currently scheduled to commence in FY13.
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 ten years.
Thickened Primary Sludge Pump Replacement	Design and construction to replace the thickened primary sludge pumps in order to reduce water use and maintenance costs, in FY14-15.
Digested Sludge Pump Replacement Design & Construction	The three positive displacement Abel pumps cause a great deal of pipe vibration and need frequent maintenance. Added per the Master Plan, pumps with higher flow rates are being installed to reduce the potential for grit settlement in the pipes. The first of two construction projects began in October 2009, to install one centrifugal pump and a flushing pump. These new pumps will be tested for at least 6 months to ensure they work before the three existing pumps are replaced. Both phases are scheduled to be completed by 2013.
Centrifuge Back-drive Replacements	Replace the centrifuge back-drives, which have become obsolete. Scheduled to commence in FY12 and take 2 years to complete.
Grit & East/West Odor Ctrl Air Handler Unit Replacements	Replace deteriorated air handlers; added per the Master Plan. Replacements in FY09-11, 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.
Fire Alarm System Replacement – Design & Construction	Newly identified in FY08, added to the Master Plan. To replace obsolete fire alarm monitoring & control systems. Design in FY12, replace in FY13/16 and approximately every 20 years thereafter.
HVAC Equipment Replacement – Design/ESDC & Construction	Newly identified in FY08, added to the Master Plan. To replace two obsolete HVAC control systems with one manufacturer's system, reducing replacement parts and improving automation. Design in FY12, replace in FY14-17 and then every 15 years. Increased the scope to include central lab fume hoods and East/West Odor Control Air Handler replacements in FY11.
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; plan to replace four centrifuges every ten years beginning in FY15.
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. Scheduled replacement of 3 chillers and two compressors in FY12-14. Other work to commence in FY14-17 with future rehab and upgrade work occurring every 10 years.

<b>Sub-phase</b>	<b>Scope</b>
<i>Equipment Replacement:</i>	
South System Pump Station Pump Lube System Replacement	Change the pump lubrication system from using grease to one using oil. Only requires routine maintenance after installation, not replacement. Included in the Master Plan. Construction is scheduled for FY14-15.
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 is scheduled for FY11-15. Scope also includes plug valve replacements. A new project to complete additional digester storage tank rehab work was added in FY12 (see project listed in bold).
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. Planning for replacements in FY12-14. Scope revisions were made in FY10 to include replacing the magnetic flow meters.

<b>Sub-phase</b>	<b>Scope</b>
<i>Architectural:</i>	
Study/Concept Design-Concrete Repairs	For installing a protective coating on concrete in secondary clarifiers and disinfection basins. Recent data indicates work not needed; dropped in FY11.
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 is scheduled to begin in FY12, phase 3 in FY15.
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. Work currently scheduled for FY15-16.
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 by 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. Work completed in 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. Scheduled for FY12-14, on a 20-year cycle.

<b>Sub-phase</b>	<b>Scope</b>
<i>Utilities:</i>	
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, to be complete by August 2011. EEU-4 is scheduled to start in FY12; Under the Master Plan, Phase 5 was added and is scheduled to start in FY13.

<b>Sub-phase</b>	<b>Scope</b>
<i>Utilities:</i>	
VFD Replacements, including future cycles from the Master Plan	The program to replace obsolete variable frequency drives (VFDs) in the North Main Pump Station (in FY12-15), South System Pump Station (done in FY07-08), Winthrop Terminal Facility (FY13-15), and miscellaneous smaller VFDs throughout the plant (on-going). Future replacements every 10-12 years.
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. 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 in FY12.
Thermal Power Plant Modifications – REI	Project covers REI work on one of the 5 projects above, modifications in the Thermal Power Plant. Scheduled to begin in FY12.
Switchgear REI for 7061 & 7061A	To provide REI services on two Power System Improvement projects (above). Removed in the FY11 CIP, the REI work will be done by in-house staff.
Switchgear Replacements including future cycles added per the Master Plan	On-going program to sequentially replace obsolete electrical switchgear. Several buildings scheduled for FY12-15, others in FY19-21. Future cycles beyond that period are not currently funded due to cost increases.
Transformer Replacements	Subphase removed in FY05, added back in FY09 due to need. 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.
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. Scheduled to begin in FY12 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, now scheduled for FY21.
Sodium Hypochlorite Pipe Replacement	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 FY14-16.
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.
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 by February 2008. Phase 3 began in June 2009 and was completed in March 2011. Includes periodic valve replacements. No other repeat cycles are currently planned.
Fuel Transfer Pipe Replacement	Replace the diesel fuel pipeline from the barge area to the storage tanks at the Thermal Power Plant. Project currently on hold; cementing the current pipeline in place scheduled to be done in FY12-13.
North Main Pump Station Motor Control Center (MCC) Construction	Sequential replacement of the MCC equipment that has become obsolete and unreliable. Schedule accelerated for FY11 due to poor condition. Designed under As-Needed Design task order, construction scheduled to be completed in two sequential phases in FY12-15.
CTG Rebuilds	Rebuilds of the combustion turbines in the Thermal Power Plant. Added from the Master Plan, scheduled for FY14-16 with repeat cycles every 15 years.
STG System Modifications Design & Construction	Involves 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; includes the services of an Owners Representative. Substantially complete by the end of FY11.



<b>Sub-phase</b> <i>Utilities:</i>	<b>Scope</b>
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 FY14-15.

<b>Sub-phase</b> <i>Support:</i>	<b>Scope</b>
DISC Application	Hardware, software, and contract services to implement a Deer Island plant-wide computerized database of all plant systems (electrical, gas, water, etc).
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 FY14.
As-Needed Design Phases 5 and 6	On-going technical design services and/or construction support to supplement existing engineering resources for specialized or complex engineering issues. Typically, two contracts are issued in tandem and run for two years each. Phase 5-1, 5-2, 6-1 and 6-2 contracts were moved here from <i>Plant Optimization</i> in FY10. Starting with Phase 6, the contract length was extended to three years each. These design phases are currently scheduled to end in 2012, followed by phases added to the project listed below.
Deer Island As-Needed Technical Design	Added in FY08 as part of the Master Plan, 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. From FY12 through FY15 expect to have two contracts at \$900,000 per year each, and then increase to \$1M each for FY16 through FY25. Each series of new contracts will be deducted from this placeholder and given their own subphase numbers.

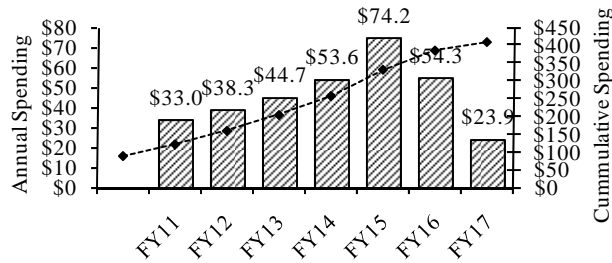
<b>Sub-phase</b> <i>Specialties:</i>	<b>Scope</b>
Sodium Hypochlorite Tank Liner Removal	Removed the failed lining in tank #1 of the four sodium hypochlorite storage tanks. Completed in September 2006.
Hypochlorite Tanks 1&3 Reline	Renamed the "Sodium Hypo Tank Repair 1" subphase in FY08. Included the 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. Work completed in October 2008.
Future Sodium Hypo Tank Rehabilitation or Replacement	Periodic stripping and relining of the four sodium hypochlorite tanks, based on historical experience to date. Included in the Master Plan. Based on condition, expect to start replacing on tank per year beginning in FY14.
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.

<b>Sub-phase</b> <i>Specialties:</i>	<b>Scope</b>
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, increased due to change orders; work began in February 2009, to take three years to complete.
Gravity Thickener Rehab - Design	New subphase in FY09 for designing gravity thickener improvements, as discussed further below. Project staff determined that a separate design phase is needed for the major overhaul work (now denoted 6966E).
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) involves replacing some fiberglass covers in FY10-11. 6966A, B and C were added for emergency repairs to center columns in three tanks. 6966D is for complete replacement of these center columns in all 4 tanks with a higher grade steel. The final phase, 6966E 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.
Ancillary Modifications Design and Construction 4	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 <i>Plant Optimization</i> project in FY10. Construction currently scheduled for FY15-18.
<b>Clarifier Rehabilitation Phase 2</b>	To correct deficiencies noted during Primary & Secondary Clarifier Rehabilitation. Influent gates not sealing off tanks adequately which means an entire battery must be isolated for periodic maintenance and inspection; 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; 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. These issues impact overall plant and functionality.
<b>DI Digester Storage Tank Design/ESDC and Rehabilitation</b>	The Deer Island residuals facility includes three digester modules and two gas handling/ sludge storage tanks. Damage to glass lining in digester overflow piping was noted during struvite removal. These pipes are to be replaced under the Digester Mods Pipe Replacement contract (7055). Other residuals piping systems and valves have similar problems and need 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.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$575,907	\$87,440	\$488,467	\$33,030	\$38,281	\$186,099	\$223,236	\$149,212

**DI Asset Protection**



Project Status 5/11	20.1%	Status as % is approximation based on project budget and expenditures. Several previously completed phases for this project are included in the Completed Project list. Contracts in process include the following: As-Needed Design Phases 6-1 and 6-2, Miscellaneous VFD Replacements, Electrical Equipment Upgrade Construction 3; TPP Dump Condenser Replacement, and Switchgear Automation (two of the Power System Improvements – Construction contracts); Primary & Secondary Clarifier Rehab Design & Construction, Digester Sludge Pump Replacement Construction Phase 1, and NMPS VFD Replacement Design. Contracts for Fuel Transfer Pipe (cementing in place) and Fire Alarm System Replacement Design are also expected to start in FY12. In FY12, several of the largest projects projected to start are NMPS VFD Replacement, Electrical Equip. Upgrade 4, NMPS MCC Construction and Digester Modules Pipe Replacement.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$512,501	\$575,907	\$63,406	Jun-48	Jun-48	None	\$222,428	\$186,099	(\$36,329)

**Explanation of Changes**

- The project cost increase is primarily due to the two new projects added in FY12: Clarifier Rehabilitation Phase 2 (\$28.5M), and DI Digester Storage Tank Design/ESDC and Rehabilitation (\$20M), as well as several other revised cost estimates including Sodium Hypo Pipe Replacement Design and Construction, WTF VFD Replacements Construction, Ancillary Modifications Construction 4, Fire Alarm System

Replacement Design and Construction, Ancillary Mod 4 Final Design, Expansion Joint Repair Construction 2, and HVAC Equipment Replacement Construction (which includes costs transferred from the lab for air handling equipment and fume hood replacements). This increase was partially offset by the award being less than budget for PICS Replacement Construction, and revised cost for Digester Modules 1 and 2 Pipe Replacement.

- Spending shifted primarily due to several project schedule changes including WTF VFD Replacement Construction, Electrical Equipment Upgrade 4 & 5, NMPS VFD Replacement Construction, DITP Switchgear Replacement, NMPS Motor Control Center, Fuel Transfer Pipe Replacement Design and Construction, among others. These were partially offset by the new projects added and updated cost estimates above.

### **CEB Impact**

- 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 and result in anticipated annual electrical savings of nearly \$600,000. Some examples include: the NMPS VFDs (\$187,000 in FY16), Winthrop Terminal Facility VFD Replacement (\$30,000 in FY16), Future SSPS VFD Replacements (\$120,000 in FY20), Transformer Replacements in (\$20,000 in FY16), Electrical Equipment Upgrades 4 (\$100,000 in FY16), and HVAC Equipment Replacement (\$126,000 in FY17).
- 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 the FY08 and FY09 CIP cycles. Additional capital reinvestment was required in the FY10 CIP. 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 discrete CIP program in FY08.

**Scope:** No new projects were added for the Clinton facility in the FY08 or FY09 cycle, since only projects with a priority rating of 1 or 2 were added per the Master Plan. The Clinton projects listed in the Master Plan all have a priority rating of 3 or 4. The Plant-wide Concrete Repair, Digester Cleaning & Rehab, and the Aeration Efficiency projects shown below were added for FY10 based on identified needs; three additional projects were added for FY12 (shown in bold text) to alleviate problems that occurred with the heavy rain and floods in 2010.

Sub-phase	Scope
Clinton Soda Ash Replacement	Added in the Final FY06 budget cycle. The soda ash delivery system required for pH control in the activated sludge process is obsolete and needs to be replaced. The contract was awarded in November 2007 and work was complete by August 2008.
Clinton Permanent Standby Generator	New for FY07. Install a permanent standby generator at the Clinton Wastewater Treatment Plant. Completed in November 2007.
Clinton Plant-Wide Concrete Repair	The concrete walls, walkways and structural support beams across the primary clarifiers and secondary trickling filters 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.
Clinton Digester Cleaning & Rehabs	Clinton's two digesters are approximately 20% filled with compacted grit which is limiting their efficiency. A new discharge permit to be issued soon includes phosphorous limits requiring both digesters to be used at all times. Need to empty, clean and rehab the tanks (replace covers, piping, valves, gas lancers and mixers) to operate under new permit. Awarded a contract for cleaning the first digester in May 2010, work completed by July 2010. The tank rehab work is scheduled to begin in late FY12.
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. The existing pumps cannot handle the high flow conditions that occur during very heavy and back-to back rain storms. This project will help to enhance the community system by ensuring that backups and untreated overflows are less likely to occur. Work expected to begin in FY12.

Sub-phase	Scope
<b>Phosphorous Removal</b>	Latest draft NPDES permit requires phosphorous removal to 0.15 mg/l. The Authority expects the permit to be issued in FY12 with four years allowed to achieve compliance. Current treatment system does not reduce phosphorous to required levels and this new process equipment is needed to achieve this limit. Process train would be sized to handle maximum daily flows. Will improve effluent discharge to river and watershed.
<b>Influent Gates</b>	Install two new 36-inch influent gates to control flow from Clinton and Lancaster which will help prevent potential flooding and protect plant assets. These gates would allow for throttling back on the plant flow during high flow conditions. Currently, all flows from upstream come directly to the plant. Heavy storms increase the flow beyond plant pumping capacity. These gates would allow for some control over the influent volume. The gates would have to be managed so that the plant wet well does not overflow, and upstream back-ups do not occur .

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$7,298	\$586	\$6,712	(\$78)	\$650	\$2,430	\$4,523	\$0

Project Status 5/11	8.9%	Status as % is approximation based on project budget and expenditures.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$3,115	\$7,298	\$4,182	Feb-13	Jan-16	35 mos.	\$2,771	\$2,430	(\$341)

#### Explanation of Changes

- Project cost, schedule, and spending changed due to new projects added for Clinton Wastewater Treatment Plant: Auxiliary Pumps (scope added to the aeration project), Phosphorous Removal, and Influent Gates. The reduction in FY09-13 spending is due to moving the expected NTP date for the phosphorous removal project one year later than was previously planned.

#### CEB Impact

- The projects are required to replace obsolete equipment and systems. The aeration efficiency project is projected to reduce Clinton's electricity usage. Assume (\$35,000) in incremental avoided costs as of FY13. The concrete repair, digester rehab, and phosphorous work may result in decreased maintenance and/or operating costs although the potential benefits have not been quantified at this time.

## S. 211 Laboratory Services

### 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 Central Laboratory at the Deer Island Treatment Plant began operating in 1995. The infrastructure needs to be maintained so that the laboratory operation can keep samples uncontaminated and the staff safe. 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.

**Scope:** These are specialty projects, all related to laboratory modifications. In the Proposed FY09 cycle, these sub-phases were moved from the DI Asset Protection Project and set up as a separate project. No new projects are added at this time.

Sub-phase	Scope
Metals Lab Fume Hood Replacement Design & Construction	Replace six metals lab fume hoods. Scope not included in other lab projects. Expanded the project to include a design & construction phase in FY09; previously expected the design to be done by As-Needed task order. Design began in January 2009, and the construction Notice to Proceed was issued in March of 2011, with a completion date of February 2012.
Metals Lab Modification Construction	Build-out of a laboratory room to house the new ICP/MS instrument. This trace metal analyzer needs clean space to function properly. Also, replace a failed fume hood and an obsolete TKN digestion unit in the Wet Chemistry lab. Contract was awarded in April 2007 and work was complete by September 2008.
Central Lab Renovations Design and Construction	Design and construction of improvements at the Central Lab at Deer Island. Improvements include changes in the physical layout to improve workflow; to capture fumes from sample containers and bottle-wash process; and replace deteriorated lab cabinets, sinks and counters, etc. Scope and funding was added to the DITP "HVAC Equipment Replacement" project in FY12.
Central Lab Fume Hood Replacements Construction	Replacement of approximately 35 fume hoods in the Lab at Deer Island not included in other projects above. This scope of work was added to the "HVAC Equipment Replacement" project under the Deer Island Treatment Plant Asset Protection program in FY11; the project costs were added to that project in the Final FY12 CIP. Work is scheduled to begin in FY14.
Central Lab Fume Hood Replacements Design	This project was to provide the design services for the project shown above; this scope (and associated funding) was added to the DITP Asset Protection program under the "HVAC Equipment Replacement Design" project, expected to commence in FY12.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
2,315	\$1,088	\$1,227	\$170	\$1,056	\$1,385	\$0	\$0

Project Status 5/11	50.7%	Status as % is approximation based on project budget and expenditures.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$6,667	\$2,315	(\$4,353)	Apr-15	Feb-12	(38) mos.	\$2,033	\$1,385	(\$647)

**Explanation of Changes**

- Project cost, schedule, and spending changed due to scope for Central Lab Renovations Design and Construction and the Central Lab Fume Hood Replacement Design and Construction projects were moved to DITP HVAC Equipment Replacement Construction contract.

**CEB Impact**

- 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.



## S. 271 Residuals Asset Protection

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### 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 2015, the major pieces of processing equipment will be 20 - 25 years old. The facility is currently in good condition, but significant reinvestment is anticipated in the FY14-18 timeframe. 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, NEFCO is responsible for all facility operation and maintenance including any necessary capital improvements until December 2015. They are 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; culminating in a decision point sometime in FY12-13.

A comprehensive Residuals Condition Assessment/Reliability Study began in May 2009 (with a study to assess the latest technology and regulatory trends planned as a second phase starting in FY12) followed by a Facility Plan/EIR project. These projects will review 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 an 8-year period (FY12-19). Scheduling of upgrade projects will be based on equipment failure risk, construction sequencing to maintain facility operations, and capital expenditure planning.

For the residuals biosolids processing facility, proposed spending of \$180.3 million on eighteen projects is identified in the 40-year master plan timeframe of FY07 through FY48. 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.

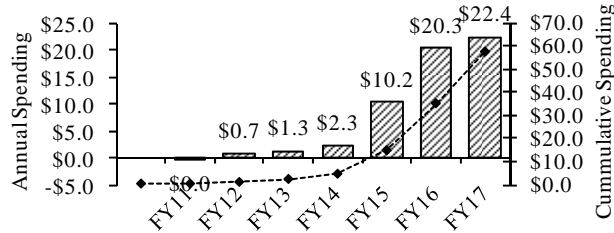
## Scope

Sub-phase	Scope
Condition Assessment/ Reliability Study* (1)	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 2 <sup>nd</sup> phase, Technology & Regulatory Assessment is scheduled to begin in FY12.
Residuals Plant Facility Plan/EIR* (1)	The design and construction of improvements to the plant utilities infrastructure (electric, water, sanitary, and drainage) may be necessary. This CIP project slated to start in FY13 will address issues identified during the initial study.
Residuals Plant Upgrades - Design & Constr* (1)	Select a consultant to design and oversee implementation of equipment replacements (all of the individual replacement projects listed below) to coincide with the end of the operations contract. The total project is estimated at \$4M for the designs and \$10M for ESDC/REI services during construction of all other subphases, for the duration of 8 years.
Six Rotary Dryer Replacements- Construction* (1)	Replace the rotary dryers. Estimated at \$20M over three years beginning in FY14, with repeat cycles in FY29 and FY44. 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* (1)	Replacement of the air scrubbers/packed towers. Estimated at \$3M to be spent over two years beginning in 2016, with repeat cycles every 15 years (FY31 and FY46).
Plant MCC Construction* (1)	Replacement of the motor control center (MCC) equipment. Estimated at \$1.5M over two years starting in FY17 with repeat cycles every 15 years (FY32 and FY47).
FRSA Pier Rehab Design & Construction* (2)	To complete a study, and then design for rehabilitation (or demolition) of piers at the Biosolids Processing Facility. This \$700k project was deleted in the FY10 cycle.
Rail System Rehab Construction* (2)	To rehabilitate portions of the rail system. Estimated at \$1M over two years beginning in FY17, with repeat cycles in FY32 and FY47 for \$1M each.
Replace 9 Pellet Storage Silos - Construction* (2)	To replace the pellet storage silos at the end of their expected useful life of 15 years. The project is estimated at \$2M with a duration of 2 years beginning in FY16. Based on the Master plan, the replacement cycle repeats in FY31 and FY46.
Sludge Feed Conveyor Replacement - Construction* (2)	Replacement of the sludge feed conveyors and weigh scales (from the centrifuges to the rotary dryers). The project is estimated at \$1M with a duration of one year beginning in FY15. Based on the Master plan, the conveyors and weigh scales may need to be replaced again in FY30 and FY45.
Sludge Storage Tank Rehab* (2)	Rehabilitation of the sludge storage tanks and related valves. Estimated at \$1M over one year beginning in FY16, with repeat cycles in FY31 and FY46.
Pumping Systems Upgrade - Construction* (2)	For the replacement or rehabilitation of the sludge, centrate, and chemical pumps. Cost estimate of \$2M with a duration of 2 years beginning in FY15. Future replacement or rehab cycles recur in 15-year intervals, in FY30 and FY45 at \$2M per cycle.
Replace 12 Centrifuges – Construction* (2)	To replace the sludge thickening centrifuges at the end of their expected 18-year useful life. The project is estimated at \$18M with a duration of two years beginning in FY16. Based on the Master plan, the centrifuges may need to be replaced again in FY33.
Utility Upgrades - Construction* (2)	Upgrades to the water, sewer, electrical, and telephone systems. Estimated at \$2M over two years beginning in FY17. Repeat cycles every 15 years (FY32 & FY47).
Odor Control System Upgrade - Construction* (2)	Replacement of the pipelines and odor control equipment for treating the off-gases from the sludge storage tanks prior to release to the atmosphere. Estimated at \$500k over one year beginning in FY18, with repeat cycles in FY33 and FY48.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$147,930	\$360	\$147,570	(\$14)	\$715	\$2,335	\$62,803	\$82,791

**Residuals Asset Protection**



Project Status 5/11	0.2%	Status as % is approximation based on project budget and expenditures. The Residuals Plant Condition Assessment/Reliability Study was completed in July 2010. Award of the Technology & Regulatory Review contract is anticipated to occur in FY12.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$147,930	\$147,930	\$0	Jun-48	Jun-48	None	\$4,596	\$2,335	(\$2,261)

**Explanation of Changes**

- Spending changed due to revised schedules for Residuals Facility Plan/EIR and Residuals Facilities Upgrade Design contracts.

**CEB Impact**

- 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 permittees 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 permittees 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 (and subsequent modifications), which produced a revised long-term plan for CSO control 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 a typical rainfall year 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 in a typical rainfall year 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 a 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 Schedule Seven it created revised milestones and also 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), 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 set of variance extensions was issued by DEP in September 2010 (for Alewife Brook/Upper Mystic River) and October 2010 (for Lower Charles River Basin). These extensions are in effect until September and October 2013, 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 control goals for each receiving water segment, including the Prison Point Facility amendment of May 2008, 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, including the general uncertainty associated with construction of tunnels or micro-tunnels and related shafts, such as with the Brookline Sewer Separation project, other subsurface work in urban areas, 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), the Town of Brookline 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. Updated project schedules are presented in Table 2. By June 2011, MWRA and the CSO communities had completed 29 of the 35 projects in the plan, and four projects were in design or construction. The two remaining projects, both associated with Alewife Brook, are scheduled for design commencement by April 2012. With this level of completion, MWRA has achieved significant progress in reducing CSO discharges to Boston Harbor and tributary rivers. The completed CSO projects, together with improvements to MWRA's wastewater conveyance and treatment systems, including the upgraded Deer Island Treatment Plant and associated pump stations, have reduced the total annual volume of CSO discharge in a typical rainfall year from 3.3 billion gallons in 1988 to 515 million gallons today, an 84% reduction,

with 79% of the remaining overflow receiving treatment at MWRA's four long-term CSO facilities. The remaining projects are scheduled to complete by December 2015.

**Table 1**

Receiving Water	CSO Discharge Goals (typical rainfall year)		Projects*	Capital Cost* (\$ million)
	Activations	Volume (million gallons)		
Alewife Brook/Upper Mystic River	7 untreated and 3 treated @ Somerville Marginal	7.3 3.5	<ul style="list-style-type: none"> <li>• Cambridge/Alewife Sewer Separation</li> <li>• MWR003 Gate and Rindge Siphon Relief</li> <li>• Interceptor Connection Upgrades</li> <li>• Somerville Baffle Manhole Separation</li> <li>• Cambridge Floatables Control (portion)</li> </ul>	60.3
Mystic River/Chelsea Creek Confluence and Chelsea Creek	4 untreated and 39 treated @ Somerville Marginal	0.6 60.6	<ul style="list-style-type: none"> <li>• Somerville Marginal CSO Facility Upgrade</li> <li>• Hydraulic Relief at BOS017</li> <li>• Chelsea Trunk Sewer Replacement</li> <li>• Chelsea Branch Sewer Relief</li> <li>• CHE008 Outfall Repairs</li> <li>• East Boston Branch Sewer Relief (portion)</li> </ul>	77.8
Charles River (including Stony Brook and Back Bay Fens)	3 untreated and 2 treated @ Cottage Farm	6.8 6.3	<ul style="list-style-type: none"> <li>• Cottage Farm CSO Facility Upgrade</li> <li>• Stony Brook Sewer Separation</li> <li>• Hydraulic Relief at CAM005</li> <li>• Cottage Farm Brookline Connection and Inflow Controls</li> <li>• Charles River Interceptor Gate Controls</li> <li>• Brookline Sewer Separation</li> <li>• Bulfinch Sewer Separation</li> <li>• MWRA Outfall Closings and Floatables Control</li> <li>• Cambridge Floatables Control (portion)</li> </ul>	91.0
Inner Harbor	6 untreated and 17 treated @ Prison Point	9.1 243.0	<ul style="list-style-type: none"> <li>• Prison Point CSO Facility Upgrade</li> <li>• Prison Point Optimization</li> <li>• BOS019 Storage Conduit</li> <li>• East Boston Branch Sewer Relief (portion)</li> </ul>	61.8
Fort Point Channel	3 untreated and 17 treated @ Union Park	2.5 71.4	<ul style="list-style-type: none"> <li>• Union Park Treatment Facility</li> <li>• BOS072-073 Sewer Separation and System Optimization</li> <li>• BWSC Floatables Control</li> <li>• Lower Dorchester Brook Sewer Modifications</li> </ul>	62.6
Constitution Beach	Eliminate		<ul style="list-style-type: none"> <li>• Constitution Beach Sewer Separation</li> </ul>	3.8
North Dorchester Bay	Eliminate		<ul style="list-style-type: none"> <li>• N. Dorchester Bay Storage Tunnel and Related Facilities</li> <li>• Pleasure Bay Storm Drain Improvements</li> <li>• Morrissey Blvd Storm Drain</li> </ul>	257.2
Reserved Channel	3 untreated	1.5	<ul style="list-style-type: none"> <li>• Reserved Channel Sewer Separation</li> </ul>	62.3
South Dorchester Bay	Eliminate		<ul style="list-style-type: none"> <li>• Fox Point CSO Facility Upgrade (interim improvement)</li> <li>• Commercial Pt. CSO Facility Upgrade (interim improvement)</li> <li>• South Dorchester Bay Sewer Separation</li> </ul>	126.8
Neponset River	Eliminate		<ul style="list-style-type: none"> <li>• Neponset River Sewer Separation</li> </ul>	2.4
Regional			<ul style="list-style-type: none"> <li>• Planning, Technical Support and Land Acquisition</li> </ul>	51.1
<b>TOTAL</b>		<b>413.3</b>		<b>857.1</b>
<b>Treated</b>		<b>384.8</b>		

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

MWRA’s capital 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 implementation of the CSO plan in 2015, with a required assessment report due by December 2020.

**Table 2**

Project (Shading indicates completed 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	Aug 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	Mar 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	Jan 13
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	Apr 12	Aug 14	Oct 15
	Interceptor Connection Relief and Floatables Control at SOM01A	Apr 12	Sep 13	Jun 14
Region-wide Floatables Control and Outfall Closings		Sep 96	Mar 99	Dec 07

(1) (2)



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 DEP water quality standards.

<b>Project</b>	<b>Purpose</b>
<b>MWRA Managed</b>	
North Dorchester Bay & Reserved Channel	Eliminate CSO discharges (25-year storm control) and provide a high level of separate stormwater control to greatly reduce 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.
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.
<b>Community Managed</b>	
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.

<b>Project</b>	<b>Purpose</b>
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 a 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 a 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, 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 a typical year.
Brookline Sewer Separation	Separate several areas of Brookline, totaling 72 acres, where there are remaining combined sewers tributary to MWRA's Charles River Valley Sewer. The project is intended to reduce treated CSO discharges to the Lower Charles River Basin at the Cottage Farm Facility.
Bulfinch Triangle Sewer Separation	Separate the combined sewers in a 61-acre area of Boston bounded by North Station, Haymarket Station, North Washington St., and Cambridge St. The project is intended to reduce CSO discharges to the Lower Charles River Basin and Upper Inner Harbor, reduce overflows to the Prison Point CSO Facility, and close outfall BOS049.

Project	Purpose
<b>CSO Support</b>	
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 activities, and acquisition of land, easements and construction permits required for CSO project implementation.

#### Expenditure Forecast (in \$000s) and Program Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$857,089	\$710,893	\$146,196	\$46,312	\$34,711	\$305,765	\$28,672	\$436

Program Status 5/11	87.7%	Status as % is approximation based on project budget and expenditures. MWRA and the CSO communities continue to make significant progress towards completing the remaining CSO projects in compliance with Schedule Seven. (See individual project status and background information).
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#### Changes to Program Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$885,630	\$857,089	(\$28,541)	Dec-15	Dec-15	None	\$336,936	\$305,765	(\$31,170)

#### Explanation of Changes

- MWRA Managed (\$2.3M)**  
 Project Changes: East Boston Branch Sewer Relief (\$2.3M), North Dorchester Bay CSO +\$0.6M, Charles River CSO Controls (\$0.8M).
- Community Managed (\$26.5M)**  
 Project Changes: Reserved Channel Sewer Separation (\$11.4M), Cambridge Sewer Separation (\$8.3M), Brookline Sewer Separation (\$3.7M), Morrissey Boulevard Storm Drain (\$3.3M).
- CSO Planning & Support +\$0.2M**  
 Project Changes: Land/Easement +\$0.2M

#### CEB Impact

- Completion and start-up of these projects will result in a total net increase of \$350,000 in FY17 for periodic cleaning of the tunnel.

# 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 commenced construction of the North Dorchester Bay tunnel in August 2006 and completed construction of the Pleasure Bay storm drain improvements in March 2006. MWRA completed the North Dorchester Bay tunnel and related facilities (including dewatering pumping station, 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.

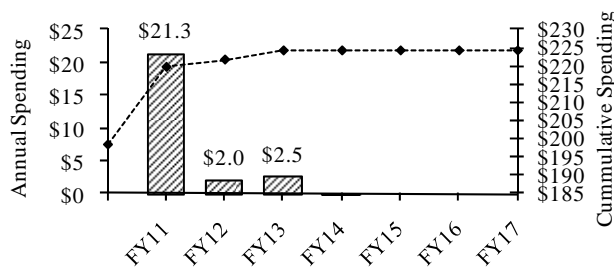
**Scope**

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 control 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 Dewater Pumping Station and Ventilation Building to include antennas, repeaters and radios.
North Dorchester Outfall Dredging/Cleaning Study/Design and Construction	This project includes cleaning/dredging of four outfalls in North Dorchester Bay to maintain service for the North Dorchester Bay CSO Project.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$224,252	\$198,404	\$25,848	\$21,340	\$2,002	\$85,205	\$5	\$0

**North Dorchester Bay**



Project Status 5/11	96.5%	Status as % is approximation based on project budget and expenditures. The Tunnel Construction contract was substantially complete in November 2009. In June 2006, the Authority executed a MOU with Massport for the Authority's construction on Massport land including the tunnel mining shaft and the dewatering pumping station. Construction of Pleasure Bay Drain Improvements was substantially complete on March 28, 2006. North Dorchester Outfall Dredging Design/ESDC was awarded in March 2011. The Dewatering Pump Station & Sewers and Ventilation Building construction contracts were substantially complete by May 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$223,649	\$224,252	\$604	May-11	Feb-13	21 mos.	\$84,606	\$85,205	\$599

**Explanation of Changes**

- Project cost, schedule, and planned spending primarily changed due to addition of North Dorchester Outfall Dredging work and final construction costs. Project cost partially offset by revised costs for Tunnel Design and Tunnel & Facilities Construction Management Services,

**CEB Impact**

- Estimate of \$350K in FY17 for periodic cleaning of the tunnel.

# S. 347 East Boston Branch Sewer Relief

## Project Purpose and Benefits

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

*To 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 and Boston Inner Harbor and facilitating the beneficial uses of these receiving water segments most of the time. 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 will relieve the interceptor system serving most of East Boston, minimizing CSO discharges to Boston Harbor and Chelsea Creek through outfalls BOS003-014. Existing sewers will be replaced using a combination of construction methods including microtunneling, pipe bursting and open cut. Some were rehabilitated using relining method. The rehabilitation construction contract commenced in March 2003 and was substantially completed in May 2004. Other design and construction was delayed pending completion of a project reassessment to assure cost benefit. Regulatory agreement that the original hydraulic relief project is the appropriate plan for East Boston CSO control was achieved in March 2006. In June 2006, Design 2/CS was awarded for completion of design and construction administration for the microtunneling and pipebursting contracts. In July 2008, the East Boston Branch Relief Sewer contract (microtunneling) was awarded. In April 2009, Sections 38 & 207 Replacement contract (pipebursting) was awarded. Construction of the project attained substantial completion in July 2010.

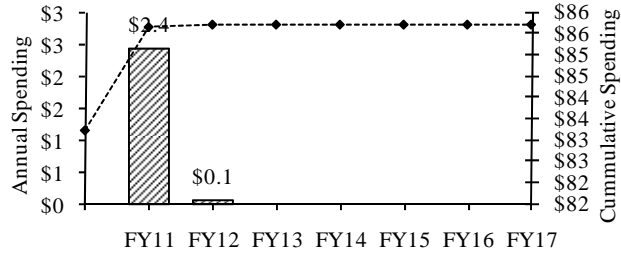
## Scope

Sub-phase	Scope
Design/CS/RI	Design, project reassessment, and construction administration/resident inspection for rehabilitation contract.
Design 2/CS	Completion of design for replacement of sewers by microtunneling and pipebursting contracts, and construction administration for these contracts.
Resident Inspection Services	Resident Inspection Services for the Design 2 construction contracts.
East Boston Branch Relief Sewer Construction	Construction of 13,500 feet of replacement sewers primarily by microtunneling.
East Boston Branch Sewer Rehab Construction	Rehabilitation of 5,400 feet of existing sewer.
Sections 38 & 207 Replacement Construction	Replacement of 6,000 feet of existing sewers by pipe bursting.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
85,715	\$83,221	\$2,494	\$2,437	\$56	\$75,009	\$0	\$0

**East Boston Branch Sewer Relief**



Project Status 5/11	99.9%	Status as % is approximation based on project budget and expenditures. The rehabilitation contract was substantially complete in May 2004. Design 2/CS was awarded in June 2006. East Boston Branch Relief Sewer and Section 38 & 207 construction contracts were substantially complete in July 2010.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$88,037	\$85,715	(\$2,322)	Jul-10	Jul-10	None	\$77,331	\$75,009	(\$2,322)

**Explanation of Changes**

- Project cost and planned spending decrease due to revised change order estimates and balancing credits for East Boston Branch Relief Sewer. Also, revised costs for Resident Inspection Services and design. This was partially offset by additional change orders for Section 38 and 207 Replacement contract.

**CEB Impact**

- No impacts identified at this time.



## S. 355 MWR003 Gate and Siphon

### Project Purpose and Benefits

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

*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*, and is part of the revised recommended CSO plan for Alewife Brook. The project consists of the following elements: an automated hydraulic relief gate and associated controls at CSO regulator RE031 upstream of CSO outfall MWR003; an inverted siphon barrel parallel to the existing inverted siphon barrel that conveys overflows from the Alewife Brook Sewer to MWR003; and floatables control consisting of an in-line net in 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. Also included are improvements to the Alewife Reservation in the immediate project area that are expected conditions of the Department of Conservation and Recreation (DCR) construction permit and license agreement, based on preliminary discussions with DCR. 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, 2010, and expected to be sequentially reissued through 2020.

### Scope

Sub-phase	Scope
Design	Design and engineering services during construction.
Construction	Construction of an automated gate and associated controls at Outfall MWR003, 150 feet of new siphon, interceptor relief at Outfall SOM01A and floatables controls at outfalls MWR003 and SOM01A.

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$3,682	\$0	\$3,682	\$0	\$60	\$430	\$3,252	\$0

Project Status 5/11	0.0%	Status as % is approximation based on project budget and expenditures. Design contract is now expected to be awarded in April 2012.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$3,489	\$3,682	\$193	Jan-15	Nov-15	11 mos.	\$445	\$430	(\$15)

**Explanation of Changes**

- Revised cost estimate to account for inflation adjustments due to new ENR index.
- Schedule and spending changed due to delay in commencement of construction of the City of Cambridge's Contract 12 (CAM004 Stormwater Outfall and Wetland Basin).

**CEB Impact**

- No impacts identified at this time.

# S. 357 Charles River CSO Controls

## Project Purpose and Benefits

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

*Implements wastewater system optimization measures, including structural and operational improvements, to further reduce CSO discharges to the Charles River Basin at and near the Cottage Farm CSO Facility. Also, evaluates the cost and benefit of making additional hydraulic interconnections within the interceptor systems related to Cottage Farm. This project is required to minimize CSO discharges to the Charles River Basin in accordance with the long-term control plan accepted by EPA, DEP and the Federal Court in April 2006.*

## Project History and Background

In response to the long-term CSO control plan MWRA recommended in 1997, DEP and EPA issued variances to water quality standards for the Charles River. With the variance, DEP approved and required implementation of MWRA’s plan for the Charles River Basin, and required MWRA to identify and evaluate additional measures that could further reduce CSO discharges to the Basin. In August 2005, MWRA recommended a series of optimization measures and investigations to further lower CSO discharges, including 1) bringing into operation the existing but unutilized 54-inch “Brookline Connection” that crosses beneath the Charles River from the Cottage Farm influent chamber (Cambridge side) to an improved connection with the South Charles Relief Sewer (Boston side); 2) developing gate controls and a control system to optimize and potentially automate the operation of the existing Cottage Farm influent gates; 3) providing a piped interconnection between the two overflow chambers outside the Cottage Farm facility and optimizing overflow weir settings within each chamber; 4) investigating and recommending a strategy for optimizing the transfer of flows between the Charles River Valley Sewer and the South Charles Relief Sewer using, if appropriate and beneficial, existing gates located at three connections between these interceptors; and 5) evaluating the feasibility of improving hydraulic performance along the North Charles Metropolitan Sewer and the North Charles Relief Sewer by creating new connections or modifying existing connections between these interceptors and by adjusting overflow regulators along these interceptors.

The Cottage Farm Brookline Connection Inflow Controls construction contract reached substantial completion in June 2009.

## Scope

<b>Sub-phase</b>	<b>Scope</b>
Cottage Farm Brookline Connection Inflow Controls Design CA	Design/CA services to bring the 54-inch Brookline Connection into operation; develop controls and operational strategy for the existing Cottage Farm influent gates and provide a piped interconnection between the two overflow chambers outside the Cottage Farm facility.
Cottage Farm Brookline Connection Inflow Controls Construction	Construction and implementation of the above improvements and controls, as recommended in design.
Interceptor Optimization Evaluations and Design CS/RI	Study, Design and CS/RI to implement an operational strategy for optimizing the transfer of flows between the Charles River Valley Sewer and the South Charles Relief Sewer using existing gates and to evaluate the feasibility of improving hydraulic performance along the North Charles Metropolitan Sewer and the North Charles Relief Sewer by creating new connections or modifying existing connections between these interceptors and by adjusting overflow regulators along these interceptors.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$3,633	\$3,466	\$167	\$167	\$0	\$2,532	\$0	\$0

Project Status 5/11	100%	Status as % is approximation based on project budget and expenditures. Design/CA contract for the Brookline Connection/Cottage Farm was completed in June 2010. Interceptor Optimization Engineering/Design was completed in January 2011. Cottage Farm Brookline Connection and Inflow Controls Construction was completed in June 2009 and wetlands restoration completed in June 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$4,406	\$3,633	(\$773)	Oct-11	Oct-11	None	\$3,305	\$2,532	(\$773)

**Explanation of Changes**

- Budget and spending decreased due to final cost adjustments.

**CEB Impact**

- No impacts identified at this time.

# **S. 340 South Dorchester Bay Sewer Separation (Fox Point)**

## **Project Purpose and Benefits**

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

*This project, together with sewer separation at Commercial 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 existing combined sewers for use as sanitary sewers. The plan calls for construction of approximately 71,000 feet of new storm drains. BWSC is implementing the project with MWRA funds.

A contract for design services was executed by 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 Fox Point CSO Facility in November 2007

## **Scope**

<b>Sub-phase</b>	<b>Scope</b>
Design	Design services for construction contracts to be bid, awarded and managed by BWSC.
Construction	Construction of 71,000 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**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$54,171	\$53,763	\$409	\$0	\$409	\$409	\$0	\$0

Project Status 5/11	99.2%	Status as % is approximation based on project budget and expenditures.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$54,171	\$54,171	\$0	Nov-06	Nov-06	None	\$409	\$409	\$0

**Explanation of Changes**

- N/A

**CEB Impact**

- Impacts absorbed within the current year's CEB.

# 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 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 evaluations to verify sufficient inflow has been removed from the sewer system, that the project performance objectives for the sewer system have been achieved, and that the CSO regulators can remain closed permanently. Downspout disconnection and inflow removal are expected to continue through June 2013.

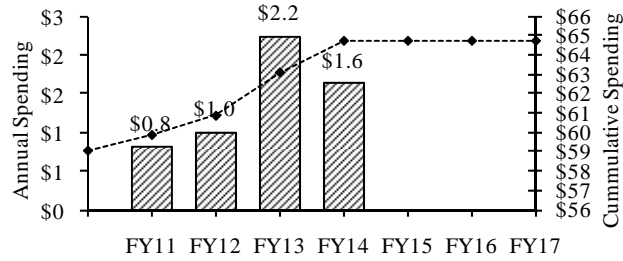
## Scope

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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$ 64,725	\$59,061	\$5,665	\$810	\$992	\$8,207	\$1,628	\$0

### South Dorchester Bay Sewer Separation -Commercial Point



Project Status 5/11	92.5%	Status as % is approximation based on project budget and expenditures.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$64,551	\$ 64,725	\$174	Jun-13	Jun-14	12 mos.	\$9,661	\$8,207	(\$1,454)

#### Explanation of Changes

- Schedule and spending changed to account for revised schedule from Boston Water & Sewer Commission for Dorchester Interceptor Relief work (continuing downspout disconnections and inflow removal).
- Project cost increased due to revised design cost for final design and police details.

#### CEB Impact

- Impacts absorbed within the current year's CEB.



# S. 344 Stony Brook Sewer Separation

## Project Purpose and Benefits

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

*To minimize CSO discharges to Stony Brook Conduit and the Back Bay Fens, both of which drain to the Charles River, by separating combined sewer systems in parts of Roxbury and Jamaica Plain. Implementation of the recommended sewer separation plan will reduce the number of overflows to the Stony Brook Conduit from as many as 22 to zero in a 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

This project, which involves constructing approximately 73,000 feet of new storm drains, is managed by BWSC with MWRA funds and oversight. The CIP reflects the 1997 FEIR recommendation for sewer separation. BWSC has agreed to complete the project and fund any costs in excess of \$45 million plus appropriate inflation adjustments.

BWSC commenced construction in July 2000 and completed the sewer separation work in September 2006, in compliance with Schedule Seven. Street paving, flow metering and analyses to verify the project's intended hydraulic performance and level of CSO control was performed in 2007 and 2008.

## Scope

Sub-phase	Scope
Design CS/RI	Design services managed by BWSC.
Construction	Construction of 73,000 feet of new storm drains, managed by BWSC.

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$44,333	\$44,197	\$136	\$2	\$0	(\$719)	\$0	\$0

Project Status 5/11	99.7%	Status as % is approximation based on project budget and expenditures.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$44,333	\$44,333	\$0	Sep-06	Sep-06	None	(\$719)	(\$719)	\$0

**Explanation of Changes**

- N/A

**CEB Impact**

- 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, 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 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.

**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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$55,702	\$24,863	\$30,838	\$4,603	\$6,788	\$27,926	\$9,325	\$0

Project Status 5/11	48.8%	Status as % is approximation based on project budget and expenditures.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$63,985	\$55,702	(\$8,283)	Dec-15	Dec-15	None	\$36,361	\$27,926	(\$8,435)

**Explanation of Changes**

- Project cost and spending changed primarily due to actual bid amount for Cambridge construction contract 12 being less than original estimate.

**CEB Impact**

- No impacts identified at this time.

# S. 356 Fort Point Channel Sewer Separation

## Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Fulfills a regulatory requirement*
- ☑ *Extends current asset life*

*To minimize CSO discharges to Fort Point Channel by separating combined sewer systems tributary to outfall BOS073 and implementing system optimization measures at BOS072. Implementation of the recommended sewer separation plan will reduce the number of overflows from these outfalls from as many as 23 to zero in a 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

On August 14, 2003, MWRA received a Certificate from the Secretary of Environmental Affairs accepting the Notice of Project Change that recommended replacing the Fort Point Channel CSO Storage Conduit project (1997 FEIR recommended plan) with a plan for sewer separation and system optimization. On September 17, 2003, the Board of Directors authorized the Executive Director to negotiate related revisions to the Federal Court Order in the Boston Harbor Case. On February 27, 2004, MWRA's motion to revise the court schedule was approved by the Federal Court.

MWRA and BWSC agreed that this project, like other sewer separation projects in the CSO control plan, would be implemented within the MOU and FAA, with BWSC performing final design, construction services and construction and MWRA funding eligible costs. BWSC would also own and operate the separated systems upon construction completion.

The project is intended to eliminate CSO discharges in a typical year at outfalls BOS072 and BOS073. On March 30, 2007, BWSC substantially completed construction of the project, in compliance with Schedule Seven. BWSC installed 4,550 linear feet of new storm drain and completed weir raising and floatables controls at the related CSO regulators. BWSC is conducting flow monitoring and hydraulics evaluations to verify that the CSO control goals have been met.

To reduce CSO discharges from the Lower Dorchester Brook Sewer to Fort Point Channel and to bring CSO discharges to the Fort Point Channel in line with the long-term level of control an additional phase was added to this project. BWSC has agreed to relocate a CSO regulator and perform limited sewer separation with a MWRA funding cap of \$2.03 million.

## Scope

Sub-phase	Scope
Design	Design services for construction contracts to be bid, awarded and managed by BWSC.
Construction	Construction of approximately 4,550 linear feet of new storm drains and appurtenant structures tributary to outfalls BOS072 and BOS073, managed by BWSC. 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 are also included.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$12,047	\$10,270	\$1,777	\$1,662	\$114	\$3,756	\$0	\$0

Project Status 5/11	99.0%	Status as % is approximation based on project budget and expenditures. Construction reached substantial completion in March 2007.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$12,062	\$12,047	(\$15)	Dec-10	Dec-10	None	\$3,770	\$3,756	(\$15)

**Explanation of Changes**

- Budget and spending decreased due to revised cost estimates.

**CEB Impact**

- 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. 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.

## Scope

Sub-phase	Scope
Design CS/RI	Design services for construction contracts to be 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$32,899	\$35,585	(\$2,687)	\$0	(\$2,946)	\$18,197	\$25	\$0

Project Status 5/11	98.2%	Status as % is approximation based on project budget and expenditures. Construction was substantially complete in July 2009.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$36,224	\$32,899	(\$3,325)	Jun-09	Jun-09	None	\$21,527	\$18,197	(\$3,330)

## Explanation of Changes

- Budget and spending decreased due to final eligibility costs for contract 2 and police.

## CEB Impact

- 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 a 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

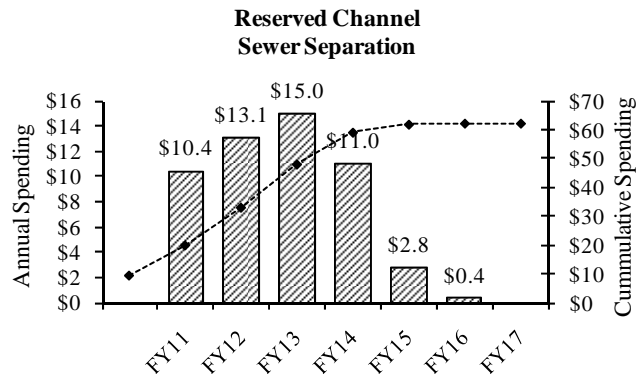
In April 2001, MWRA filed a Notice of Project Change with MEPA, recommending a reassessment of the overall CSO control approach for North Dorchester Bay and the Reserved Channel. The reassessment was completed in April 2004, when MWRA filed the Supplemental Facilities Plan and Environmental Impact Report 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 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 planned construction contracts for this project and has since issued notices to proceed for four additional construction contracts.

## 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$62,323	\$9,653	\$52,670	\$10,441	\$13,097	\$45,425	\$14,181	\$0





Project Status 5/11	32.2%	Status as % is approximation based on project budget and expenditures. BWSC began design in July 2006 and completed the first of eight construction contracts. Also, awarded contracts 3A, 3B and contract 7 in FY11.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY2	Chge.	FY11	FY12	Chge.
\$73,684	\$62,323	(\$11,361)	Dec-15	Dec-15	None	\$57,340	\$45,425	(\$11,915)

**Explanation of Changes**

- Project cost and spending changed due to updated cost estimates for Contracts 1, 3A, and 7, actual award for Contract 3B, and updated projected spending from BWSC.

**CEB Impact**

- No impacts identified at this time.

# S. 360 Brookline Sewer Separation

## Project Purpose and Benefits

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

To minimize CSO discharges to the Charles River by separating combined sewer systems in several areas of Brookline. Implementation of the recommended sewer separation plan will reduce the number of overflows to the Charles River. 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 response to the long-term CSO control plan MWRA recommended in 1997, DEP and EPA issued variances to water quality standards for the Charles River. With the variance, DEP approved (and required implementation of) MWRA's plan for the Charles River Basin, but maintained the water quality standard Class B pending the collection of additional water quality information and the evaluation of higher levels of CSO control. The original variance, issued in October 1998, and subsequent extensions to the variance required MWRA to prepare a report assessing the performance of the upgraded Cottage Farm CSO treatment facility. The report also evaluated the cost and benefit of constructing additional storage at this facility to lower treated discharges to the Basin. MWRA submitted the Cottage Farm CSO Facility Assessment Report to MEPA and DEP in January 2004. While concluding that additional storage at Cottage Farm would not be cost effective, the report also concluded that further CSO control could be achieved through system optimization and inflow removal such as with sewer separation projects already underway or planned by the City of Cambridge and the Town of Brookline. This project will 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 discharges to the Charles River at the Cottage Farm facility.

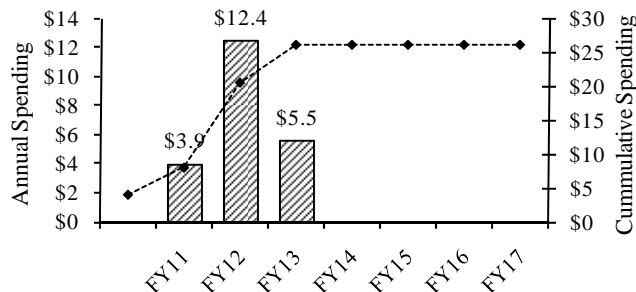
## Scope

Sub-phase	Scope
Design CS/RI	Design services for construction contracts to be bid, awarded and managed by the Town of Brookline.
Construction	Construction of new storm drains and appurtenant structures within a 72-acre tributary to MWRA's Charles River Valley Sewer, managed by the Town of Brookline.

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$25,930	\$4,100	\$21,831	\$3,937	\$12,394	\$24,659	\$0	\$0

Brookline Sewer Separation



Project Status 5/11	31.0%	Status as % is approximation based on project budget and expenditures. The Town of Brookline began design in November 2006 and completed the first of two construction contracts in November 2009. Contract 2 commenced in January 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$29,599	\$25,930	(\$3,669)	Jul-12	Nov-12	4 mos.	\$28,328	\$24,659	(\$3,669)

**Explanation of Changes**

- Project cost and spending changed primarily due to revised cost estimate for Contract 2 based on bid amount.
- Schedule changed due to revised schedule for contract 2 by the Town of Brookline.

**CEB Impact**

- No impacts identified at this time.

# S. 361 Bulfinch Triangle Sewer Separation

## Project Purpose and Benefits

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

To minimize CSO discharges to the Charles River by separating combined sewer systems in several areas of Boston, bounded by North Station, Haymarket Station, North Washington Street, and Cambridge Street. Implementation of the recommended sewer separation plan will reduce the number of overflows to the Charles River. 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 response to the long-term CSO control plan MWRA recommended in 1997, DEP and EPA issued variances to water quality standards for the Charles River. With the variance, DEP approved (and required implementation of) MWRA's plan for the Charles River Basin, but maintained the water quality standard Class B pending the collection of additional water quality information and the evaluation of higher levels of CSO control. The original variance, issued in October 1998, and subsequent extensions to the variance required MWRA to prepare a report assessing the performance of the upgraded Cottage Farm CSO treatment facility. The report also evaluated the cost and benefit of constructing additional storage at this facility to lower treated discharges to the Basin. MWRA submitted the Cottage Farm CSO Facility Assessment Report to MEPA and DEP in January 2004. While concluding that additional storage at Cottage Farm would not be cost effective, the report also concluded that further CSO control could be achieved through system optimization and inflow removal, such as with sewer separation projects already underway or planned by the City of Cambridge and the Town of Brookline. In 2005, MWRA identified and recommended a set of system optimization measures and inflow removal projects to further reduce treated CSO discharges at Cottage Farm. This project will separate the combined sewers in the area of Boston bounded by North Station, Haymarket Station, North Washington St, and Cambridge St. The project is intended to reduce discharges to the Charles River, reduce overflows to the Prison Point CSO facility and allow BWSC to permanently close outfall BOS049. BWSC attained substantial completion of this project in July 2010.

## Scope

Sub-phase	Scope
Design CS/RI	Design services for construction contracts to be bid, awarded and managed by BWSC.
Construction	Construction to separate the combined sewers in the area of Boston including North Station, Haymarket Station, North Washington St, Cambridge St and immediate environs, managed by BWSC.

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$9,986	\$8,961	\$1,025	\$896	\$128	\$9,489	\$0	\$0

Project Status 5/11	98.7%	Status as % is approximation based on project budget and expenditures. Construction was substantially complete in July 2010.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$9,986	\$9,986	\$0	Jul-10	Jul-10	None	\$9,489	\$9,489	\$0

**Explanation of Changes**

- N/A

**CEB Impact**

- 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 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 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.

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 new 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$51,128	\$48,786	\$2,343	\$17	\$1,616	\$5,348	\$256	\$436

Project Status 5/11	95.4%	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 will govern the Authority's construction on land owned by Massport, including the tunnel mining shaft and the dewatering pump station.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$50,892	\$51,128	\$236	Dec-20	Dec-20	None	\$5,190	\$5,348	\$158

**Explanation of Changes**

- Project cost and spending increased due to higher than anticipated permit and restoration costs.

**CEB Impact**

- No impacts identified at this time.



## S. 128 Infiltration/Inflow 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.

On August 19, 1992, the Board of Directors approved \$25 million to fund the initial phase of the I/I Local Financial Assistance Program. On June 28, 1995, the Board approved \$38.8 million to fund a second phase of the program. Both Phase 1 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 on June 24, 1998, an additional \$40 million for Phase 4 on June 13, 2001, an additional \$40 million for Phase 5 on June 23, 2004, an additional \$40 million for Phase 6 on June 28, 2006, an additional \$40 million for Phase 7 and an additional \$40 million for Phase 8 on June 24, 2009. The grant/loan ratio was revised for Phases 3 through 8 to 45% grants and 55% interest-free loans. 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 FY2021.

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$122,585	\$98,613	\$23,972	\$4,894	\$1,815	\$15,859	\$21,361	(\$6,036)

Project Distribution Status 5/11	68.9%	Through May 2011, MWRA has distributed \$80.5 million in grants and \$126.5 million in interest-free loans to fund over 400 separate projects in 43 communities under the I/I Local Financial Assistance Program.
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Project Repayment Status 5/11	59.0%	Through May 2011, a total of \$105.0 million has been repaid by member communities receiving interest-free loans.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$122,594	\$122,585	(\$9)	Jun-26	Jun-26	None	\$8,590	\$15,859	\$7,270

**Explanation of Changes**

- Spending decreased due to the timing of loan distributions and repayments.

**CEB Impact**

None

# **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 to MWRA customers' taps. The program began in 1995 and the principle components have been 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, including CIP funding for a completed sewer project and on-going land acquisition activities.

**MetroWest Water Supply Tunnel** The 17-mile-long 14-foot diameter tunnel connects the new John J. Carroll Water Treatment Plant at Walnut Hill in Marlborough to the greater Boston area. It is now the main transmission line moving water into the metropolitan Boston area. Once inspection, repairs and interconnections are complete, the old Hultman Aqueduct will be used in parallel as the back-up transmission link. Construction began on the tunnel in 1986 and the completed tunnel placed in service in October 2003.

**John J. Carroll Water Treatment Plant** The new 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 *Cryptosporidium* while reducing levels of chlorine disinfection byproducts. Ultraviolet light treatment is being added as a second primary disinfection process. 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. MWRA's Water Master Plan also identifies additional storage facilities, including the Spot Pond Storage Facility, that are currently scheduled to be built beginning in FY12.

**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 water mains in the MWRA and community systems. Water in direct contact with the iron 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 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.

## S. 542 Carroll Water Treatment Plant

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### 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 will be added 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 SDWA by the United States Environmental Protection Agency (USEPA) in Massachusetts.

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

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

The new 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, but the LT2ESWT rule will require a second primary disinfectant and a somewhat more stringent inactivation of cryptosporidium than the plant's current design. This project includes the addition of an ultraviolet light disinfection treatment process at the plant to meet requirements of the LT2ESWT rule.

## 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.
<i>Cryptosporidium</i> Inactivation Study	Determination of the site-specific efficacy of inactivating <i>Cryptosporidium</i> 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.
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.

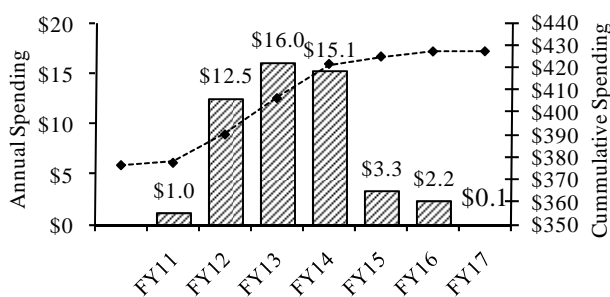
<b>Sub-phase</b>	<b>Scope</b>
WHCP4: Treatment Facilities	Construction of ozonation, corrosion control, chloramination operations and emergency generator buildings, modifications to Shafts B and C, and installation of system wide instrumentation from Wachusett Reservoir to Norumbega Reservoir.
WHCP6: 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, SCADA emergency OCC facilities for the new water treatment plant. In addition, the contract includes demolition of old electrical building, some miscellaneous items at Cosgrove Intake Building and replacement of the roof and HVAC system for Water Quality Lab at Southboro. Also, buildings rehab will incorporate achievable LEED (Leadership on Energy & Environmental Design) goals during detail design.
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 JJCWTP.
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.
Cosgrove Tunnel Inspection	Inspection of Cosgrove Tunnel while it is inactivated during construction of the connection to the Carroll Water Treatment Plant.
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.

Sub-phase	Scope
Walnut Hill Ultra Violet Disinfection Design, and Construction	Design and construction programs to add Ultra Violet (UV) to the JJCWTP.
As-Needed Technical Assistance #1 and #2	As-needed design services to support the start-up of the JJCWTP 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.
<b>Carroll Water Treatment Plant Storage Tank Roof Drainage System Repair</b>	Investigate the cause of the trench drainage system's poor performance. Design and construct a solution that addresses the cause. Poor roof drainage could possibly result in water quality problems.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$426,797	\$376,700	\$50,097	\$1,026	\$12,458	\$33,424	\$20,620	\$0

#### John J. Carroll Water Treatment Plant



Project Status 5/11	88.4%	Status as % is approximation based on project budget and expenditures. The Ultraviolet Design contract was awarded in April 2008. Closed Loop Cooling System, a contract of Ancillary Modifications Construction 2 subphase, was substantially complete in April 2010. Technical Assistance contracts 5 and 6 commenced in September 2010. Second Gaseous Oxygen Line was awarded in February 2011. Carroll Ultraviolet Disinfection Facility Construction was awarded in April 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$429,436	\$426,797	(\$2,639)	Dec-15	Jan-16	1 mos.	\$39,117	\$33,424	(\$5,693)

**Explanation of Changes**

- Project cost decrease due to actual award of the Ultraviolet Disinfection Construction contract being less than the engineer’s estimate. This was partially offset by the new sub-phase added for Carroll Water Treatment Storage Tank Roof Drainage System Repair.
- Schedule shifted for new sub-phase for Carroll Water Treatment Storage Tank Drainage System Repair.
- Spending decreased due to actual award noted above. Also, schedule change for Existing Facilities Modifications CP-7 and Fit-Out Construction.

**CEB Impact**

- Expect an increase of \$200,000 for FY14 for utilities and chemicals and a further increase of \$75,000 for operating costs for UV in FY15. Expect \$25K for Wachusett Algae Facility in FY16 and \$25K in FY17 for utilities.



# S. 543 Quabbin Water Treatment Plant

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## 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 siting 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.

**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.
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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$17,686	\$10,297	\$7,390	\$522	\$300	\$5,443	\$2,100	\$0

Project Status 5/11	60.5%	Status as % is approximation based on project budget and expenditures. Completed disinfection and contact time monitoring facilities in September 2000. The Quabbin Study/Pilot was completed in December 2005. Quabbin UVWTP Design CS/RI was awarded in September 2008 with the notice-to-proceed issued in December 2008.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$17,488	\$17,686	\$198	Sep-12	Aug-13	23 mos.	\$7,275	\$5,443	(\$1,833)

**Explanation of Changes**

- Project cost, schedule, and spending changed due to revised cost estimate and schedule for Quabbin Ultra Violet Disinfection Construction.

**CEB Impact**

- Annual incremental operating costs for UV treatment are estimated at \$50,000 in FY14.

# 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. Presently, the area relies on the existing open reservoir for non-potable emergency storage, creating the potential for supply disruption and a boil water order if repairs are needed on a major transmission line for Quincy and other communities in the Southern High Service Area. Covered distribution storage will equalize pressure at the extremities of the Southern High pressure zone and provide potable emergency storage in case of unexpected interruptions of supply. New covered storage facilities at the Blue Hills Reservation will have a capacity of 20 million gallons.*

## Project History and Background

Blue Hills Reservoir was constructed in the 1950's and was removed from active service in 1981 due to contamination from birds and animals. The reservoir is currently used as non-potable emergency supply. MWRA's long-term plan is to provide 320 million gallons of enclosed storage at various locations throughout the waterworks system. This quantity represents approximately one day of maximum demand. A covered storage facility in the Southern High Service Area will equalize water pressure during periods of peak demand and work 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 are proposed to be 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 will mitigate environmental impacts and improve the look of the finished site.

MWRA's consultant began conceptual design and environmental assessment activities in April 1997. The Secretary of Environmental Affairs certified the Final Environmental Impact Report as adequate and complete in December 2001. The DEP Commissioner issued a Wetlands Protection Act Variance for the project in November 2003, which was appealed by a citizens group. The wetlands appeal was dismissed by the Superior Court in October 2006 and MWRA awarded a Design/Build contract in November 2006 to complete the project.

## 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$40,695	\$39,841	\$854	\$446	\$15	\$21,457	\$349	\$0

Project Status 5/11	98.2%	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.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$40,681	\$40,695	\$14	Jan-13	Jan-14	12 mos.	\$21,759	\$21,457	(\$302)

**Explanation of Changes**

- Project cost changed due to inflation adjustment and change order.
- Spending and schedule changed due to Roadway Resurfacing work being pushed out one year.

**CEB Impact**

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

# S. 550 Spot Pond Storage Facility

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## 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, Boston Low, and East and West Spot Pond Mains) have been rehabilitated and their capacity has been restored to as-new condition. Once Spot Pond is replaced with a covered distribution reservoir it will be possible to operate the system as it was originally designed. The new Weston Covered Storage Facility at Loring Road (constructed as part of the MetroWest Tunnel project) replaced the open Weston Reservoir. Spot Pond Storage Facility will replace Spot Pond Reservoir.

The new Spot Pond Storage Facility will be approximately 8 feet lower in elevation than the Weston Facility. At night, when water demand is low, the capacity of the Low Service transmission mains will be used to fill the Spot Pond tanks by gravity. During peak demand periods of the day, water will flow into the Low Service System from both Loring Road and Spot Pond storage tanks.

At 20 million gallon capacity, the Spot Pond Storage Facility will be the same size as that at Loring Road. Just as pressure reducing valves allow the tanks at Loring Road to be filled from the high service Norumbega Covered Storage, the Spot Pond Storage tank will be filled with water reduced in pressure from the WASM 4 Transmission Main.

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

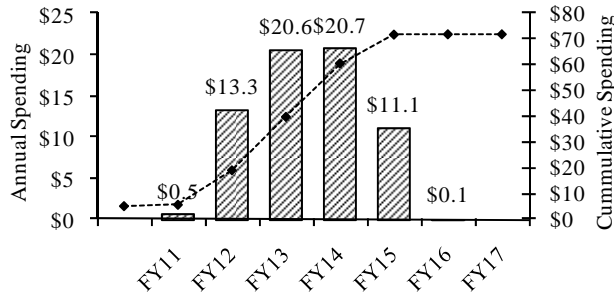
**Scope**

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

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$71,696	\$5,373	\$66,324	\$520	\$13,288	\$39,564	\$31,900	\$0

**Low Storage Near Spot Pond**



Project Status 5/11	7.9%	Status as % is approximation based on project budget and expenditures. Design Build is expected to begin in September 2011. Early Construction Water Connection was awarded in June 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY2	Chge.
\$62,547	\$71,696	\$9,149	Jul-14	Sep-14	3 mos.	\$37,974	\$39,564	\$1,589

**Explanation of Changes**

- Project cost and spending increased primarily due to revised Design/Build cost estimate.

**CEB Impact**

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

# S. 604 MetroWest Water Supply Tunnel

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## 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 new 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, rely 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 will provide 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. On May 9, 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 will allow 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 September 2009 construction began 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 will be bid (CP6B) to rehabilitate the remainder of the Hultman Aqueduct from Shaft C of the Cosgrove Tunnel to Shaft 1 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 will be 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**

<b>Sub-phase</b>	<b>Scope</b>
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-foot 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.
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.

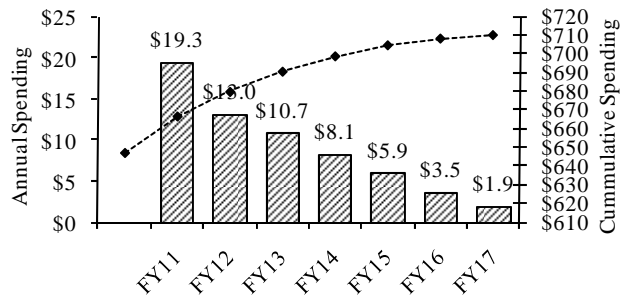
<b>Sub-phase</b>	<b>Scope</b>
Construction: Eastern Tunnel Segment – CP3A	Construction of the eastern portion of the tunnel. An approximately 4,400-foot long, 12-foot finished diameter tunnel was constructed from the Shaft 5A bottom through the “WYE” where it meets the Middle Tunnel Segment and on to 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-foot 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.
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.

<b>Sub-phase</b>	<b>Scope</b>
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 CP6ALower 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 65 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	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.
<b>Shaft 5A/5 Surface Piping Inspection/Restoration</b>	Internal inspection of surface piping in the Shaft 5A / Shaft 5 area. Restore pipe coating systems, cathodic protection systems, thrust restraint, and drainage system.
<b>Shaft 5 Electrical Upgrade</b>	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**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$710,719	\$647,170	\$63,549	\$19,299	\$12,980	\$56,375	\$19,544	\$1,000

## Metro West Tunnel



Project Status 5/11	94.1%	Status as % is approximation based on project budget and expenditures. Placed MetroWest Tunnel into service in November 2003. Awarded Hultman Interconnect Final Design/CA contract in September 2005. CP6A Lower Hultman Rehab began in September 2009. Expect Upper Hultman CP6B contract to be awarded in 2011.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$704,027	\$710,719	\$6,692	Sep-14	Jan-20	76 mos.	\$49,914	\$56,375	\$6,461

### Explanation of Changes

- Project cost increase is primarily due to new projects added for Shaft 5A/5 Surface Piping Inspection/Restoration and Shaft 5 Electrical Upgrades. Also revised cost estimate for Upper Hultman CP-6B and additional change orders for CP6A Lower Hultman Rehabilitation construction.
- Schedule changed due to new projects added above.
- Spending changed due to accelerated schedule for CP6A Lower Hultman Rehabilitation, and cost and schedule change for CP6B Upper Hultman Rehabilitation. This increase was partially offset by revised schedule for Valve Chamber Storage Access Improvements contract.

### CEB Impact

- No additional costs identified at this time.

# S. 615 Chicopee Valley Aqueduct Redundancy

## Project Purpose and Benefits

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

*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.*

## Project History and Background

The Chicopee Valley Aqueduct (CVA) supplies water to South Hadley Fire District No. 1, Chicopee, and Wilbraham. The 48-inch and 36-inch diameter aqueduct was built in 1949 of reinforced concrete pipe with an embedded steel cylinder. It is the only means of supplying these communities with water. The capacity of the aqueduct is 23 million gallons per day, which is sufficient to meet the communities' peak summer demand. It is currently not possible to perform routine maintenance without disrupting supply to these communities. If supply through the CVA were shut off upstream of Nash Hill Covered Storage, Chicopee would be without water after two days, and South Hadley and Wilbraham would be without water even sooner. If the CVA were shut off downstream of Nash Hill Covered Storage, Chicopee would be immediately without water supply.

New construction under this project consists of a 8,100 feet long second barrel of the CVA from Nash Hill Covered Storage to Chicopee of 30-inch diameter pipe; 3,100 feet of 16-inch redundant pipeline between the Nash Hill Covered Storage and the South Hadley takeoff; and 2,400 feet of 20-inch redundant pipeline between the Route 21 Valve Chamber and the Wilbraham takeoff, new fire tanker hookups within the three host communities of Ludlow, Ware, and Belchertown, and two emergency mutual aid interconnections between the CVA system and the Springfield Water & Sewer Commission system in Ludlow. With these new pipelines in place, the three communities will be connected to Quabbin Reservoir, Nash Hill Covered Storage, or both in the event of a failure anywhere along the length of the aqueduct. Construction also includes rehabilitation of the Bondsville throttling station and the Route 21 Valve Chamber. This project will also provide additional mainline valves along the aqueduct that will help isolate manageable segments of the CVA; and rehabilitate appurtenances such as meters, air valves, and blow-off valves.

## Scope

Sub-phase	Scope
Pipeline Redundancy – Planning	In-house planning of redundant pipelines and aqueducts for Chicopee, South Hadley Fire District # 1, and Wilbraham.
Pipeline Redundancy – Design and Construction	Design, construction administration, resident inspection, and construction for CVA redundancy facilities.

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY10	FY11	FY09-13	FY14-18	Beyond FY18
\$8,667	\$8,667	\$0	\$0	\$0	\$95	\$0	\$0

Project Status 5/11	100%	Status as % is approximation based on project budget and expenditures. Construction was substantially complete in April 2008.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$8,605	\$8,667	\$62	Apr-08	Apr-08	None	\$34	\$95	\$61

**Explanation of Changes**

- Project cost increased due to final cost adjustments. Contracts are completed.

**CEB Impact**

- None identified at this time.

## **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)*

*To investigate the licensing and rehabilitation of the turbine generator at the Winsor Station in Belchertown to produce hydroelectric power to be used to sell to the electric grid, or to potentially provide power to other MWRA facilities. Also, to consider station piping improvements which would allow water to go to the Swift River without going through the isolation valve and determine 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 hydroelectric turbine/generator unit that is inoperative due to a fire in 1991 that destroyed the electrical switchgear. A bypass valve at the Winsor Station house also allows flow to be discharged directly to the Swift River.

Around the time that the fire occurred, hydropower re-development was not a priority given the low value of energy and the capital costs of station rehabilitation (in addition to switchgear replacement, turbine/generator repairs were also required). Another factor that forestalled hydropower development was that the Winsor dam hydroelectric facilities were never licensed by the Federal Energy Regulatory Commission (FERC). Shortly before the fire occurred, FERC directed MWRA to license the facilities. Given that the Swift River hosts a valued trout fishery, fishery concerns promised to complicate an already onerous federal licensing process.

Efforts to rehabilitate the Winsor Station facilities began in 1995 when MWRA obtained a preliminary permit from FERC, the first step in the FERC process. The FERC preliminary permit secures the applicant a priority position to file a license application for development - it does not authorize development, however. The permit's conditions required MWRA to consult with resource agencies and to conduct environmental and engineering studies to assess the project's feasibility and to support a license application. Therefore, MWRA consulted with resource agencies and conducted a number of environmental studies required for a license application. Some specialized fisheries studies were conducted by a consultant; various other studies were prepared in-house by MWRA with assistance from MDC staff.

Engineering and economic feasibility studies and concept design were also required to develop information to satisfy FERC's license requirements and to develop preliminary cost information to support financial analysis and decisions regarding whether or not to proceed with hydropower re-development. Accordingly, in 1997, MWRA procured the services of Duke Engineering and Services (DE&S) to conduct certain technical evaluations.

The first phase of work was completed in mid-1998. DE&S evaluated two alternatives for redeveloping Winsor Dam hydropower facilities. The study found that it would be feasible to 1) rehabilitate the existing turbine/generator; or 2) install a new turbine generator that would operate at higher efficiencies due to modern technology and a design optimized for minimum flow conditions and 24-hour/day operations.

Funding of the hydroelectric sub-phase for an updated feasibility study to address permitting and energy economics at the Winsor Station has been deleted. Hydroelectric operation will be included in the Hatchery Pipeline project.

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 subphases are needed to address the extensive work on the Quabbin Transmission System and the Swift River bypasses. These subphases 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 and Winsor Station Upgrades - To replace the antiquated and unreliable shutter system with a sluice gate to control flow in the Quabbin Aqueduct and inspect the Quabbin Tunnel and recommend maintenance or repairs.
- 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 utilized at the Ware Disinfection Facility and surplus power will be sold back to the grid.

**Scope**

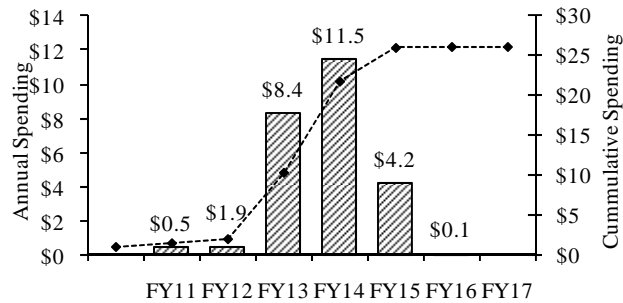
<b>Sub-phase</b>	<b>Scope</b>
Preliminary Permit Study	Study to determine project feasibility.
Design and Construction Quabbin Aqueduct and Winsor Station Upgrades	Design to address station piping improvements for water supply and Swift River discharge. The work also includes rehabilitation and improvements at Shafts 2 and 12, and inspection of the Quabbin Aqueduct. Installation of a roller to control flow at Shaft 12, the intake to the Quabbin Aqueduct, thereby improving safety and reliability of the transmission system. Construction to address piping improvements and building rehabilitation for water supply and Swift River discharge.
Hatchery Pipeline Design and Construction	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 for use at the Ware Disinfection Facility and surplus sold back to the grid. The hydro turbine currently is not funded but will be included in the FY13 Proposed CIP.
Winsor Station Chapman Valve Repair	Construction of replacement valving for the existing 36” Chapman Butterfly Valve (design by Technical Assistance consultant).
Purchase of Sleeve Valves	For replacing the damaged Chapman Butterfly Valve.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$26,082	\$933	\$25,149	\$471	\$509	\$10,231	\$15,813	\$0



## Winsor Station/Pipeline Improvements



Project Status 5/11	5.1%	Status as % is approximation based on project budget and expenditures. Winsor Station Chapman Valve Repair commenced in February 2009. Design for Shaft 12 Quabbin Aqueduct and Winsor Station Upgrades Notice-to-Proceed was issued in December 2009. Hatchery Pipeline Design/ESDC/RI expected to commence in 2011.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$14,866	\$26,082	\$11,216	Jun-14	Jun-14	None	\$7,458	\$10,231	\$2,773

### Explanation of Changes

- Project cost increased due to revised cost estimates for Winsor Station Rehabilitation & Improvements and Hatchery Pipeline Construction contracts.
- Planned spending shift due to updated cost estimate for Winsor Station Rehabilitation and Hatchery Pipeline contracts noted above.

### 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 will be needed in Phase I Valve Rehabilitation, require 6 to 10 months to fabricate and must be pre-purchased so the valves will be available for installation.
Oakdale Phase 1A Electrical Design & Construction	Upgrade the 60 year old Oakdale electrical control systems & the switchyard which are antiquated and unsafe to personnel. Will lower the voltage from 2,200 to 480.

Ware River Intake Valve Replacement	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	Replace current motorized screens on the CVA Intake which are nearing the end of their useful life. The screens keep debris from entering CVA.
Wachusett Lower Gatehouse Rehabilitation	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.
<b>Rehabilitation of Oakdale Turbine</b>	Rehabilitate turbine. Turbine was last rehabilitated in 1986 and we will be approaching thirty years which is the expected life of an overhaul.
<b>Geo-thermal Heat Wachusett Gatehouse</b>	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.
<b>Rehabilitate Wachusett Gatehouse Chamber 4 Piping</b>	Rehabilitate the piping in chamber 4 of the Lower Gatehouse. Investigate the possibility of simplifying the layout and reducing the number of valves. Existing piping and valves are of poor quality. Other piping and valves of the same age in this facility have already been replaced.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$13,547	\$4,513	\$9,034	\$283	\$1,250	\$2,981	\$3,843	\$2,300

Project Status 5/11	35.0%	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 Electrical Design phase began in October 2009.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$11,420	\$13,547	\$2,127	Jun-18	Jan-21	31 mos.	\$3,068	\$2,981	(\$87)

#### Explanation of Changes

- Project cost and schedule changed due to new projects added for Rehabilitation of Oakdale Turbine, Geothermal Heat Wachusett Gatehouse, and Rehabilitate Wachusett Gatehouse Chamber 4 Piping.

#### CEB Impact

- 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	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).

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$4,288	\$651	\$3,637	\$9	\$0	\$310	\$3,343	\$0

Project Status 5/11	15.4%	Status as % is approximation based on project budget and expenditures. Inspection of Sudbury Aqueduct was completed in October 2006. Short Term Repairs Phase 1 is expected to begin in July 2012.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$3,267	\$4,288	\$1,021	Jul-13	Jan-16	30 mos.	\$1,836	\$310	(\$1,526)

**Explanation of Changes**

- Project cost and schedule changed primarily due new sub-phases added for Ash St. Sluice Gates.
- Project spending changed due to revised schedule for Sudbury Short-Term Repairs Phase 2.

**CEB Impact**

- None identified at this time.

# S. 620 Wachusett Reservoir Spillway Improvements/Winsor Dam Repair

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## Project Purpose and Benefit

- Extends current asset life
- Improves system operability and/or reliability.

*Project will provide the necessary spillway improvements to the Wachusett Reservoir Dam including replacing the existing flashboards with motorized gate for regulating the reservoir water level and improving its storage capacity. This project will also repair the Winsor Dam drainage system to include upgrading the existing 24" corrugated metal pipe (CMP) and the 24" clay tile pipe to improve surface drainage and its water quality discharged into the Swift River.*

## Project History and Background

The Winsor Dam (Quabbin Reservoir) and the Wachusett Reservoir Dam are more than 60 and 100 years old respectively. Previously they were under the care and control of the Department of Conservation and Recreation (DCR), formerly the Metropolitan District Commission (MDC). However, MWRA assumed responsibility for capital improvements to this facility as of April 2004 per legislative approval of a Memorandum of Understanding between the MWRA and the Massachusetts DCR. This project will upgrade the existing flashboards that regulate the reservoir water level and improve its water storage capacity at the Wachusett reservoir, and rehabilitate the existing drainage system at the downstream of Winsor Dam.

The Wachusett Reservoir Dam is part of the major dam system that will be inspected, tested and repaired if necessary under a separate project. However, more urgently, its spillway and dike on the north side of the reservoir have shown signs of wear and tear since the early 1990s. In 1992, the DCR had contracted GZA Consultant to design the needed repairs to the dike as well as a series of mechanically operated gates to replace the old flashboards (100 ft lower section) that are used to regulate the reservoir level and to control flood. However, DCR postponed this project due to difficulty in issuing bonds to finance the work.

The scope of the Wachusett Reservoir Spillway portion of this project includes inspection and reassessment of the conditions for the entire spillway (100 ft lower section as well as 350 ft upper section) and the North Dike, and review of the existing Hydraulics & Hydrology study. Based on the H&H study results it will ensure that the auxiliary spillway channel will, together with the existing spillway, be able to pass the maximum probable flood (MPF). Also, included is design for the installation of the crest gate and piezometers. It also covers review and revision of the twelve (12) year old design as necessary to bring the existing design plans and specifications up to date for construction.

The Winsor Dam Repair portion of this project provides a review of the completed existing design specifications and drawings that were produced by the DCR. Work includes repair or replacing the drainage system and installing piezometers for monitoring any dam seepage.

During preparations for improvements at the Wachusett Dam and Spillway in early 2007, samples of caulk and concrete mortar from the exterior concrete construction joints on Wachusett Dam crest and its downstream dam face were collected and analyzed. Results of analyses conducted on the caulk and efflorescence samples indicated the presence of polychlorinated biphenyls (PCBs) in the exterior caulking materials in concentrations higher than limits allowable by the United States Environmental Protection Agency in accordance with the Toxic Substance Control Act.

Results of samples taken at the nearby Cosgrove Intake Building and Shaft A structure, which were constructed under a single contract in the mid-1960s, also confirmed the presence of PCB-containing caulk. Three separate PCB-removal contracts were developed based on the locations, potential PCB impacts and the structural functions of

the impacted facilities. The first contract removed PCBs at the Cosgrove Intake Building and Shaft A, and the second contract removed PCBs from the crest of the Wachusett Dam. The third and final contract provided removal of PCBs that had migrated through run-off into the efflorescence mortar joints on the downstream side of the Wachusett Dam face and the soil at the toe of the dam.

**Scope**

<b>Sub-phase</b>	<b>Scope</b>
Design and Construction	Covers inspection and reassessment of the design and including Engineering Services during Construction (ESDC) and Resident Inspection (RI) for the rehabilitation of the spillway and dike at the Wachusett Reservoir and the drainage system at the Quabbin Reservoir.
Equipment Pre-Purchase	Pre-purchase the Wachusett Crest Gate so that it will be fabricated and delivered in time for installation by the construction contractor.
Cosgrove and Shaft A PCB Removal	Phase 1 covers remediation of PCB contaminated materials at the Cosgrove Intake and Shaft A.
Wachusett Dam PCB Removal	Phase 1 also covers remediation of PCB contaminated materials on the dam crest, and providing new water proofing and new concrete top slab of the dam.
Phase 2 PCB Material Remediation	Phase 2 has remediated PCB material that has migrated to the downstream dam face and into the soil at the toe of the dam.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$9,498	\$9,305	\$194	\$194	\$0	1,448	\$0	\$0

Project Status 5/11	99.9%	Status as % is approximation based on project budget and expenditures. Design contract was awarded in January 2006. Construction reached substantial completion in November 2008. Cosgrove and Shaft A PCB Removal work reached substantial completion in October 2008. Wachusett Dam PCB Removal work reached substantial completion in November 2008. Phase 2 PCB Material Remediation reached substantial completion in July 2010.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$11,944	\$9,498	(\$2,446)	Jul-10	Jul-10	None	\$3,894	\$1,448	(\$2,446)

**Explanation of Changes**

- Project cost and spending decrease due to costs reclassification of costs to comply with GASB 49 (Pollution Remediation).

**CEB Impact**

- 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 15, 2004 meeting, the MWRA Board of Directors approved the use of MWRA bond proceeds for such purpose.

### Scope

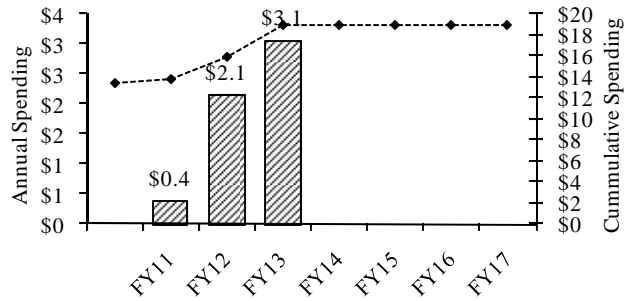
Sub-phase	Scope
Land Acquisition	Acquire parcels of real estate or interests in real estate critical to protection of the watershed and source water quality.

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$19,000	\$13,419	\$5,582	\$375	\$2,147	\$10,793	\$0	\$0



### Watershed Land



Project Status 5/11	72.6%	Status as % is approximation based on project budget and expenditures. MWRA began purchasing land in FY07.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY2	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$19,000	\$19,000	\$0	Jun-12	Jun-12	None	\$10,793	\$10,793	\$0

#### Explanation of Changes

- N/A

#### CEB Impact

- 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, require modifications to the Framingham Reservoir No. 3 (Foss) Dam and the Weston Reservoir 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 these two dams, Foss Dam will require spillway modifications and a parapet wave wall to pass the SDF while at the much smaller Weston Reservoir, the dam will only require the parapet wave wall to safely contain the SDF.

Additionally, all earthen dams and masonry dams under MWRA responsibility were built in the late 1800s to early 1900s and are in need of repairs. Based on ongoing inspections, immediate repairs such as riprap 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. Equip Framingham Reservoir No. 3 (Foss) Dam's existing spillway with a reliable non-mechanical gate system capable of passing Massachusetts' regulatory spillway design flood (SDF). Construct parapet wave walls on dam crests to safely contain the SDF at the Foss and Weston Reservoir Dams. Design required repair measures at the Foss, Weston, Sudbury, Chestnut Hill and Wachusett Open Channel Lower dams and associated gatehouses.
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.
<b>Goodnough Dike Drainage Improvement</b>	Restoring proper drainage to the downstream discharge location of the Goodnough Dike toe drain system. Continued flooding of the toe drain system due to downstream conditions could lead to internal problems within the dam and overall dam safety concerns. Recent inspection of the flooded drain system and downstream conditions indicate water is backing-up into the toe drain system. 302 CMR 10:00 Dam Safety Regulations require proper correction of deficiencies identified by licensed dam safety engineers. This is a High-Hazard-class-Dam for the largest reservoir in MWRA system. Proper functioning of the overall drain system is critical to maintenance of this earthen dam.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$8,181	\$354	\$7,827	\$430	\$1,411	\$4,797	\$3,384	\$0

Project Status 5/11	8.9%	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 was awarded in June 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$8,739	\$8,181	(\$558)	Jun-16	Dec-15	(6) mos.	\$6,757	\$4,797	(\$1,961)

**Explanation of Changes**

- Project cost changed due to revised cost estimate for Dam Safety Modifications & Repairs and deleting budget for Oakdale Preliminary Design/Permit sub-phase as work will be done as part of a Technical Assistance contract. This was partially offset by new project added for Goodnough Dike Drainage Improvements.
- Spending decreased due to revised cost estimate for the combined Dam Safety Modifications & Repairs CP-1 and CP-2 and elimination of Oakdale Preliminary Design/Permits budget.

**CEB Impact**

- No impacts identified at this time.

## S. 625 Long Term Redundancy

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### 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 Aqueduct.*

### 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 will evaluate alternatives and develop conceptual designs and cost estimates to provide redundancy for the metropolitan tunnel system and the Cosgrove Tunnel.

The metropolitan tunnel system will be 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 has involved 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 is to develop and evaluate alternative surface pipe improvements, in addition to previously proposed tunnel loops, to achieve the required 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. While the integrity of the underground tunnel sections is believed to be good based on very low, unaccounted for water levels in the MWRA transmission system, there is still risk of failure mainly due to pipe failures at the surface connections to the distribution system or major subsurface issues such as structural issues due to earthquake or faults. A rupture of piping at surface connection 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 repairs. Although the assumption is that tunnels have a useful life of 100 years, due to the need to keep these lines in service, these subsurface structures have not been inspected and their actual condition is unknown. 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 tanks also provide mitigation of the effects of piping rupture at these points.

In the event of a failure of the City Tunnel, a limited amount of water could be transferred through the WASM 3 line (scheduled for major rehabilitation) and WASM 4 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.

If the Dorchester Tunnel were to experience a problem, flow could be routed to the south through surface mains. However, this relies on the completion of the Chestnut Hill Connecting Mains project.

A 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. The recommendations of the study will form the basis for subsequent projects for MEPA environmental review, permitting, design and construction. On June 9, 2010 and June 30, 2010, staff presented the findings and recommendations for the metropolitan tunnel system to the Board of Directors.

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 system, the recommended plan includes both northern and southern components. The southern components are identified below in the Sudbury Aqueduct Design/CA/RI and Construction. The northern components are addressed in the Weston Aqueduct Supply Mains (WASM) 3 project.

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.

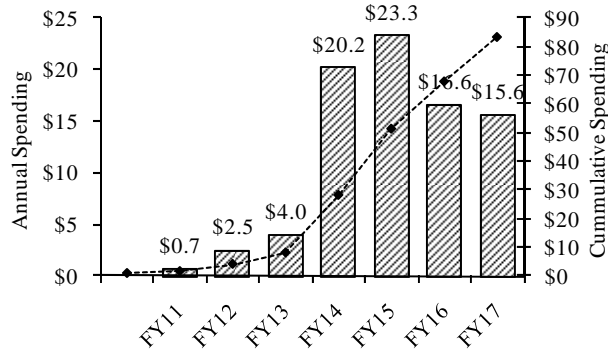
### Scope

Sub-phase	Scope
Water Transmission Redundancy Plan	Redundancy Study/Tunnel Alternatives for long term redundancy.
Cosgrove Tunnel Redundancy Pump Station Design/ESDC/RI and Construction	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 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 pumping 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 completion of the on-going 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 Preliminary Design/EIR, Design CA/RI, MWWST/Sudbury Aqueduct Connection Construction, Sudbury Aqueduct Slipline Construction, Chestnut Hill Final Connections Construction	Design and construction for providing redundancy for the Southern Metropolitan area. The southern component consists of pressurizing the Sudbury Aqueduct from Needham to Chestnut Hill and connecting it to the Chestnut Hill Emergency Pump Station, constructing an emergency generator for the Chestnut Hill Emergency Pump Station, and constructing a tunnel or surface pipe from the Sudbury Aqueduct to either Shaft 5/5A or the Norumbega site of the Metro West Supply Tunnel/Hultman Aqueduct system.
Tops of Shafts Rehab Design CA/RI and Construction	Design and construction of rehabilitation/replacement of connecting pipes and valves at the top of tunnel shafts throughout the metropolitan tunnel system.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$338,053	\$730	\$337,323	\$682	\$2,518	\$7,952	\$99,147	\$230,955

**Long Term Redundancy**



Project Status 5/11	0.4%	Status as % is approximation based on project budget and expenditures. An engineering services contract for the Water Transmission Redundancy Plan was awarded in September 2008. Staff presented the findings of this study to the Board of Directors in January and June 2010.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$326,032	\$338,053	\$12,021	Dec-21	Jun-21	(6) mos.	\$12,477	\$7,952	(\$4,524)

**Explanation of Changes**

- Project cost, schedule, and spending changed due to redundancy initiatives being further defined and broken out into several sub-phases and re-phased with updated cost estimates and schedules including work transferred from the Chestnut Hill Connecting Mains project. Also, Sudbury Aqueduct Construction broken out into phases for MWWST/Sudbury Aqueduct Construction and Sudbury Aqueduct Slipline Construction.

**CEB Impact**

- No impacts 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 retrofit approximately 500 blow-off valves and replace 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 responses reduce 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 retrofitting of the blow off valves to provide air gaps to ensure that non-potable water cannot reach the potable water lines. In addition, many of the main line valves in the system are significantly beyond their original design life. Many of these are either inoperable or inadequate and require replacement, repair or retrofitting.

However, significant progress has been made in the last several years in correcting the cross connections at the 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

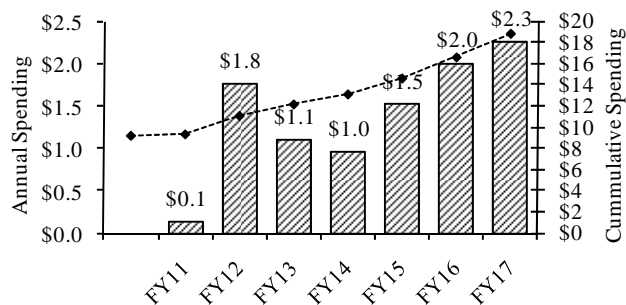
Sub-phase	Scope
Design/Phase 1	Design of valve replacements, setting priorities based on the level of urgency or risk associated with each valve and scheduling work on valves that would not otherwise be replaced during upcoming pipeline rehabilitation projects.
Construction - Phase 1	Purchase and installation of 27 blow-off valve retrofits.
Construction - Phase 2	Purchase and installation of ten blow-off valve retrofits and ten main line valve replacements.
Construction - Phase 3	Purchase and installation of ten blow-off valve retrofits and 12 main line valve replacements as well as rehabilitation of two meters.
Construction - Phases 4, 5 & 6	For each phase, purchase and installation of 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 includes 4 blow-off valve retrofits, 8 main line valve replacements and 9 globe valves (tank isolation).
Construction Phases 7, 8 & 9	For each phase, purchase and installation of blow-off valve retrofits and main line valve replacements and rehabilitation of miscellaneous meters. Each phase includes approximately ten blow-off valve retrofits and ten main line valve replacements.

Sub-phase	Scope
Equipment Purchase	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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$20,032	\$9,144	\$10,888	\$135	\$1,755	\$3,550	\$7,577	\$326

#### Valve Replacement



Project Status 5/11	46.1%	Status as % is approximation based on project budget and expenditures. Phases 1-6 are complete. Phase 7 commenced in April 2011. Phases 8 and 9 will commence in FY14 and FY16, respectively.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$19,132	\$20,032	\$900	Jun-16	Jun-17	12 mos.	\$3,614	\$3,550	(\$63)

#### Explanation of Changes

- Project cost increased due to revised cost estimate for Construction 7 and inflation adjustments due to new ENR index.
- Schedule change reflects updated schedule for Contract 9.

#### CEB Impact

- 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 approximately 30 miles of steel pipelines and determine the feasibility of upgrading or installing cathodic protection systems to protect pipelines from corrosion.*

## Project History and Background

Approximately 68miles 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 steel pipelines, thereby increasing pipeline life and deferring the need for replacement. Without proper cathodic protection, pipeline leaks and 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. 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.
Test Station Installation 2 to 4	Installation of approximately 415 test stations at approximately 400-foot intervals. Wires will be attached to the pipes and to reference anodes to collect test data. Upon completion of the four test contracts, planning and engineering staff will set priorities and determine the scope of rehabilitation work needed to ensure cathodic protection of the pipelines.

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$1,458	\$141	\$1,317	\$0	\$0	\$0	\$0	\$1,317

Project Status 5/11	9.7%	Status as % is approximation based on project budget and expenditures. Project Planning phase is complete. Test Station Installations 2 is expected to commence in FY19.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$1,405	\$1,458	\$53	Jun-22	Jun-22	None	\$0	\$0	\$0

**Explanation of Changes**

- Project cost increased due to inflation adjustments due to new ENR index.

**CEB Impact**

- None identified at this time.

# S. 730 Weston Aqueduct Supply Mains (WASM)

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## 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 Extra High pressure zones. 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 existing 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 extreme emergency.

WASM 1 is a 48-inch diameter unlined cast iron pipeline about 38,700 feet long that was constructed in 1904. WASM 2, built in 1916, is a 60-inch diameter unlined 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 in 1926 and 1927. 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 200,000 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.

The WASMs are currently 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 is necessary to restore their original carrying capacity and will include 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, or 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 has 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. The rehabilitation of WASMs 1 and 2 is complete.

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, analysis has shown that failure of WASM 3 is one of the highest risks in the MWRA distribution system. The Waltham Connection project will provide redundancy so that the main can be rehabilitated/replaced in phases. Based on the recommendations of the Transmission Redundancy Study, approximately 8 of the 11 miles of WASM 3 will be replaced with a larger 72-inch main. The remaining 3 miles will be rehabilitated.

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. When one or more of the Metropolitan tunnels is shut down, WASM 4 will operate in tandem with the West Spot Pond Supply Main as a high service line to supply the communities north of the city tunnel.

**Scope**

<b>Sub-phase</b>	<b>Scope</b>
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).
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.

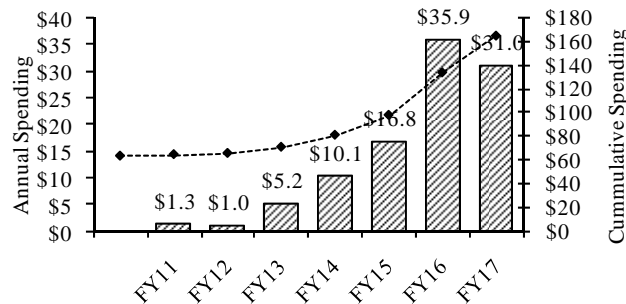
<b>Sub-phase</b>	<b>Scope</b>
Construction - Boston WASMs 1 & 2 (6281)	Construction on the remaining lengths of WASMs 1 and 2 consists of rehabilitation of 8,640 linear feet of Section 4 of WASM 1 through the Newton Commonwealth Golf Course to Gatehouse #1, rehabilitation of 11,450 linear feet of Sections 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 - Waltham WASM3 CP2 (6543)	Replacement of the westerly portion of WASM 3 with a new 72-inch pipe generally located between the Hultman Branch and the Watertown Branch and valve improvements on the Spot Pond Supply Main West to allow it to be used under High Service pressure in an emergency..
Construction – Belmont WASM 3 CP3 (6544)	Replacement of the middle portion of WASM 3 with a 72-inch pipe generally located between the Watertown Branch and the Spring Street Pumping Station.
Construction - Arlington WASM 3 CP4 (6545)	Rehabilitation of the easterly portion of WASM 3 and a short segment of Section 51 generally located between the Spring Street Pumping Station and the Shaft 9 line.
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).

Sub-phase	Scope
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, and a new connection to Waltham from the Northern Extra High service area (construction contract 7222).
Construction Section 36/WS/Waltham Conn. (7222)	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, rehabilitation of approximately 5,795 linear feet of the Watertown Section, a new 11B interconnection to WASM 3, and 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$265,772	\$63,120	\$202,652	\$1,312	\$1,004	\$9,745	\$99,351	\$95,776

#### Weston Aqueduct Supply Mains



Project Status 5/11	24.2%	Status as % is approximation based on project budget and expenditures. Newton WASMs 1 & 2, Boston WASMs 1 & 2, Auburndale WASMs 1, 2 & 4, Newton WASMs 2 & 4, Allston WASM 4 & W. Ave Sewer, and WASM 3 PCCP SPL12 are complete. Section 28 Arlington CP-1 was substantially complete in February 2011. Design CA/RI Section 36/Watertown Section/Waltham Connection commenced in January 2011.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$260,084	\$265,772	\$5,688	Sep-21	Sep-21	None	\$13,822	\$9,745	(\$4,077)

### **Explanation of Changes**

- Project cost increased primarily due to inflation adjustments due to new ENR index.
- Spending decreased primarily due to Design CA/RI Section 36/Watertown Section/Waltham Connection award was less than engineer's estimate. Also, schedule change for Section 36/Watertown Section/Waltham Connection Construction.

### **CEB Impact**

- 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. Currently 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, and Canton.

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 contract for Section 107 Phase 1 was completed in January 2009. The contract for Section 107 Phase 2 was awarded in December 2009.

### Scope

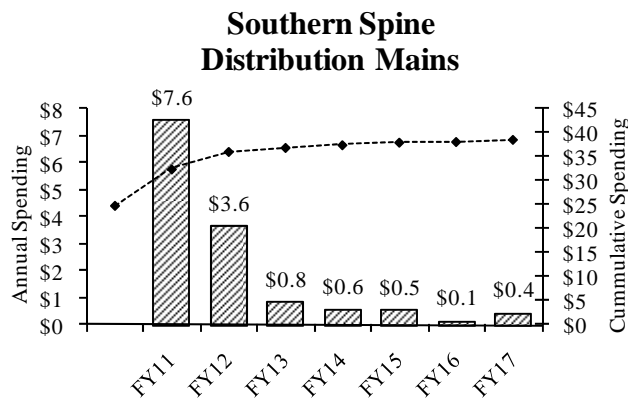
Sub-phase	Scope
Sections 21,43, 22 Design/CS/RI	Design, construction services, and resident inspection for five construction contracts in Phase 1, including rehab of 32,000 linear feet of 24- to 48-inch main, and installation of 17,000 linear feet of 36- to 48-inch main. Rehabilitation to consist of 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 existing 48-inch 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	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.
Section 22 North Facility Plan/EIR	Facility Plan/EIR for Section 22 North.
Section 22 North Design/ESDC	Design/ESDC for Section 22 North.
Section 22 North Construction	Rehabilitation of 17,300 linear feet of existing 48-inch Section 22 North.



Sub-phase	Scope
Section 107 Phase 1 Construction	Construction of 4,400 linear feet of new 48-inch water main from East Milton Square to Furnace Brook Parkway in Milton and Quincy.
Section 107 Phase 2 Construction	Replacement of existing Sections 21 and 43 with 9,200 linear feet of new 48-inch water main 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	Rehabilitation of 4,400 linear feet of Section 22 South.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$70,668	\$24,985	\$45,683	\$7,585	\$3,644	\$19,446	\$2,247	\$31,365



Project Status 5/11	45.9%	Status as % is approximation based on project budget and expenditures. Construction of Contracts 1 and 1A for Section 22 South is completed. Section 107 Phase 1 Construction was substantially complete in January 2009. Section 107 Phase 2 Construction was awarded in December 2009.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$69,495	\$70,668	\$1,174	May-22	May-22	None	\$19,466	\$19,446	(\$20)

#### Explanation of Changes

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

#### CEB Impact

- 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 single spine mains serving 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, which are currently single spine mains serving 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, and Newton, and the Roslindale and West Roxbury sections of Boston. Water is pumped to this pressure zone from the Dorchester tunnel through three pump stations.

The Southern Extra High pressure zone is currently deficient in distribution storage and lacking in redundant distribution pipelines. The average day water use of the Southern Extra High communities from MWRA’s system is 11.6 million gallons per day (mgd); the maximum day use is 24 mgd. 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

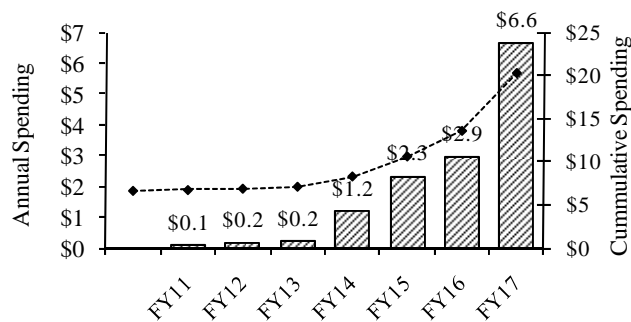
Sub-phase	Scope
Concept Plan	A study to assess storage, capacity and condition of existing distribution pipes, new pipeline routing options and tank sites will be identified.
University Ave Water Main	Initial phase to provide redundant pipeline on University Avenue in Norwood. Project broken out from the larger SEH redundancy and storage projects. This work has been completed.

Sub-phase	Scope
Redundancy Pipeline/Storage Design & Construction Ph 1	The first phase to provide redundancy to Sections 77 & 88 through design and construction of a redundant pipeline and single storage tank with the location and volume to be determined by the Concept Study.
Redundancy Pipeline Design & Construction Phase 2	The second phase to provide redundancy to Sections 77 & 88 through design and construction of additional redundant pipeline.
Design & Construction Phase 3 Pump Station	Third construction phase to include a new pump station.
Design & Construction Phase 4 Second Tank	Fourth phase to include a second storage tank.
Section 77/88 Des/Con	Rehab of Sections 77 & 88 after redundant pipeline is in place.
Des/CA/RI and Construction Short-term Improvements	This phase will cover the design and construction of short-term measures identified in the conceptual plan.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$97,179	\$6,663	\$90,516	\$92	\$162	\$5,471	\$21,138	\$68,903

**SEH  
Redundancy & Storage**



Project Status 5/11	6.9%	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.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$93,841	\$97,179	\$3,338	Jun-26	Jun-27	12 mos.	\$7,840	\$5,471	(\$2,369)

**Explanation of Changes**

- Project cost increased due to inflation adjustments on unawarded redundancy and storage sub-phases.
- Schedule and spending shift due to updated schedule for SEH Redundancy/Storage Final Design CA/RI and subsequent phases for additional time to coordinate with communities.

**CEB Impact**

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

## S. 719 Chestnut Hill Connecting Mains

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### 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

At Chestnut Hill the City Tunnel divides into two branches: the City Tunnel Extension going north to supply the Northern High System, Northern Intermediate High System and the Northern Extra High System, and the Dorchester Tunnel, which goes south to supply the Southern High System and the Southern Extra High System. 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 Service System, the Northern Low Service System, and the Southern High Service System.

The Southern High System can 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.

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. Future design efforts will relocate the reservoir level control functions and provide an emergency electric generator for the pump station. 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**

<b>Sub-phase</b>	<b>Scope</b>
Design/CA/RI and Construction – Potable Pump Station Connection	Construction of potable suction and discharge piping to the emergency pump station, restructuring piping to permit surplus of Chestnut Hill pumping 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 surplus 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	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/CS/RI and Construction – Emergency Pump Relocation	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	Payment(s) to the City of Boston for paving work provided.
BECo Emergency Pump Connection	Payment to Boston Edison Company for installation of electrical service to meet special requirements. Provision of the services eliminated the need to install a standby generator.
Equipment Pre-Purchase	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	Demolition of garages prior to transfer of property to the Commonwealth, at request of state Department of Capital Asset Management.
Chestnut Hill Emergency Pump Station Emergency Generator Final Design CA/RI and Construction	Final Design CA/RI services and construction for the Chestnut Hill Emergency Pump Station Emergency Generator.
Design and Construction Shaft 7 Building	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.
<b>Chestnut Hill Underground Pump Station Electrical Rehabilitation</b>	The Chestnut Hill Underground Pump Station groundwater is extremely high and has entered the electrical equipment and caused electrical equipment to fail. This project is to relocate electrical conduits out of the concrete slab to prevent further failures.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$29,361	\$17,462	\$11,900	\$25	\$0	\$447	\$6,341	\$5,111

Project Status 5/11	59.6%	Status as % is approximation based on project budget and expenditures. Preliminary engineering for the final pipe connections reached substantial completion in April 2006. Chestnut Hill Emergency Pump Station Emergency Generator Final Design CA/RI is expected to commence in July 2012.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$30,481	\$29,361	(\$1,120)	Jul-15	Jul-17	24 mos.	\$1,136	\$447	(\$689)

**Explanation of Changes**

- Project cost decreased due to project repackaged and re-phased for redundancy initiatives. Final Connection work is now part of Long Term Redundancy Project. This decrease was partially offset by new project for Chestnut Hill Underground Pump Station Electrical Rehabilitation.
- Schedule shift and spending changed due to repackaging project and adding new project for Chestnut Hill Underground Pump Station Electrical Rehabilitation.

**CEB Impact**

- 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 Avenue pumping 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 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, and Canton. 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 and completed in February 2001, involved installation of SCADA systems at each station. Under the second construction contract, MWRA will complete rehabilitation of the five pump stations. 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 pumping stations.

## Scope

Sub-phase	Scope
Preliminary Design	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/CS/RI	Design for rehabilitation of five pump stations, including installation of SCADA systems.
Construction II and C	Installation of instrumentation at five pump stations to enable remote operation and monitoring.
Rehab of 5 Pump Stations	Rehabilitation of Belmont, Brattle Court, Spring Street, Hyde Park, and Reservoir Road pump stations, including installation of new mechanical, electrical, instrumentation, and security systems, and building and site refurbishment, and SCADA installation.
Proprietary Equipment Purchases	Purchase of proprietary materials for SCADA system for Interim Instrumentation and Control.
Design 2 CS/RI	Final Design, construction services, and resident inspection for rehabilitation of five pump stations.



Sub-phase	Scope
<b>Pump Station Rehabilitation</b>	Rehabilitation of the Commonwealth Avenue, Gillis, Lexington Street, and Newton Street 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. Commonwealth Avenue, Gillis, and Lexington Street are the only pump stations for their respective service areas.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$55,144	\$29,962	\$25,182	\$116	\$66	\$12,158	\$0	\$25,000

Project Status 5/11	54.5%	Status as % is approximation based on project budget and expenditures. Construction rehabilitation of 5 pump stations (Belmont, Brattle Court, Spring Street, Hyde Park, and Reservoir Road) was substantially complete in June 2010.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$30,717	\$55,144	\$24,427	Jun-10	Jun-24	168 mos.	\$12,731	\$12,158	(\$573)

#### Explanation of Changes

- Project cost and schedule changed primarily due to new project added for Pump Station Rehabilitation.
- Spending decreased due to final cost adjustments.

#### CEB Impact

- None identified at this time.

# S. 722 Northern Intermediate High (NIH) Redundancy and Covered 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 day 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 emergency storage for the service area and is not advantageously placed within the NIH system.

Section 89 is a three mile, four foot diameter 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 is 109 years old and measures 6,300 feet in length and 24 inches in diameter. Because of its age and the fact that it is unlined, 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

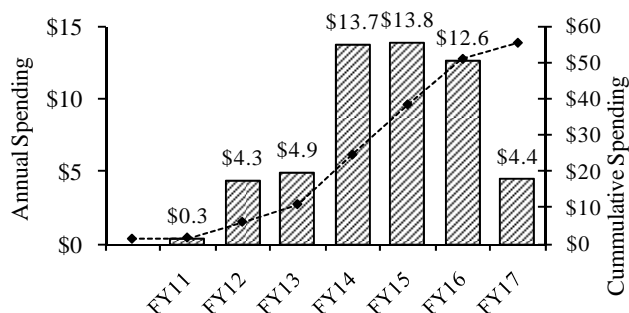
Sub-phase	Scope
Concept Plan, ENF, and Mobile Pump Unit	Develop a concept level plan to evaluate options to reduce the risk and the impacts of potential failures in Sections 29 and 89. Measures may include (but are not limited to) valve improvements, improved community interconnections, pipeline redundancy, targeted emergency response plans, additional storage or 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 NIH Impr/Gillis PS Impr./Reading-Stoneham Interconnection	This phase (Contract 7045) will cover the design and construction of short-term measures identified in the conceptual plan including Gillis PS Improvements and the Reading/Stoneham Interconnection.
Design and Construction Section 89/29 Redundancy Ph 1 & 2	The Concept Plan has developed preliminary route alternatives in order to provide redundancy to Section 89. Final routes will be determined following consultations with local elected officials, consideration of permitting requirements, project impacts and the location of the recommended storage for the NIH system. Contract 6906 will include design and CA/RI for the redundant pipeline only (approximately 7 miles).
NIH Storage Design and Construction	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.

Sub-phase	Scope
Section 89/29 Rehab Design and Construction (Ph 1 and 2)	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. This phase includes design and construction of Section 89/29 rehab.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$79,070	\$1,260	\$77,810	\$346	\$4,333	\$10,172	\$49,213	\$19,052

#### NIH Redundancy and Storage



Project Status 5/11	1.8%	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 is expected to commence in September 2011.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$79,253	\$79,070	(\$182)	Jan-20	Jan-21	12 mos.	\$11,081	\$10,172	(\$908)

#### Explanation of Changes

- Project cost decreased due to increased due to actual award for Section 89/29 Redundancy design was less than engineer's estimate. This was partially offset by inflation adjustments on unawarded contracts.
- Schedule change reflects updated schedule for NIH Storage Construction.
- Spending changed primarily due to actual award for Section 89/29 Redundancy design was less than engineer's estimate and revised cost for Concept Plan. This was partially offset by revised schedule for project easements.

#### CEB Impact

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

# **S. 713 Spot Pond Supply Mains - Rehabilitation**

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## **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, which are 100 years old, 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.

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

The carrying capacities of the 100-year old mains have been significantly reduced as a result of the build up of rust deposits (tubercules) and other matter along the pipeline 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 line 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 pipeline constructed in 1949. Rehabilitation of this main is 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 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 facilitate consolidation of the Boston Low and Northern Low Service Areas into one service area and 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	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	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	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	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 11, Brighton and Cambridge).
Early Valve Replacement Contract	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 – Trusses	Section 4 Bridge Trusses spanning the Fitchburg Main Line and the New Hampshire-Maine Line are in need of repair, painting and replacement, respectively.
Early Valve Equipment Purchase	Purchase Order for 12 valves that were installed from 1998-1999 as a precursor to the cleaning and lining contracts.
Section 4 Webster Ave Bridge Pipe Rehabilitation Design and Construction	Section 4 is a 48” 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.
Section 50 Pipe Rehabilitation Design and Construction	Section 50 is several hundred feet of 20” cast iron main on exposed pilings which is need of rehabilitation.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$66,127	\$60,995	\$5,132	(\$15)	\$150	\$2,452	\$2,850	\$347

Project Status 5/11	92.2%	Status as % is approximation based on project budget and expenditures. Work in Contract 2, Middle, is complete. Contract 3 (South) was substantially complete in April 2008. Section 4 Webster Ave Bridge Pipe Replacement Design is expected to commence in FY12.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$66,097	\$66,127	\$30	Dec-18	Dec-18	None	\$2,768	\$2,452	(\$316)

**Explanation of Changes**

- Project cost increase primarily due to inflation adjustment for Construction 4 Trusses.
- Planned spending decreased due to revised schedule/cash flows for Section 4 Webster Ave Bridge Pipe Rehabilitation Design and Section 50 Pipe Rehabilitation Design/ESDC/RI contracts.

**CEB Impact**

- None identified at this time.

# 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 an unlined pipeline serving a portion of the Northern Low System. This pipeline, Section 8, has reduced carrying capacity because of rust build-up, and has experienced leaks at above average rates. Improvements will consist primarily of replacement of a portion of Section 8 and cleaning, lining, and valve repairs along nearly 1.5 miles of water main. Rehabilitation of Sections 37 and 46 will improve the service to East Boston and will allow the shutdown of Section 8 for rehabilitation. 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 1913 and serves Malden, Everett, Chelsea, and East Boston. The Section 8 pipeline 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 pipeline walls. Excavations for the installation of new valves along portions of Section 8 have indicated possible 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. The existing Sections 37 and 46, located in Chelsea, are older 36-inch cast iron mains. 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 these two pipelines will need cleaning and cement mortar lining. Section 97A, a new 16-inch pipeline will provide redundancy to East Boston via Northern High System. The pipeline will connect to existing Meter 99 in East Boston and to the Boston low-pressure system through a new pressure-reducing valve.

## Scope

Sub-phase	Scope
Survey, Design CA/RI and Construction – Section 8	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 Construction	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	Installation of approximately 3,000 linear feet of 16-inch and 12-inch water main and a new pressure-reducing valve. This new work will be part of the Northern High System and add redundancy to East Boston, including Logan Airport.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$20,233	\$2,262	\$17,971	\$59	\$32	\$2,328	\$4,779	\$13,069

Project Status 5/11	11.5%	Status as % is approximation based on project budget and expenditures. Section 97A Construction contract was substantially complete in October 2009.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$19,600	\$20,233	\$633	Jul-17	Jul-20	36 mos.	\$2,287	\$2,328	\$41

**Explanation of Changes**

- Project cost increase due to revised cost estimate as a result of inflation adjustments for Section 8 Design and Construction. Also, change orders for Section 97A.
- Schedule change due to rescheduling Section 8 Construction as a result of project priorities.
- Planned spending increased due to additional change orders for Section 97A.

**CEB Impact**

- None identified at this time.



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

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### **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- 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 about 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 80-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.

Originally 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 pipeline through Newton and Waltham has been eliminated in favor of a shorter 36-inch pipeline in Waltham from Meter 182 to the Waltham transmission system; and the rehabilitation of Sections 23, 24 and 47 has been delayed until the Long Term Redundancy study is finalized.

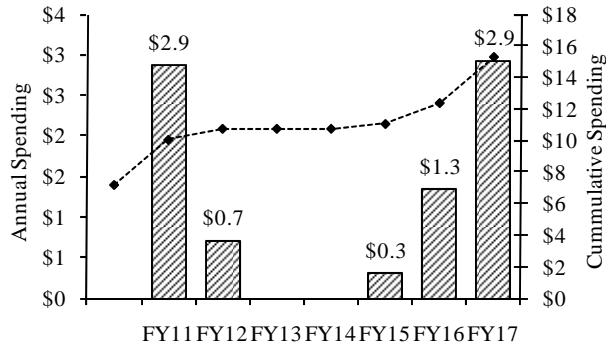
**Scope**

<b>Sub-phase</b>	<b>Scope</b>
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 residential 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 CP-3, 5 and Meter 120. Construction Administration and Resident Inspection services to be performed by in-house staff.
Design 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.
South Segment CP3 (6392)	Cleaning and lining of 6,900 linear feet of 20-inch pipe (Section 24) from Meter 120 to WASM 4, 5,350 linear feet of 36-inch (Section 23) and 10,170 linear feet of 20-inch (Sections 24 and 47) pipe, and 2,950 linear feet of 20-inch pipe along Section 24 from WASM 4 to Meter 40.
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.
Replacement of Section 25 Design (6955) and Construction (6956)	Replacement of existing Section 25 (approximately 4,800 linear feet of existing 16" pipe) with a new pipeline.
Section 75 Extension	Addition of approximately 6,000 feet of new 30-inch 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. Requires replacement of Section 25.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$31,632	\$7,153	\$24,480	\$2,868	\$706	\$5,409	\$10,346	\$10,559

### New Connecting Mains



Project Status 5/11	30.8%	Status as % is approximation based on project budget and expenditures. Northeast Segment CP-5 construction contract was awarded in July 2009.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$30,131	\$31,632	\$1,501	Nov-19	Nov-19	None	\$4,987	\$5,409	\$422

#### Explanation of Changes

- Project cost increased due to updated cost estimates for Design and Construction CP2 Cleaning & Lining Section 59 & 60, and Replacement of Section 25 Design and Construction. Also inflation adjustments for South Segment (CP3) and additional change orders for Northeast Segment (CP5). This increase was partially offset by revised easement cost estimate.
- Spending increased due to additional change orders for Northeast Segment (CP5).

#### CEB Impact

- 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 107-year old pipe 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	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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$3,308	\$124	\$3,184	\$0	\$0	\$1	\$1,427	\$1,757

Project Status 5/11	3.7%	Status as % is approximation based on project budget and expenditures.
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### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$3,179	\$3,308	\$129	Nov-18	Nov-18	None	\$0	\$1	\$1

### Explanation of Changes

- Project cost increased due to inflation adjustment.

### CEB Impact

- None identified at this time.

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

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## 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 the pressure deficiencies 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, 53A, and 68 in Revere and Section 53 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, Revere 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 pipeline revealed that these sections had severe flow problems. The pipeline was only able to carry a fraction of its designed capacity because of internal corrosion. Cleaning and lining the pipeline restored flow capacity.

Section 53 in Malden and Revere was an 18,900-foot long, 30-inch 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 main has been completed. The Revere portion of Section 53 will be rehabilitated and/or replaced as necessary. In addition to feeding into the new 48-inch Saugus/Lynn pipeline, this pipeline will play an important role in the supply network for Deer Island. Sections 49 and 49A, an old 24-inch pipeline, is used to connect Section 53 to Shaft 9A of the City Tunnel. It is undersized for this purpose and is a severe restriction. A new 3,000-foot, 48 or 60-inch diameter pipeline is needed to reinforce Sections 49 and 49A. An 850-foot portion of Section 68 interconnects Section 53 with the new Saugus/Lynn pipeline. This section needs to be reinforced with 850 feet of 48-inch pipeline. The Shaft 9A-D Extension will provide a more reliable connector to the Section 99 pipeline that serves as the suction line to the Gillis Pump Station.

Construction of the Malden Section 53 and Revere Beach pipelines was substantially completed in September and October 1994 respectively. Construction of Section 53 Revere started in October 2008.

**Scope**

<b>Sub-phase</b>	<b>Scope</b>
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	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	Installation of 11,907 feet of 48-inch diameter pipeline in Malden on Section 53.
Construction Linden Square	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	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	Installation of control valves needed to regulate water pressure and fill the Winthrop standpipe.
Construction DI Pipeline Cleaning & Lining (C&L)	Design and cleaning and lining of the 2,000 linear feet, 8-inch diameter water supply main to Deer Island.
Construction – Winthrop C&L	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.
Construction 68 & 53A	Construction of 850 linear feet of new 48-inch pipe (Section 68) and 3,000 linear feet of new 60-inch pipe (Section 53A) in Malden.
Shaft 9A-D Extension Construction	Construction of approximately 2,000 linear feet of new pipeline in Malden connecting the Shaft 9A-D line to Section 99.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$33,612	\$26,833	\$6,779	\$0	\$5	\$2,949	\$5,768	\$1,000

Project Status 5/11	79.8%	Status as % is approximation based on project budget and expenditures. Revere Beach, Malden Section 53 and Linden Square construction are complete. Revere Section 53 Construction was substantially complete in August 2009.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$33,514	\$33,612	\$98	Nov-19	Nov-19	None	\$2,938	\$2,949	\$11

**Explanation of Changes**

- Project cost increased due to revised cost estimate for Section 68 & 53A.

**CEB Impact**

- None identified at this time.

# S. 731 Lynnfield Pipeline

## Project Purpose and Benefits

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

To meet high demands in Lynnfield by installing approximately 4,450 linear feet 24-inch water main, 2,840 feet of 36-inch water main and 6,000 feet of 12-inch water main The Lynnfield Water District serves a portion of the Town of Lynnfield. The community meter is served by an 8-inch main, approximately 7,000 feet long. The main is undersized and its capacity is inadequate to meet high water demands. Rehabilitation of the main will not increase the capacity sufficiently.

## Project History and Background

MWRA supplies Lynnfield Water District via Meter 169 located adjacent to Route 1 at the Saugus/Lynnfield town line. An eight-inch cast iron main, approximately 7,000 feet long, connects Meter 169 to Section 70 in Saugus. This main does not have the hydraulic capacity to serve the meter during high demand periods. This project includes construction of a supplemental main from Section 70 to the meter and construction of approximately 6,000 feet of distribution piping for the town of Saugus. The cost of this project will be shared by MWRA and the town of Saugus. An interim interconnection to the Saugus system was constructed in early FY08.

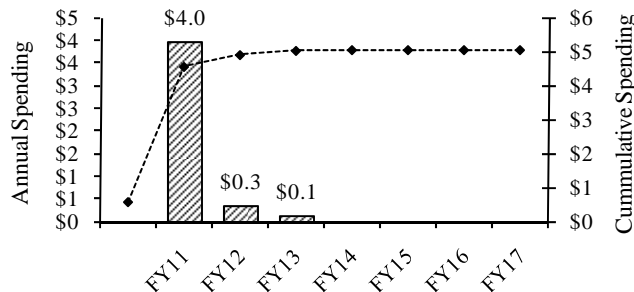
## Scope

Sub-phase	Change/Explanation
Temporary Interconnect Construction Ph 1	Install approximately 150 feet of 24" main.
Design and Construction Ph 2	Construction of 4,700 linear feet of new 24-inch main, 1,800 feet of 36-inch water main and 6,000 feet of 12-inch water main.

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$5,042	\$583	\$4,459	\$3,966	\$347	\$4,508	\$21	\$0

Lynnfield Pipeline





Project Status 5/11	17.7%	Status as % is approximation based on project budget and expenditures. Temporary Interconnect Construction Phase I reached substantial completion in December 2007. Construction (Phase 2) commenced in January 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$7,635	\$5,042	(\$2,593)	Jul-12	Jan-13	6 mos.	\$7,072	\$4,508	(\$2,564)

**Explanation of Changes**

- Project cost and planned spending decreased due to revised cost estimate for Construction (Phase2) based on contract bid amount.

**CEB Impact**

- None identified at this time.

# S. 618 Northern High Northwest Transmission Section 70-71

## 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*

*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 unlined steel and are over 55 years old. 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 study 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 study.

## Scope

Sub-phase	Scope
Planning	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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$1,000	\$0	\$1,000	\$0	\$0	\$0	\$1,000	\$0

Project Status 5/11	0.0%	Status as % is approximation based on project budget and expenditures. Planning is expected to begin in July 2013.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$1,000	\$1,000	\$0	Jun-14	Jun-14	None	\$0	\$0	\$0

## Explanation of Changes

- N/A

## CEB Impact

- 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 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. Section 45 is a 16-inch 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.	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). Rehabilitation of Section 63, consisting of about 3,400 linear feet of 20-inch pipeline connecting Section 63 to Meter 136.
Construction Sections 34 & 45	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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$6,690	\$3,632	\$3,058	\$5	\$10	\$25	3,033	\$0

Project Status 5/11	54.3%	Status as % is approximation based on project budget and expenditures. Construction of a portion of Section 45 was rehabilitated in September 2001. In-house design of Sections 34 and 45 followed by construction scheduled to start in FY15.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$6,569	\$6,690	\$121	Nov-15	Nov-16	12 mos.	\$31	\$25	(\$6)

**Explanation of Changes**

- Project cost increase due to inflation adjustments.
- Schedule shifted due to project priorities.

**CEB Impact**

- None identified at this time.

# S. 735 Section 80 Rehabilitation

## Project Purpose and Benefits

- Contributes to improved public health*
- Extends current asset life*

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

*Rehabilitation of approximately 16,197 feet of pipe along Route 128/95. 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 cathodic protection 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 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	Design and rehab of approximately 16,197 feet of pipeline in Section 80 along route 128/95.

## Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$8,485	\$0	\$8,485	\$0	\$0	\$0	\$606	\$7,879

Project Status 5/11	0.0%	Status as % is approximation based on project budget and expenditures.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$8,359	\$8,485	\$126	Dec-20	Dec-20	None	\$0	\$0	\$0

## Explanation of Changes

- Project cost increase due to inflation adjustment as a result of new ENR index.

## CEB Impact

- None identified at this time.

# 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 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 is building several new and upgraded facilities. These include the Nash Hill Covered Storage facility and the Loring Road Covered Storage facility, which are complete, and the Walnut Hill Water Treatment Plant, the MetroWest Water Supply Tunnel, , and the Norumbega Covered Storage facility, which are under construction. The existing system-wide backbone microwave communications network has been improved to connect these new facilities to the waterworks communications system.

## Scope

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

<b>Sub-phase</b>	<b>Scope</b>
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.
Winsor Dam High Line Replacement	Replace high line cable from Winsor Power Station to Quabbin Tower to insure uninterrupted service of SCADA communication network.

**Expenditure Forecast (in \$000s) and Project Status**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$16,992	\$15,705	\$1,287	\$50	\$952	\$1,325	\$0	\$0

Project Status 5/11	92.4%	Status as % is approximation based on project budget and expenditures. All contracts are complete except for SCADA Implementation work which is scheduled for completion in December 2011. Winsor Dam High Line Replacement is expected to begin in late 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$16,992	\$16,992	\$0	Dec-11	May-12	5 mos.	\$1,325	\$1,325	\$0

**Explanation of Changes**

- Schedule changed for the Winsor Dam High Line Replacement project due to project priorities.

**CEB Impact**

- No additional impacts 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 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.

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$1,799	\$1,036	\$763	\$0	\$0	\$228	\$535	\$0

Project Status 5/11	57.6%	Status as % is approximation based on project budget and expenditures. Records Development is the one outstanding sub-phase and has been delayed due to competing project priorities. Expect NTP in FY13.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$1,799	\$1,799	\$0	Dec-14	Dec-14	None	\$228	\$228	\$0

**Explanation of Changes**

- N/A

**CEB Impact**

- No additional impacts identified at this time.

# S. 765 Local Water Pipeline Assistance Program

## Project Purpose and Benefit

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

*To provide loans to facilitate the rehabilitation or replacement of unlined water pipelines in MWRA communities.*

## Project History and Background

The Local Pipeline Assistance Program is a critical piece of MWRA’s Integrated Water Supply Improvement Program. In November 1999, the Board of Directors approved an MWRA-administered program, supported for ten years 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).

An additional \$210 million was added to the FY11 budget for the next phase known as the 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 allocated based on each community’s share of total unlined pipe miles.
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**

<b>Total Budget</b>	<b>Payments thru FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY09-13</b>	<b>FY14-18</b>	<b>Beyond FY18</b>
\$0	\$105,810	(\$105,810)	(\$825)	\$7,160	\$37,988	(\$2,546)	(\$126,520)

Project Status 5/11	44.0%	Through May 2011, \$203 million in loans were distributed to member communities.
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**Changes to Project Scope, Budget, and Schedule**

<b>Project Cost</b>			<b>Scheduled Completion Date</b>			<b>FY09-13 Spending</b>		
<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>	<b>FY11</b>	<b>FY12</b>	<b>Chge.</b>
\$0	\$0	\$0	Nov-29	Jun-30	7 mos.	\$63,703	\$37,988	(\$25,714)

**Explanation of Changes**

- Spending shift is due to revised cash flows. Also, updated cost estimates for Community Loans.
- Schedule change due to updated schedule for CVA Loans and Repayments.

**CEB Impact**

- The annual interest paid for the Commercial Paper program supporting the Local Water Pipeline initiative is over \$1.2 million per year based on the last 10 years.

# 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 2018 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	Retrofit approximately 195 meter manholes.
Design and Construction Walnut Hill Tank	Full structural analysis of the Walnut Hill Elevated Tank based on corrosion discovered. Rehab 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 Seat 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. Installation of vent structures in draft of new sliding sleeve valves to relieve vacuum conditions when valves are operating and to prevent damage to floor plates and to eliminate an unsafe and unsanitary condition.
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.
Design of Cosgrove Turbine Isolation	Modification of means of downstream isolation of Cosgrove turbines to allow for preventive and corrective maintenance against new tailwater elevation which was increased to allow flow to John J. Carroll Water Treatment Plant.

Sub-phase	Scope
<b>Covered Storage Tank Rehabilitation</b>	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.
<b>Elevated Water Storage Tank Repainting</b>	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.
<b>Shaft 9 Rehabilitation</b>	Ground water leakage is filling the access shaft. The piping and components in the access shaft need to be evaluated and repair work performed.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$16,884	\$221	\$16,663	\$24	\$407	\$621	\$10,824	\$5,218

Project Status 5/11	1.3%	Status as % is approximation based on project budget and expenditures. Waltham Pipe/Bridge Replacement project was substantially complete in September 2004. Transformer Replacement at Cosgrove Intake Building began in June 2011.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$4,813	\$16,884	\$12,071	Jun-18	Jul-23	61 mos.	1,422	\$621	(\$801)

#### Explanation of Changes

- Project cost and schedule changed due to new projects added for Covered Storage Tank Rehabilitation, Elevated Water Storage Repainting, and Shaft 9 Rehabilitation.
- Planned spending shift due to updated schedules including Design of the Walnut Hill Tank, Cosgrove Valve Seat, and Design of the Cosgrove Turbine as a result of project priorities.

#### CEB Impact

- No additional impacts identified at this time.

## 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.

### 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 1-10. <b>Contract 9 &amp; 10 were added during the FY12 Final Process.</b>

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$11,549	\$5,631	\$5,918	\$969	\$2,233	\$7,297	\$533	\$0

Project Status 5/11	54.4%	Status as % is approximation based on project budget and expenditures. All tasks in <i>Inventory &amp; Evaluation Phases 1 &amp; 2</i> are complete. As-Needed Design contract 4 was completed in August 2009 and contract 3 was completed in February 2010. As-Needed Design 7 began in January 2010 and As-Needed Design 8 began in February 2010. As-Needed Design 6 was completed in August 2010. As-Needed Design 5 was completed in March 2011. As-Needed Contracts 9 and 10 were awarded in July 2011.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
8,265	\$11,549	\$3,284	Feb-12	Aug-13	18 mos.	\$4,546	\$7,297	\$2,751

**Explanation of Changes**

- Project cost and planned spending increased due new projects added for As-Needed Design Contracts 9 and 10. Also, amendments for As-Needed Design contract 7

**CEB Impact**

- One of the final tasks under the *Inventory & Evaluation Phases 1 & 2* contract consisted of REI/ESDC services on the *Equipment Condition Monitoring* subphase, one of the projects under S.206, *Deer Island Treatment Plant Asset Protection*. Condition Monitoring provides DITP staff with real time, non-intrusive means of evaluating equipment performance (through vibration and temperature monitoring). Maintenance tasks are then performed when the trends indicate that a problem exists, saving staff time and reducing unnecessary maintenance. Total budgetary benefits are not quantified 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** - New subphase added to the FY11 CIP are noted in **Bold**.

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.
FY09-13 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.
<i>Vehicles:</i>	
Closed Circuit TV Inspection Truck	Purchase of TV Inspection Truck (WRA700) 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 prior to FY10 including Back Hoe, Vector Truck, Water Service Truck, Bucket Machine, Excavator, Grove Crane, Land Fill Loader, Power Sweeper/Catch Basin Cleaner, Back Hoe (WRA-285), Front-End Loader, Dump Truck WRA-558, Dump Truck (WRA 522), Crane (WRA 185), International Tractor/Trailer
Ramp Truck	Purchase of Ramp Truck to replace WRA-396 to support Fleet Services.
Street Sweeper	Purchase of Street Sweeper to support MWRA facilities and community assistance.
FY09-13 Vehicle Purchases	Vehicle purchases planned for FY10-13.
FY14-18 Vehicle Purchases	Future vehicle purchases planned for FY14-18.

### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$15,655	\$8,000	\$7,655	\$1,252	\$2,170	\$7,498	\$2,900	\$0

Project Status 5/11	54.2%	Status as % is approximation based on project budget and expenditures. Purchase and installation of security equipment is in process and will continue through FY13.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$14,971	\$15,655	\$684	Jun-18	Jun-18	None	\$6,827	\$7,498	\$671

**Explanation of Changes**

- Project cost increased primarily due to revised cost estimates for Security Equipment and Installation and FY14-18 Vehicle Purchases.
- Spending increased due to revised cost estimate for Security Equipment and Installation.

**CEB Impact**

- No additional 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$ 1,200	\$0	\$1,200	\$0	\$400	\$800	\$400	\$0

### Changes in Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$1,200	\$1,200	\$0	Jun-13	Jun-14	12 mos.	\$1,200	\$800	(\$400)

### Explanation of Changes

- Schedule and spending shift to reflect continuation of contracts for an additional year.

### CEB Impact

- When Technical Assistance contracts are used to support a project in the operating budget, the costs are charged to the CEB.

## **S. 931 Business Systems Plan**

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### **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**

During the process of developing the FY94-96 Capital Improvement Program, it became evident that MWRA needed to invest in the upgrade, enhancement, and expansion of its Management Information Systems (MIS) to adapt to the changing business needs of the waterworks and sewerage systems, and to respond to new regulatory requirements. To address these needs, MWRA initiated and implemented a business system planning effort to determine future MIS support requirements. Annual plan updates have assisted staff, external constituencies, and the Board of Directors in understanding the critical role of information systems in carrying out MWRA's environmental and economic mission.

The initial business systems plan focused primarily on FY95-97 (Phase 1) with the goal of getting greater use out of existing systems. Implementation of Phase I improvements was completed in June 1997.

Phase II (FY97-10) built on the progress made during Phase I and continued the development of economies of scale through optimization of existing assets, technology conversion promoting database integration, and infrastructure improvement. Except for improvements to the TRAC Information System (TRAC/IS), Phase II is complete. The TRAC I/S was competitively bid in FY07 and the project is expected to be completed in Q2 FY13.

Phase III (FY99-01) focused on implementing a newly, integrated financial, procurement and human resources/payroll system (Lawson) which replaces three separate and obsolete software products. This project was substantially completed in May 2000 and met schedule and budgetary targets. Implementation of a Treasury application (XRT) and integration with MAXIMO was completed by the close of FY01. The system reduces duplication of databases, streamlines several business processes, and improves staff ability to perform trend analysis.

Phase IV of the Business Systems Plan supported MWRA's effort in anticipation of the year 2000 to assess systems and applications and implement corrective actions to avoid systems failures. This phase was completed in February 2000, and MWRA did not experience any major system failures or disruptions. In addition, approximately 65% of Phase IV spending was for items that would have been purchased under normal circumstances and the items have a useful life well beyond 2000.

Phase V (FY01-10) supports MWRA's ongoing program of information system improvements. The focus is on development of a Waterworks Operations Management system similar to the one used to support Deer Island management, implementation of MAXIMO for the Field Operations Department (completed), and improvements to the Laboratory Information Management System (LIMS) to ensure MWRA keeps pace with changing business needs and technology standards. The LIMS contract was awarded in FY08 and the project was completed in Q2 FY10. In addition, Phase V includes replacement of obsolete minicomputers and improvements to GIS and TV Inspection systems based on benchmarking results (completed).

Phase VI (FY04-12) supports the replacement of obsolete PBXs at major sites, the re-licensing of Microsoft Office products, storage/server improvements for Computer Center operations, and the conversion of Lawson portfolio to a current supported operating system. Lawson hardware was procured in FY08; software procurement and implementation was completed in May 2009.

A new MIS Plan, as part of the overall Authority's Master Plan, is under development. The major areas of focus are: replacing aging systems and the network architecture, improving disaster recovery, enhancing data integration, consolidating server/computing resources, and implementing applicable best practices. The goal is to continue to support efficient administrative, financial, operational, engineering and planning functions with cost-effective technologies. Key projects identified include: NET2020 project, storage/server improvements (SAN), Computer

Center and OCC infrastructure equipment replacements, records management software and telecommunications equipment replacement.

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

<b>Sub-phase</b>	<b>Scope</b>
Phase I (FY95-97)	<u>(Complete)</u> : Upgrade of BHP minicomputers; Unix-based minicomputer for GIS integration; implementation and enhancement of the Sewerage Analysis and Management System (SAMS) including high-end workstations to incorporate improved hydraulic modeling capabilities, condition information, mapping, and GIS data so that CSO Master Plan and Transport data requirements are met; PC replacements; storage and functionality improvements for TRAC (IS) and wastewater flow data; leasing of three replacement minicomputers for administration and finance systems to address capacity and performance issues; implementation of CADD software and related tools including the establishment of a document management system to index thousands of engineering documents maintained by the Records Management Center and technical information centers at CNY and Deer Island; and development of a network plan for Business Systems Plan updates to address industry changes, maintenance/replacement concerns and functionality needs.
Phase II (FY97-10)	(Complete): Server consolidation, network scalability program, database integration program, PBX replacement, records management inventory program, maintenance management and waterworks programming services are completed.  (Open): The new TRAC I/S replacement was in production by September 2009 and the CIP includes 3 years of maintenance through FY13 and efforts customizing based on MWRA business needs and regulatory requirements. The Authority accepted the system in October 2010.
Phase III (FY99-01)	(Complete): Procurement of new integrated financial, procurement and human resources/payroll system. Purchase and installation of a back-up generator for Building 36 in the Charlestown Navy Yard and network project support.
Phase IV	(Complete): Year 2000 assessment and improvements.

Sub-phase	Scope
Phase V (FY01-10)	<p><u>(Complete):</u> <u>Waterworks Operations Management System (OMS) project:</u> Establishment of a system to integrate SCADA, water quality, flow, and related data for management reporting and analysis. SCADA incorporation to Process Book is complete. In FY06, a Harbor Outfall Monitoring Database project was identified and the system was completed in FY08. Data warehouse was completed in Q2 FY10.</p> <p><u>(Complete)</u> <u>Geographical Information Management System (GIS):</u> Conversion of GIS from UNIX to NT based on vendor software changes (complete). Also, completed recommendations from a TV Inspection Benchmarking Project by purchasing new software to improve data and operational efficiencies. New business requirements, including expansion of GeoXH handhelds to collect information on manhole inspections and its incorporation into GIS, are being handled under the CEB.</p> <p><u>(Complete):</u> <u>GIS Projects and Enhancements Project:</u> In FY01, the scope of this project was expanded to include Open-VMS minicomputers replacement project, which is the project to replace Deer Island VMS servers. In FY08, the Open VMS project was renamed GIS Projects and Enhancements Project and an RFB was published Q1 FY09.</p> <p><u>Laboratory Information Management System:</u> Implementation of software improvements to stay current with industry standards and meet ongoing business needs. A competitive bid was awarded in FY08. Development and testing continued during FY09 with final system acceptance in Q3 FY10. The LIMS will process both water and wastewater samples. Phase One, water testing, of the LabWare LIMS implementation went live in Q3 FY09 as planned. Phase Two, wastewater testing, was completed in Q3 FY10. LIMS replacement is complete.</p>

Sub-phase	Scope
Phase VI (FY04–09)	<p><u>(Complete):</u> <u>Telecommunications:</u> Replacement of the Deer Island PBX (completed in FY04).</p> <p><u>(Complete)</u> <u>Lawson Minicomputer:</u> The original plan was to purchase a backup UNIX minicomputer to be used for Lawson processing and storage improvements for all MWRA's minicomputer and server resources (scheduled for FY08). However, in order to maintain vendor support for the Lawson System, new OS and server replacements, application environment and upgrades needed to be implemented in FY08/FY09. New servers were procured for Chelsea (production) and Deer Island (disaster recovery/test/development) in FY08. Application Environment upgrade was procured and installed in FY08.</p> <p><u>(Open):</u> <u>Disaster Recovery:</u> In FY06, as part of the MWRA-wide Continuity of Operations Planning project, it was determined that a permanent disaster recovery computer center would be located at the Interim Corrosion Control Facility at the CWTP. A disaster recovery computer center was viewed as a higher priority than the originally budgeted server consolidation line item. This project has changed. The ICCF plan was not viable due to limited space and Weston was identified as a preferred alternative site. However, Weston requires time for design and cost analysis. Pending a review of the viability and cost of a redundant network connection via microwave technology, a third option, utilizing the existing DITP Data Center as the permanent Disaster Recovery was investigated. However, since the Commonwealth is opening a new Disaster Recovery site in Springfield, the MIS Department is working closely with state officials to explore utilizing the space at the new site scheduled to open in the Spring of 2012. The approach will allow the MWRA to save money by leveraging the existing infrastructure (i.e. environmental equipment, generator, security, UPS, etc). The schedule for completion is FY13.</p> <p><u>(Complete)</u> <u>Microsoft Licensing:</u> Microsoft's current strategy is 2 years of final maintenance on a version once a newer version has been released. The remaining CIP provides for approximately 350 future Office 2007 licenses (previous re-licensing programs yielded a credit); however, MIS used the funding for Microsoft Server licenses. The outstanding Microsoft office licenses were purchased under the CEB in FY09 and FY10.</p> <p><u>(Open)</u> <u>Document Management:</u> The replacement of InfoStar, the MWRA Document Management System, was originally part of this phase but it was eliminated in December 2004 and is requested for FY15. Project not funded during the FY09 Cycle but was resubmitted in FY10 and was budgeted under the FY11 CIP. Staff are currently evaluating various software and anticipate bid specifications in FY12.</p>

Sub-phase	Scope
NET2020 (FY10–FY12)	(Open): The current MWRA network architecture was implemented in CY2000 in preparation for the facility and staffing consolidation that took place in Chelsea in 2001. The goal was to establish a computer network architecture that would support MWRA's evolving information technology requirements over a 10-year period through 2010. MWRA's architecture emphasizes manageability, stability, flexibility and adaptability. MWRA major sites connected to Chelsea are: Charlestown, Marlborough Records Center, Weston Reservoir, Advisory Board, Carroll Water Treatment Plant, Clinton, Cosgrove, Deer Island Treatment Plant, Nut Island, Pellet Plant, Quabbin Reservoir Lab and Southborough. Due to costs and limited provider options, smaller sites gain access to the MWRA network through a variety of methods such as dial-up (modem over telephone lines) and virtual private network (VPN) over DSL lines or cable company connections. VPN will also be used to support planned projects of wireless connectivity for field staff using MAXIMO, Global Position Units, and for full systems access by the Emergency Services Unit during drills, security incidents and disasters. The NET2020 project will address the new network architecture for the period 2010 to 2020 including replacing all network equipment (3 main switches, 105 premise switches and numerous appliances) with newer products.
SAN II (FY12) SAN III (FY15)	(Open): SANs provide modular scalability, high availability, increased fault tolerance and centralized storage management. Historical data can also be archived to cheaper storage following industry best practices. The use of a SAN reduces footprint requirements. Also, energy needed to run and cool the SAN equipment is reduced by approximately 50%. The current inventory of major servers and minicomputers is 87 (this does not include site servers for file sharing and printing). The first SAN (Phase II) will collapse up to 32 servers/minicomputers' direct attached storage. SAN II will collapse up to an additional 32 servers/minicomputers' direct storage in FY13. In FY15, a SAN III has been planned to replace the original SAN with the then current technology.
Telecommunications (FY14–FY15)	(Open): Voice communication is done using private branch exchanges (PBXs) located at Charlestown, Chelsea, Southborough, Carroll Water Treatment Plant, Deer Island, Clinton and Nut Island. Because the PBXs are networked, staff at these facilities can use four-digit dialing to call each other at no cost. Charlestown and Chelsea operator consoles are linked to permit Chelsea to be the primary call-intake facility. Likewise, Chelsea and Deer Island are uniquely linked to allow Chelsea to be the backup console. A full replacement of the equipment is not planned until FY14, prior to which new technologies will be reviewed such as Voice over IP (telephone communications using the Internet) before the next 10-year architecture is established.
Computer Center & OCC Infrastructure (FY15–FY16)	(Open): 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 beginning in FY15.
Laboratory Instrument Data Management	(Open): Implementation of software improvements to stay current with industry standards, meet ongoing business needs and to re-establish vendor support. Included are a Chromatography Data Management Server and a more global instrument data management system. This solution could include a server-based approach to managing instrument data and interfacing with LIMS. Regulation requires laboratory testing and data archiving. The project will be started after the new Laboratory Information Management System (LIMS) has been implemented which is scheduled for FY12.
Corporate Server Infrastructure & Document Distribution	(Open): The Corporate Server Infrastructure and Replacement Program is one of the major technology changes for the MIS Department along with PIMS, LIMS and Lawson upgrades. Based on current technology standards, the average hardware system infrastructure has a useful life of 3-5 years. MIS requested \$500,000 for FY09 and \$500,000 for FY13 to prepare for upcoming technology changes in infrastructure and major applications server replacement in a 4-year cycle.



<b>Sub-phase</b>	<b>Scope</b>
DITP/OMS	(Open): Establishment of a system to integrate SCADA, water quality, flow, and related data for management reporting and analysis. SCADA incorporation to Process Book is ongoing. Data warehouse completed in FY10.
GIS/TV Inspection	(Open): Conversion of GIS from UNIX to NT based on vendor software changes was completed. Also, completed recommendations from a TV Inspection Benchmarking Project by purchasing new software to improve data and operational efficiencies. New business requirements, including expansion of GeoXH handhelds to collect information on manhole inspections and its incorporation into GIS, are being handled under the CEB.
GIS Projects & Enhancements	(Open): Project will consist of Hardware, Installations, Software, Customizations and Technical Support of Geographical Information Systems. Project began in FY09 Q2 and will continue through FY13.
MIS Strategic Planning Implementation	(Open): Project will consist of consultant services, hardware, storage, technical support and strategic projects.
MIS Licensing	(Open): Funding for Microsoft Licensing Suite of products – Office Professional 2003 was completed. Remainder of funds will be used for MS VISTA and Office Professional 2007 Test Licenses.
Lawson Conversion	(Complete): Original funding of \$600,000. The remainder of funding came from Phase V projects where bids were awarded at a lower than anticipated cost. The project includes funding for new OS, server replacements and application environment (new servers were procured for Chelsea (production) and Deer Island (disaster recovery/test/development) in FY08). Application Environment upgrade was completed in FY08. The application software upgrade, including technical support and professional services was successfully completed in Q4 FY10.
Cyber Security	(Open): Funding for Development Contract executed in December 2007 for Internet Data Protection 24X7 Monitoring costs. Cyber Security Monitoring continues to provide multiple layers of protection against internal and external threats to our networks and systems. Updates to software and hardware for this purpose are ongoing and continuous.
Original SAN	(Complete): The original amount of \$680,004 funded from Phase II project. Funding will be used for Hardware, Software and Technical Support. This project provides increased data storage with high availability, centralized storage management and more energy-efficient operations
Cyber Security	(Open): Next phase of Cyber Security to provide new appliances, software upgrades, and hardware replacement in addition to the 24 hour 7 day/week monitoring to outfit the 2 <sup>nd</sup> MIS Data Center. This project is expected to commence in FY12.
Lawson System Upgrade	(Open): Next phase of Lawson hardware, environment, and application replacement or upgrades. This project is expected to commence in FY14.
Laboratory Information Mgmt System (LIMS)	(Open): The system is used by MWRA for processing water and wastewater related samplings intended to demonstrate compliance with state and federal regulations. Hardware replacements and enhancements to the system based on current useful life.
Pre-Treatment Information Mgmt System (PIMS)	(Open): 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.
Document Control System Software Application Replacement	(Open): The Document Control Application is used to track, manage and retrieve the latest and best engineering document information (drawings, specs, submittals, etc.) on MWRA infrastructure assets. The information from the application is used for field maintenance, repair, engineering, construction, litigation, etc.

Sub-phase	Scope
<b>NET 2020 DITP/Southborough</b>	(Open): Network Infrastructure Project - Copper cable upgrade to CAT6 to support new standards and fiber upgrade to support increased backbone capacity for 10GIG. This request is for funding of DITP and Southboro facilities cabling and fiber upgrade. The cabling and fiber are non-compliant with current standards.

#### Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$38,800	\$23,910	\$14,890	\$948	\$1,635	\$8,407	\$8,385	\$0

Project Status 5/11	63.5%	Status as % is approximation based on project budget and expenditures. Phases V and VI are in process and nearly complete. The TRAC IS system and the LIMS replacement contracts were awarded in FY08.
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#### Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$36,700	\$38,800	\$2,100	Sep-16	Sep-16	None	\$8,750	\$8,407	(\$343)

#### Explanation of Changes

- Project cost increased due to new project added for NET 2020 DITP/Southborough.
- Spending decreased due to revised schedules for MIS Strategic Planning, Corporate Server Infrastructure & Document Distribution, NET 2020 (FY10-12), and SAN II contracts. This was partially offset by new project listed above.

#### CEB Impact

- The incremental software and/or hardware maintenance costs for the Phase II TRAC Replacement (\$150,000 in FY14); Phase V LIMS Replacement (GIS & OMS) (\$187,000 in FY14); SAN II (\$100,000 in FY15); NET2020 (\$50,000 in FY14); and SAN III (\$100,000 in FY19); Telecommunications will have a \$25,000 impact in FY19; and NET2020 DITP and Southborough (\$75,000 in FY16).

## S. 932 Environmental Remediation

### Project Purpose

*To implement remedial programs necessary to protect the environment and to ensure compliance with the Clean State Initiative.*

### Project History and Background

Fuel tank replacements at Prison Point CSO, Cottage Farm CSO, and Chelsea Creek Headworks will enable MWRA to meet all current regulatory requirements and provide enhanced spill prevention and leak detection capabilities.

In accordance with the Massachusetts Contingency Plan, MWRA installed an oil recovery system to clean up oil contamination at Prison Point in conjunction with the tank replacement. Removed contaminated soil in conjunction with the tank replacement at the Chelsea Creek Headworks.

Many MWRA underground storage tanks (USTs) have been upgraded or replaced to meet current regulations. Two USTs at the Prison Point CSO were replaced in spring 1999, with remediation completed in October 2010. Chelsea Creek Headworks and Cottage Farm UST replacement construction was completed in December 2002. The Commercial Point CSO and Hingham Pump Station UST Upgrades construction contract began in February 2003 and was completed in March 2003.

### Scope

Sub-phase	Scope
Technical Assistance – Environmental Remediation	Design, construction oversight, and waste site clean-up services for Prison Point, Cottage Farm, and Chelsea Creek tank replacements.
Prison Point Tank Replacement – Construction	Removal and replacement of two underground fuel storage tanks at the Prison Point CSO facility. Operation of oil recovery system. Assessment, design and installation of system upgrades.
Cottage Farm Tank Replacement – Construction	Removal and replacement of two underground fuel storage tanks at the Cottage Farm CSO facility.
Cosgrove Power Station – Design/CS and Construction	Design and construction of stormwater collection and surface water discharge system.
Oakdale Power Station – Design and Construction	Design and construction of non-contact cooling water disposal system. Design includes resolution of MCP issues associated with ground water conditions.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$1,556	\$1,500	\$57	\$57	\$0	\$88	\$0	\$0

Project Status 5/11	100%	Status as % is approximation based on project budget and expenditures. The Prison Point oil recovery was completed in July 2010 and decommissioning of the oil recovery system was completed in October 2010.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$1,805	\$1,556	(\$249)	Jan-13	Jan-13	None	\$268	\$88	(\$180)

**Explanation of Changes**

- Project cost and spending decreased due to revised cost estimate for prison point oil recovery.

**CEB Impact**

- No additional impacts 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 FY10	Remaining Balance	FY11	FY12	FY09-13	FY14-18	Beyond FY18
\$2,151	\$371	\$1,780	\$0	\$527	\$2,151	\$0	\$0

Project Status 5/11	17.2%	Status as % is approximation based on project budget and expenditures. CSB/Demolition began in May 2009 and is substantially complete. Records Center Shelving and Moving to the interim warehouse/records center was completed in the spring of 2009.
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## Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$7,308	\$2,151	(\$5,157)	Jun-13	Jan-13	(5) months	\$7,308	\$2,151	(\$5,157)

**Explanation of Changes**

- Project cost, schedule and spending changed due to the deletion of Marlborough Records Center and Chelsea Annex from the budget.

**CEB Impacts**

- No additional impacts 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 now underway or planned for FY11 include: 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.

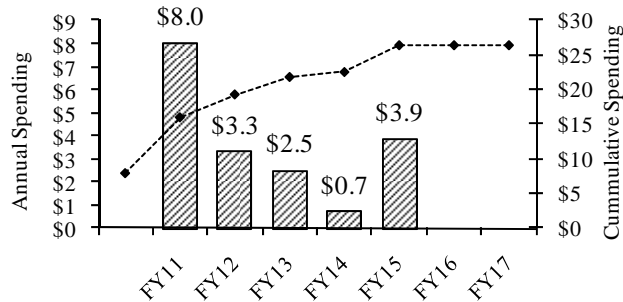
### Scope

Sub-phase	Scope
DI Solar	Design and construction of 100kw 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.
DI Photovoltaic System Phase I	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	Design and construction for future DI Wind project.
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	Energy consultant for energy efficiency throughout the Authority.
Wachusett Hydro Design & Construction	Design and construction of 155kw hydro generation plant at Wachusett Reservoir. Projected annual output estimated at 750,000 kwh.
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 478kw at Carroll WTP plant. Projected annual output estimated at over 646,000 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.
DI Wind Phase 2	Installation of up to 3 additional 600 kw wind turbines at Deer Island. Projected annual output estimated at 1,150,000 kwh per turbine.

**Expenditure Forecast (in \$000s) and Project Status**

Total Budget	Payments thru FY10	Remaining Balance	FY11	FY2	FY09-13	FY14-18	Beyond FY18
\$26,377	\$8,011	\$18,366	\$8,009	\$3,293	\$21,231	\$4,554	\$0

**Alternative Energy Initiatives**



Project Status 5/11	51.3%	Status as % is approximation based on project budget and expenditures. Carroll Water Treatment Solar and Loring Road Hydro Construction were completed in May 2011. Charlestown Wind Project began in February 2010.
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**Changes to Project Scope, Budget, and Schedule**

Project Cost			Scheduled Completion Date			FY09-13 Spending		
FY11	FY12	Chge.	FY11	FY12	Chge.	FY11	FY12	Chge.
\$25,452	\$26,377	\$925	Dec-14	Dec-14	None	\$24,249	\$21,231	(\$3,018)

**Explanation of Changes**

- Project cost increased primarily due to change orders for Charlestown Wind and Carroll Water Treatment Plant Solar contracts. Also, inflation adjustments for Future Deer Island Wind Construction (Formerly Nut Island Wind) contract.
- Spending decreased primarily due to schedule change for Future DI Wind Construction partially offset by cost increases listed above.

**CEB Impacts**

- Deer Island Wind Phase II reflects impacts of (\$300,000) in incremental avoided costs and +\$40,000 in RPS revenue in FY14; Future DI Wind assume (\$106,000) in incremental avoided costs and +\$15,000 in RPS revenue in FY15; Wachusett Hydro assume avoided cost of (\$131,000) and additional revenue of \$19,000 as of FY16.



## APPENDIX 2

# Expenditure Forecast Report with Planned NTP and SC dates

# Understanding the Expenditure Forecasts

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Capital expenditure forecasts, sometimes referred to as project cashflows, are presented in this section of the FY12 Final 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 FY10**

Payments through FY10 includes actual and accrued expenditures since the inception of the contract through the end of FY10.

**Remaining Balance**

Remaining Balance is calculated by subtracting Payments through FY10 from the Contract Amount. This amount is then spread in the columns to the right, from FY11 to Beyond FY18.

**APPENDIX 2**  
**FY12 FINAL TEN YEAR CIP BY MAJOR PROGRAM CATEGORY**

CAPITAL IMPROVEMENT PROGRAM EXPENDITURE FORECAST FY2009-2013 (\$000)													
	Total Contract Amount	Project Payments Thr. FY10	Balance as of 6/30/10	FY09 Actual	FY10 Actual	FY11 Projected	QI FY12	QII FY12	QIII FY12	QIV FY12	FY12	FY13	5-Year Total FY09-13
<b>Wastewater System Improvements</b>	2,625,405	1,494,038	1,131,368	123,710	152,658	100,648	19,511	16,325	30,687	21,106	87,628	110,234	574,878
<b>Waterworks System Improvements</b>	2,735,725	1,705,376	1,030,349	52,855	50,106	39,992	12,804	13,518	20,524	20,766	67,611	103,783	314,347
<b>Business &amp; Operations Support</b>	107,140	57,274	49,866	5,674	8,669	11,235	2,032	1,561	2,766	3,899	10,258	11,600	47,435
<b>Contingency</b>	129,372		129,372				1,357	1,526	2,161	3,349	8,393	11,864	20,257
<b>Total MWRA w/ Contingency</b>	<b>5,597,642</b>	<b>3,256,688</b>	<b>2,340,954</b>	<b>182,239</b>	<b>211,433</b>	<b>151,874</b>	<b>35,704</b>	<b>32,930</b>	<b>56,138</b>	<b>49,120</b>	<b>173,890</b>	<b>237,481</b>	<b>956,917</b>

**TEN-YEAR CAPITAL IMPROVEMENT PROGRAM SUMMARY BY CATEGORY**

CAPITAL IMPROVEMENT PROGRAM EXPENDITURE FORECAST FY2012-2021 (\$000)													
			FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	10-Year Total FY12-21
<b>Wastewater System Improvements</b>			87,628	110,234	125,201	138,573	122,502	106,180	66,068	59,402	38,474	25,930	880,192
<b>Waterworks System Improvements</b>			67,611	103,783	115,106	91,649	91,054	74,064	52,678	160,493	176,254	101,254	1,033,946
<b>Business &amp; Operations Support</b>			10,258	11,600	4,887	7,594	2,767	1,075	450	0	0	0	38,631
<b>Contingency</b>			8,393	11,864	15,522	16,234	14,784	13,283	9,187	16,069	13,396	10,640	129,372
<b>Total MWRA w/ Contingency</b>			<b>173,890</b>	<b>237,481</b>	<b>260,716</b>	<b>254,050</b>	<b>231,107</b>	<b>194,602</b>	<b>128,383</b>	<b>235,964</b>	<b>228,124</b>	<b>137,824</b>	<b>2,082,141</b>

Total FY09-13 (see FY09-13 Table)			182,239	211,433	151,874	173,890	237,481	956,917
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Total FY12-21			173,890	237,481	260,716	254,050	231,107	194,602	128,383	235,964	228,124	137,824	2,082,141
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Please note the five-year total (FY09-13) of \$956,917,000 includes \$20,257,000 in contingency funds. The spending without contingency is \$936,660,000.

**Massachusetts Water Resources Authority  
FY12 Final Capital Expenditure Forecast**

Program / Project	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY10	Remaining Balance	FY11	FY12	FY13	FY09 - FY13	FY14 - FY18	Beyond FY18
<b>Total MWRA</b>				<b>5,468,270,862</b>	<b>3,256,687,504</b>	<b>2,211,583,359</b>	<b>151,874,022</b>	<b>165,497,274</b>	<b>225,616,615</b>	<b>936,659,641</b>	<b>999,849,875</b>	<b>668,745,425</b>
<b>Wastewater</b>				<b>2,625,405,406</b>	<b>1,494,037,580</b>	<b>1,131,367,826</b>	<b>100,647,700</b>	<b>87,627,824</b>	<b>110,233,934</b>	<b>574,877,709</b>	<b>558,524,956</b>	<b>274,333,392</b>
<b>Interception &amp; Pumping</b>				<b>814,734,390</b>	<b>497,510,481</b>	<b>317,223,909</b>	<b>16,333,696</b>	<b>10,401,158</b>	<b>24,629,299</b>	<b>60,707,855</b>	<b>217,929,180</b>	<b>47,930,564</b>
<b>102 Quincy Pump Facilities</b>	<b>completed project</b>			25,908,059	25,908,077	(18)						
<b>104 Braintree-Weymouth Relief Facilities</b>				234,001,950	215,884,599	18,117,351	12,609,873	921,821	1,445,656	15,830,425	3,140,000	
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	13,221,359	3,707,953	9,513,405	9,513,405			9,561,562		
Tunnel Construction/Rescue	10049_5315	Jun-99	Jul-03	83,550,809	83,550,809	-						
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	-				76,562		
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	15,265,432	14,533,306	732,126	410,305	321,821		1,356,427		
Rehabilitation of Section 624 - Construction	10060_5310	Jul-10	Dec-10	2,546,882	-	2,546,882	2,546,882			2,546,882		
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	825,088	783,619	41,469	41,469			80,534		
Hazardous Waste	10265_6074	Jul-95	Apr-07	7,937	7,937	-				6,037		
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	-				42,421		
Wetlands Replication	10470_7290	Jul-10	Jun-12	700,000	16,532	683,468	97,812	500,000	85,656	700,000		
Mill Cove Siphon Sluice Gates - Design	10479_7326	Jan-12	Jan-13	-	-	-						
Mill Cove Sluice Gates - Construction	10480_7327	Jan-12	Jun-13	600,000	-	600,000		100,000	400,000	500,000	100,000	
Braintree-Weymouth Improvements	10493_7366	Apr-12	Jun-16	4,000,000	-	4,000,000			960,000	960,000	3,040,000	

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<b>105 New Neponset Valley Relief Sewer</b>	<b>completed project</b>			30,300,308	30,300,303	5						
<b>106 Wellesley Extension Replacement Sewer</b>	<b>completed project</b>			64,358,560	64,358,543	17						
<b>107 Framingham Extension Relief Sewer</b>	<b>completed project</b>			47,855,985	47,855,986	(1)						
<b>127 Cummingsville Replacement Sewer</b>	<b>completed project</b>			8,998,777	8,998,767	10				43,382		
<b>130 Siphon Structure Rehabilitation</b>				2,684,821	939,770	1,745,051			87,984	87,984	1,657,067	
Planning	10253_6017	Jan-96	Nov-98	937,670	937,670	-						
Land Acquisition	10280_6165	Jun-06	Dec-10	2,100	2,100	-						
Design/CS/RI	10293_6224	Jul-12	Sep-16	498,586	-	498,586			87,984	87,984	410,602	
Construction	10294_6225	Oct-14	Sep-15	1,246,465	-	1,246,465					1,246,465	
<b>131 Upper Neponset Valley Sewer System</b>				55,056,026	53,753,997	1,302,029	133,553	1,168,476		1,906,369		
Design/CS/RI	10256_6031	May-00	Apr-09	4,647,513	4,584,683	62,830	62,830			154,436		
Legal	10266_6075	Jun-00	Apr-08	131,259	43,531	87,728	19,252	68,476		130,000		
Sewer Sections 685-686 - Replacement	10290_6191	Mar-05	Mar-08	37,004,923	37,004,923	-				509,867		
Land Acquisition	10311_6450	Jun-00	Apr-08	2,602,325	1,502,325	1,100,000		1,100,000		1,100,045		
Sewer Section 687 Replacement - Construction	10352_6629	Oct-06	Nov-07	7,663,585	7,663,585	-				(181,000)		
Boston Paving	10393_6830	Apr-05	Apr-08	659,809	609,723	50,086	50,086			93,366		
Resident Engineering/Inspection	10439_7072	Apr-05	Feb-09	2,346,611	2,345,226	1,385	1,385			99,655		
<b>132 Corrosion &amp; Odor Control</b>				16,782,343	3,002,810	13,779,534			275,490	275,490	12,504,044	1,000,000
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	622,209	622,209	-						
FES Tunnel Rehab - Construction	10405_6918	Dec-15	Jun-17	6,800,000	-	6,800,000					6,800,000	
FES/FERS Biofilters - Design	10406_6919	Jul-12	Apr-15	1,040,738	-	1,040,738			275,490	275,490	765,248	
FES Tunnel Rehab - Design	10453_7196	Jul-15	Jun-17	1,700,000	-	1,700,000					1,700,000	
FES/FERS Biofilters - Construction	10456_7215	Apr-14	Apr-15	2,238,796	-	2,238,796					2,238,796	
System-wide Odor Control - Study	10491_7364	Jul-18	Jul-20	1,000,000	-	1,000,000						1,000,000
Nut Island Odor Control System - Evaluation & Design	10492_7365	Jul-14	Jul-16	1,000,000	-	1,000,000					1,000,000	

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<b>136 West Roxbury Tunnel</b>				46,934,077	9,538,629	37,395,447	948,741			1,607,568	21,100,000	15,346,707
Inspection	10299_6230	Jul-98	Sep-99	344,202	344,202	-						
Tunnel Easements & Permits	10329_6566	Mar-10	Dec-15	53,789	31,034	22,755	22,755			53,789		
Legal	10330_6567	Apr-00	Mar-10	2,133	2,133	-				295		
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	1,412,185	1,412,185	-						
Technical Assistance	10366_6709	Nov-99	Mar-10	7,752	7,752	-						
Tunnel - Design	10400_6897	Feb-09	Jun-11	1,553,484	627,498	925,986	925,986			1,553,484		
Tunnel - Construction	10401_6898	Sep-13	Jun-19	36,446,707	-	36,446,707				-	21,100,000	15,346,707
<b>137 Wastewater Central Monitoring</b>				20,839,477	19,783,761	1,055,716	155,716	250,000	600,000	6,841,741	50,000	
Planning	10301_6232	Jan-98	Jul-99	563,425	563,425	-						
Design and Integration Services	10319_6532	Jun-02	Jul-10	6,501,542	6,345,826	155,716	155,716			1,508,524		
Construction 1 (CP1)	10320_6533	Mar-06	Jan-08	7,662,173	7,662,173	-				7,780		
Construction 2 (CP2)	10321_6534	Feb-08	Jul-09	5,139,444	5,139,444	-				4,460,402		
Technical Assistance	10322_6535	Sep-02	Jul-10	7,425	7,425	-				4,235		
Equipment Prepurchase	10398_6861	Apr-05	Dec-09	65,468	65,468	-				10,800		
Wastewater Redundant Communications	10490_7363	Nov-11	Apr-13	900,000	-	900,000		250,000	600,000	850,000	50,000	
<b>139 South System Relief Project</b>				4,939,244	3,439,244	1,500,000				(645)	937,500	562,500
Archdale - CS/RI	10309_6419	Nov-98	Aug-99	5,379	5,379	-				(645)		
Archdale - Construction	10310_6420	May-99	Aug-99	210,748	210,748	-						
Sections 70 & 71 HLS - Evaluation	10318_6519	Sep-98	Oct-99	215,140	215,140	-						
Outfall 023 - Design	10345_6595	Jun-99	Sep-99	509	509	-						
Outfall 023 - Cleaning	10346_6596	Apr-00	Nov-00	1,097,526	1,097,526	-						
Land Acquisition/Easements	10347_6605	Apr-99	Apr-05	5,053	5,053	-						
Sections 70 & 71 HLS - Construction	10349_6611	Jun-99	Oct-99	417,021	417,021	-						
Milton Financial Assistance	10350_6616	Oct-99	Jun-00	1,487,868	1,487,868	-						
Outfall 023 - Structural Improvements	10386_6801	Jan-17	Dec-18	1,500,000	-	1,500,000					937,500	562,500

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<b>141 Wastewater Process Optimization</b>				10,248,436	930,308	9,318,128		583,000	417,000	1,000,000	7,693,128	625,000
Planning	10367_6733	Aug-01	Aug-04	930,308	930,308	-						
Hydraulic Flood Engineering Analysis - North System	10412_6930	Sep-11	Jun-14	2,500,000	-	2,500,000		583,000	417,000	1,000,000	1,500,000	
Somerville Sewer - Design	10413_6931	Oct-13	Aug-16	200,000	-	200,000					200,000	
Somerville Sewer - Construction	10414_6932	Mar-16	Aug-16	968,128	-	968,128					968,128	
Siphon - Planning	10415_6933	Nov-16	Jun-17	150,000	-	150,000					150,000	
Manhole Structure Flood Protection - Design	10416_6934	Jan-14	Dec-14	500,000	-	500,000					500,000	
Manhole Structure Flood Protection - Construction	10417_6935	Jul-16	Jun-18	5,000,000	-	5,000,000					4,375,000	625,000
<b>142 Wastewater Meter Sys. - Equip. Replacement</b>				26,578,429	5,137,912	21,440,517	140,517	60,000	1,193,545	1,443,209	8,892,310	11,154,145
Planning / Study	10371_6739	Jan-12	May-12	100,000	-	100,000		60,000	40,000	100,000		
Equipment Purchase & Installation	10379_6793	Nov-03	Jun-08	5,278,429	5,137,912	140,517	140,517				189,664	
Design	10410_6928	Jul-13	Jan-16	200,000	-	200,000					200,000	
Construction	10411_6929	Jan-15	Jan-16	1,000,000	-	1,000,000					1,000,000	
WW Metering Asset Protection/Equipment Purchase	10451_7191	Jul-12	Jul-25	20,000,000	-	20,000,000			1,153,545	1,153,545	7,692,310	11,154,145
<b>143 Regional I/I Management Planning</b>	<b>completed project</b>			168,987	168,987	-						
<b>145 Facility Asset Protection</b>				213,328,912	7,508,788	205,820,123	2,345,296	7,417,861	20,609,624	31,672,332	156,205,132	19,242,212
Prison Point HVAC Upgrades - Construction	10380_6795	Dec-10	Mar-12	2,124,900	-	2,124,900	523,594	1,601,306		2,124,900		
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	Jul-12	Nov-14	6,733,518	-	6,733,518			2,088,000	2,088,000	4,645,518	
Rehab of Section 93A Lexington	10383_6798	Jul-03	Apr-04	1,565,742	1,565,742	-						
Headworks Upgrades - CM Services	10387_6802	Jul-11	Apr-17	6,500,000	-	6,500,000		847,827	1,130,435	1,978,262	4,521,740	
Technical Assistance	10392_6829	Jul-02	Nov-08	78,189	36,577	41,612	41,612			52,971		
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	-				(271,680)		
Survey	10396_6857	Nov-04	May-05	10,708	10,708	-						
Permits	10397_6858	May-03	Nov-08	8,057	8,057	-				1,010		
Remote Headworks Concept Plan	10399_6886	May-08	Sep-09	738,728	687,888	50,840	50,840			686,728		
Interceptor Renewal No. 2	10418_6936	Jul-16	Jul-17	6,044,700	-	6,044,700					6,044,700	
Alewife Brook Pump Station Rehab - Design/CA	10419_6937	Apr-10	Nov-15	1,106,337	32,225	1,074,112	227,861	178,164	178,164	616,414	489,923	
Prison Point HVAC Upgrades - Design	10420_6938	Jan-08	Mar-13	452,248	243,070	209,178	104,011	49,380	55,787	404,134		
93 A Force Main Replacement	10423_6987	May-06	Jan-07	461,962	461,962	-						
Mill Brook Valley Sewer Sections 79&92	10424_7004	Jun-04	Mar-05	542,292	542,292	-						
Hingham Pump Station Isolation Gate - Construction	10427_7033	Sep-11	Apr-12	350,000	-	350,000		306,250	43,750	350,000		
Caruso Pump Station Generator Replacement	10431_7037	Apr-12	Jan-13	582,440	-	582,440			582,440	582,440		
Prison Pt & Cottage Farm Washdown Sys Pipe-Design	10433_7039	Jul-11	Mar-13	-	-	-						

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Prison Pt & Cottage Farm Washdown Sys Pipe-Constr.	10434_7040	Mar-12	Sep-12	-	-	-						
Land/Easements	10440_7073	Jul-03	Jun-10	103,386	103,336	50	50			50		
Nut Island Headworks Fire Alarm/Wiring Replacement	10444_7144	Jun-09	Dec-09	285,391	285,391	-				285,391		
Headworks Upgrades - Construction	10445_7161	Dec-12	Dec-17	125,525,938	-	125,525,938			8,231,208	8,231,208	117,294,730	
Pump Stations & CSOs Condition Assessment	10446_7162	Jan-12	Dec-13	3,000,000	-	3,000,000		375,000	1,500,000	1,875,000	1,125,000	
Interceptor Renewal No.1 - Design	10447_7163	Aug-11	Aug-15	200,000	-	200,000		32,800	49,200	82,000	118,000	
Interceptor Renewal No.1 - Construct.	10448_7164	Jan-14	Jun-15	3,800,000	-	3,800,000					3,800,000	
Headworks Upgrades - Design/CA	10455_7206	Jul-10	Dec-18	6,682,531	-	6,682,531	1,074,696	897,240	897,240	2,869,176	3,813,355	
Malden & Melrose Hydraulic & Structural - Study	10457_7216	Jan-13	Dec-13	300,000	-	300,000			75,000	75,000	225,000	
Malden & Melrose Hydraulic & Structural - Construct.	10458_7217	Jan-14	Dec-16	1,000,000	-	1,000,000					1,000,000	
Nut Island Fire Pump Building - Study	10459_7218	Nov-12	Dec-13	300,000	-	300,000			107,000	107,000	193,000	
Nut Island Mechanical & Electrical Replacements	10460_7219	Jun-12	May-15	3,000,000	-	3,000,000			833,330	833,330	2,166,670	
Headworks Effluent Shaft - Study	10463_7237	Jul-13	Jun-14	500,000	-	500,000					500,000	
Melrose Sewer	10464_7248	Feb-10	Feb-11	654,510	410,402	244,108	244,108			654,510		
Interceptor Ren. No. 3 Camb/Somerville Sects. 26&27	10467_7279	Jul-18	Jun-19	5,000,000	-	5,000,000						5,000,000
Interceptor Ren. No. 4 Everett Sections 23/24/156	10468_7280	Jul-16	Jun-17	3,000,000	-	3,000,000					3,000,000	
Cottage Farm Fuel System Upgrade	10469_7281	Oct-11	Apr-12	300,000	-	300,000		257,142	42,858	300,000		
NI Electrical & Grit/Sreens Conveyance - Design	10477_7312	Mar-11	Oct-14	1,024,877	-	1,024,877	78,524	258,096	258,096	594,716	430,161	
NI Electrical & Grit/Sreens Conveyance - Construction	10478_7313	Jul-12	Oct-13	6,000,000	-	6,000,000			3,375,000	3,375,000	2,625,000	
Interceptor Renewal No. 5 - Milton	10481_7328	Jul-17	Jun-20	4,000,000	-	4,000,000					1,000,000	3,000,000
Interceptor Renewal No. 6 - Chelsea	10482_7329	Jul-18	Jun-21	11,000,000	-	11,000,000						11,000,000
New Neponset VFD Replacement	10483_7330	Jan-12	Jan-13	-	-	-						
Somerville Marginal Influent Gates Replacement	10484_7344	Jul-11	Nov-11	341,319	-	341,319		341,319		341,319		
PP Dry Weather Flow & Stripping Pump Improvements	10485_7358	Jan-13	Dec-15	750,000	-	750,000			62,500	62,500	687,500	
PP/CF CSO Rehab Preliminary Design/Study	10486_7359	Jan-13	Jun-18	1,000,000	-	1,000,000			45,453	45,453	909,060	45,487
System Relief & Contingency Planning	10487_7360	Jul-13	Jun-15	500,000	-	500,000				-	500,000	
Delauri Pump Station Electrical Room Cooling	10488_7361	Jul-12	Jul-13	250,000	-	250,000			187,500	187,500	62,500	
Caruso PS HVAC & Fire Detection System Upgrades	10489_7362	Apr-12	Mar-14	1,000,000	-	1,000,000			500,000	500,000	500,000	
Pump Station Rehab - Preliminary Design/Study	10500_7375	Jul-14	Jun-19	750,000	-	750,000					553,275	196,725
Prison Point Gearbox Rebuilds	10501_7389	Jun-11	Dec-11	440,000	-	440,000		440,000		440,000		
Sect 156 Rehab - Owners Rep	10502_7392	Jun-11	Jun-12	200,000	-	200,000		166,667	33,333	200,000		
Sect 156 Rehab - Design/Build	10503_7393	Jun-11	Jun-12	2,000,000	-	2,000,000		1,666,670	333,330	2,000,000		
<b>146 D.I. Cross Harbor Tunnel</b>				5,000,000	-	5,000,000					5,000,000	
Tunnel Shaft Repairs - Plan/Design/Construction	10454_7199	Jul-14	Jun-17	5,000,000	-	5,000,000					5,000,000	
<b>147 Randolph Trunk Sewer Relief</b>				750,000	-	750,000					750,000	
Study	10461_7220	Jul-13	Jun-15	750,000	-	750,000					750,000	



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<b>Treatment</b>				<b>618,975,239</b>	<b>122,569,933</b>	<b>496,405,306</b>	<b>33,121,714</b>	<b>39,986,921</b>	<b>46,325,617</b>	<b>190,210,125</b>	<b>227,759,023</b>	<b>149,212,031</b>
<b>200 DI Plant Optimization</b>	<b>completed project</b>			33,455,815	33,455,815	-				296,298		
<b>206 DI Treatment Plant Asset Protection</b>				575,907,220	87,440,104	488,467,116	33,029,749	38,280,507	44,708,929	186,098,593	223,235,900	149,212,031
DITP Roof Replacements	18045_6196	Jun-10	Jun-11	2,372,886	-	2,372,886	2,372,886			2,372,886		
DISC Application	19162_6241	Jun-96	Jun-14	250,000	125,077	124,923					124,923	
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
Ancillary Mods - Construction 4	19188_6538	Nov-14	Mar-18	10,037,100	-	10,037,100					10,037,100	
Equipment Condition Monitoring	19193_6594	May-04	Jan-05	1,776,946	1,776,946	-						
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	Jun-11	Nov-12	2,000,000	-	2,000,000		1,230,768	769,232	2,000,000		
Expansion Joint Repair - Construction 3	19218_6705	May-14	Nov-14	502,435	-	502,435				-	502,435	
As-needed Design Phase 6-1	19220_6721	May-09	May-12	1,850,000	606,650	1,243,350	351,201	892,149		1,850,000		
As-needed Design Phase 6-2	19221_6722	May-09	May-12	1,850,000	297,352	1,552,648	293,074	1,259,574		1,850,000		
Eastern Seawall Design - 1	19222_6723	Jan-13	Nov-15	488,482	-	488,482			81,414	81,414	407,068	
Eastern Seawall Construction - 1	19223_6724	May-14	Nov-15	2,093,494	-	2,093,494					2,093,494	
Digester Gas Flare #4 - Design	19227_6728	Jun-12	Mar-15	423,400	-	423,400			194,059	194,059	229,341	
Digester Gas Flare #4 - Construction	19228_6729	Oct-13	Mar-15	661,563	-	661,563					661,563	
Roof Replacement - Phase I	19230_S464	Mar-09	Mar-10	2,749,941	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	-				220		
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-14	145,275	62,055	83,220				27,657	83,220	
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	Jul-08	Jun-15	2,537,993	876,808	1,661,185		820,264	415,296	2,074,375	425,625	
Reline Hypochlorite Tanks 2 & 4	19250_6849	Apr-08	Oct-08	2,241,692	2,241,692	-				1,787,192		
Chemical Pipe Replacement - Design	19252_6851	Sep-12	Jan-15	493,817	-	493,817			164,605	164,605	329,211	
Chemical Pipe Replacement - Construction	19253_6852	Jan-14	Jan-15	2,009,740	-	2,009,740					2,009,740	
Sodium Hypochlorite Pipe Replacement - Design	19254_6853	Jun-12	Nov-16	2,009,740	-	2,009,740			772,977	772,977	1,236,763	
Sodium Hypochlorite Pipe Replacement - Construction	19255_6854	Nov-13	Nov-16	7,034,090	-	7,034,090					7,034,090	
Electrical Equipment Upgrades - Construction 3	19256_6855	Feb-08	Aug-11	15,049,800	12,189,375	2,860,425	2,143,624	716,801		14,406,800		

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WTF VFD Replacement - Construction	19258_6875	Jan-13	Jan-15	3,730,394	-	3,730,394			310,866	310,866	3,419,528	
Heat Loop Pipe Replacement - Construction 1	19259_6876	Mar-05	Dec-05	615,000	615,000	-						
Miscellaneous VFD Replacements	19260_6877	May-05	Jan-13	2,625,000	932,451	1,692,549		1,000,000	692,549	1,722,389		
LOCAT Scrubber Replacement - Design	19263_6880	Nov-12	May-15	900,000	-	900,000			180,000	180,000	720,000	
Grit Air Handler Replacements	19264_6881	Jul-08	Jun-10	1,792,362	1,766,391	25,971	25,971			1,792,362		
CEMS Equipment Replacement	19265_6882	Nov-05	Mar-06	101,872	101,872	-						
Heat Loop Pipe Replacement - Construction 2	19266_6883	Dec-06	Feb-08	1,488,356	1,488,356	-						
PICS Replacement - Construction	19267_6884	Jun-11	Apr-12	1,302,198	-	1,302,198		1,302,198		1,302,198		
Primary & Secondary Clarifier Rehab - Construction	19268_6899	Feb-09	Feb-12	59,554,381	35,764,710	23,789,671	16,838,739	6,950,932		59,554,381		
Electrical Equipment Upgrades - Construction 4	19270_6901	Oct-11	Oct-13	3,500,000	-	3,500,000		875,000	1,750,000	2,625,000	875,000	
NMPS VFD Replacement - Design/ESDC	19271_6902	Dec-07	Jul-15	1,696,817	847,281	849,536	232,467	102,846	154,267	1,118,104	359,956	
NMPS VFD Replacement - Construction	19272_6903	Jul-11	Jul-15	46,000,000	-	46,000,000		6,666,667	10,000,000	16,666,667	29,333,333	
Fire Alarm System Replacement - Design	19273_6904	Jun-11	Oct-14	2,800,000	-	2,800,000		816,666	661,111	1,477,777	1,322,223	
Gravity Thickener Rehab - Design	19274_6963	Feb-12	Jul-15	977,500	-	977,500		112,788	375,962	488,750	488,750	
Primary & Secondary Clarifier Rehab - Design	19276_6965	Mar-09	Feb-13	2,049,379	578,334	1,471,045	682,760	788,285		2,049,379		
Gravity Thickener Improvements - Construction	19277_6966	Apr-10	Jul-15	7,871,224	299,568	7,571,656	578,575	540,354	666,667	2,085,164	5,786,060	
STG System Modifications - Design	19278_6967	Jun-09	Apr-11	549,318	157,776	391,542	391,542			549,318		
Electrical Equipment Upgrades 3 - REI	19279_6968	Feb-08	Jun-11	1,206,631	647,768	558,863	425,955	132,908		1,137,472		
Fuel Transfer Pipe Replacement - Design	19280_6969	Nov-18	Feb-22	1,150,000	-	1,150,000						1,150,000
Fuel Transfer Pipe Replacement - Construction	19281_6970	Jan-12	Feb-22	3,571,233	-	3,571,233		250,000	500,000	750,000		2,821,233
NMPS Motor Control Center - Design	19282_6971	Jul-11	Sep-15	953,410	-	953,410		185,294	164,706	350,000	603,410	
NMPS Motor Control Center - Construction	19283_6972	Jul-11	Sep-15	7,085,725	-	7,085,725		562,500	437,500	1,000,000	6,085,725	
STG System Modifications - Construction	19284_6973	May-10	Apr-11	2,383,175	805,641	1,577,534	1,577,534			2,383,175		
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-13	Feb-16	5,451,000	-	5,451,000			302,833	302,833	5,148,167	
Digester & Storage Tank Rehab - Design/ESDC	19290_7052	Jan-12	Dec-16	3,000,000	-	3,000,000		500,000	1,000,000	1,500,000	1,500,000	
Thickened Primary Sludge Pump Replace. - Design	19291_7053	Sep-12	Apr-15	575,000	-	575,000			287,500	287,500	287,500	
Thickened Primary Sludge Pump Replace. - Construct.	19292_7054	Jul-13	Apr-15	2,538,774	27,297	2,511,477					2,511,477	
Digester Modules 1 & 2 Pipe Replacement	19293_7055	Feb-11	Jun-14	8,662,466	-	8,662,466	68,748	2,662,485	3,412,485	6,143,718	2,518,748	
LOCAT Scrubber Replacement - Construction	19294_7056	Jun-12	May-15	4,935,798	-	4,935,798			833,333	833,333	4,102,465	
Centrifuge Backdrive Replacement	19295_7057	Aug-11	Aug-13	2,650,854	25,954	2,624,901		883,618	1,325,427	2,212,760	415,856	
Switchgear Replacement - Design	19296_7058	Nov-12	Apr-14	1,152,876	-	1,152,876			320,244	320,244	832,632	
Switchgear Replacement - Construction	19297_7059	Sep-11	Apr-14	4,043,938	-	4,043,938		786,322	1,797,305	2,583,627	1,460,311	
Power Consultant Recommendations - Design	19298_7060	Jan-06	Jul-09	2,097,404	2,097,404	-				271,600		
Power System Improvements - Construction	19299_7061	Jan-09	Apr-13	9,712,979	1,710,765	8,002,214	3,198,193	2,616,521	1,750,000	9,275,479	437,500	
NMPS VFD Replacement - REI	19300_7062	Jul-11	Aug-15	2,000,000	-	2,000,000		367,347	489,796	857,143	1,142,857	
Heat Loop Pipe Replacement - Construction 3	19301_7063	Jun-09	Mar-11	11,337,812	8,489,581	2,848,231	2,848,231			11,337,812		

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Ancillary Modifications - Final Design 4	19303_7088	Oct-12	Mar-18	2,209,416	-	2,209,416			429,610	429,610	1,779,806	
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	-				267,876		
As-needed Design Phase 5-2	19306_7091	Jul-07	Jul-09	1,055,822	1,055,822	-				428,663		
Thermal Power Plant Fuel & Steam Modifications-REI	19307_7094	Jul-11	Sep-13	1,150,000	-	1,150,000		425,926	511,111	937,037	212,963	
HVAC Equipment Replacement - Design/ESDC	19309_7111	Sep-11	Aug-16	3,500,000	-	3,500,000		777,777	972,222	1,749,999	1,750,001	
HVAC Equipment Replacement - Construction	19310_7110	Aug-13	Aug-16	17,100,600	-	17,100,600					17,100,600	
DI As-needed Technical Design	19311_7121	May-11	Dec-25	26,450,000	-	26,450,000			1,500,000	1,500,000	9,000,000	15,950,000
Digester Sludge Pump Replacement - Design	19312_7122	Jul-29	Jun-30	-	-	-						
Digester Sludge Pump Replacement - Construction	19313_7123	Oct-09	Feb-13	4,347,862	443,613	3,904,249	1,000,249	484,000	2,420,000	4,347,862		
Electrical Equipment Upgrades Phase 5	19314_7124	Oct-12	Jun-21	23,161,875	-	23,161,875			1,597,370	1,597,370	15,973,707	5,590,798
Future SSPS VFD Replacements - Design	19316_7126	Jul-15	Jun-20	4,800,000	-	4,800,000					3,700,000	1,100,000
Future SSPS VFD Replacements - Construction	19317_7127	Nov-16	Jun-20	19,200,000	-	19,200,000					6,600,000	12,600,000
Future NMPS VFD Replacements - Design	19318_7128	Jun-21	Sep-24	4,420,000	-	4,420,000						4,420,000
Future NMPS VFD Replacements - Construction	19319_7129	Sep-22	Sep-24	17,680,000	-	17,680,000						17,680,000
Future Miscellaneous VFD Replacements - Design	19320_7130	Jul-12	Feb-15	1,333,000	-	1,333,000			500,000	500,000	833,000	
Future Miscellaneous VFD Replacements - Construct.	19321_7131	May-13	May-18	5,334,000	-	5,334,000					5,334,000	
DI Switchgear Replacement - Design	19322_7132	Jul-15	Apr-20	4,500,000	-	4,500,000					3,000,000	1,500,000
DI Switchgear Replacement - Construction	19323_7133	Apr-18	Apr-21	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-14	Oct-14	3,000,000	-	3,000,000					1,000,000	2,000,000
DI CTG Rebuilds	19326_7136	Jun-13	Jun-16	6,000,000	-	6,000,000					4,000,000	2,000,000
DI Centrifuge Replacements - Design	19327_7137	Jul-13	Oct-15	4,160,000	-	4,160,000					1,040,000	3,120,000
DI Centrifuge Replacements-Construction	19328_7138	Oct-14	Oct-15	16,640,000	-	16,640,000					4,160,000	12,480,000
Cryogenics Plant - Equipment Replacement - Design	19329_7139	Jul-13	May-16	1,600,000	-	1,600,000					1,600,000	
Cryogenics Plant - Equipment Replacement-Construct.	19330_7140	Jan-12	May-16	6,400,000	-	6,400,000		616,667	1,733,333	2,350,000	4,050,000	
Future Sodium Hypochlorite Tank Rehab	19332_7142	Jul-17	Jul-19	10,000,000	-	10,000,000					2,500,000	7,500,000
Barge Berth and Facility Replacement	19334_7168	Oct-11	Oct-13	2,264,750	-	2,264,750		1,085,793	707,376	1,793,169	471,581	
South System PS Lube System Replacement	19335_7169	Jul-18	Jul-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 Processing Units Replacement	19338_7172	Feb-21	Feb-23	8,000,000	-	8,000,000						8,000,000
NMPS & WTF Butterfly Valve Replacement	19339_7275	Jan-12	Jan-14	2,500,000	-	2,500,000		312,500	1,250,000	1,562,500	937,500	
Digester & Storage Tank Rehab - Construction	19345_7373	Dec-13	Dec-16	20,000,000	-	20,000,000					20,000,000	
Clarifier Rehab - Phase 2	19346_7374	Sep-11	May-16	28,500,000	-	28,500,000		1,555,556	3,277,773	4,833,329	23,666,671	
<b>210 Clinton Wastewater Treatment Plant</b>				7,297,661	586,014	6,711,647	(78,164)	650,000	1,616,688	2,429,755	4,523,123	
Clinton Soda Ash Replacement	19302_7075	Nov-07	Aug-08	267,221	267,221	-				152,878		
Clinton Permanent Standby Generator	19308_7095	Feb-07	Nov-07	230,440	230,440	-						

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Clinton Plant-Wide Concrete Repair	19340_7276	Feb-13	Feb-15	750,000	75,193	674,807	(75,193)		62,500	62,500	687,500	
Clinton Digester Cleaning & Rehab	19341_7277	May-10	Dec-13	1,500,000	-	1,500,000	10,189		862,521	872,710	627,290	
Clinton Aeration Efficiency Improvement	19342_7278	Aug-11	Aug-12	750,000	13,160	736,840	(13,160)	500,000	250,000	750,000		
Clinton WWTP Influent Gates	19343_7371	Jan-12	Jul-12	300,000	-	300,000		150,000	150,000	300,000		
Phosphorous Removal	19950_7377	Jan-13	Jan-16	3,500,000	-	3,500,000			291,667	291,667	3,208,333	
<b>211 Laboratory Services</b>				<b>2,314,543</b>	<b>1,088,000</b>	<b>1,226,543</b>	<b>170,129</b>	<b>1,056,414</b>		<b>1,385,479</b>		
Metals Lab Fume Hood Replacement - Construction	19152_6197	Mar-11	Feb-12	955,000	-	955,000	86,818	868,182		955,000		
Metals Lab Fume Hood Replacement - Design	19249_6848	Jan-09	Feb-12	390,706	119,163	271,543	83,311	188,232		390,706		
Metals Lab Modification - Construction	19251_6850	May-07	Sep-08	968,837	968,837	-				39,773		
Central Lab Renovations - Design	19261_6878			-	-	-						
Central Lab Renovations - Construction	19262_6879			-	-	-						
Central Lab Fume Hood Replacement - Design	19331_7141			-	-	-						
Central Lab Fume Hood Replacement - Construction	19337_7171			-	-	-						
<b>Residuals</b>				<b>211,740,619</b>	<b>64,170,447</b>	<b>147,570,172</b>	<b>(14,402)</b>	<b>714,574</b>	<b>1,275,667</b>	<b>2,335,438</b>	<b>62,803,333</b>	<b>82,791,000</b>
<b>261 Residuals</b>			<b>completed project</b>	<b>63,810,848</b>	<b>63,810,848</b>	<b>-</b>						
<b>271 Residuals Asset Protection</b>				<b>147,929,771</b>	<b>359,599</b>	<b>147,570,172</b>	<b>(14,402)</b>	<b>714,574</b>	<b>1,275,667</b>	<b>2,335,438</b>	<b>62,803,333</b>	<b>82,791,000</b>
Residuals Facility Plan / EIR	26069_7143	Oct-12	Aug-13	870,000	-	870,000			609,000	609,000	261,000	
Residuals Facility Upgrade - Design	26070_7145	Jan-13	Jan-15	4,000,000	-	4,000,000			666,667	666,667	3,333,333	
Residuals Facility Upgrade-Construction	26071_7146	Jul-14	Jul-19	10,000,000	-	10,000,000					7,667,000	2,333,000
Condition Assessment/Technology&Regulatory Review	26072_7147	May-09	Apr-12	1,059,771	359,599	700,172	(14,402)	714,574		1,059,771		
Six Rotary Dryer Replacements - Design	26073_7148			-	-	-						
Six Rotary Dryer Replacements - Construction	26074_7149	Jul-13	Jul-16	57,000,000	-	57,000,000					20,000,000	37,000,000
Six Air Scrubber Replacements - Design	26075_7150			-	-	-						
Six Air Scrubber Replacements - Construction	26076_7151	Jul-15	Jul-17	8,000,000	-	8,000,000					3,000,000	5,000,000
Plant MCC Replacements - Design	26077_7152			-	-	-						
Plant MCC Replacements - Construction	26078_7153	Jul-16	Jul-18	4,500,000	-	4,500,000					1,375,000	3,125,000
Rail System Rehabilitation - Design	26081_7175			-	-	-						
Rail System Rehabilitation - Construction	26082_7176	Jul-16	Jul-18	3,000,000	-	3,000,000					917,000	2,083,000
Replace 9 Pellet Storage Silos - Design	26083_7177			-	-	-						
Replace 9 Pellet Storage Silos - Construction	26084_7178	Jul-15	Jul-17	6,000,000	-	6,000,000					2,000,000	4,000,000
Sludge Conveyor Replacement - Design	26085_7179			-	-	-						
Sludge Conveyor Replacement - Construction	26086_7180	Jul-14	Jul-15	3,000,000	-	3,000,000					1,000,000	2,000,000
Sludge Storage Tank Rehab - Design	26087_7181			-	-	-						
Sludge Storage Tank Rehab - Construction	26088_7182	Jul-15	Jul-16	3,000,000	-	3,000,000					1,000,000	2,000,000

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Upgrade Pumping System - Design	26089_7183			-	-	-						
Upgrade Pumping System - Construction	26090_7184	Jul-14	Jul-16	6,000,000	-	6,000,000					2,000,000	4,000,000
Replace 12 Centrifuges - Design	26091_7185			-	-	-						
Replace 12 Centrifuges - Construction	26092_7186	Jul-15	Jul-17	34,000,000	-	34,000,000					18,000,000	16,000,000
Utility Upgrades - Design	26093_7187			-	-	-						
Utility Upgrades - Construction	26094_7188	Jul-16	Jul-18	6,000,000	-	6,000,000					1,833,000	4,167,000
Odor Control System Upgrade - Design	26095_7189			-	-	-						
Odor Control System Upgrade - Construction	26096_7190	Jul-17	Jul-18	1,500,000	-	1,500,000					417,000	1,083,000
<b>CSO</b>				<b>857,089,296</b>	<b>710,892,689</b>	<b>146,196,607</b>	<b>46,312,322</b>	<b>34,710,520</b>	<b>36,066,004</b>	<b>305,765,220</b>	<b>28,671,942</b>	<b>435,811</b>
<b>MWRA Managed</b>				<b>435,612,189</b>	<b>403,421,290</b>	<b>32,190,899</b>	<b>23,944,304</b>	<b>2,118,120</b>	<b>2,871,528</b>	<b>162,905,072</b>	<b>3,256,947</b>	
<b>339 North Dorchester Bay</b>				224,252,120	198,404,218	25,847,901	21,339,710	2,001,662	2,501,528	85,205,025	5,000	
North Dorchester Outfall - Design/CA/RI	10426_7032	Mar-11	Apr-13	1,010,264	-	1,010,264	311,000	469,000	225,264	1,005,264	5,000	
Tunnel - Design/ESDC	32660_6220	Sep-04	Aug-12	23,518,463	22,873,805	644,658	357,999	193,756	92,904	1,893,498		
Tunnel - Construction (Ch30)	32661_6244	Aug-06	Nov-09	147,721,547	147,036,379	685,168	522,668	162,500		38,863,305		
Dewatering Pump Station & Sewers - Construction	32662_6245	Apr-09	Apr-11	26,471,349	12,719,503	13,751,846	13,711,484	40,362		26,471,349		
Tunnel & Facilities - CM Services	32726_6993	Oct-05	Apr-12	9,030,920	5,986,540	3,044,380	2,210,562	833,818		5,867,804		
Pleasure Bay - Construction	32732_7012	Sep-05	May-06	3,194,885	3,194,885	-						
Design/ESDC/Facilities	32733_7013	Nov-06	May-12	4,887,796	4,008,490	879,306	511,711	267,594	100,001	2,889,497		
Tunnel Rescue/Emergency Response	32744_7103	Mar-07	Dec-09	822,449	861,167	(38,718)	(38,718)			619,862		
Ventilation Building - Construction	32745_7259	Dec-09	May-11	5,295,130	1,723,450	3,571,680	3,537,048	34,632		5,295,130		
Communication Systems	32746_7345	Jul-10	May-11	215,956	-	215,956	215,956			215,956		
No. Dorchester Outfall Dredging - Construction	32747_4094	Sep-12	Feb-13	2,083,360	-	2,083,360			2,083,360	2,083,360		
<b>347 East Boston Branch Sewer Relief</b>				85,714,666	83,220,764	2,493,902	2,437,444	56,458		75,009,288		
Design	32673_6256	Mar-00	Sep-06	3,463,306	3,463,306	-				582		
East Boston Branch Relief Sewer	32674_6257	Jul-08	Jul-10	62,095,217	61,110,371	984,846	984,846			62,095,217		
East Boston Branch Sewer Rehab	32719_6840	Apr-03	May-04	5,222,005	5,222,005	-						
Sections 38 & 207 Replacement	32720_6841	Apr-09	Jul-10	8,875,990	8,070,118	805,872	805,872			8,875,990		
Design 2 CS	32742_7087	Jun-06	Jul-11	2,868,766	2,817,400	51,367	(5,091)	56,458		848,117		
Resident Inspection Services	32743_7097	Jul-08	Jul-10	3,189,382	2,537,565	651,817	651,817			3,189,382		
<b>348 BOS019 Storage Conduit</b>	<b>completed project</b>			14,287,581	14,287,582	(1)				(44,066)		
<b>349 Chelsea Trunk Sewer</b>	<b>completed project</b>			29,779,319	29,779,319	-						
<b>350 Union Park Detention Treatment Facility</b>	<b>completed project</b>			49,583,406	49,583,406	-				(227,192)		

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<b>353 Upgrade Existing CSO Facilities</b>	<b>completed project</b>			22,385,200	22,385,201	(1)						
<b>354 Hydraulic Relief Projects</b>	<b>completed project</b>			2,294,549	2,294,549	-						
<b>355 MWR003 Gate &amp; Siphon</b>				3,681,947	-	3,681,947		60,000	370,000	430,000	3,251,947	
Design	32722_6952	Apr-12	Sep-16	1,227,316	-	1,227,316		60,000	370,000	430,000	797,316	
Construction	32723_6953	Sep-14	Nov-15	2,454,631	-	2,454,631					2,454,631	
<b>357 Charles River CSO Controls</b>				3,633,400	3,466,251	167,149	167,150			2,532,017		
Design	32729_7009	Sep-06	Jun-10	1,204,917	1,204,248	669	669			321,091		
Interceptor Optimization Evaluation & Design	32730_7010	Jan-08	Jan-11	662,509	662,065	444	444			444,951		
Cottage Farm/Brookline Connect. Inflow Cntrls-Const.	32740_7080	Jun-08	Oct-11	1,765,975	1,599,938	166,037	166,037			1,765,975		
<b>Community Managed</b>				<b>370,348,738</b>	<b>258,685,821</b>	<b>111,662,917</b>	<b>22,351,125</b>	<b>30,976,320</b>	<b>33,176,476</b>	<b>137,512,015</b>	<b>25,158,995</b>	
<b>340 S. Dorchester Bay Sewer Sep (Fox Point)</b>				54,171,205	53,762,619	408,586		408,586		408,586		
Design	32651_6155	Jun-96	Aug-09	11,416,679	11,153,942	262,737		262,737		262,737		
Construction	32664_6247	Apr-99	Nov-06	42,754,526	42,608,677	145,849		145,849		145,849		
<b>341 S. Dorchester Bay Sew Sep (Commercial Pt.)</b>				64,725,351	59,060,736	5,664,615	809,824	992,000	2,235,000	8,206,970	1,627,791	
Design	32650_6154	Jun-96	Jun-14	17,737,961	14,907,529	2,830,431	748,256	992,000	848,000	3,812,295	242,175	
Construction	32665_6248	Apr-99	Jun-14	46,987,390	44,153,206	2,834,184	61,568		1,387,000	4,394,675	1,385,616	
<b>342 Neponset River Sewer Separation</b>	<b>completed project</b>			2,444,394	2,444,393	1						
<b>343 Constitution Beach Sewer Separation</b>	<b>completed project</b>			3,768,888	3,768,891	(3)						
<b>344 Stony Brook Sewer Separation</b>				44,332,716	44,196,560	136,156	2,000		134,155	(719,285)		
Design/CS/RI	32667_6395	Jul-98	Sep-08	10,137,304	10,135,304	2,000	2,000			345,167		
Construction	32668_6251	Jul-00	Sep-06	34,195,412	34,061,257	134,155			134,155	(1,064,452)		

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<b>346 Cambridge Sewer Separation</b>				55,701,646	24,863,397	30,838,250	4,602,581	6,788,000	10,123,000	27,925,847	9,324,668	
Design/CS/RI	32654_6161	Jan-97	Jun-16	22,310,884	11,192,925	11,117,959	1,371,687	3,690,000	2,945,000	10,516,442	3,111,272	
Construction	32672_6255	Jul-98	Dec-15	33,390,762	13,670,472	19,720,290	3,230,894	3,098,000	7,178,000	17,409,405	6,213,396	
<b>351 BWSC Floatables Controls</b>	<b>completed project</b>			932,979	932,979	-						
<b>352 Cambridge Floatables Control</b>	<b>completed project</b>			1,086,925	1,086,926	(1)				164,725		
<b>356 Fort Point Channel Sewer Separation</b>				12,047,018	10,270,403	1,776,615	1,662,305	114,310		3,755,860		
Design	32724_6991	May-04	Jun-11	2,435,362	1,986,776	448,586	354,615	93,971		1,074,428		
Construction	32725_6992	Mar-05	Dec-10	9,611,656	8,283,627	1,328,029	1,307,690	20,339		2,681,432		
<b>358 Morrissey Boulevard Drain</b>				32,898,545	35,585,079	(2,686,534)		(2,945,991)	234,000	18,196,917	25,457	
Construction	32713_6696	Dec-06	Jun-09	28,320,446	31,595,438	(3,274,991)		(3,274,991)		16,626,760		
Design	32735_7015	Jun-05	Jun-13	4,578,099	3,989,642	588,457		329,000	234,000	1,570,157	25,457	
<b>359 Reserved Channel Sewer Separation</b>				62,322,968	9,652,961	52,670,006	10,440,927	13,097,000	14,951,001	45,424,895	14,181,079	
Construction	32727_6994	May-09	Dec-15	48,125,016	3,929,018	44,195,998	8,289,013	10,152,000	13,004,000	35,374,031	12,750,985	
Design	32734_7014	Jul-06	Jun-16	14,197,952	5,723,943	8,474,009	2,151,914	2,945,000	1,947,001	10,050,864	1,430,094	
<b>360 Brookline Sewer Separation</b>				25,930,231	4,099,660	21,830,571	3,937,250	12,394,000	5,499,320	24,658,630		
Design/CS/RI	32736_7076	Nov-06	Jun-13	3,858,954	2,535,473	1,323,481	793,290	368,000	162,191	2,587,354		
Construction	32737_7077	Nov-08	Nov-12	22,071,276	1,564,187	20,507,089	3,143,960	12,026,000	5,337,129	22,071,276		
<b>361 Bulfinch Triangle Sewer Separation</b>				9,985,871	8,961,217	1,024,654	896,238	128,415		9,488,870		
Design/CS/RI	32738_7078	Aug-06	Jun-11	1,365,361	1,007,905	357,456	229,041	128,415		868,361		
Construction	32739_7079	Sep-08	Jul-10	8,620,510	7,953,312	667,198	667,197			8,620,509		
<b>Planning &amp; Support</b>				<b>51,128,369</b>	<b>48,785,578</b>	<b>2,342,791</b>	<b>16,893</b>	<b>1,616,080</b>	<b>18,000</b>	<b>5,348,133</b>	<b>256,000</b>	<b>435,811</b>
<b>324 CSO Support</b>				51,128,369	48,785,579	2,342,791	16,893	1,616,080	18,000	5,348,133	256,000	435,811
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	-				(114,342)		
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	1,956,556	1,956,550	6						
Watershed Planning	32645_6036	Dec-94	Apr-01	877,134	877,134	-						
Technical Review	32648_6150	Jul-96	Dec-20	793,592	528,932	264,660					40,000	224,660
Land Acquisition/Easement	32658_6169	Jul-96	Jun-14	13,904,402	12,275,429	1,628,973	16,893	1,416,080	18,000	5,262,475	166,000	12,000

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System Assessment	32691_6372	May-97	Dec-20	476,000	26,849	449,151		200,000		200,000	50,000	199,151
<b>Other Wastewater</b>				<b>122,865,861</b>	<b>98,894,029</b>	<b>23,971,832</b>	<b>4,894,370</b>	<b>1,814,652</b>	<b>1,937,346</b>	<b>15,859,071</b>	<b>21,361,478</b>	<b>(6,036,014)</b>
<b>128 I/I Local Financial Assistance</b>				122,584,985	98,613,153	23,971,832	4,894,370	1,814,652	1,937,346	15,859,071	21,361,478	(6,036,014)
Phase II - Grants	10273_6084	May-93	May-06	15,928,524	15,928,524	-						
Phase II - Loans	10274_6085	May-93	May-06	47,664,000	47,664,000	-						
Phase II - Repayments	10282_6170	May-94	May-11	(47,664,000)	(47,378,695)	(285,305)	(285,305)			(1,122,000)		
Public Participation	10348_6609	Feb-99	Jun-02	6,461	6,461	-						
Phase IV - Grants	10368_6736	Nov-99	May-10	34,650,000	34,650,000	-				1,294,358		
Phase IV - Loans	10369_6737	Nov-99	May-10	42,350,000	42,350,000	-				1,581,995		
Phase IV - Repayments	10370_6738	Nov-00	May-15	(42,350,000)	(36,546,345)	(5,803,655)	(2,950,948)	(1,708,123)	(556,622)	(13,715,912)	(587,962)	
Phase V - Grants	10407_6925	Aug-04	May-12	18,000,000	16,146,895	1,853,105	741,590	1,111,515		6,216,126		
Phase V - Loans	10408_6926	Aug-04	May-12	22,000,000	19,735,087	2,264,913	781,386	1,483,527		7,597,488		
Phase V - Repayments	10409_6927	Aug-05	May-17	(22,000,000)	(9,888,159)	(12,111,841)	(3,532,535)	(3,115,110)	(2,530,416)	(15,743,014)	(2,933,780)	
Phase VI - Grants	10441_7107	Nov-06	Jun-15	18,000,000	7,023,939	10,976,061	2,919,846	1,631,250	1,800,000	10,776,575	4,624,965	
Phase VI - Loans	10442_7108	Nov-06	Jun-15	22,000,000	8,584,814	13,415,186	3,569,001	1,993,750	2,200,000	13,171,670	5,652,435	
Phase VI - Repayments	10443_7109	Nov-07	Jun-20	(22,000,000)	(2,272,068)	(19,727,932)	(1,761,843)	(1,968,093)	(2,031,552)	(7,661,965)	(11,596,945)	(2,369,499)
Phase VII - Grants	10471_7293	Aug-09	Jun-18	18,000,000	1,173,915	16,826,085	2,195,865	1,350,000	1,800,000	6,519,780	11,480,220	
Phase VII - Loans	10472_7294	Aug-09	Jun-18	22,000,000	1,434,785	20,565,215	3,647,435	1,650,000	2,200,000	8,932,220	13,067,780	
Phase VII - Repayments	10473_7295	Aug-10	Jun-23	(22,000,000)	-	(22,000,000)	(430,122)	(614,064)	(944,064)	(1,988,250)	(8,815,235)	(11,196,515)
Phase VIII - Grants	10474_7296	Aug-13	Jun-21	18,000,000	-	18,000,000					5,850,000	12,150,000
Phase VIII - Loans	10475_7297	Aug-13	Jun-21	22,000,000	-	22,000,000					7,150,000	14,850,000
Phase VIII - Repayments	10476_7298	Aug-14	Jun-26	(22,000,000)	-	(22,000,000)					(2,530,000)	(19,470,000)
<b>138 Sewerage System Mapping Upgrade</b>	<b>completed project</b>			280,876	280,876	-						



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<b>Waterworks</b>				<b>2,735,725,189</b>	<b>1,705,375,823</b>	<b>1,030,349,366</b>	<b>39,991,643</b>	<b>67,611,075</b>	<b>103,783,081</b>	<b>314,346,897</b>	<b>424,551,685</b>	<b>394,412,033</b>
<b>Drinking Water Quality Improvements</b>				<b>663,548,064</b>	<b>538,884,456</b>	<b>124,663,608</b>	<b>2,513,743</b>	<b>26,061,389</b>	<b>41,118,906</b>	<b>99,988,543</b>	<b>54,969,568</b>	
<b>542 John J. Carroll Water Treatment Plant</b>				426,796,510	376,699,818	50,096,692	1,025,540	12,458,076	15,992,906	33,424,071	20,620,167	
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-14	79,000	52,245	26,755	25,679	1,076		30,680		
Cryptosporidium Inactivation Study	53367_6118	Feb-97	May-00	150,000	150,000							
Management Support - Design	53371_6134	Apr-97	Apr-00	1,729,937	1,729,937							
AWWARF Study	53375_6182	Dec-96	Sep-03	650,342	650,342							
Emergency Discharge Reservoir Water Mgmt 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					98,218		
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 Fac. - Underwater	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	145,871,496	145,871,496							
Late Sitework - CP6	53416_6491	Jul-04	Jan-06	4,127,831	4,127,831							
OCIP	53418_6494	Mar-99	Dec-07	5,107,090	5,107,089	2						
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	Jul-12	Dec-13	5,000,000	-	5,000,000			2,352,000	2,352,000	2,648,000	
CSX Crossing	53427_6670	Aug-01	Dec-01	64,700	64,700	-						
Wachusett Algae - Design CS/RI	53428_6671	Jul-13	Oct-16	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 - Design	53436_6772	Feb-02	Mar-04	-	-	-						

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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-14	1,500,000	547,679	952,321			423,000	228,070	529,321	
Wachusett Algae - Construction	53448_6889	Feb-14	Dec-15	1,800,000	-	1,800,000					1,800,000	
CWTP Ultraviolet Disinfection - Design/ESDC/RI	53450_6923	Jul-08	Apr-15	4,393,797	915,917	3,477,880	234,867	794,000	794,000	2,738,784	1,655,013	
CWTP Ultraviolet Disinfection - Construction	53451_6924	May-11	Mar-14	29,413,382	-	29,413,382		9,244,000	10,084,000	19,328,000	10,085,382	
As-needed Technical Assistance No.1	53452_6939	Jan-06	Jun-08	491,274	491,274	-				330		
Existing Facilities Modifications, CP7 - Design	53453_6951	Jul-05	Dec-14	1,842,611	580,416	1,262,195	90,749	319,000	400,000	1,276,387	452,446	
As-needed Technical Assistance	53455_6989	Jan-06	Jun-08	702,025	702,024	1				21,023		
Ancillary Modifications - Construction 1	53456_7084	Jul-06	Jun-08	160,475	160,475	-						
Ancillary Modifications - Construction 2	53457_7085	Jan-09	Dec-14	6,421,320	2,055,315	4,366,005	200,000	1,600,000	1,566,000	5,421,315	1,000,005	
Ancillary Modifications - Design 3	53458_7192	Mar-08	Sep-10	325,116	181,629	143,487	143,487			322,616		
Ancillary Modifications - Design 4	53459_7208	Mar-08	Sep-10	527,403	448,739	78,664	78,664			480,648		
Technical Assistance 5	53464_7315	Sep-10	Sep-12	563,000	-	563,000	122,200	250,000	190,800	563,000		
Technical Assistance 6	53465_7316	Sep-10	Sep-12	563,000	-	563,000	129,894	250,000	183,106	563,000		
CWTP Storage Tank Roof Drainage System	53470_7376	Jan-15	Jan-16	2,000,000	-	2,000,000					2,000,000	
<b>543 Quabbin Water Treatment Plant</b>				17,686,450	10,296,770	7,389,680	522,399	300,000	4,467,000	5,442,647	2,100,281	
Quabbin WTP - Design/CA/RI	53363_6043	May-95	Aug-01	3,793,701	3,793,701	-				(29,021)		
Permit Fees	53380_6210	Jan-98	Jan-12	10,000	7,110	2,890	2,890			2,890		
Utilities	53381_6211	Aug-98	Jan-12	13,400	13,400	-						
Construction	53382_6212	Nov-98	Sep-00	5,070,892	5,070,892	-						
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	-						
Quabbin UVWTP - Design/CA/RI	53439_6775	Dec-08	Oct-14	1,790,740	195,775	1,594,965	519,509	300,000	380,000	1,395,284	395,456	
Quabbin UVWTP - Construction	53440_6776	May-12	Aug-13	5,791,825	-	5,791,825			4,087,000	4,087,000	1,704,825	
Quabbin UVWTP -Study/Pilot	53442_6804	May-02	Dec-05	1,142,272	1,142,272	-				(13,506)		
<b>544 Norumbega Covered Storage</b>		<b>completed project</b>		106,674,146	106,674,146	-				101,670		
<b>545 Blue Hills Covered Storage</b>				40,694,845	39,841,137	853,708	446,288	15,000	43,000	21,456,571	349,421	
Technical Support & Permit Compliance	53385_6215	Apr-02	Dec-15	104,000	25,758	78,242	11,000	15,000	15,000	43,496	37,242	
Design / Build	53386_6216	Jan-07	Apr-10	37,693,514	37,445,236	248,278	248,278			20,997,161	-	
Roadway Resurfacing - Design	53460_7213	Jul-12	Jan-14	55,767	-	55,767			28,000	28,000	27,767	
Roadway Resurfacing - Construction	53461_7214	Apr-13	Jan-14	284,412	-	284,412					284,412	
EIR/Preliminary Design/OR	68025_6139	May-97	Jun-10	2,557,153	2,370,143	187,010	187,010			387,914		

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<b>550 Spot Pond Storage Facility</b>				71,696,112	5,372,585	66,323,527	519,516	13,288,313	20,616,000	39,563,584	31,899,699	
Environmental Review	53400_6455	Apr-02	Feb-03	232,830	232,830	-						
Design / Build	53402_6457	Sep-11	Sep-14	61,682,874	-	61,682,874		11,669,000	20,005,000	31,674,000	30,008,874	
Easement / Land Acquisition	53447_6868	Oct-08	Dec-09	5,930,000	5,099,245	830,755	50,455	100,000	50,000	5,299,700	630,300	
Owners' Representative	53462_7233	Mar-10	Jul-15	2,892,096	40,510	2,851,586	469,061	561,000	561,000	1,631,571	1,260,525	
Early Construction Water Connection	53463_7314	Jun-11	Jan-12	958,313	-	958,313		958,313		958,313		
Early Construction Detention Basin	53466_7343			-	-	-						
<b>Transmission</b>				<b>1,147,194,362</b>	<b>694,899,906</b>	<b>452,294,456</b>	<b>21,740,869</b>	<b>20,814,785</b>	<b>30,411,251</b>	<b>94,982,351</b>	<b>145,073,343</b>	<b>234,254,193</b>
<b>597 Winsor Station Pipeline</b>				26,082,268	932,863	25,149,406	470,517	508,623	8,356,852	10,230,573	15,813,414	
Preliminary Permit, Study & Licensing	60032_6276	Nov-97	Jun-99	38,282	38,282	-						
Hatchery Pipeline - Design/ESDC/RI	60077_7017	Oct-11	Jul-15	683,406	-	683,406		91,120	182,242	273,362	410,044	
Quabbin Aqueduct & WPS Upgrade - Design/CA/RI	60087_7114	Dec-09	Jun-15	2,320,000	109,886	2,210,114	470,517	417,503	417,503	1,415,409	904,591	
Winsor Power Station Rehab & Improvement	60088_7115	Oct-12	Jun-14	20,350,064	-	20,350,064			7,248,888	7,248,888	13,101,176	
Shafts 1,2, 9 & 12 Rehab & Improvements	60096_7198	Feb-12	Jun-14	-	-	-						
Winsor Power Station Chapman Valve Repair	60101_7212	Feb-09	Nov-09	416,425	416,425	-				416,425		
Purchase of Sleeve Valves	60105_7234	Jul-08	May-09	368,270	368,270	-				368,270		
Hatchery Pipeline - Construction	60106_7235	Dec-12	Feb-14	1,905,822	-	1,905,822			508,219	508,219	1,397,603	
<b>601 Sluice Gate Rehabilitation</b>	<b>completed project</b>			9,158,418	9,158,411	7						
<b>604 MetroWest Tunnel</b>				710,719,106	647,169,913	63,549,193	19,298,612	12,980,008	10,727,000	56,374,707	19,543,570	1,000,000
Study	59794_5043	Jun-84	Oct-89	414,770	414,770	-						
Design/EIR - Tunnel/ESDC	59795_5044	Apr-92	Mar-07	37,938,693	37,938,693	-				51,985		
Sudbury Pipe Bridge - Construction	59796_5048	Nov-91	Jun-92	295,910	295,910	-						
West Tunnel Segment - CP1	59798_6054	Apr-97	Apr-03	147,787,139	147,787,135	4						
Construction Management / Resident Inspection	59799_5284	May-95	Apr-04	39,427,799	39,427,799	-						
Technical Assistance	59804_5976	Jun-84	Jun-98	131,401	131,400	1						
Land Acquisition	59805_5139	Oct-95	Jul-13	6,258,741	6,258,741	-						
Hultman Study	59806_5141	Apr-95	Mar-05	1,863,997	1,863,998	(1)						
DEP Permit Fees	60012_6037	Oct-94	Sep-14	53,802	50,802	3,000	1,000	1,000	1,000	3,240		
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	5,871,954	5,871,954	-						
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	-						

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OCIP	60021_6122	Jun-96	May-06	26,021,792	26,021,794	(2)				(1,034)		
Hultman Leak Repair	60022_6128	Aug-96	May-97	307,281	307,280	1						
Framingham MOU	60023_6129	May-96	Dec-03	2,444,171	2,444,171	-						
Local Supply Contingency - Construction	60024_6130	Jun-97	Dec-03	4,307,753	4,298,444	9,309		9,308		19,331		
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	Dec-11	Sep-14	8,785,000	-	8,785,000		1,033,000	3,100,000	4,133,000	4,652,000	
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	55,975,616	55,975,616	-						
Hultman Investigation and Repair	60042_6430	Jun-99	Nov-00	1,604,381	1,604,381	-						
Hultman Repair Bands 98-99	60043_6492	Apr-99	Jun-99	116,457	116,457	-						
Wayland MOA	60053_6762	Jun-00	Dec-02	35,040	35,040	-						
Equipment Prepurchase	60054_6777	Jun-05	Mar-06	198,000	198,000	-						
Hultman Rehab - CP9	60058_6856	Nov-05	Dec-06	3,256,702	3,256,702	-						
Interim Disinfection	60059_6872	Jan-03	Oct-05	1,244,539	1,244,540	(1)						
Hultman Interconnect - Final Design/CA/RI	60066_6911	Sep-05	Sep-14	6,387,819	3,930,450	2,457,369	495,859	500,000	500,000	2,396,748	961,510	
Valve Chamber Modifications - Design CA/	60072_6950	Jan-13	Jun-17	1,056,220	-	1,056,220			59,000	59,000	997,220	
Lower Hultman Rehab -CP6A	60073_6975	Sep-09	Mar-14	51,188,615	12,017,873	39,170,742	18,189,987	10,839,000	6,500,000	47,546,860	3,641,754	
Hultman Interconnect - RI Services	60083_7082	Jan-10	Sep-14	2,499,909	309,802	2,190,107	602,561	547,700	517,000	1,977,063	522,846	
CP6 Easements	60085_7105	Jan-08	Apr-14	175,000	22,437	152,563	9,205	50,000	50,000	131,292	43,358	
CP6A Demolition	60086_7106	Sep-08	Jan-09	57,222	57,222	-				57,222		
Valve Chamber & Storage Tank Access Improvements	60109_7283	Jul-13	Jul-17	3,000,000	-	3,000,000					3,000,000	
Shaft 5 Electrical Upgrade	60128_7367	Jan-19	Jan-20	1,000,000	-	1,000,000						1,000,000
Shaft 5A/5 Surface Piping Inspection & Restoration	60129_7368	Jan-14	Jan-15	1,500,000	-	1,500,000					1,500,000	
Valve Chamber Modifications - Construction	75525_7755	Jul-14	Jun-16	4,224,881	-	4,224,881					4,224,881	
<b>615 Chicopee Valley Aqueduct Redundancy</b>			<b>completed project</b>	8,666,747	8,666,747	-				95,143		

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<b>616 Quabbin Transmission System</b>				13,547,156	4,512,714	9,034,442	283,086	1,250,000	1,358,852	2,981,225	3,842,504	2,300,000
Facilities Inspection	60055_6828	Oct-05	Oct-07	1,007,459	1,007,462	(3)	(3)			(3)		
Equipment Pre-purchase	60075_7007	Feb-05	Jun-08	534,366	534,366	-						
Oakdale Phase 1A Electrical - Design	60103_7229	Oct-09	Jan-14	799,880	89,287	710,593	283,089	250,000	135,000	757,376	42,504	
Oakdale Phase 1A Electrical - Construction	60104_7230	Nov-11	Jan-13	2,223,852	-	2,223,852		1,000,000	1,223,852	2,223,852		
Ware River Intake Valve Replacement	60108_7282	Jul-14	Jul-17	1,200,000	-	1,200,000					1,200,000	
CVA Intake Motorized Screens Replacement	60112_7332	Jul-17	Jun-18	500,000	-	500,000					500,000	
Wachusett Lower Gatehouse Rehab	60113_7333	Jul-14	Dec-18	2,200,000	-	2,200,000					2,100,000	100,000
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 Chamber 4 Piping	60137_7380	Jan-19	Jan-20	1,000,000	-	1,000,000						1,000,000
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	-						
<b>617 Sudbury / Weston Aqueduct Repairs</b>				4,288,085	651,357	3,636,728	8,591		285,102	310,102	3,343,033	
Sudbury Aqueduct Inspection	60056_6838	Aug-05	Oct-06	369,520	369,520	-						
Technical Assistance	60057_6839	Sep-09	Dec-11	25,002	16,409	8,593	8,591			25,000		
Weston Aqueduct Inspection	60070_6947	Jul-13	Mar-14	150,000	-	150,000					150,000	
Sudbury Short-Term Repairs	60076_7016	Jul-12	Jun-13	380,135	-	380,135			285,102	285,102	95,033	
Sudbury Short-Term Repairs - Phase 2	60110_7317	Jul-13	Jul-14	2,098,000	-	2,098,000					2,098,000	
Ash Street Sluice Gates	60130_7369	Jan-15	Jan-16	1,000,000	-	1,000,000					1,000,000	
Hazardous Material Sudbury Aqueduct	75486_6617	Apr-99	May-05	265,428	265,428	-						
<b>620 Wachusett Reservoir Spillway Improvements</b>				9,498,392	9,304,814	193,578	193,572			1,448,424		
Equipment Pre-purchase	60078_7018	Jul-06	Aug-09	546,319	546,318	1				7,366		
Design	60079_7019	Jan-06	May-10	2,455,816	2,455,809	7	7			672,454		
Construction	60080_7020	May-07	Nov-08	4,959,598	4,959,595	3				992,003		
Technical Assistance	60097_7207	Mar-07	Jul-08	114,742	114,586	156	156			(801)		
Cosgrove and Shaft A PCB Removal	60098_7209	Oct-07	Oct-08	874,892	874,890	1				(210,001)		
Wachusett Dam PCB Removal	60099_7210	Nov-07	Nov-08	344,621	344,620	1				(215,001)		
Phase 2 PCB Material Remediation	60102_7221	Feb-09	Jul-10	202,404	8,995	193,409	193,409			202,404		
<b>621 Watershed Land</b>				19,000,000	13,418,500	5,581,500	375,000	2,147,000	3,059,500	10,793,000		
Land Acquisition	60081_7069	Apr-06	Jun-12	19,000,000	13,418,500	5,581,500	375,000	2,147,000	3,059,500	10,793,000		
<b>622 Cosgrove/Wachusett Redundancy</b>				-	-	-						
Cosgrove Tunnel Alternative Study	60082_7071			-	-	-						

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<b>623 Dam Projects</b>				8,180,836	354,167	7,826,669	429,613	1,411,363	2,601,710	4,796,853	3,383,983	
Dam Safety Modifications & Repairs - Construction	60094_7194	Oct-11	Sep-13	4,695,695	-	4,695,695		1,173,924	2,347,848	3,521,772	1,173,923	
Dam Safety Modifications & Repairs - Design/CA/RI	60100_7211	Sep-09	Jun-14	1,534,741	354,167	1,180,574	429,457	237,195	237,195	1,258,014	276,727	
Oakdale Dam Permits and Preliminary Design	60118_7346	Jan-11	Dec-11	400	-	400	156	244		400		
Oakdale Dam - Design/ESDC/RI	60119_7347	Jan-13	Dec-16	200,000	-	200,000			16,667	16,667	183,333	
Oakdale Dam Removal - Construction	60120_7348	Jul-14	Dec-15	750,000	-	750,000					750,000	
Goodnough Dike Drainage Improvements	60131_7370	Jul-13	Jul-14	1,000,000	-	1,000,000					1,000,000	
<b>625 Long Term Redundancy</b>				338,053,354	730,420	337,322,934	681,878	2,517,791	4,022,235	7,952,324	99,146,839	230,954,193
Water Transmission Redundancy Plan	60035_6273	Oct-08	Sep-11	1,918,971	730,420	1,188,551	681,878	506,673		1,918,971		
Cosgrove Tunnel Redundancy PS - Design/ESDC/RI	60090_7156	Oct-11	May-17	8,284,080	-	8,284,080		741,858	1,483,716	2,225,574	6,058,506	
Cosgrove Tunnel Redundancy PS - Construction	60091_7157	Apr-13	Oct-15	41,420,400	-	41,420,400					41,420,400	
Sudbury Aqueduct - Design/CA/RI	60092_7159	Jan-14	Dec-21	46,203,421	-	46,203,421					24,545,569	21,657,852
Sudbury Aqueduct Slipline - Construction	60093_7160	Jan-18	Dec-20	85,472,722	-	85,472,722					7,122,727	78,349,995
MWWST/Sudbury Aqueduct Connection - Construct.	60107_7291	Jan-17	Dec-20	141,165,901	-	141,165,901					16,822,869	124,343,032
Sudbury Aqueduct - Preliminary Design/EIR	60122_7352	Oct-11	Sep-13	5,077,039	-	5,077,039		1,269,260	2,538,519	3,807,779	1,269,260	
Chestnut Hill Final Connection - Construction	60123_7353	Jan-17	Jun-19	3,515,214	-	3,515,214					1,757,607	1,757,607
Tops of Shafts Rehab - Design/CA/RI	60126_7356	Jul-17	Jun-22	999,345	-	999,345					149,901	849,444
Tops of Shafts Rehab - Construction	60127_7357	Jul-19	Jun-21	3,996,263	-	3,996,263						3,996,263
<b>Distribution And Pumping</b>				<b>881,819,539</b>	<b>341,330,904</b>	<b>540,488,635</b>	<b>16,487,739</b>	<b>12,215,055</b>	<b>14,630,942</b>	<b>79,212,904</b>	<b>215,696,318</b>	<b>281,458,745</b>
<b>618 Northern High NW Trans Sections 70 &amp; 71</b>				1,000,000	-	1,000,000					1,000,000	
Planning	60063_6895	Jul-13	Jun-14	1,000,000	-	1,000,000					1,000,000	
<b>677 Valve Replacement</b>				20,032,043	9,144,478	10,887,565	135,000	1,755,000	1,095,000	3,550,150	7,576,700	325,866
Construction 1	67559_5126	Nov-95	Nov-96	717,800	717,800	-						
Technical Assistance	67560_5124	Oct-95	May-10	113,338	113,338	-				1,595		
Equipment Purchase	68005_6088	Oct-95	Jun-18	4,037,670	1,111,804	2,925,866		200,000	400,000	924,790	2,000,000	325,866
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	-				238,765		
Construction 7	68127_6436	Apr-11	Apr-13	2,385,000	-	2,385,000	135,000	1,555,000	695,000	2,385,000		
Permits	68239_6859	Jan-02	May-10	770	770	-						
Easements	68240_6860	Jan-02	May-10	5,770	5,770	-						
Construction 8	68300_7195	Jan-14	Jun-16	2,788,350	-	2,788,350					2,788,350	

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Construction 9	68307_7236	Dec-15	Jun-17	2,788,350	-	2,788,350					2,788,350	
<b>678 Boston Low Service - Pipe &amp; Valve Rehab</b>	<b>completed project</b>			23,690,867	23,690,863	4						
<b>683 Heath Hill Road Pipe Replacement</b>	<b>completed project</b>			19,358,026	19,364,786	(6,760)	(6,750)			(9,817)		
<b>689 James L. Gillis Pump Station</b>	<b>completed project</b>			33,419,006	33,419,007	(1)						
<b>692 Northern High Service - Sect 27 Improvement</b>				3,307,842	123,646	3,184,196		206	500	706	1,426,800	1,756,690
Section 27 - Construction	67769_6333	Mar-17	Nov-18	3,183,271	26,581	3,156,690					1,400,000	1,756,690
Easements	68192_6589	Apr-15	Mar-17	22,800	-	22,800					22,800	
Technical Assistance	68211_6712	Oct-99	Mar-17	64,500	59,794	4,706		206	500	706	4,000	
Surveying	68229_6809	Jun-01	Mar-17	37,271	37,271	-						
<b>693 NHS - Revere &amp; Malden Pipeline Improve.</b>				33,611,815	26,832,740	6,779,075	25	5,275	6,000	2,949,322	5,767,790	1,000,000
Revere & Malden - Design/CS/RI	67780_5185	May-88	Sep-94	1,785,748	1,785,747	1						
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	10,026,429	10,026,430	(1)						
Revere Section 53 - Construction	67784_5177	Sep-08	Aug-09	2,938,027	2,938,022	5				2,938,022		
Control Valves - Construction	67785_5191	Jun-88	Aug-89	948,785	948,780	5						
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	575,014	575,040	(26)						
Sections 68 & 53A - Construction	67790_6335	Jun-16	Nov-17	5,544,090	-	5,544,090					5,544,090	
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 Admin.	67793_5239	Apr-91	Nov-91	125,380	125,380	-						
Road Restoration - Design/CA/RI	67996_6033	Nov-94	Dec-95	77,251	77,250	1						
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 - Design/CA/RI	68257_6957			-	-	-						
Shaft 9A-D Extension - Construction	68258_6958	Mar-18	Nov-19	1,200,000	-	1,200,000					200,000	1,000,000
Survey	68265_6978	Jul-06	Mar-18	30,000	-	30,000		5,000	5,000	10,000	20,000	
Permits	68280_7049	Apr-05	Mar-18	5,000	-	5,000	25	275	1,000	1,300	3,700	

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<b>702 New Connect Mains - Shaft 7 to WASM 3</b>				31,632,274	7,152,607	24,479,667	2,868,185	706,263	500	5,408,829	10,345,704	10,559,016
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-16	3,537,000	3,532,814	4,186		500	500	43,395	3,186	
Design/CA/RI Meter 120	68111_6384	Aug-02	Oct-08	1,278,328	1,277,722	606	606			31,326		
CP3 - Final Design/CA/RI	68112_6385	Oct-14	Aug-20	1,456,980	-	1,456,980					1,200,000	256,980
CP1 A&B - Easements	68114_6387			16,919	16,919	-						
CP3 - Easements	68115_6388	Jan-16	Dec-16	40,000	-	40,000					40,000	
CP5 - Easements	68117_6390	Dec-06	Jan-11	29,000	21,609	7,391	7,391			28,701		
CP3 - South Segment	68119_6392	Oct-16	Aug-19	6,679,993	-	6,679,993					4,000,000	2,679,993
CP5 - Northeast Segment	68121_6394	Aug-09	Nov-11	5,305,407	1,739,456	3,565,951	2,860,188	705,763		5,305,407		
CP2- Clean & Line Sections 59 & 60 - Construction	68174_6548	Jan-18	Nov-19	4,488,708	-	4,488,708					1,000,000	3,488,708
CP2 -Easements	68175_6547	May-17	Nov-17	33,000	-	33,000					33,000	
Replacement of Section 25 - Design/CA/RI	68255_6955	Apr-16	Aug-20	484,186	-	484,186					325,000	159,186
Replacement of Section 25 - Construction	68256_6956	Apr-18	Aug-19	2,420,926	-	2,420,926					250,000	2,170,926
Sections 59 & 60 - Design/CA/RI	68286_7086	Jan-16	Nov-20	897,741	-	897,741					494,518	403,223
Section 75 Extension	68315_7284	Oct-15	Oct-19	4,400,000	-	4,400,000					3,000,000	1,400,000
<b>704 Rehabilitation of Other Pump Stations</b>				55,143,866	29,961,799	25,182,067	116,201	65,874		12,158,292		25,000,000
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	21,847,848	21,925,345	(77,497)	(77,489)			10,137,081		
Legal	68179_6557	Jul-99	Jan-10	6,097	6,097	-				3,292		
Proprietary Equipment Purchases	68204_6676	Jun-99	Jan-10	157,638	157,638	-						
Design 2 CS/RI	68266_6980	Dec-04	Jun-11	4,596,185	4,336,621	259,564	193,690	65,874		2,017,919		
Pump Station Rehabilitation	75522_7383	Jul-19	Jun-24	25,000,000	-	25,000,000						25,000,000
<b>706 NHS - Connecting Mains from Section 91</b>	<b>completed project</b>			2,360,194	2,360,194	-						



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<b>708 Northern Extra High Service - New Pipelines</b>				6,690,165	3,632,119	3,058,046	5,000	10,000	10,000	25,000	3,033,047	
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	3,031,571	3,031,572	(1)						
Regulatory Compliance	68010_6099	Nov-95	Oct-00	250	250	-						
Sections 34 & 45 - Construction	68162_6522	May-15	Nov-16	2,996,933	-	2,996,933					2,996,933	
Public Participation	68176_6554	Jul-99	Nov-15	5,000	-	5,000					5,000	
Legal	68177_6555	Jul-99	Nov-15	5,000	-	5,000					5,000	
Technical Assistance	68210_6707	Nov-10	Nov-15	54,000	7,886	46,114	5,000	10,000	10,000	25,000	21,114	
PLC Equipment Purchases	68215_6749	Dec-99	Dec-00	4,219	4,220	(1)						
Permits	68281_7050	Nov-10	Nov-15	5,000	-	5,000					5,000	
<b>712 Cathodic Protection Of Distribution Mains</b>				1,457,700	140,913	1,316,787						1,316,787
Planning Phase I	68002_6058	Apr-95	Dec-97	107,680	107,680	-						
Test Station Installation 2	68129_6438	Jun-19	Jun-20	438,929	-	438,929						438,929
Test Station Installation 3	68130_6439	Jun-20	Jun-21	438,929	-	438,929						438,929
Test Station Installation 4	68131_6440	Jun-21	Jun-22	438,929	-	438,929						438,929
Technical Assistance	68216_6751	Jan-00	May-09	33,233	33,233	-						
<b>713 Spot Pond Supply Mains Rehab</b>				66,127,170	60,995,278	5,131,892	(15,121)	150,000	1,800,000	2,451,659	2,850,000	347,013
Section 4 Webster Ave Bridge Pipe Rehab - Design	60114_7334	Jan-12	Dec-14	500,000	-	500,000		150,000	200,000	350,000	150,000	
Section 4 Webster Ave Bridge Pipe Rehab - Construct.	60115_7335	Jan-13	Jan-14	1,500,000	-	1,500,000			1,500,000	1,500,000		
Section 50 Pipe Rehab - Design/ESDC/RI	60116_7336	Jul-12	Jun-15	500,000	-	500,000			100,000	100,000	400,000	
Section 50 Pipe Rehab - Construction	60117_7337	Jul-13	Jun-14	1,500,000	-	1,500,000					1,500,000	
Preliminary Design & Design/CA/RI	68038_6223	Sep-98	Oct-08	10,868,582	10,868,582	-				76,155		
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	79,783	79,782	1						
Middle (Medford/Somerville)	68108_6381	Jun-02	Jul-06	22,176,813	22,176,813	(1)						
South (Cambridge/Boston)	68109_6382	Oct-04	Apr-08	17,590,133	17,590,133	-				326,397		
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	-						
Construction 4 - Bridge Trusses	68209_6697	Apr-17	Dec-18	1,147,013	-	1,147,013					800,000	347,013
CP3 - CA/RI	68274_7003	Sep-04	Apr-09	924,656	939,777	(15,121)	(15,121)			99,107		
<b>714 Southern Extra High Sections 41 &amp; 42</b>	<b>completed project</b>			3,657,243	3,657,243	-						

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<b>719 Chestnut Hill Connecting Mains</b>				29,361,450	17,461,614	11,899,836	25,061		422,000	447,061	6,341,497	5,111,277
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	432,139	25,061	25,061			25,061		
Shaft 7 Building - Design & Construction	68052_6302	Jul-21	Jul-25	5,111,277	-	5,111,277						5,111,277
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	-						
CHEPS Emergency Generation - Construction	68267_6982	Jul-14	Jul-16	4,210,384	-	4,210,384					4,210,384	
CHEPS Emergency Generation - Final Design/CA/RI	68268_6995	Jul-12	Jun-17	1,053,114	-	1,053,114			197,000	197,000	856,114	
CH Underground Pump Station Electrical Rehab	75521_7382	Jul-12	Jul-17	1,500,000	-	1,500,000			225,000	225,000	1,275,000	
<b>720 Warren Cottage Line Rehab</b>	<b>completed project</b>			1,204,821	1,204,821	-						
<b>721 Southern Spine Distribution Mains</b>				70,668,351	24,984,857	45,683,494	7,585,198	3,644,269	841,449	19,445,839	2,247,085	31,365,485
Sections 21, 43 & 22 - Design	68083_6290	Sep-00	May-13	7,776,068	5,697,277	2,078,791	716,819	605,321	605,321	2,521,682	151,330	
Sections 21, 43 & 22 - Easements	68084_6291	Mar-02	May-12	134,000	78,395	55,605	28,278	21,864	5,463	59,384		
Section 22 South - Construction	68085_6292	Jul-03	Jun-05	4,993,131	4,993,131	-						
Sections 20 & 58 - Design	68089_6296	Jun-18	Nov-23	2,602,518	-	2,602,518						2,602,518
Sections 20 & 58 - Easements	68090_6297	Sep-16	Sep-20	35,070	-	35,070					13,070	22,000
Sections 20 & 58 - Construction	68091_6298	Sep-20	May-22	12,247,570	-	12,247,570						12,247,570
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	Jul-03	May-17	200,000	3,194	196,806	7,569	30,276	30,276	68,121	128,685	
Section 22 North - Construction	68235_6844	Jan-19	Jan-21	14,947,397	-	14,947,397						14,947,397
Section 107 Phase 1 - Construction	68236_6845	Jul-07	Jan-09	6,184,370	6,212,034	(27,664)	(27,672)			2,182,350		
Legal	68237_6846	May-04	Jun-10	5,000	1,192	3,808	1,000	2,808		3,934		
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	May-12	14,610,368	4,566,775	10,043,593	6,859,204	2,984,000	200,389	14,610,368		
Milton Pressure Regulator Valve	68291_7104	Jun-06	Nov-06	135,000	135,000	-						

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Section 22 North - Design/ESDC	68298_7120	Jul-16	Jan-21	2,500,000	-	2,500,000					954,000	1,546,000
Section 22 North - Facility Plan/EIR	68299_7155	Jul-13	Jun-15	1,000,000	-	1,000,000					1,000,000	
<b>722 Northern Intermed. High Redund. &amp; Storage</b>				79,070,352	1,260,226	77,810,126	346,040	4,333,000	4,867,070	10,172,363	49,212,503	19,051,513
Concept Plan	53454_6954	Feb-06	Aug-10	826,748	769,458	57,290	57,290			192,775		
Easements	68093_6306	Jul-12	Jun-14	300,000	-	300,000			275,000	275,000	25,000	
Section 89/29 Redundancy - Design	68252_6906	Mar-11	Sep-17	4,644,381	-	4,644,381	59,000	705,000	705,000	1,469,000	3,175,381	
Purchase Mobile Pump Unit	68276_7026	Jul-09	Jan-10	291,315	251,783	39,532	39,532			291,315		
Short Term Improvements - Design/CA/RI	68277_7045	Sep-09	Sep-13	825,171	238,985	586,186	190,218	200,000	100,000	729,203	95,968	
Permits	68278_7047	Jan-10	Dec-18	5,000	-	5,000		2,000	2,000	4,000	1,000	
Technical Assistance	68279_7048	Jan-10	Dec-18	18,000	-	18,000		4,000	4,000	8,000	10,000	
Section 89 & 29 Redundancy - Construction Phase 1	68282_7066	Jan-13	Jan-16	19,359,260	-	19,359,260			968,000	968,000	18,391,260	
Section 89 & 29 Redundancy - Construction Phase 2	68283_7067	Apr-13	Apr-16	19,700,894	-	19,700,894					19,700,894	
NIH Storage - Construction	68284_7068	Jan-19	Jan-21	15,715,164	-	15,715,164						15,715,164
Section 89 & 29 Rehab - Design	68294_7116	Jul-14	Jun-18	1,327,139	-	1,327,139					1,245,000	82,139
Section 89 & 29 Rehab - Construction	68295_7117	Jul-16	Jun-18	6,633,626	-	6,633,626					5,771,000	862,626
Gillis Pump Station Improvements	68309_7260	Oct-11	Oct-12	3,581,827	-	3,581,827		1,653,000	1,928,827	3,581,827		
Reading/Stoneham Interconnections	68310_7261	Sep-11	Aug-12	2,653,243	-	2,653,243		1,769,000	884,243	2,653,243		
NIH Storage - Design	68316_7311	Jan-17	Dec-21	3,188,584	-	3,188,584					797,000	2,391,584
<b>723 Northern Low Service Rehab - Section 8</b>				20,232,660	2,262,065	17,970,595	59,428	32,000	32,000	2,327,510	4,779,000	13,068,167
Survey	68094_6321	Jul-11	Jun-14	80,000	-	80,000		30,000	30,000	60,000	20,000	
Section 8 - Construction	68095_6322	Jul-18	Jul-20	12,181,316	-	12,181,316					-	12,181,316
Rehab Sections 37 & 46 Chelsea/East Boston Constr.	68262_6962	Jul-15	Jun-16	3,200,000	-	3,200,000					3,200,000	
Permits	68263_6977	Jul-05	Jul-18	299,000	284,892	14,108	520	2,000	2,000	275,674	9,000	588
Technical Assistance	68264_6979	Jul-05	Jul-17	44,245	44,245	-						
Section 97A - Construction	68275_7021	Oct-08	Oct-09	1,991,836	1,932,928	58,908	58,908			1,991,836		
Section 8 - Design/CA/RI	68287_7092	Jul-15	Jul-20	2,436,263	-	2,436,263					1,550,000	886,263
<b>725 Hydraulic Model Update</b>	<b>completed project</b>			598,358	598,358	-						

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<b>727 Southern Extra High Redundancy &amp; Storage</b>				97,178,950	6,662,885	90,516,065	91,527	162,000	222,105	5,471,248	21,138,000	68,902,429
Concept Plan/Preliminary Design/Environmental Review	53397_6452	Feb-07	Feb-12	840,072	525,273	314,799	91,527	160,000	63,272	428,097		
Redundancy/Storage Phase 1 - Final Design/CA/RI	53398_6453	Jul-13	Jun-19	5,500,707	-	5,500,707					5,255,000	245,707
Redundancy/Storage Phase 1 - Construction	53399_6454	Jul-15	Jun-18	27,503,539	-	27,503,539					12,876,000	14,627,539
Redundancy/Storage Phase 2 - Final Design/CA/RI	68135_6444	Jul-16	Jun-21	4,218,819	-	4,218,819					2,013,000	2,205,819
University Avenue Water Main	68136_6445	Mar-08	Nov-08	6,137,448	6,137,445	4				4,882,318		
Sections 77 & 88 Rehab - Design	68292_7112	Jul-23	Jun-28	1,178,520	-	1,178,520						1,178,520
Sections 77 & 88 Rehab - Construction	68293_7113	Jul-25	Jun-27	4,714,080	-	4,714,080						4,714,080
Short Term Improvements - Design/CA/RI	68302_7223	Jul-12	Jun-16	200,000	-	200,000			56,000	56,000	144,000	
Short Term Improvements - Construction	68303_7224	Jul-14	Jun-15	750,000	-	750,000					750,000	
Easements	68305_7226	Aug-08	Jul-25	300,000	-	300,000			100,000	100,000	100,000	100,000
Permits	68306_7227	Aug-08	Jul-25	5,000	167	4,833		2,000	2,833	4,833		
Redundancy/Storage Phase 2 Construction	68308_7245	Jul-18	Jun-20	21,094,096	-	21,094,096						21,094,096
Phase 4, 2nd Tank - Construction	68311_7262	Jul-23	Jun-25	9,010,869	-	9,010,869						9,010,869
Phase 4, 2nd Tank - Design	68312_7263	Jul-21	Jun-26	1,802,174	-	1,802,174						1,802,174
Phase 3, Pump Station - Construction	68313_7264	Jul-21	Jun-23	11,138,900	-	11,138,900						11,138,900
Phase 3, Pump Station - Design	68314_7265	Jun-19	Jun-24	2,784,725	-	2,784,725						2,784,725
<b>730 Weston Aqueduct Supply Mains (WASM)</b>				265,772,389	63,120,479	202,651,910	1,311,956	1,004,000	5,209,319	9,744,895	99,351,474	95,775,158
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	6,013,476	6,013,476	-				133,999		
WASMs 1 & 2 - Design/CA/RI	68027_6142	Jun-97	Jul-06	5,066,028	5,074,652	(8,624)	(8,624)			(8,624)		
Appraisal / Easement	68030_6174	Mar-95	Oct-18	753,000	293,352	459,648	20,000			20,954	360,000	79,648
WASM 1, 2 & 4 - Auburndale	68031_6175	Jun-97	Nov-98	4,001,461	4,001,461	-						
Meter 103 - Construction	68032_6176	Oct-96	Jul-98	61,027	61,027	-						
WASMs 1 & 2 - Newton	68041_6280	Mar-00	Jun-02	9,218,520	9,218,520	-						
WASMs 1 & 2 - Boston	68042_6281	Feb-03	Jun-05	7,038,896	7,038,896	-						
WASMs 2 & 4 - Newton	68069_6312	Apr-98	Mar-01	8,281,877	8,281,877	-						
WASM 4 - Allston & Western Ave. Sewer	68070_6313	Feb-02	Dec-04	17,330,800	17,330,800	-						
WASM 3 - MEPA/Design/CA/RI	68166_6539	Jan-12	Sep-22	29,951,091	-	29,951,091		460,000	2,995,000	3,455,000	14,975,000	11,521,091
Section 36/Watertown/Waltham Conn. - Design/CA/RI	68167_6540	Jan-11	Dec-16	2,988,492	-	2,988,492	205,875	484,000	484,000	1,173,875	1,814,617	
WASM 3 Waltham - CP2	68170_6543	Jan-15	Mar-17	59,458,984	-	59,458,984					59,458,984	
WASM 3 Belmont - CP3	68171_6544	Apr-17	Jun-20	73,478,754	-	73,478,754					4,400,000	69,078,754
WASM 3 Arlington - CP4	68172_6545	Jul-19	Sep-21	15,095,665	-	15,095,665						15,095,665
Section 28, Arlington - CP1	68173_6546	Aug-09	Feb-11	2,309,450	1,541,814	767,636	767,636			2,309,450		
Survey	68245_6870	Dec-01	Oct-18	210,000	88,681	121,319		60,000	61,319	121,319		
Arlington Pipe Work	68269_6996	Dec-09	May-10	401,036	253,333	147,703	147,702			401,035		

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WASM3 Section 12 Replacement - Construction	68272_7000	Oct-04	Sep-05	2,113,693	2,113,693	-						
WASM3 Section 12 Replacement - Design	68273_7001	May-04	Aug-06	266,008	266,008	-						
Section 28 - Design/CA/RI	68285_7083	Oct-06	Apr-11	867,044	687,677	179,367	179,367			468,887		
Section 36/Watertown/Waltham Conn. - Construction	68301_7222	Jan-13	Dec-15	20,011,873	-	20,011,873			1,669,000	1,669,000	18,342,873	
<b>731 Lynnfield Pipeline</b>				5,041,661	582,786	4,458,875	3,965,990	347,169	125,000	4,508,224	20,717	
Construction Phase 2	68187_6584	Jan-11	Jan-13	3,810,568	-	3,810,568	3,635,000	175,568		3,810,568		
Easement, Legal, License & Permits	68196_6619	Jul-07	Jul-11	200,000	3,399	196,601	150,000	46,601		200,000		
Design/CA/RI	68251_6905	Nov-07	Jul-13	759,093	307,386	451,707	180,990	125,000	125,000	498,493	20,717	
Temporary Interconnect - Phase 1 Construction	68289_7096	Jun-07	Dec-07	272,000	272,001	(1)				(837)		
<b>732 Walnut St. &amp; Fisher Hill Pipeline Rehab</b>	<b>completed project</b>			2,716,993	2,717,141	(148)				563,223		
<b>735 Section 80 Rehabilitation</b>				8,485,344	-	8,485,344					606,000	7,879,344
Water Supply Contingency	68248_6890			-	-	-						
Section 80 - Construction	68249_6891	Jan-19	Dec-20	6,788,275	-	6,788,275						6,788,275
Section 80 - Design/CS/RI	68250_6892	Jan-17	Dec-21	1,697,069	-	1,697,069					606,000	1,091,069
<b>Other Waterworks</b>				<b>43,163,224</b>	<b>130,260,557</b>	<b>(87,097,332)</b>	<b>(750,708)</b>	<b>8,519,846</b>	<b>17,621,982</b>	<b>40,163,099</b>	<b>8,812,458</b>	<b>(121,300,905)</b>
<b>753 Central Monitoring System</b>				16,992,422	15,704,996	1,287,426	50,000	952,427	285,000	1,325,478		
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	Dec-11	2,101,110	1,813,683	287,427	50,000	237,427		325,478		
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	-						
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	1,957,398	1,957,399	(1)						
Ludlow Communications	75495_6825	Sep-01	Oct-01	40,504	40,504	-						
Winsor Dam High Line Replacement	75512_7338	Nov-11	May-12	1,000,000	-	1,000,000		715,000	285,000	1,000,000		

**Massachusetts Water Resources Authority  
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Program / Project	Contract No.	Notice to Proceed	Substantial Completion	Total Contract Amount	Payments through FY10	Remaining Balance	FY11	FY12	FY13	FY09 - FY13	FY14 - FY18	Beyond FY18
<b>763 Distribution System Facilities Mapping</b>				1,798,919	1,036,368	762,551			228,000	228,000	534,551	
Planning and Design	75458_5162	Feb-95	Dec-98	936,368	936,368	-						
Data Purchase	75476_6152	Nov-95	Aug-96	100,000	100,000	-						
Records Development	75484_6525	Jul-12	Dec-14	762,551	-	762,551			228,000	228,000	534,551	
<b>764 Local Water Infrastructure Rehab</b>	<b>completed project</b>			7,487,758	7,487,762	(4)						
<b>765 Local Water Pipeline Assistance Program</b>				-	105,810,060	(105,810,060)	(824,888)	7,160,419	16,918,982	37,988,441	(2,546,093)	(126,518,480)
Community Loans	75485_6608	Aug-00	Jun-13	251,796,500	185,250,488	66,546,013	11,557,858	22,000,000	32,988,155	111,717,249		
Community Repayment	75493_6759	Aug-01	Jun-23	(251,796,500)	(79,440,427)	(172,356,073)	(18,525,049)	(19,225,351)	(19,569,173)	(87,756,881)	(84,246,093)	(30,790,407)
Local Water System Assistance Loans	75513_7339	Aug-10	Jun-20	200,000,000	-	200,000,000	6,142,303	4,000,000	4,000,000	14,142,303	110,600,000	75,257,697
Local Water System Assistance Repayment	75514_7340	Aug-11	Jun-30	(200,000,000)	-	(200,000,000)		(614,230)	(1,400,000)	(2,014,230)	(31,900,000)	(166,085,770)
CVA Loans	75515_7350	Nov-10	Jun-20	10,000,000	-	10,000,000		1,000,000	1,000,000	2,000,000	5,000,000	3,000,000
CVA Repayments	75516_7351	Nov-11	Jun-30	(10,000,000)	-	(10,000,000)			(100,000)	(100,000)	(2,000,000)	(7,900,000)
<b>766 Waterworks Facility Asset Protection</b>				16,884,125	221,370	16,662,755	24,180	407,000	190,000	621,180	10,824,000	5,217,575
Meter Vault Manhole Retrofits	75490_6689	Sep-15	Jun-18	1,751,575	-	1,751,575					1,534,000	217,575
Walnut Hill Tank - Design	75497_6832	Jul-12	Jun-17	300,000	-	300,000			60,000	60,000	240,000	
Walnut Hill Tank - Construction	75498_6833	Jan-14	Jul-15	1,000,000	-	1,000,000					1,000,000	
Waltham Bridge Pipe Replacement	75501_6910	Mar-04	Sep-04	237,550	221,370	16,180	16,180			16,180		
Permits and Legal Fees	75502_6920	Mar-04	Mar-12	15,000	-	15,000	8,000	7,000		15,000		
Cosgrove Turbine Isolation - Design	75506_7023	Jul-13	Dec-17	480,000	-	480,000					480,000	
Cosgrove Valve Seat Replacement - Construction	75509_7064	Jul-13	Dec-13	500,000	-	500,000					500,000	
Cosgrove Valve Seat Replacement - Design	75510_7065	Jul-12	Dec-14	100,000	-	100,000			30,000	30,000	70,000	
Transformer at Cosgrove Intake Building	75511_7228	Jun-11	Jul-12	500,000	-	500,000		400,000	100,000	500,000		
Shaft 9 Rehab	75520_7381	Jul-13	Jul-16	2,000,000	-	2,000,000					2,000,000	
Elevated Water Storage Tank Repainting	75523_7384	Jul-13	Jul-16	5,000,000	-	5,000,000					5,000,000	
Covered Storage Tank Rehab	75524_7385	Jul-19	Jul-23	5,000,000	-	5,000,000						5,000,000

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<b>Business &amp; Operations Support</b>				<b>107,140,268</b>	<b>57,274,100</b>	<b>49,866,167</b>	<b>11,234,678</b>	<b>10,258,374</b>	<b>11,599,599</b>	<b>47,435,035</b>	<b>16,773,232</b>	
<b>881 Equipment Purchase</b>				15,655,183	7,999,991	7,655,191	1,252,499	2,169,752	1,332,657	7,497,792	2,900,000	
TV Inspection Truck	92367_6732	Jul-00	Mar-01	-	-	-				(174,977)		
Security Equipment & Installation	92374_6760	Jan-01	Jun-13	6,835,076	5,164,125	1,670,951	307,658	1,255,636	107,657	3,788,156		
ICP-MS Lab Testing Equipment	92379_6808	Oct-08	Dec-08	117,432	117,432	-						
Back Hoe	92381_6866	Apr-03	Jun-04	-	-	-				(129,921)		
Vactor Truck	92382_6867	Apr-03	Jun-03	-	-	-				(219,890)		
Water Service Truck	92383_6907	Apr-04	Jun-04	-	-	-				(114,357)		
Bucket Machine	92384_6944	Oct-04	Dec-04	-	-	-				(136,936)		
Excavator	92385_6945	Apr-07	Jun-07	-	-	-				(232,699)		
Grove Crane	92386_6946	May-05	Aug-05	-	-	-				(310,800)		
Land Fill Loader	92388_6981	May-05	Aug-05	-	-	-				(112,682)		
PowerSweeper/Catch Basin	92392_6986	Apr-04	Jun-04	-	-	-				(154,958)		
Back Hoe (WRA385)	92394_6990	Jan-08	Mar-08	-	-	-				(96,900)		
Front-End Loader	92396_7028	Jul-05	Mar-06	-	-	-				(110,258)		
Dump Truck (WRA 522)	92398_7030	Jan-09	Mar-09	-	-	-	(283)			(283)		
Crane (WRA-185)	92400_7074	Apr-06	Jun-06	-	-	-				(298,378)		
High Lift Fork Loader (Lull)	92411_7239	Oct-10	Dec-10	121,449	-	121,449	121,449			121,449		
Ford Ramp Truck	92416_7246	Apr-10	Jun-10	121,572	121,572	-				121,572		
Street Sweeper	92417_7247	Jul-09	Sep-09	181,673	181,673	-				181,673		
Prior Vehicle Purchases	98454_7306	Jul-00	Jun-10	2,415,190	2,415,190	-				2,415,190		
FY09-13 Vehicle Purchases	98455_7307	Jul-09	Jun-13	1,841,570	-	1,841,570	702,454	714,116	425,000	1,841,570		
FY14-18 Vehicle Purchases	98456_7308	Jul-13	Jun-18	2,900,000	-	2,900,000					2,900,000	
FY09-13 Major Lab Instrumentation	98457_7309	Jan-12	Dec-12	1,000,000	-	1,000,000		200,000	800,000	1,000,000		
Front-End Loader	98467_7325	Oct-10	Dec-10	121,221	-	121,221	121,221			121,221		
<b>925 Technical Assistance</b>				1,200,000	-	1,200,000		400,000	400,000	800,000	400,000	
Land Appraisal	77000_Land			150,000	-	150,000		50,000	50,000	100,000	50,000	
Surveying	80000_Surv			150,000	-	150,000		50,000	50,000	100,000	50,000	
Hazardous Material	90000_Hazm			900,000	-	900,000		300,000	300,000	600,000	300,000	
<b>930 MWRA Facility - Chelsea</b>	<b>completed project</b>			9,851,105	9,851,105	-				(35,800)		

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<b>931 Business Systems Plan</b>				38,800,321	23,910,223	14,890,098	948,288	1,635,097	3,921,301	8,406,829	8,385,412	
Network - Phase I	92322_6015	Jul-94	Dec-96	141,610	141,610	-						
Phase I (FY95-97)	92338_6014	Jul-94	Mar-03	1,146,321	1,146,321	-						
Hardware - Phase I	92339_6013	Jul-94	Dec-96	440,770	440,770	-						
Phase II (FY97-10)	92343_6177	Jul-96	Jun-13	4,174,368	4,083,731	90,637	8,146	43,039	39,452	923,507		
Phase III (FY99-01)	92347_6362	Dec-97	Jun-04	10,748,465	10,748,465	-						
Phase IV / Year 2000 Improvements	92352_6508	Jul-98	Jan-00	3,037,973	3,037,973	-						
Phase V (FY01-10)	92353_6509	Jul-01	Jun-12	1,941,518	1,874,648	66,870	29,533	37,337		977,724		
Phase VI (FY04-09)	92380_6865	Jan-03	Jun-13	2,608,400	2,070,897	537,503	24,935	236,570	236,570	290,686	39,428	
Computer Center & OCC Infrastructure	92404_7200	Jul-14	Jun-16	1,500,000	-	1,500,000					1,500,000	
Net 2020 (FY10-12)	92405_7201	Mar-11	Jun-14	1,500,000	-	1,500,000	537,000	263,000	513,000	1,313,000	187,000	
SAN II (FY12)	92406_7203	Jul-12	Jun-13	600,000	-	600,000			450,000	450,000	150,000	
SAN III (FY15)	92407_7204	Jul-14	Jun-15	600,000	-	600,000					600,000	
Telecommunications (FY14-15)	92408_7205	Jul-13	Jun-15	750,000	-	750,000					750,000	
Laboratory Instrument Data Management	92410_7238	Oct-11	Oct-12	250,000	-	250,000		60,000	190,000	250,000		
Corporate Server Infrastructure & Document Distrib.	92412_7240	Jun-12	Jun-16	1,000,000	-	1,000,000		50,000	375,000	425,000	575,000	
DITP/OMS	92418_7249	Jul-12	Dec-12	142,279	-	142,279			142,279	142,279		
GIS/TV Inspection	92419_7250	Apr-09	Jun-10	45,370	20,875	24,495	24,495				45,370	
GIS Upgrades & Enhancements	92420_7251	Jul-12	Jun-13	300,000	-	300,000			300,000	300,000		
MIS Strategic Planning	92422_7253	Jan-12	Jun-17	500,000	-	500,000		50,000	50,000	100,000	400,000	
MIS Licensing	92423_7254	Jul-08	Mar-10	24,211	-	24,211	24,211				24,211	
Lawson Conversion	92424_7255	Jun-08	Jun-11	429,532	185,453	244,079	210,767	33,312			429,532	
Cyber Security	92425_7256	Apr-09	Jun-14	330,000	5,416	324,584	2,600	167,000	83,000	258,016	71,984	
Original SAN	92426_7257	Jul-09	Jun-12	289,504	154,064	135,440	86,601	48,839		289,504		
Cyber Security	92434_7285	Sep-11	Sep-13	1,200,000	-	1,200,000		646,000	554,000	1,200,000		
Lawson System Upgrade	92435_7286	Sep-13	Sep-15	1,550,000	-	1,550,000					1,550,000	
Laboratory Info. Mangement System (LIMS)	92436_7287	Sep-14	Sep-16	600,000	-	600,000					600,000	
Pre-Treatment Info. Management System (PIMS)	92437_7288	Sep-14	Sep-16	600,000	-	600,000					600,000	
Document Control Sys Software App. Replacement	92438_7289	Jul-12	Jul-13	250,000	-	250,000			200,000	200,000	50,000	
NET 2020 DITP/Southborough	92469_7386	Jul-12	Jul-14	2,100,000	-	2,100,000			788,000	788,000	1,312,000	
<b>932 Environmental Remediation</b>				1,556,465	1,499,928	56,537	56,538			88,266		
Technical Assistance / Environmental Remediation	92369_6745	Feb-99	Jun-07	543,654	544,979	(1,325)	(1,324)			(1,324)		
Prison Point Tank Removal - Constructruction	92370_6746	Feb-99	Jan-13	529,787	471,925	57,862	57,862			89,590		
Cottage Farm Tank Replacement - Construction	92371_6747	Jun-02	Dec-02	427,749	427,749	-						
Oakdale Power Station	92376_6805	Sep-03	Dec-04	47,066	47,066	-						
Cosgrove Power Station	92377_6806	Jun-02	Aug-02	8,209	8,209	-						



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<b>933 Capital Maintenance Planning &amp; Develop.</b>				11,549,269	5,630,919	5,918,351	968,744	2,233,056	2,183,191	7,296,530	533,360	
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	314,424	314,424	-						
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	676,162	613,577	62,585	62,585			676,162		
As-Needed Design Contract 3	92402_7101	Aug-07	Feb-10	578,622	581,049	(2,426)	(2,426)			259,017		
As-Needed Design Contract 4	92403_7102	Aug-07	Aug-09	343,744	343,744	-				155,367		
As-Needed Design Contract 6	92413_7242	Aug-08	Aug-10	761,055	706,587	54,468	54,468			761,055		
As-Needed Design Contract 7	92414_7243	Jan-10	Jan-12	1,444,235	169,158	1,275,077	442,378	555,132	277,567	1,444,235		
As-Needed Design Contract 8	92415_7244	Feb-10	Feb-12	1,334,054	5,407	1,328,647	411,739	611,268	305,640	1,334,054		
As-Needed Design Contract 9	98470_7390	Aug-11	Aug-13	1,600,000	-	1,600,000		533,328	799,992	1,333,320	266,680	
As-Needed Design Contract 10	98471_7391	Aug-11	Aug-13	1,600,000	-	1,600,000		533,328	799,992	1,333,320	266,680	
<b>934 MWRA Facilities Management &amp; Planning</b>				2,150,535	370,533	1,780,002		527,000	1,253,000	2,150,533		
Design/Engineering Services	92389_6983	Sep-11	Jan-13	150,000	(2)	150,002		62,000	88,000	149,998		
Facilities Construction	92390_6984	May-09	Jan-13	2,000,535	370,535	1,630,000		465,000	1,165,000	2,000,535		
<b>935 Alternative Energy Initiatives</b>				26,377,389	8,011,400	18,365,988	8,008,609	3,293,469	2,509,450	21,230,885	4,554,460	
Deer Island Solar	19285_6974	Sep-07	May-08	903,714	903,714	-				311,671		
DI Solar - Grant	92427_6974A	Nov-07	Dec-08	-	-	-						
DI Wind	92428_6974C	Nov-08	Apr-10	4,014,494	3,998,500	15,994	15,994			4,014,494		
DI Wind - Grant	92429_6974D	Nov-08	Dec-10	-	-	-						
Future DI Wind Construction	92430_7270	Sep-13	Aug-14	4,190,960	-	4,190,960					4,190,960	
Future DI Wind Grant	92431_7271	Sep-13	Aug-14	-	-	-						
Loring Road Hydro - Design	92432_6974E	Mar-08	Sep-09	2,345	2,344	1				2,344		
Loring Road Hydro-Grant - Design	92433_7273	Jan-09	Feb-11	-	-	-						
Loring Road Hydro-Grant - Construction	92433_7273A	Jan-09	Feb-11	-	-	-						
Technical Assistance - Solar	92439_7274	May-09	May-12	385,000	67,220	317,780	139,409	178,371		385,000		
Energy Advisory Consultant Services	92440_6974B	Jun-08	Jun-09	58,780	45,950	12,830	12,830			58,780		
Wind Power Feasibility Study	92441_OP67	Mar-07	Jun-10	658,350	338,027	320,323	320,323			658,350		
DI Photovoltaic System Phase 1 - Construction	92442_7292	Sep-09	Mar-10	1,119,000	1,119,000	-				1,119,000		
Technical Assistance - Energy Efficiency	92443_7274A	May-09	May-12	500,000	-	500,000	131,204	368,796		500,000		
Technical Assistance - Solar II	92444_7274B	May-09	May-12	380,000	32,927	347,073	111,453	235,620		380,000		
Tech Assistance - Emerging Technology	92445_7274C	May-09	May-12	200,000	-	200,000	50,618	149,382		200,000		
Technical Assistance - Wind	92446_7274D	May-09	May-12	750,000	162,000	588,000	180,234	407,766		750,000		
Wachusett Hydro - Grant	98447_7299	Jan-10	Jun-12	-	-	-						
Wachusett Hydro - Design & Construction	98448_7300	Jul-12	Dec-14	1,313,500	-	1,313,500			950,000	950,000	363,500	
Charlestown Wind - Construction	98450_7302	Feb-10	Aug-11	5,120,900	651,061	4,469,839	3,416,305	1,053,534		5,120,900		

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<b>Program / Project</b>	<b>Contract No.</b>	<b>Notice to Proceed</b>	<b>Substantial Completion</b>	<b>Total Contract Amount</b>	<b>Payments through FY10</b>	<b>Remaining Balance</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>	<b>FY09 - FY13</b>	<b>FY14 - FY18</b>	<b>Beyond FY18</b>
Charlestown Wind - Grant	98451_7303	Feb-10	Mar-11	-	-	-						
John J. Carroll WTP Solar - Construction	98452_7304	Jan-10	Aug-11	2,423,346	99,808	2,323,538	2,323,538			2,423,346		
John J. Carroll WTP Solar - Grant	98453_7305			-	-	-						
Loring Road Hydro - Construction	98459_6974F	Jan-10	May-11	1,857,000	590,849	1,266,151	1,266,151			1,857,000		
John J. Carroll WTP Solar - Stimulus	98460_7318	Feb-10	Mar-11	-	-	-						
Delauri Pump Station Wind - Constructruction	98461_7319	Feb-10	Mar-11	-	-	-						
DI Photovoltaic System Phase 1 - Stimulus	98462_7320	Sep-09	Mar-10	-	-	-						
DI Wind Phase II - Construction	98463_7321	Nov-11	May-13	2,500,000	-	2,500,000	40,550	900,000	1,559,450	2,500,000		
DI Wind Phase II - Stimulus	98464_7322	Nov-11	May-13	-	-	-						
Norumbega Solar - Construction	98465_7323			-	-	-						
Norumbega Solar - Stimulus	98466_7324			-	-	-						
Loring Road Hydro - Constructruction - Stimulus	98468_7341	Jan-10	Apr-11	-	-	-						

**MASSACHUSETTS WATER RESOURCES AUTHORITY  
CONTINGENCY FUND FORECAST FY2012 - 2021  
(\$000)**

	<b>Total Contingency Budget FY12-21</b>	<b>Q1 FY2012</b>	<b>Q2 FY2012</b>	<b>Q3 FY2012</b>	<b>Q4 FY2012</b>	<b>FY2012</b>	<b>FY2013</b>	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
<b>Wastewater System Improvements</b>															
FY2012	3,640	609	680	1,011	1,340	3,640									
FY2013	5,251						5,251								
FY2014	7,187							7,187							
FY2015	9,325								9,325						
FY2016	8,210									8,210					
FY2017	7,945										7,945				
FY2018	5,394											5,394			
FY2019	5,178												5,178		
FY2020	2,475													2,475	
FY2021	1,589														1,589
<b>Total Wastewater System Improvements</b>	<b>\$56,194</b>	<b>\$609</b>	<b>\$680</b>	<b>\$1,011</b>	<b>\$1,340</b>	<b>\$3,640</b>	<b>\$5,251</b>	<b>\$7,187</b>	<b>\$9,325</b>	<b>\$8,210</b>	<b>\$7,945</b>	<b>\$5,394</b>	<b>\$5,178</b>	<b>\$2,475</b>	<b>\$1,589</b>
<b>Waterworks System Improvements</b>															
FY2012	4,063	613	743	964	1,743	4,063									
FY2013	5,829						5,829								
FY2014	8,021							8,021							
FY2015	6,377								6,377						
FY2016	6,380									6,380					
FY2017	5,262										5,262				
FY2018	3,762											3,762			
FY2019	10,890												10,890		
FY2020	10,922													10,922	
FY2021	9,051														9,051
<b>Total Waterworks System Improvements</b>	<b>\$70,558</b>	<b>\$613</b>	<b>\$743</b>	<b>\$964</b>	<b>\$1,743</b>	<b>\$4,063</b>	<b>\$5,829</b>	<b>\$8,021</b>	<b>\$6,377</b>	<b>\$6,380</b>	<b>\$5,262</b>	<b>\$3,762</b>	<b>\$10,890</b>	<b>\$10,922</b>	<b>\$9,051</b>
<b>Business &amp; Operations Support</b>	<b>\$2,620</b>	<b>\$135</b>	<b>\$102</b>	<b>\$187</b>	<b>\$266</b>	<b>\$690</b>	<b>\$784</b>	<b>\$314</b>	<b>\$532</b>	<b>\$194</b>	<b>\$75</b>	<b>\$32</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Total MWRA</b>	<b>\$129,372</b>	<b>\$1,357</b>	<b>\$1,526</b>	<b>\$2,161</b>	<b>\$3,349</b>	<b>\$8,393</b>	<b>\$11,864</b>	<b>\$15,522</b>	<b>\$16,234</b>	<b>\$14,784</b>	<b>\$13,283</b>	<b>\$9,187</b>	<b>\$16,069</b>	<b>\$13,396</b>	<b>\$10,640</b>

# APPENDIX 3

## New Capital Projects Added During the FY12 CIP

**Appendix 3  
New Capital Projects Added to the FY12 CIP**

<b>Program</b>	<b>Project</b>	<b>Subphase</b>	<b>Contract No.</b>	<b>Requestor</b>	<b>Current Priority Rating</b>	<b>Included in the Master Plan</b>	<b>Priority Rating per the Master Plan</b>	<b>Total Contract Amount</b>	<b>FY09-13</b>	<b>Beyond Cap</b>	<b>Total Expenditures</b>
Interception & Pumping	Braintree-Weymouth Relief Facilities	Braintree-Weymouth Improvements	10493_7366	Brian Kubaska	2	no	n/a	\$4,000,000	\$960,000	\$3,040,000	\$4,000,000
	Corrosion & Odor Control	Nut Island Odor Control System Evaluation & Design	10492_7365	Brian Kubaska	3	no	n/a	\$1,000,000	\$0	\$1,000,000	\$1,000,000
		System-wide odor control study	10491_7364		3	yes	n/a	\$1,000,000	\$0	\$1,000,000	\$1,000,000
	Wastewater Central Monitoring	Wastewater Redundant Communications	10490_7363	Andrew Hildick-	2	no	n/a	\$900,000	\$850,000	\$50,000	\$900,000
	I&P Facility Asset Protection	Caruso PS HVAC & Fire Detection System Upgrade	10489_7362	Brian Kubaska	2	yes	3	\$1,000,000	\$500,000	\$500,000	\$1,000,000
		Delauri PS Electrical Room Cooling	10488_7361		2	yes	n/a	\$250,000	\$187,500	\$62,500	\$250,000
		System Relief & Contingency Planning Study	10487_7360		2	no	n/a	\$500,000	\$0	\$500,000	\$500,000
		Prison Point & Cottage Farm CSO Rehab	10486_7359		2	yes	n/a	\$1,000,000	\$45,453	\$954,547	\$1,000,000
		Prison Point Dry Weather Flow & Stripping Improvements	10485_7358		3	yes	n/a	\$750,000	\$62,500	\$687,500	\$750,000
		Prison Point Gearbox Rebuilds	10501_7389		2	yes	n/a	\$440,000	\$440,000	\$0	\$440,000
		Pump Station Rehab - Preliminary Design & Study	10500_7375		2	yes	n/a	\$750,000	\$0	\$750,000	\$750,000
		Sect 156 Rehab - Design/Build	10503_7393		2	yes	n/a	\$2,000,000	\$2,000,000	\$0	\$2,000,000
		Sect 156 Rehab - Owners Rep	10502_7392		2	yes	n/a	\$200,000	\$200,000	\$0	\$200,000
Treatment	DI Treatment Plant Asset Protection	Clarifier Rehab Phase 2	19346_7374	Rick Adams	2	no	n/a	\$28,500,000	\$4,833,329	\$23,666,671	\$28,500,000
		Digester & Storage Tank Rehab Design/ESDC	19290_7052		2	no	n/a	\$3,000,000	\$1,500,000	\$1,500,000	\$3,000,000
		Digester & Storage Tank Rehab - Const.	19345_7373		2	no	n/a	\$20,000,000	\$0	\$20,000,000	\$20,000,000
	Clinton Wastewater Treatment Plant	Clinton WWTP Influent Gates	19343_7371	John Riccio	2	no	n/a	\$300,000	\$300,000	\$0	\$300,000
		Phosphorous Removal	19950_7377		2	yes	3	\$3,500,000	\$291,667	\$3,208,333	\$3,500,000

**Appendix 3  
New Capital Projects Added to the FY12 CIP**

<b>Program</b>	<b>Project</b>	<b>Subphase</b>	<b>Contract No.</b>	<b>Requestor</b>	<b>Current Priority Rating</b>	<b>Included in the Master Plan</b>	<b>Priority Rating per the Master Plan</b>	<b>Total Contract Amount</b>	<b>FY09-13</b>	<b>Beyond Cap</b>	<b>Total Expenditures</b>	
Drinking Water Quality Improvements	John J. Carroll Water Treatment Plant	CWTP Storage Tank Roof Drainage System	53470_7376	Dave Coppes	3	no	n/a	\$2,000,000	\$0	\$2,000,000	\$2,000,000	
Transmission	MetroWest Tunnel	Shaft 5A / Shaft 5 Surface Piping Inspection and Restoration	60129_7368		2	no	n/a	\$1,500,000	\$0	\$1,500,000	\$1,500,000	
		Shaft 5 Electrical Upgrade	60128_7367		4	no	n/a	\$1,000,000	\$0	\$1,000,000	\$1,000,000	
	Sudbury / Weston Aqueduct Repairs	Ash Street Sluice Gates	60130_7369		3	no	n/a	\$1,000,000	\$0	\$1,000,000	\$1,000,000	
	Dam Projects	Goodnough Dike Drainage Improvements	60131_7370		2	yes	n/a	\$1,000,000	\$0	\$1,000,000	\$1,000,000	
	Quabbin Transmission System	Rehabilitate Oakdale Turbine	Rehabilitate Oakdale Turbine		60135_7378	5	no	n/a	\$1,000,000	\$0	\$1,000,000	\$1,000,000
			Geo-Thermal Heating - Wachusett Lower Gatehouse		60136_7379	5	no	n/a	\$200,000	\$0	\$200,000	\$200,000
			Rehab Wachusett Lower Gatehouse Chamber 4 Piping	60137_7380	3	no	n/a	\$1,000,000	\$0	\$1,000,000	\$1,000,000	
Distribution And Pumping	Chestnut Hill Connecting Mains	Chestnut Hill Underground Pump Station Electrical Rehab	75521_7382	John Colbert	1	no	n/a	\$1,500,000	\$225,000	\$1,275,000	\$1,500,000	
	Rehab of Other Pumping Stations	Pump Station Rehabilitation	75522_7383	Mark Johnson	3	yes	n/a	\$25,000,000	\$0	\$25,000,000	\$25,000,000	
Other Waterworks	Waterworks Facility Asset Protection	Shaft 9 Rehab	75520_7381	Mark Johnson	3	yes	n/a	\$2,000,000	\$0	\$2,000,000	\$2,000,000	
		Elevated Water Storage Tank Repainting	75523_7384		3	no	n/a	\$5,000,000	\$0	\$5,000,000	\$5,000,000	
		Covered Storage Tank Rehabilitation	75524_7385		4	no	n/a	\$5,000,000	\$0	\$5,000,000	\$5,000,000	
Business & Operations Support	Business Systems Plan	NET 2020 DITP/Southboro	92469_7386	Joe Barrett	2	no	n/a	\$2,100,000	\$788,000	\$1,312,000	\$2,100,000	
	Capital Maintenance Planning & Development	As-Needed Design Contract 9	98470_7390	John McCormick	2	no	n/a	\$1,600,000	\$1,333,320	\$266,680	\$1,600,000	
		As-Needed Design Contract 10	98471_7391		2	no	n/a	\$1,600,000	\$1,333,320	\$266,680	\$1,600,000	

**Appendix 3  
New Capital Projects Added to the FY12 CIP**

<b>Program</b>	<b>Project</b>	<b>Subphase</b>	<b>Contract No.</b>	<b>Requestor</b>	<b>Current Priority Rating</b>	<b>Included in the Master Plan</b>	<b>Priority Rating per the Master Plan</b>	<b>Total Contract Amount</b>	<b>FY09-13</b>	<b>Beyond Cap</b>	<b>Total Expenditures</b>
<b>SUMMARY</b>											
<b>Total Wastewater Projects</b>					<b>16</b>			<b>\$69,090,000</b>	<b>\$12,170,449</b>	<b>\$56,919,551</b>	<b>\$69,090,000</b>
<b>Total Waterworks Projects</b>					<b>13</b>			<b>\$47,200,000</b>	<b>\$225,000</b>	<b>\$46,975,000</b>	<b>\$47,200,000</b>
<b>Total Business &amp; Operations Support Projects</b>					<b>3</b>			<b>\$5,300,000</b>	<b>\$3,454,640</b>	<b>\$1,845,360</b>	<b>\$5,300,000</b>
<b>Total New Projects</b>					<b>32</b>			<b>\$121,590,000</b>	<b>\$15,850,089</b>	<b>\$105,739,911</b>	<b>\$121,590,000</b>

## APPENDIX 4

### Overview of the FY12 Final CIP and Changes from the FY11 Final CIP



**APPENDIX 4**  
**Overview of the FY12 Final CIP and Changes from the FY11 Final CIP**  
**(\$000)**

Program and Project	FY11 Final			
	Total Budget Amount	FY09-13	FY14-18	Beyond 18
<b>Total MWRA</b>	<b>5,332,754</b>	<b>1,057,152</b>	<b>995,058</b>	<b>417,528</b>
<b>Wastewater</b>	<b>2,574,720</b>	<b>644,573</b>	<b>516,710</b>	<b>195,768</b>
<b>Interception &amp; Pumping</b>	<b>798,735</b>	<b>66,924</b>	<b>229,583</b>	<b>14,061</b>
102 Quincy Pump Facilities	25,908	-	-	-
104 Braintree-Weymouth Relief Facilities	233,573	18,442	100	-
105 New Neponset Valley Relief Sewer	30,300	-	-	-
106 Wellesley Ext Replacement Sewer	64,359	-	-	-
107 Framingham Extension Relief Sewer	47,856	-	-	-
127 Cummingsville Replacement Sewer	8,999	43	-	-
130 Siphon Structure Rehabilitation	2,613	84	1,589	-
131 Upper Neponset Valley Sewer	54,426	1,276	-	-
132 Corrosion & Odor Control	14,647	325	11,319	-
134 Ashland Extension Sewer	-	-	-	-
135 System Master Plan Interceptors	-	-	-	-
136 West Roxbury Tunnel	88,784	7,575	72,328	-
137 Wastewater Central Monitoring	19,939	5,992	-	-
139 South System Relief Project	4,940	-	938	562
141 Wastewater Process Optimization	10,310	3,103	6,277	-
142 Wastewater Meter Sys-Equipment Replacement	26,578	790	7,201	13,499
143 Regional I/I Management Planning	169	-	-	-
145 I&P Facility Asset Protection	159,584	29,294	124,081	-
146 D.I. Cross Harbor Tunnel	5,000	-	5,000	-
147 Randolph Trunk Sewer Relief	750	-	750	-
<b>Treatment</b>	<b>555,740</b>	<b>227,528</b>	<b>171,589</b>	<b>104,828</b>
200 DI Plant Optimization	33,456	296	-	-
206 DI Treatment Plant Asset Protection	512,501	222,428	167,884	104,829
210 Clinton Wastewater Treat Plant	3,115	2,771	-	-
211 Laboratory Services	6,667	2,033	3,705	-
<b>Residuals</b>	<b>211,741</b>	<b>4,596</b>	<b>60,542</b>	<b>82,792</b>
261 Residuals	63,811	-	-	-
271 Residuals Asset Protection	147,930	4,596	60,542	82,792

FY12 Final			
Total Budget Amount	FY09-13	FY14-18	Beyond 18
<b>5,468,271</b>	<b>936,660</b>	<b>999,850</b>	<b>668,745</b>
<b>2,625,405</b>	<b>574,874</b>	<b>558,524</b>	<b>274,333</b>
<b>814,734</b>	<b>60,708</b>	<b>217,929</b>	<b>47,930</b>
25,908	-	-	-
234,002	15,831	3,140	-
30,300	-	-	-
64,359	-	-	-
47,856	-	-	-
8,999	43	-	-
2,685	88	1,657	-
55,056	1,907	-	-
16,782	275	12,504	1,000
-	-	-	-
-	-	-	-
46,934	1,608	21,100	15,347
20,839	6,842	50	-
4,939	(1)	938	563
10,248	1,000	7,693	625
26,578	1,444	8,892	11,153
169	-	-	-
213,329	31,673	156,205	19,242
5,000	-	5,000	-
750	-	750	-
<b>618,975</b>	<b>190,210</b>	<b>227,759</b>	<b>149,212</b>
33,456	296	-	-
575,907	186,099	223,236	149,212
7,298	2,431	4,523	-
2,315	1,385	-	-
<b>211,741</b>	<b>2,335</b>	<b>62,803</b>	<b>82,791</b>
63,811	-	-	-
147,930	2,337	62,803	82,791

Change from FY11 Final			
Total Budget Amount	FY09-13	FY14-18	Beyond 18
<b>135,517</b>	<b>(120,493)</b>	<b>4,792</b>	<b>251,217</b>
<b>50,686</b>	<b>(69,695)</b>	<b>41,815</b>	<b>78,566</b>
<b>16,000</b>	<b>(6,216)</b>	<b>(11,654)</b>	<b>33,869</b>
-	-	-	-
429	(2,611)	3,040	-
-	-	-	-
-	-	-	-
-	-	-	-
72	4	68	-
630	631	-	-
2,135	(50)	1,185	1,000
-	-	-	-
-	-	-	-
(41,850)	(5,967)	(51,228)	15,347
900	850	50	-
(1)	(1)	-	1
(62)	(2,103)	1,416	625
-	654	1,691	(2,346)
-	-	-	-
53,745	2,379	32,124	19,242
-	-	-	-
-	-	-	-
<b>63,236</b>	<b>(37,318)</b>	<b>56,170</b>	<b>44,384</b>
-	-	-	-
63,406	(36,329)	55,352	44,383
4,183	(340)	4,523	-
(4,352)	(648)	(3,705)	-
<b>-</b>	<b>(2,261)</b>	<b>2,262</b>	<b>-</b>
-	-	-	-
-	(2,259)	2,261	(1)

**APPENDIX 4**  
**Overview of the FY12 Final CIP and Changes from the FY11 Final CIP**  
**(\$000)**

Program and Project	FY11 Final			
	Total Budget Amount	FY09-13	FY14-18	Beyond 18
<b>CSO</b>	<b>885,630</b>	<b>336,936</b>	<b>26,054</b>	<b>424</b>
340 Dorchester Bay Sewer Separation (Fox)	54,171	409	-	-
341 Dorchester Bay Sew Separation (Comm. Pt.)	64,551	9,661	-	-
342 Neponset River Sewer Separation	2,444	-	-	-
343 Constitution Beach Sewer Separation	3,769	-	-	-
344 Stony Brook Sewer Separation	44,333	(719)	-	-
346 Cambridge Sewer Separation	63,985	36,361	9,173	-
351 BWSC Floatables Controls	933	-	-	-
352 Cambridge Floatables Control	1,087	165	-	-
356 Fort Point Channel Sewer Separation	12,062	3,770	-	-
358 Morrissey Boulevard Drain	36,224	21,527	20	-
359 Reserved Channel Sewer Separation	73,684	57,340	13,627	-
360 Brookline Sewer Separation	29,599	28,328	-	-
361 Bulfinch Triangle Sewer Separation	9,986	9,489	-	-
339 North Dorchester Bay	223,649	84,606	-	-
347 East Boston Branch Sewer Relief	88,037	77,331	-	-
348 BOS019 Storage Conduit	14,288	(44)	-	-
349 Chelsea Trunk Sewer	29,779	-	-	-
350 Union Park Detention Treatment Facility	49,583	(227)	-	-
353 Upgrade Existing CSO Facilities	22,385	-	-	-
354 Hydraulic Relief Projects	2,295	-	-	-
355 MWR003 Gate & Siphon	3,489	445	3,044	-
357 Charles River CSO Controls	4,406	3,305	-	-
324 CSO Support	50,892	5,190	190	424
<b>Other Wastewater</b>	<b>122,875</b>	<b>8,590</b>	<b>28,942</b>	<b>(6,337)</b>
128 I/I Local Financial Assistance	122,594	8,590	28,942	(6,337)
138 Sewerage System Mapping Upgrade	281	-	-	-
<b>Total Waterworks</b>	<b>2,652,480</b>	<b>359,467</b>	<b>468,842</b>	<b>221,760</b>
<b>Drinking Water Quality</b>	<b>656,826</b>	<b>106,227</b>	<b>42,009</b>	<b>-</b>
542 Carroll Water Treatment Plant	429,436	39,117	17,567	-
543 Quabbin Water Treatment Plant	17,488	7,275	69	-
544 Norumbega Covered Storage	106,674	102	-	-
545 Blue Hills Covered Storage	40,681	21,759	33	-
550 Spot Pond Storage Facility	62,547	37,974	24,340	-
<b>Transmission</b>	<b>1,117,058</b>	<b>96,231</b>	<b>157,570</b>	<b>190,375</b>
597 Winsor Station Pipeline	14,866	7,458	7,370	-
601 Sluice Gate Rehabilitation	9,158	-	-	-
604 MetroWest Tunnel	704,027	49,914	20,312	-
615 Chicopee Valley Aqueduct Redundancy	8,605	34	-	-
616 Quabbin Transmission System	11,420	3,068	3,929	-
617 Sudbury/Weston Aqueduct Repairs	3,267	1,836	796	-
620 Wachusett Reservoir Spillway Improvement	11,944	3,894	-	-
621 Watershed Land	19,000	10,793	-	-
622 Cosgrove/Wachusett Redundancy	-	-	-	-
623 Dam Projects	8,739	6,757	1,982	-
625 Long Term Redundancy	326,032	12,477	123,181	190,375

Total Budget Amount	FY12 Final		
	FY09-13	FY14-18	Beyond 18
<b>857,089</b>	<b>305,762</b>	<b>28,672</b>	<b>436</b>
54,171	409	-	-
64,725	8,207	1,628	-
2,444	-	-	-
3,769	-	-	-
44,333	(720)	-	-
55,702	27,926	9,325	-
933	-	-	-
1,087	164	-	-
12,047	3,755	-	-
32,899	18,197	25	-
62,323	45,425	14,181	-
25,930	24,658	-	-
9,986	9,489	-	-
224,252	85,206	5	-
85,715	75,008	-	-
14,288	(44)	-	-
29,779	-	-	-
49,583	(227)	-	-
22,385	-	-	-
2,295	-	-	-
3,682	430	3,252	-
3,633	2,531	-	-
51,128	5,348	256	436
<b>122,866</b>	<b>15,859</b>	<b>21,361</b>	<b>(6,036)</b>
122,585	15,859	21,361	(6,036)
281	-	-	-
<b>2,735,722</b>	<b>314,344</b>	<b>424,553</b>	<b>394,414</b>
<b>663,548</b>	<b>99,988</b>	<b>54,969</b>	<b>-</b>
426,797	33,424	20,620	-
17,686	5,442	2,100	-
106,674	102	-	-
40,695	21,456	349	-
71,696	39,564	31,900	-
<b>1,147,193</b>	<b>94,985</b>	<b>145,074</b>	<b>234,255</b>
26,082	10,232	15,813	-
9,158	-	-	-
710,719	56,375	19,544	1,000
8,667	95	-	-
13,547	2,981	3,843	2,300
4,288	310	3,343	-
9,498	1,449	-	-
19,000	10,794	-	-
-	-	-	-
8,181	4,797	3,384	-
338,053	7,952	99,147	230,955

Total Budget Amount	Change from FY11 Final		
	FY09-13	FY14-18	Beyond 18
<b>-28,541</b>	<b>-31,170</b>	<b>2,618</b>	<b>12</b>
-	-	-	-
174	(1,454)	1,628	-
-	-	-	-
-	-	-	-
-	(1)	-	-
(8,283)	(8,435)	152	-
-	-	-	-
-	(1)	-	-
(15)	(15)	-	-
(3,325)	(3,330)	5	-
(11,361)	(11,915)	554	-
(3,669)	(3,670)	-	-
-	-	-	-
603	600	5	-
(2,322)	(2,323)	-	-
-	-	-	-
-	-	-	-
193	(15)	208	-
(773)	(774)	-	-
236	158	66	12
<b>(9)</b>	<b>7,269</b>	<b>(7,581)</b>	<b>301</b>
(9)	7,269	(7,581)	301
-	-	-	-
<b>83,242</b>	<b>(45,123)</b>	<b>(44,289)</b>	<b>172,654</b>
<b>6,722</b>	<b>(6,239)</b>	<b>12,960</b>	<b>-</b>
(2,639)	(5,693)	3,053	-
198	(1,833)	2,031	-
-	-	-	-
14	(303)	316	-
9,149	1,590	7,560	-
<b>30,135</b>	<b>(1,246)</b>	<b>(12,496)</b>	<b>43,880</b>
11,216	2,774	8,443	-
-	-	-	-
6,692	6,461	(768)	1,000
62	61	-	-
2,127	(87)	(86)	2,300
1,021	(1,526)	2,547	-
(2,446)	(2,445)	-	-
-	1	-	-
-	-	-	-
(558)	(1,960)	1,402	-
12,021	(4,525)	(24,034)	40,580

**APPENDIX 4**  
**Overview of the FY12 Final CIP and Changes from the FY11 Final CIP**  
**(\$000)**

Program and Project	FY11 Final			
	Total Budget Amount	FY09-13	FY14-18	Beyond 18
<b>Distribution &amp; Pumping</b>	<b>847,504</b>	<b>90,331</b>	<b>287,851</b>	<b>163,871</b>
618 Northern High NW Tran Section 70-71	1,000	-	1,000	-
677 Valve Replacement	19,132	3,614	6,939	-
678 Boston Low Service-Pipe & Valve Rehab	23,691	-	-	-
683 Heath Hill Road Pipe Replacement	19,365	(3)	-	-
689 James L. Gillis Pump Station Rehabilitation	33,419	-	-	-
692 NHS - Section 27 Improvements	3,179	-	2,278	778
693 NHS - Revere & Malden Pipeline Improvements	33,514	2,938	5,721	960
702 New Connect Mains-Shaft 7 to WASM3	30,131	4,987	9,216	10,609
704 Rehabilitation of Other Pump Stations	30,717	12,731	-	-
706 NHS-Connecting Mains from Section 91	2,360	-	-	-
708 Northern Extra High Service - New Pipelines	6,569	31	2,906	-
712 Cathodic Protection Of Distribution Mains	1,405	-	-	1,264
713 Spot Pond Supply Mains Rehabilitation	66,097	2,768	2,851	-
714 Southern Extra High Sects 41,42, & 74	3,657	-	-	-
719 Chestnut Hill Connecting Mains	30,481	1,136	11,884	-
720 Warren Cottage Line Rehabilitation	1,205	-	-	-
721 Southern Spine Distribution Mains	69,495	19,466	2,257	30,161
722 NIH Redundancy & Storage	79,253	11,081	51,697	15,841
723 Northern Low Service Rehabilitation Section 8	19,600	2,287	17,256	-
724 Northern High Service - Pipeline Rehabilitation	-	(2)	-	-
725 Hydraulic Model Update	598	-	-	-
727 SEH Redundancy & Storage	93,841	7,840	52,364	31,970
730 Weston Aqueduct Supply Mains	260,084	13,822	120,835	64,526
731 Lynnfield Pipeline	7,635	7,072	50	-
732 Walnut St. & Fisher Hill Pipeline Rehabilitation	2,717	563	-	-
733 NHS Pipeline Rehab 13-18 & 48	-	-	-	-
734 SEH Pipelines-Sections 30, 39, 40, & 44	-	-	-	-
735 Section 80 Rehabilitation	8,359	-	597	7,762
<b>Other</b>	<b>31,092</b>	<b>66,678</b>	<b>(18,588)</b>	<b>(132,486)</b>
753 Central Monitoring System	16,992	1,325	-	-
763 Distribution Systems Facilities Mapping	1,799	228	535	-
764 Local Water Infrastructure Rehabilitation	7,488	-	-	-
765 Local Water Pipeline Improve Loan Program	-	63,703	(22,146)	(132,633)
766 Waterworks Facility Asset Protection	4,813	1,422	3,023	147
<b>Business &amp; Operations Support</b>	<b>105,552</b>	<b>53,112</b>	<b>9,509</b>	<b>-</b>
881 Equipment Purchase	14,971	6,827	2,887	-
925 Technical Assistance	1,200	1,200	-	-
930 MWRA Facility - Chelsea	9,851	(36)	-	-
931 Business Systems Plan	36,700	8,750	5,942	-
932 Environmental Remediation	1,805	268	69	-
933 Capital Maintenance Planning	8,265	4,546	-	-
934 MWRA Facilities Management	7,308	7,308	-	-
935 Alternative Energy Initiative	25,452	24,249	611	-

FY12 Final			
Total Budget Amount	FY09-13	FY14-18	Beyond 18
<b>881,818</b>	<b>79,209</b>	<b>215,697</b>	<b>281,461</b>
1,000	-	1,000	-
20,032	3,550	7,577	326
23,691	-	-	-
19,358	(10)	-	-
33,419	-	-	-
3,308	1	1,427	1,757
33,612	2,949	5,768	1,000
31,632	5,409	10,346	10,559
55,144	12,158	-	25,000
2,360	-	-	-
6,690	25	3,033	-
1,458	-	-	1,317
66,127	2,452	2,850	347
3,657	-	-	-
29,361	447	6,341	5,111
1,205	-	-	-
70,668	19,445	2,247	31,365
79,070	10,172	49,213	19,052
20,233	2,327	4,779	13,069
-	(2)	-	-
598	-	-	-
97,179	5,471	21,138	68,903
265,772	9,744	99,351	95,776
5,042	4,508	21	-
2,717	563	-	-
-	-	-	-
-	-	-	-
8,485	-	606	7,879
<b>43,163</b>	<b>40,162</b>	<b>8,813</b>	<b>(121,302)</b>
16,992	1,325	-	-
1,799	228	535	-
7,488	-	-	-
-	37,988	(2,546)	(126,520)
16,884	621	10,824	5,218
<b>107,139</b>	<b>47,434</b>	<b>16,772</b>	<b>-</b>
15,655	7,498	2,900	-
1,200	800	400	-
9,851	(36)	-	-
38,800	8,406	8,385	-
1,556	89	-	-
11,549	7,296	533	-
2,151	2,151	-	-
26,377	21,230	4,554	-

Change from FY11 Final			
Total Budget Amount	FY09-13	FY14-18	Beyond 18
<b>34,314</b>	<b>(11,122)</b>	<b>(72,154)</b>	<b>117,590</b>
-	-	-	-
900	(64)	638	326
-	-	-	-
(7)	(7)	-	-
-	-	-	-
129	1	(851)	979
98	11	47	40
1,501	422	1,130	(50)
24,427	(573)	-	25,000
-	-	-	-
121	(6)	127	-
53	-	-	53
30	(316)	(1)	347
-	-	-	-
(1,120)	(689)	(5,543)	5,111
-	-	-	-
1,173	(21)	(10)	1,204
(183)	(909)	(2,484)	3,211
633	40	(12,477)	13,069
-	-	-	-
-	-	-	-
3,338	(2,369)	(31,226)	36,933
5,688	(4,078)	(21,484)	31,250
(2,593)	(2,564)	(29)	-
-	-	-	-
-	-	-	-
-	-	-	-
126	-	9	117
<b>12,071</b>	<b>(26,516)</b>	<b>27,401</b>	<b>11,184</b>
-	-	-	-
-	-	-	-
-	-	-	-
-	(25,715)	19,600	6,113
12,071	(801)	7,801	5,071
<b>1,587</b>	<b>(5,678)</b>	<b>7,263</b>	<b>-</b>
684	671	13	-
-	(400)	400	-
-	-	-	-
2,100	(344)	2,443	-
(249)	(179)	(69)	-
3,284	2,750	533	-
(5,157)	(5,157)	-	-
925	(3,019)	3,943	-

# APPENDIX 5

## Master Plan/CIP Status

## **Master Plan Priority Ratings - Wastewater**

### **Priority One**

### **Critical/Emergency**

Risk moderate to high/Consequence very high

*Projects which:*

Resolve emergencies or critical threats to public health or worker health and safety

Prevent imminent failure of the system and significant loss of service

---

### **Priority Two**

### **Essential Projects**

Risk variable/Consequences high

*Projects which are essential to:*

Critical facility assessment

Fix existing reliability or capacity problems during dry weather flow conditions

Reduce sanitary sewer overflows from the MWRA system

Address facilities in poor condition where the ability to provide uninterrupted service or adequate flow is compromised.

Upgrade or maintain emergency backup facilities in poor condition

Meet minimum hydraulic performance requirements and service needs

Implement MWRA's approved CSO control plan

Maintain wastewater effluent and residuals quality

To comply with mandated legal, regulatory or statutory requirements

---

### **Priority Three** **Necessary Projects**

Risk moderate to high/Consequence moderate to low

*Projects which are necessary to:*

Improve public health and worker safety

Restore the system's infrastructure where it is seriously deteriorated

Improve hydraulic performance

Significantly improve the effectiveness, efficiency, or reliability of system operations and service delivery including where appropriate, the ability to monitor the system

Maintain consumer confidence

To comply with other legal, regulatory or statutory requirements

---

**Priority Four**

**Important Projects**

Risk moderate/Consequences low

*Projects which are important to:*

Maintain the integrity of the system's infrastructure

Produce significant cost savings or revenue gains for MWRA

Monitor system needs and plan appropriate longer-term responses

Provide acceptable working conditions at field sites and at maintenance support facilities

Implement the regional I/I plan

---

**Priority Five**

**Desirable Projects**

Risk/Consequence both low

*Projects which are desirable because they would:*

Yield worthwhile cost savings, revenue gains, or efficiency improvements for MWRA

Protect the long term value and usefulness of system assets

Solve future problems and conditions which are expected to arise in the latter half of the planning period

Be beneficial towards the improved operation of a local system

## **Master Plan Priority Ratings - Water**

### **Priority One**

### **Critical/Emergency**

Risk moderate to high/Consequence very high

*Projects which:*

Resolve emergencies or critical threats to public health or worker health and safety

Prevent imminent failure of the system and significant loss of service

---

### **Priority Two**

### **Essential Projects**

Risk variable/Consequences high

*Projects which are essential to:*

Critical facility assessment

Fix existing reliability problems related to “single points of failure”

Upgrade or maintain emergency back-up facilities in operational condition

Address facilities in poor condition where the ability to provide uninterrupted service, sanitary protections or adequate flow is compromised.

Meet minimum hydraulic performance requirements and service needs including adequate distribution storage in areas with a critical shortfall of storage

To comply with mandated legal, regulatory or statutory requirements

---

### **Priority Three**

### **Necessary Projects**

Risk moderate to high/Consequences moderate to low

*Projects which are necessary to:*

Improve public health and worker safety

Restore the system’s infrastructure where it is seriously deteriorated

Significantly improve the effectiveness, efficiency, or reliability of system operations and service delivery including where appropriate, the ability to monitor the system

Preserve water quality during distribution

Maintain consumer confidence

To comply with other legal, regulatory or statutory requirements

---

### **Priority Four**

### **Important Projects**

Risk moderate/Consequence low

*Projects which are important to:*

Maintain the integrity of the system’s infrastructure

Improve hydraulic performance or add distribution storage

Produce significant cost savings or revenue gains for MWRA

Monitor system needs and plan appropriate longer-term responses

Provide acceptable working conditions at field sites and at maintenance support facilities

Maintain efforts to manage system demands

Provide broader environmental benefits

---

**Priority Five**

**Desirable Projects**

Risk/Consequence both low

*Projects which are desirable because they would:*

Yield worthwhile cost savings, revenue gains, or efficiency improvements for MWRA

Protect the long term value and usefulness of system assets

Solve future problems and conditions which are expected to arise in the latter half of the planning period

Be beneficial towards the improved operation of a local system



**Appendix 5**  
**Master Plan/CIP Status**  
(in 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 FY 13	Comment
<b>FY12 Budget Cycle</b>									
<b>S.132 Corrosion and Odor Control</b>									
S.10491.7364 System Wide Odor Control Study	2	FY12	3	Jul-18	Jul-20	1,000	0	1,000	
<b>S.145 I&amp;P Facility Asset Protection</b>									
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	
<b>S.210 Clinton Wastewater Treatment Plant</b>									
S.19950.7377 Phosphorous Removal	3	FY12	2	Jan-13	Jan-16	3,500	292	3,208	
<b>S. 623 Dam Projects</b>									
S.60131.7370 Goodnough Dike Drainage Improvements	3	FY12	2	Jul-13	Jul-14	1,000	0	1,000	
<b>S. 704 Rehabilitation of Other Pump Stations</b>									
S.75522.7383 Pump Station Rehabilitation	4	FY12	3	Jul-19	Jun-24	25,000	0	25,000	
<b>S. Waterworks Facility Asset Protection</b>									
S.75520.7381 Shaft 9 Rehabilitation	2	FY12	3	Jul-13	Jul-16	2,000	0	2,000	
<b>FY12 Master Plan Totals - 13 projects</b>						<b>\$ 38,890</b>	<b>\$ 3,728</b>	<b>\$ 35,162</b>	
<b>FY11 Budget Cycle</b>									
<b>S.145 I&amp;P Facility Asset Protection</b>									
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	
<b>S.542 John J. Carroll Water Treatment Plant</b>									
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	
<b>S.713 Spot Pond Supply Mains - Rehab</b>									
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	
<b>S.765 Local Water Pipeline Imp. Loan Program</b>									
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	
<b>S.753 Central Monitoring System</b>									
S.75512.7338 Winsor Dam High Line Replacement	3	FY11	3	Jan-11	Dec-11	1,000	1,000	0	
<b>FY11 Master Plan Totals - 9 projects</b>						<b>\$ 19,726</b>	<b>\$ 34,976</b>	<b>\$ (15,250)</b>	

**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 FY 13	Comment
<b>FY10 Budget Cycle</b>									
<b>S.128 I/I Local Financial Assistance</b>									
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)	
<b>S.210 Clinton Wastewater Treatment Plant</b>									
S.32749.7277 Clinton Digester Cleaning & Rehabs	3	FY10	2	Nov-09	May-11	1,500	1,500	0	
S.32750.7278 Clinton Aeration Efficiency Improvement	3	FY10	3	May-10	May-11	372	372	0	
<b>S.145 I&amp;P Facility Asset Protection</b>									
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	
<b>S.616 Quabbin Transmission System</b>									
S.92366.7282 Ware River Intake Valve Replacement	3	FY10	3	Jul-14	Jul-17	1,200	0	1,200	
<b>S.604 MetroWest Tunnel</b>									
S.92367.7283 Valve Chamber Storage Tank Access Imp	3	FY10	2	Jul-11	Jul-13	3,000	2,500	500	
<b>S.702 New Connecting Mains - Shaft 7 to WASM 3</b>									
S.92368.7284 Section 75 Extension	3	FY10	3	Oct-15	Oct-19	4,400	0	4,400	
<b>S.931 Business Systems Plan</b>									
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.
<b>FY10 Master Plan Totals - 14 projects</b>						<b>\$ 58,672</b>	<b>\$ 15,502</b>	<b>\$ 43,170</b>	
<b>FY09 Budget Cycle</b>									
<b>S.145 I&amp;P Facility Asset Protection</b>									
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	
<b>S.130 Siphon Structure Rehabilitation</b>									
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
<b>S.147 Randolph Trunk Sewer Relief</b>									
S.10461.7220 Study	3	FY09	3	Jul-11	Jun-13	750	656	94	
<b>S.132 Corrosion &amp; Odor Control</b>									
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	
<b>S.206 DI Treatment Plant Asset Protection</b>									

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

<b>Listing of Master Plan Projects</b>	<b>Original MP Rating</b>	<b>CIP Year</b>	<b>Rating when added to CIP</b>	<b>NTP</b>	<b>SC</b>	<b>Total Contract Amount</b>	<b>FY09-13</b>	<b>Beyond FY 13</b>	<b>Comment</b>
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	
<b>S.616 Quabbin Transmission System</b>									
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
<b>S.722 NIH Redundancy &amp; Covered Storage</b>									
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	
<b>S.931 Business Systems Plan</b>									
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	
<b>FY09 Master Plan Totals - 11 projects</b>						<b>\$ 31,270</b>	<b>\$ 19,486</b>	<b>\$ 11,785</b>	
<b>FY08 Budget Cycle</b>									
<b>S.104 Braintree-Weymouth Relief Facilities</b>									
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	
<b>S.132 Corrosion &amp; Odor Control</b>									
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	
<b>S.136 West Roxbury Tunnel</b>									
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	
<b>S.142 Wastewater Meter Sys-Equip Replace</b>									
S.10451.7191 Wastewater Metering Asset Protection	2	FY08	2	Jul-15	Jan-00	20,000	0	20,000	
<b>S.145 I&amp;P Facility Asset Protection</b>									
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	
<b>S.146 D.I. Cross Harbor Tunnel</b>									
S.10454.7199 Tunnel Shaft Repairs Plan/Des/Const	2	FY08	2	Jul-14	Jun-17	5,000	0	5,000	
<b>S.200 DI Plant Optimization</b>									
S.19311.7121 DI As needed Tech Design	1	FY08	1	Sep-13	Jun-27	26,450	0	26,450	
<b>S.206 DI Treatment Plant Asset Protection</b>									
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	

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

<b>Listing of Master Plan Projects</b>	<b>Original MP Rating</b>	<b>CIP Year</b>	<b>Rating when added to CIP</b>	<b>NTP</b>	<b>SC</b>	<b>Total Contract Amount</b>	<b>FY09-13</b>	<b>Beyond FY 13</b>	<b>Comment</b>
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 System 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	<b>Condition determined to be worse than when Master Plan Priority Ratings assigned.</b>
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	
<b>S.271 Residuals Asset Protection</b>									
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	
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	
<b>S.542 John J. Carroll Water Treatment Plant</b>									
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	
<b>S.550 Low Service Storage Near Spot Pond</b>									
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	<b>Priority revised as project added to CIP</b>

**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 FY 13	Comment
S.53447.6868 Easement/Land Acquisition		FY08	2	Apr-09	Apr-14	630	563	67	
<b>S.597 Winsor Dam Hydroelectric</b>									
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 Aqdet Sluice Gate Des	2	FY08	2	Jul-08	Jun-12	400	400	0	
S.60096.7198 Shft 12 Quabbin Aqdet 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	
<b>S.614 Metropolitan Tunnel Loop</b>									
S.60035.6273 Redundancy StudyTunnel Insp Fea Study	1	FY08	1	Mar-08	Feb-10	3,500	3,208	292	
<b>S.618 Northern High NW Trans Sect 70-71</b>									
S.60063.6895 Planning	2	FY08	2	Jul-10	Jun-12	1,000	1,000	0	
<b>S.623 Dam Projects</b>									
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	
<b>S.624 Wachusett Aqueduct Pressurization</b>									
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	
<b>S.625 Long Term Redundancy</b>									
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	
<b>S.677 Valve Replacement</b>									
S.68300.7195 Valve Replacement 8&9 Construction	2	FY08	2	Jul-10	Jun-16	5,000	2,500	2,500	
<b>S.719 Chestnut Hill Connecting Mains</b>									
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	
<b>S.721 Southern Spine Distribution Mains</b>									
S.68299.7155 Southern Spine Sect 22 N Fac Plan/EIR	1	FY08	1	Jul-08	Jun-10	1,000	1,000	0	
<b>S.722 NIH Redundancy &amp; Covered Storage</b>									
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	
<b>S.727 SEH Redundancy &amp; Storage</b>									
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	

**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 FY 13	Comment
S.68293.7113 Section 77/88 Rehab	2	FY08	2	Sep-20	Jun-23	4,047	0	4,047	
<b>S.931 Business Systems Plan</b>									
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	
<b>FY08 Master Plan Totals - 67 projects</b>						<b>\$ 955,014</b>	<b>\$ 217,800</b>	<b>\$ 737,214</b>	

**Total Projects from the Master Plan:**  
**Total \$\$ of Projects from the Master Plan**

**114**  
**\$1,103,572**

# 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. FY10	<u>Status</u> Based on % of Budget Expended	<u>% Complete</u>	Planned Start	Planned End
<b>104 Braintree-Weymouth Relief</b>	<b>\$234,002</b>	<b>\$215,885</b>	<b>92.3%</b>	<b>92.3%</b>		
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	13,221	3,708	28.0%	28.0%	Jun-10
10049_5315	Tunnel Construction/Rescue	83,551	83,551	Complete	100.0%	
10050_5316	Intermediate P.S. Construction	47,445	47,445	Complete	100.0%	
10051_5303	No. 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/Fac.Plan	1,111	1,111	Complete	100.0%	
10058_5331	Design 2/CS/RI	15,265	14,533	95.2%	95.2%	Dec-11
10060_5310	Rehab Section 624	2,547	0	Future	0.0%	Jul-10
10061_5951	Technical Assistance	144	144	Complete	100.0%	
10251_6016	Sedimentation Testing	96	96	Complete	100.0%	
10263_6072	Legal	825	784	95.0%	95.0%	
10265_6074	Hazardous Waste	8	8	Complete	100.0%	
10278_6119	Design - Marine Pipeline	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	700	17	2.4%	2.4%	Jun-12
10480_7327	Mill Cove Sluice Gates Const	600	0	Future	0.0%	Jan-12
10493_7366	Braintree-Weymouth Improvements	4,000	0	Future	0.0%	Apr-12



Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>128 I/I Local Financial Assist</b>	<b>\$122,585</b>	<b>\$98,613</b>	<b>80.4%</b>	<b>80.4%</b>		
10232_5300	Community I/I Grants	0	5,800	Future	0.0%	
10233_5393	Community I/I Loans	0	17,278	Future	0.0%	
10234_5394	Community I/I Loan Repayment	0	-17,267	Future	0.0%	
10273_6084	Grants - Phase II	15,929	10,129	63.6%	63.6%	
10274_6085	Loans - Phase II	47,664	30,386	63.8%	63.8%	
10282_6170	Repayment - Phase II	-47,664	-30,111	63.2%	63.2%	May-11
10315_6505	Grants-Phase III	0	16,650	Future	0.0%	
10316_6506	Loans-Phase III	0	20,350	Future	0.0%	
10317_6507	Repayment-Phase III	0	-19,636	Future	0.0%	
10348_6609	Public Participation	6	6	Complete	100.0%	
10368_6736	Grants - Phase IV	34,650	18,000	51.9%	51.9%	May-10
10369_6737	Loans - Phase IV	42,350	22,000	51.9%	51.9%	May-10
10370_6738	Repayment - Phase IV	-42,350	-16,910	39.9%	39.9%	May-15
10407_6925	Grants-Phase V	18,000	16,147	89.7%	89.7%	May-12
10408_6926	Loans-Phase V	22,000	19,735	89.7%	89.7%	May-12
10409_6927	Repayments-Phase V	-22,000	-9,888	44.9%	44.9%	May-17
10441_7107	Grants-Phase VI	18,000	7,024	39.0%	39.0%	Jun-15
10442_7108	Loans - Phase VI	22,000	8,585	39.0%	39.0%	Jun-15
10443_7109	Repayments-Phase VI	-22,000	-2,272	10.3%	10.3%	Jun-20
10471_7293	Grants-Phase VII	18,000	1,174	6.5%	6.5%	Jun-18
10472_7294	Loans - Phase VII	22,000	1,435	6.5%	6.5%	Jun-18
10473_7295	Repayments-Phase VII	-22,000	0	Future	0.0%	Aug-10
10474_7296	Grants-Phase VIII	18,000	0	Future	0.0%	Aug-13
10475_7297	Loans - Phase VIII	22,000	0	Future	0.0%	Aug-13
10476_7298	Repayments-Phase VIII	-22,000	0	Future	0.0%	Aug-14
<b>130 Siphon Structure Rehabilit</b>	<b>\$2,685</b>	<b>\$940</b>	<b>35.0%</b>	<b>35.0%</b>		
10253_6017	Planning	938	938	Complete	100.0%	
10280_6165	Land Acquisition	2	2	Complete	100.0%	
10293_6224	Design/CS/RI	499	0	Future	0.0%	Jul-12
10294_6225	Construction	1,246	0	Future	0.0%	Oct-14
<b>131 Upper Neponset Valley Sewe</b>	<b>\$55,056</b>	<b>\$53,754</b>	<b>97.6%</b>	<b>97.6%</b>		
10256_6031	Design/CS/RI	4,648	4,585	Complete	98.6%	
10266_6075	Legal	131	44	33.6%	33.6%	Apr-08
10290_6191	Replace Sewer Sections 685-686	37,005	37,005	Complete	100.0%	
10311_6450	Land Acquisition	2,602	1,502	57.7%	57.7%	Apr-08
10352_6629	Replacement Sewer Section 687	7,664	7,664	Complete	100.0%	
10393_6830	Boston Paving	660	610	92.4%	92.4%	Apr-08
10439_7072	Resident Engineering/Inspection	2,347	2,345	Complete	99.9%	
<b>132 Corrosion &amp; Odor Control</b>	<b>\$16,782</b>	<b>\$3,003</b>	<b>17.9%</b>	<b>17.9%</b>		
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	622	622	Complete	100.0%	
10405_6918	FES Tunnel Rehab	6,800	0	Future	0.0%	Dec-15
10406_6919	FES/FERS Biofilters Design	1,041	0	Future	0.0%	Jul-12
10453_7196	FES Tunnel Rehab Des	1,700	0	Future	0.0%	Jul-15
10456_7215	FES/FERS Biofilters Const.	2,239	0	Future	0.0%	Apr-14
10491_7364	System-wide odor control study	1,000	0	Future	0.0%	Jul-18
10492_7365	NI System-wide odor control study	1,000	0	Future	0.0%	Jul-14

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>136 West Roxbury Tunnel</b>	<b>\$46,934</b>	<b>\$9,539</b>	<b>20.3%</b>	<b>20.3%</b>		
10299_6230	Inspection	344	344	Complete	100.0%	
10329_6566	Tunnel Easements-Permits	54	31	57.4%	57.4%	Dec-15
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	1,412	1,412	Complete	100.0%	
10366_6709	Technical Assistance	8	8	Complete	100.0%	
10400_6897	Tunnel Design	1,553	627	40.4%	40.4%	Dec-16
10401_6898	Tunnel Construction	36,447	0	Future	0.0%	Sep-12
<b>137 Wastewater Central Monitor</b>	<b>\$20,839</b>	<b>\$19,784</b>	<b>94.9%</b>	<b>94.9%</b>		
10301_6232	Planning	563	563	Complete	100.0%	
10319_6532	Design and Integration Services	6,502	6,346	97.6%	97.6%	
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%	
10398_6861	Equipment Prepurchase	65	65	Complete	100.0%	
10490_7363	Wastewater Redundant Communications	900	0	Future	0.0%	Nov-11
<b>141 Wastewater Process Optimiz</b>	<b>\$10,248</b>	<b>\$930</b>	<b>9.1%</b>	<b>9.1%</b>		
10367_6733	Planning	930	930	Complete	100.0%	
10412_6930	Hydr Flood Engr Analysis N. System	2,500	0	Future	0.0%	Sep-11
10413_6931	Somerville Sewer-Design	200	0	Future	0.0%	Oct-13
10414_6932	Somerville Sewer-Construction	968	0	Future	0.0%	Mar-16
10415_6933	Siphon- Planning	150	0	Future	0.0%	Nov-16
10416_6934	Manhole Struc Flood Protec Des	500	0	Future	0.0%	Jan-14
10417_6935	Manhole Struct Flood Protec Constr	5,000	0	Future	0.0%	Jul-16
<b>142 Wastewater Meter Sys-Equip</b>	<b>\$26,578</b>	<b>\$5,138</b>	<b>19.3%</b>	<b>19.3%</b>		
10371_6739	Planning/Study	100	0	Future	0.0%	Jan-12
10379_6793	Equipment Purchase/Installation	5,278	5,138	97.3%	97.3%	
10410_6928	Design	200	0	Future	0.0%	Jul-13
10411_6929	Construction	1,000	0	Future	0.0%	Jan-15
10451_7191	WW Metering Asset Prot/Equip Purch	20,000	0	Future	0.0%	Jul-12

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>145 Facility Asset Protection</b>	<b>\$213,329</b>	<b>\$7,509</b>	<b>3.5%</b>	<b>3.5%</b>		
10380_6795	Prison Point HVAC Upgrades	2,125	0	Future	0.0%	Dec-10
10381_6796	Remote Headworks Heating Sys Upgrade	1,175	1,175	Complete	100.0%	
10382_6797	Alewife Brook PS Rehab Constr	6,734	0	Future	0.0%	Jul-12
10383_6798	Rehab of Section 93A Lexington	1,566	1,566	Complete	100.0%	
10387_6802	Headworks Upgrade - CM Services	6,500	0	Future	0.0%	Jul-11
10392_6829	Technical Assistance	78	37	47.4%	47.4%	Nov-08
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	8	8	Complete	100.0%	
10399_6886	Remote Headworks Concept Plan	739	688	93.1%	93.1%	
10418_6936	Interceptor Renewal No. 2	6,045	0	Future	0.0%	Jul-16
10419_6937	Alewife Brook PS Rehab DES/CA	1,106	32	2.9%	2.9%	Nov-15
10420_6938	Des-Prison Pt HVAC Upgrades	452	243	53.8%	53.8%	Mar-13
10423_6987	93 A Force Main Replacement	462	462	Complete	100.0%	
10424_7004	Mill Brook Valley Sewer Sec 79&92	542	542	Complete	100.0%	
10427_7033	Hingham PS Isolation Gate Const	350	0	Future	0.0%	Sep-11
10431_7037	Caruso PS Replace Generator	582	0	Future	0.0%	Apr-12
10440_7073	Land/Easements	103	103	Complete	100.0%	
10444_7144	Nut Island Headworks Fire Alarm/Wire	285	285	Complete	100.0%	
10445_7161	Headdworks Upgrades Construction	125,526	0	Future	0.0%	Dec-12
10446_7162	PS/CSO Condition Assessment	3,000	0	Future	0.0%	Jan-12
10447_7163	Interceptor AP-Interc Renewal Des #1	200	0	Future	0.0%	Aug-11
10448_7164	Interceptor AP-Interc Renew #1 Const	3,800	0	Future	0.0%	Jan-14
10455_7206	Headworks Upgrades Design/CA	6,683	0	Future	0.0%	Jul-10
10457_7216	MAL & MEL HYD & Struc Study	300	0	Future	0.0%	Jan-13
10458_7217	MAL & MEL S/T HYD & Struc Const	1,000	0	Future	0.0%	Jan-14
10459_7218	NI Fire Pump Bldg Study	300	0	Future	0.0%	Nov-12
10460_7219	NI Mech & Elec Replacements	3,000	0	Future	0.0%	Jun-12
10463_7237	Headworks Effluent Shaft Study	500	0	Future	0.0%	Jul-13
10464_7248	Melrose Sewer	655	410	62.6%	62.6%	
10467_7279	Inter Ren # 3 Camb/Some Sect 26/27	5,000	0	Future	0.0%	Jul-18
10468_7280	Inter Ren # 4 Everett Sect 23/24/156	3,000	0	Future	0.0%	Jul-16
10469_7281	Cottage Farm Fuel System Upgr	300	0	Future	0.0%	Oct-11
10477_7312	NIH Elec & G & S Conveyance Des	1,025	0	Future	0.0%	Mar-11
10478_7313	NIH Elec & G & S Conveyance Con	6,000	0	Future	0.0%	Jul-12
10481_7328	Interceptor # 5 Milton	4,000	0	Future	0.0%	Jul-17
10482_7329	Interceptor Renewal # 6 Chelsea	11,000	0	Future	0.0%	Jul-18
10483_7330	New Neposet VFD Replacement	0	0	N/A	N/A	
10484_7344	Som/Marginal Gate Replacement	341	0	Future	0.0%	Jul-11
10485_7358	PP Dry Weather & Stripping Impro	750	0	Future	0.0%	Jan-13
10486_7359	PP/CF CSO Rehab Prel Des/Study	1,000	0	Future	0.0%	Jan-13
10487_7360	Sys Relief & Contingency Planning	500	0	Future	0.0%	Jul-13
10488_7361	Delauri PS Elect Room Cooling	250	0	Future	0.0%	Jul-12
10489_7362	Caruso PS HVAC & Fire Prot Upgr	1,000	0	Future	0.0%	Apr-12
10500_7375	PS Rehab Prel Des/Study	750	0	Future	0.0%	Jul-14
10501_7389	Prison Point Gearbox Rebuilds	440	0	Future	0.0%	Jun-11
<b>146 D.I. Cross Harbor Tunnel</b>	<b>5,000</b>	<b>0</b>	<b>Future</b>	<b>0.0%</b>		
10454_7199	Tunnel Shaft Repairs Plan/Des/Const	5,000	0	Future	0.0%	Jul-14
<b>147 Randolph Trunk Sewer Relief</b>	<b>750</b>	<b>0</b>	<b>Future</b>	<b>0.0%</b>		
10461_7220	Study	750	0	Future	0.0%	Jul-13

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End	
<b>206 DI Treatment Pl Asset Protection</b>	<b>575,907</b>	<b>87,440</b>	<b>15.2%</b>	<b>15.2%</b>			
18045_6196	DITP Roof Replacements	2,373	0	Future	0.0%	Jun-10	
19162_6241	DISC Application	250	125	50.0%	50.0%		Jun-14
19176_6422	Pump Packing Replacement	732	732	Complete	100.0%		
19177_6423	Demineralizer Construction	51	51	Complete	100.0%		
19182_6478	Equip Replacement Projection	25,000	0	Future	0.0%	Jul-18	
19188_6538	Ancil Mods-Con 4	10,037	0	Future	0.0%	Nov-14	
19193_6594	Equipment Condition Monitoring	1,777	1,777	Complete	100.0%		
19204_6668	Expansion Joint Repair-Design	149	149	Complete	100.0%		
19205_6669	Expansion Joint Repair- Constr 1	305	305	Complete	100.0%		
19217_6704	Expansion Joint Repair- Constr 2	2,000	0	Future	0.0%	Jun-11	
19218_6705	Expansion Joint Repair- Constr 3	502	0	Future	0.0%	May-14	
19220_6721	As Needed Des Phase 6-1	1,850	607	32.8%	32.8%		May-12
19221_6722	As-Needed Des Phase 6-2	1,850	297	16.1%	16.1%		May-12
19222_6723	Eastern Seawall Design - 1	488	0	Future	0.0%	Jan-13	
19223_6724	Eastern Seawall Construction - 1	2,093	0	Future	0.0%	May-14	
19227_6728	DIGAS Flare#4 Des	423	0	Future	0.0%	Jun-12	
19228_6729	DI Digesters Flare #4	662	0	Future	0.0%	Oct-13	
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	Hypochlorite tanks 1&3 Reline	1,691	1,691	Complete	100.0%		
19238_6765	CTG Modifications	482	482	Complete	100.0%		
19239_6767	Elec Equip Upgrade Constr 2	1,913	1,913	Complete	100.0%		
19241_6791	Document Format Conversion	145	62	42.8%	42.8%		Jun-14
19243_6811	Outfall Modification-Inspection	174	174	Complete	100.0%		
19244_6812	Secondary Clarifier Access	275	275	Complete	100.0%		
19245_6813	Transformer Replacement	2,538	877	34.6%	34.6%		Jun-15
19250_6849	Hypochlorite Tanks 2&4 Reline	2,242	2,242	Complete	100.0%		
19252_6851	Chemical pipe Replacement-Des	494	0	Future	0.0%	Sep-12	
19253_6852	Chemical pipe Replac - Constr	2,010	0	Future	0.0%	Jan-14	
19254_6853	Sodium Hypo Pipe Repl-Des	2,010	0	Future	0.0%	Jun-12	
19255_6854	Sodium Hypo Pipe Repl- Constr	7,034	0	Future	0.0%	Nov-13	
19256_6855	Elect Equip Upgrade Const 3	15,050	12,189	81.0%	81.0%		Aug-11
19258_6875	WTF VFD Replace Constr	3,730	0	Future	0.0%	Jan-13	
19259_6876	Heat Loop Pipe Repl Constr 1	615	615	Complete	100.0%		
19260_6877	Misc. VFD Replacements	2,625	932	35.5%	35.5%		Jan-13
19263_6880	Locat Scrub Replace Des	900	0	Future	0.0%	Nov-12	
19264_6881	Grit Air Handler Replacement	1,792	1,766	Complete	98.5%		
19265_6882	CEMS Equip. Replacement	102	102	Complete	100.0%		
19266_6883	Heat Loop Pipe Replac Constr 2	1,488	1,488	Complete	100.0%		
19267_6884	PICS Replacement Const	1,302	0	Future	0.0%	Jun-11	
19268_6899	Prim & Sec Clarifier Rehab Constr	59,554	35,765	60.1%	60.1%		Feb-12
19270_6901	Elect Equip Upgrade Const 4	3,500	0	Future	0.0%	Oct-11	
19271_6902	NMPS VFD Repl Des/ESDC	1,697	847	49.9%	49.9%		Jul-15
19272_6903	NMPS VFD Replace Constr	46,000	0	Future	0.0%	Jul-11	
19273_6904	Fire Alarm Syst Repl -Des	2,800	0	Future	0.0%	Jun-11	
19274_6963	Gravity Thickner Rehab Des	978	0	Future	0.0%	Feb-12	
19276_6965	Prim & Sec Clarifier Rehab Des	2,049	578	28.2%	28.2%		Feb-13
19277_6966	Gravity Thickener Imp Constr	7,871	300	3.8%	3.8%		Jul-15

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End	
19278_6967	STG System Modifications-Des	549	158	28.8%	28.8%		Apr-11
19279_6968	Electr Equip Upgrade 3-REI	1,207	648	53.7%	53.7%		Jun-11
19280_6969	Fuel Transfer Pipe Repl Des	1,150	0	Future	0.0%	Nov-18	
19281_6970	Fuel Transfer Pipe Repl Const	3,571	0	Future	0.0%	Jan-12	
19282_6971	NMPS Motor Ctrl Ctr Des	953	0	Future	0.0%	Jul-11	
19283_6972	NMPS Motor Ctrl Ctr Constr	7,086	0	Future	0.0%	Jul-11	
19284_6973	STG System Mods-Constr	2,383	806	33.8%	33.8%		Apr-11
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 Syst Repl Const	5,451	0	Future	0.0%	Feb-13	
19290_7052	Residuals Facility Rehab Design/ESDC	3,000	0	Future	0.0%	Jan-12	
19291_7053	Thick Prim Sldg Pump Repl Des	575	0	Future	0.0%	Sep-12	
19292_7054	TPS Pump Replac Construction	2,539	27	1.1%	1.1%		Apr-15
19293_7055	Digester Mod 1&2 Pipe Replc.	8,662	0	Future	0.0%	Feb-11	
19294_7056	LOCAT Scrubber Replac Const	4,936	0	Future	0.0%	Jun-12	
19295_7057	Centrifuge Backdrive Replac	2,651	26	1.0%	1.0%		Aug-13
19296_7058	DITP Switchgear Replac Design	1,153	0	Future	0.0%	Nov-12	
19297_7059	DITP Switchgear Repl Constr	4,044	0	Future	0.0%	Sep-11	
19298_7060	Power Consult Recs Design	2,097	2,097	Complete	100.0%		
19299_7061	Power System Improv Constr	9,713	1,711	17.6%	17.6%		Apr-13
19300_7062	NMPS VFD Repl-REI	2,000	0	Future	0.0%	Jul-11	
19301_7063	Heat Loop pipe Repl- Const 3	11,338	8,490	74.9%	74.9%		Mar-11
19303_7088	Ancils Mods Final Des 4	2,209	0	Future	0.0%	Oct-12	
19304_7089	Sodium Hypo Tk Lnr Removal	196	196	Complete	100.0%		
19305_7090	As-needed Des Phase 5-1	955	955	Complete	100.0%		
19306_7091	As-needed Des Phase 5-2	1,056	1,056	Complete	100.0%		
19307_7094	TPP Fuel & Steam Mods- REI	1,150	0	Future	0.0%	Jul-11	
19309_7111	HVAC equipment replacement Des/ESDC	3,500	0	Future	0.0%	Sep-11	
19310_7110	HVAC equipment replacement constr	17,101	0	Future	0.0%	Aug-13	
19311_7121	DI As needed Tech Design	26,450	0	Future	0.0%	May-11	
19313_7123	DI Digester Sludge Pump Repl Const	4,348	444	10.2%	10.2%		Feb-13
19314_7124	DI Elec Equip Upgrade Ph.5	23,162	0	Future	0.0%	Oct-12	
19316_7126	Future SSPS VFD Replacements Des	4,800	0	Future	0.0%	Jul-15	
19317_7127	Future SSPS VFD Replacements Constr	19,200	0	Future	0.0%	Nov-16	
19318_7128	Future NMPS VFD Replacements Des	4,420	0	Future	0.0%	Jun-21	
19319_7129	Future NMPS VFD Replacements Constr	17,680	0	Future	0.0%	Sep-22	
19320_7130	Future Misc. VFD Replacements Des	1,333	0	Future	0.0%	Jul-12	
19321_7131	Future Misc. VFD Replacements Constr	5,334	0	Future	0.0%	May-13	
19322_7132	DI Switchgear Replacement Design	4,500	0	Future	0.0%	Jul-15	
19323_7133	DI Switchgear Replacement Constr	16,000	0	Future	0.0%	Apr-18	
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-14	
19326_7136	DI CTG Rebuilds	6,000	0	Future	0.0%	Jun-13	
19327_7137	DI Centrifuge Replacements Des	4,160	0	Future	0.0%	Jul-13	
19328_7138	DI Centrifuge Replacements Constr	16,640	0	Future	0.0%	Oct-14	
19329_7139	DI Cryogenics Plant-Equip Repl Des	1,600	0	Future	0.0%	Jul-13	
19330_7140	DI Cryogenics Plant-Equip Repl Constr	6,400	0	Future	0.0%	Jan-12	
19332_7142	Future Sodium Hypo Tank Rehab	10,000	0	Future	0.0%	Jul-17	
19334_7168	Barge Berth and Fac. Replacement	2,265	0	Future	0.0%	Oct-11	
19335_7169	South Systm PS Lube System Repl	2,900	0	Future	0.0%	Jul-18	
19336_7170	E/W Odor Ctrl Air Handler Repl	2,000	0	Future	0.0%	Jun-25	
19338_7172	DI PICS Dist. Proc. Units Replac	8,000	0	Future	0.0%	Feb-21	
19339_7275	Butterfly Valve Replace NMPS & WTF	2,500	0	Future	0.0%	Jan-12	
19345_7373	DITP Residuals Facility Rehab	20,000	0	Future	0.0%	Dec-13	
19346_7374	Clarifier Rehab Phase 2	28,500	0	Future	0.0%	Sep-11	

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>210 Clinton Wastewater Treat Plant</b>	<b>7,298</b>	<b>586</b>	<b>8.0%</b>	<b>8.0%</b>		
19302_7075	Clinton Soda Ash Replacement	267	267	Complete	100.0%	
19308_7095	Clinton Perm Standby Generator	230	230	Complete	100.0%	
19340_7276	Clinton Plant-Wide Concrete Repair	750	75	10.0%	10.0%	Feb-15
19341_7277	Clinton Digester Cleaning & Rehabs	1,500	0	Future	0.0%	May-10
19342_7278	Clinton Aeration Efficiency Improvement	750	13	1.7%	1.7%	Aug-12
19343_7371	Clinton WWTP Influent Gates	300	0	Future	0.0%	Jan-12
19344_7372	Clinton WWTP-Auxillary Pumps	0	0	N/A	N/A	
19950_7377	Phosphorous Removal	3,500	0	Future	0.0%	Jan-13
<b>211 Laboratory Services</b>	<b>2,315</b>	<b>1,088</b>	<b>47.0%</b>	<b>47.0%</b>		
19152_6197	Metals Lab Fume Hood Repl Const	955	0	Future	0.0%	Mar-11
19249_6848	Metals Lab Fume Hood Repl	391	119	30.4%	30.4%	Feb-12
19251_6850	Metals Lab Modification Constr	969	969	Complete	100.0%	
<b>261 Residuals</b>	<b>63,811</b>	<b>63,811</b>	<b>Complete</b>	<b>100.0%</b>		
25941_5667	Design/RI/CS-Pelletizing 1	9,098	9,098	Complete	100.0%	
25948_5669	Fast-Track Equip. Prepurchase	301	301	Complete	100.0%	
25961_5643	Res. Research	419	419	Complete	100.0%	
25968_5831	Royalty Payment	575	575	Complete	100.0%	
26055_6009	Fast-Track Equip. Installation	1,450	1,450	Complete	100.0%	
26056_6010	Phase 2 Outside Construction	12,981	12,981	Complete	100.0%	
26057_6011	Phase 3 Equip. Prepurchase	4,746	4,746	Complete	100.0%	
26058_6012	Phase 3 Inside Construction	29,778	29,778	Complete	100.0%	
26065_6612	Fire Related Costs	1,694	1,694	Complete	100.0%	
26066_6615	Legal Services for Sludge Processing	2,768	2,768	Complete	100.0%	
<b>271 Residuals Asset Protection</b>	<b>147,930</b>	<b>360</b>	<b>0.2%</b>	<b>0.2%</b>		
26069_7143	Residual Facil Plan/EIR	870	0	Future	0.0%	Oct-12
26070_7145	Residuals Facil Upgrade Design	4,000	0	Future	0.0%	Jan-13
26071_7146	Residuals Facil Upgrade Constr	10,000	0	Future	0.0%	Jul-14
26072_7147	Cond Asses/Tech & Reg Review	1,060	360	34.0%	34.0%	Apr-12
26074_7149	Six Rotary Dryer Replacements Constr	57,000	0	Future	0.0%	Jul-13
26076_7151	Six Air Scrubber Replacements Constr	8,000	0	Future	0.0%	Jul-15
26078_7153	Plant MCC Replacements Const	4,500	0	Future	0.0%	Jul-16
26082_7176	Rehab Rail System Const.	3,000	0	Future	0.0%	Jul-16
26084_7178	Replace 9 Pellet Storage Silos Const.	6,000	0	Future	0.0%	Jul-15
26086_7180	Sludge Conveyor Replacement Const.	3,000	0	Future	0.0%	Jul-14
26088_7182	Sludge Storage Tank Rehab	3,000	0	Future	0.0%	Jul-15
26090_7184	Upgrade Pumping System Const.	6,000	0	Future	0.0%	Jul-14
26092_7186	Replace 12 Centrifuges Const.	34,000	0	Future	0.0%	Jul-15
26094_7188	Utility Upgrades Const.	6,000	0	Future	0.0%	Jul-16
26096_7190	Odor Control System Upgrade Const.	1,500	0	Future	0.0%	Jul-17

Subphase/Project		Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>324 CSO Support</b>		<b>51,128</b>	<b>48,786</b>	<b>95.4%</b>	<b>95.4%</b>		
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	Tech. Assistance-Geotech	61	61	Complete	100.0%		
32409_5795	Modeling	300	300	Complete	100.0%		
32411_5767	SOP Program	1,957	1,957	Complete	100.0%		
32645_6036	Watershed Planning	877	877	Complete	100.0%		
32648_6150	Technical Review	794	529	66.6%	66.6%		Dec-20
32658_6169	Land/Easement	13,904	12,275	88.3%	88.3%		Jun-14
32691_6372	System Assessment	476	27	5.7%	5.7%		Dec-20
<b>339 North Dorchester Bay</b>		<b>224,252</b>	<b>198,404</b>	<b>88.5%</b>	<b>88.5%</b>		
10426_7032	N.Dor Outfall Design/CA/RI	1,010	0	Future	0.0%	Mar-11	
32660_6220	Design ESDC/Tunnel	23,518	22,874	97.3%	97.3%		Aug-12
32661_6244	Tunnel Construction (Ch30)	147,722	147,036	Complete	99.5%		
32662_6245	Dewater/PS & Sewers	26,471	12,720	48.1%	48.1%		Apr-11
32726_6993	Tunnel & Facilities CM Services	9,031	5,987	66.3%	66.3%		Apr-12
32732_7012	Pleasure Bay Construction	3,195	3,195	Complete	100.0%		
32733_7013	Design ESDC/Facilities	4,888	4,008	82.0%	82.0%		May-12
32744_7103	Tunnel Rescue/Emergency Response	822	861	Complete	104.7%		
32745_7259	Ventilation Building Construction	5,295	1,723	32.5%	32.5%		May-11
32746_7345	Communication Systems	216	0	Future	0.0%	Jul-10	
32747_4094	N Dor Outfall Dredging Const	2,083	0	Future	0.0%	Sep-12	
<b>340 Dorch Bay Sewer Sep (Fox)</b>		<b>54,171</b>	<b>53,763</b>	<b>Complete</b>	<b>99.2%</b>		
32651_6155	Design	11,417	11,154	97.7%	97.7%		Aug-09
32664_6247	Construction	42,755	42,609	Complete	99.7%		
<b>341 Dorch Bay Sew Separ (Comm)</b>		<b>64,725</b>	<b>59,061</b>	<b>91.2%</b>	<b>91.2%</b>		
32650_6154	Design	17,738	14,908	84.0%	84.0%		Jun-14
32665_6248	Construction	46,987	44,153	94.0%	94.0%		Jun-14
<b>342 Neponset River Sewer Separ</b>		<b>2,444</b>	<b>2,444</b>	<b>Complete</b>	<b>100.0%</b>		
32652_6156	Design/CS/RI	470	470	Complete	100.0%		
32653_6160	Construction	1,975	1,975	Complete	100.0%		
<b>343 Constitution Beach Sewer S</b>		<b>3,769</b>	<b>3,769</b>	<b>Complete</b>	<b>100.0%</b>		
32649_6153	Design/CS/RI	673	673	Complete	100.0%		
32666_6249	Construction	3,096	3,096	Complete	100.0%		
<b>344 Stony Brook Sewer Separati</b>		<b>44,333</b>	<b>44,197</b>	<b>Complete</b>	<b>99.7%</b>		
32667_6395	Design/CS/RI	10,137	10,135	Complete	100.0%		
32668_6251	Construction	34,195	34,061	Complete	99.6%		
<b>346 Cambridge Sewer Separation</b>		<b>55,702</b>	<b>24,863</b>	<b>44.6%</b>	<b>44.6%</b>		
32654_6161	Design/CS/RI	22,311	11,193	50.2%	50.2%		Jun-16
32672_6255	Construction	33,391	13,670	40.9%	40.9%		Dec-15
<b>347 East Boston Branch Sewer R</b>		<b>85,715</b>	<b>83,221</b>	<b>97.1%</b>	<b>97.1%</b>		
32673_6256	Design	3,463	3,463	Complete	100.0%		
32674_6257	East Boston Branch Relief Sewer	62,095	61,110	98.4%	98.4%		Jul-10
32719_6840	East Boston Branch Sewer Rehab	5,222	5,222	Complete	100.0%		
32720_6841	Sections 38 & 207 Replacement	8,876	8,070	90.9%	90.9%		Jul-10
32742_7087	Design 2 CS	2,869	2,817	98.2%	98.2%		Jul-11
32743_7097	Resident Inspection Services	3,189	2,538	79.6%	79.6%		Jul-10
<b>355 MWR003 Gate &amp; Siphon</b>		<b>3,682</b>	<b>0</b>	<b>Future</b>	<b>0.0%</b>		
32722_6952	Design	1,227	0	Future	0.0%	Apr-12	
32723_6953	Construction	2,455	0	Future	0.0%	Sep-14	

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	<u>Status</u> Based on % of Budget Expended	<u>% Complete</u>	Planned Start	Planned End
<b>356 Fort Point Channel Sewer S</b>	<b>12,047</b>	<b>10,270</b>	<b>85.2%</b>	<b>85.2%</b>		
32724_6991 Design	2,435	1,987	81.6%	81.6%		Jun-11
32725_6992 Construction	9,612	8,284	86.2%	86.2%		Dec-10
<b>357 Charles River CSO Controls</b>	<b>3,633</b>	<b>3,466</b>	<b>95.4%</b>	<b>95.4%</b>		
32729_7009 CF Brookline Conn Inflow Controls Des	1,205	1,204	Complete	99.9%		
32730_7010 Interceptor Optimization Eng/Des	663	662	Complete	99.8%		
32740_7080 CF Brookline Conn Controls Constr	1,766	1,600	90.6%	90.6%		Oct-11
<b>358 Morrissey Boulevard Drain</b>	<b>32,899</b>	<b>35,585</b>	<b>Complete</b>	<b>108.2%</b>		
32713_6696 Construction	28,320	31,595	Complete	111.6%		
32735_7015 Design	4,578	3,990	87.2%	87.2%		Jun-13
<b>359 Reserved Channel Sewer Sep</b>	<b>62,323</b>	<b>9,653</b>	<b>15.5%</b>	<b>15.5%</b>		
32727_6994 Construction	48,125	3,929	8.2%	8.2%		Dec-15
32734_7014 Design	14,198	5,724	40.3%	40.3%		Jun-16
<b>360 Brookline Sewer Separation</b>	<b>25,930</b>	<b>4,100</b>	<b>15.8%</b>	<b>15.8%</b>		
32736_7076 Design CS/RI	3,859	2,535	65.7%	65.7%		Jun-13
32737_7077 Construction	22,071	1,564	7.1%	7.1%		Nov-12
<b>361 Bulfinch Triangle Sewer Se</b>	<b>9,986</b>	<b>8,961</b>	<b>89.7%</b>	<b>89.7%</b>		
32738_7078 Design CS/RI	1,365	1,008	73.8%	73.8%		Jun-11
32739_7079 Construction	8,621	7,953	92.3%	92.3%		Jul-10



Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>542 Carroll Water Treatment Plant</b>	<b>426,797</b>	<b>376,700</b>	<b>88.3%</b>	<b>88.3%</b>		
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	Design/CS/RI - Wachusett WTP	46,606	46,606	Complete	100.0%	
53304_5157	Permit Fees	79	52	65.8%	65.8%	Mar-14
53367_6118	Crypto. Inactivation Study	150	150	Complete	100.0%	
53371_6134	Design Management Support	1,730	1,730	Complete	100.0%	
53375_6182	AWWARF Study	650	650	Complete	100.0%	
53376_6206	Emerg Dis Res Water Mgmt Study	1,454	1,454	Complete	100.0%	
53377_6207	WHCP1 Wachusett Cosgrove Intakes	15,489	15,489	Complete	100.0%	
53378_6208	Construction Management/RI	31,438	31,438	Complete	100.0%	
53390_6365	Cosgrove Disinfection Ph II	2,169	2,169	Complete	100.0%	
53391_6397	Cosgrove Disinfection Ph I	150	150	Complete	100.0%	
53392_6401	Distribution Water Consultant	3	3	Complete	100.0%	
53393_6406	Immediate Disinf. MECO	10	10	Complete	100.0%	
53406_6479	Cosgrove Disinf.-Fac. Underwater Imps.	217	217	Complete	100.0%	
53410_6485	Community Chlorine Analyzers	49	49	Complete	100.0%	
53412_5522	WHCP2 Interim Rehab. Wach. Aque.	23,400	23,400	Complete	100.0%	
53413_6488	WHCP3 Sitework & Storage Tanks	67,368	67,368	Complete	100.0%	
53414_6489	WHCP4 Treatment Facility	145,871	145,871	Complete	100.0%	
53416_6491	WHCP6 Late Sitework	4,128	4,128	Complete	100.0%	
53418_6494	OCIP	5,107	5,107	Complete	100.0%	
53419_6495	Professional Services	2,752	2,752	Complete	100.0%	
53420_6497	Marlboro MOA	5,859	5,859	Complete	100.0%	
53421_6520	WHWTP- MECO	128	128	Complete	100.0%	
53425_6613	Site Security Services	1,264	1,264	Complete	100.0%	
53426_6650	WHCP7 Existing Facilities Mods	5,000	0	Future	0.0%	Jul-12
53427_6670	CSX Crossing	65	65	Complete	100.0%	
53428_6671	Wachusett Algae Design CS/RI	450	0	Future	0.0%	Jul-13
53432_6691	Public Health Research	1,703	1,703	Complete	100.0%	
53435_6756	Security Equipment	571	571	Complete	100.0%	
53437_6773	WHCP8 Cosgrove Screens Con	3,238	3,238	Complete	100.0%	
53443_6815	AWWARF-Evaluation Ozone & UV	302	302	Complete	100.0%	
53445_6827	Fitout/Construction	1,500	548	36.5%	36.5%	Jun-14
53448_6889	Wachusett Algae ...	1,800	0	Future	0.0%	Feb-14
53450_6923	WH Ultra Violet Dis Des ESDC/RI	4,394	916	20.8%	20.8%	Apr-15
53451_6924	WH Ultra Violet Disinfect Cons	29,413	0	Future	0.0%	May-11
53452_6939	As needed Tech Assistance #1	491	491	Complete	100.0%	
53453_6951	Des WH CP7 Existing Fac Mods	1,843	580	31.5%	31.5%	Dec-14
53455_6989	As needed Tech Assistance ...	702	702	Complete	100.0%	
53456_7084	Ancillary Mods Constr 1	160	160	Complete	100.0%	
53457_7085	Ancillary Mods Const 2	6,421	2,055	32.0%	32.0%	Dec-14
53458_7192	Ancil Mods Design 3	325	182	56.0%	56.0%	Sep-10
53459_7208	Ancillary Mods Design 4	527	449	85.2%	85.2%	Sep-10
53464_7315	Technical Assistance 5	563	0	Future	0.0%	Sep-10
53465_7316	Technical Assistance 6	563	0	Future	0.0%	Sep-10
53470_7376	CWTP Storage Tank Roof Drainage Sys	2,000	0	Future	0.0%	Jan-15

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>543 Quabbin Water Treatment Pl</b>	<b>17,686</b>	<b>10,297</b>	<b>58.2%</b>	<b>58.2%</b>		
53363_6043	Quabbin WTP Des/CA/RI	3,794	3,794	Complete	100.0%	
53380_6210	Permit Fees	10	7	70.0%	70.0%	Jan-12
53381_6211	Utilities	13	13	Complete	100.0%	
53382_6212	Construction	5,071	5,071	Complete	100.0%	
53433_6706	Ware Fire Dept. MOA	25	25	Complete	100.0%	
53434_6711	W Q Analysis Equipment	49	49	Complete	100.0%	
53439_6775	Quabbin UVWTP: Des/CA/RI	1,791	196	10.9%	10.9%	Oct-14
53440_6776	Quabbin UVWTP: Construction	5,792	0	Future	0.0%	May-12
53442_6804	Quabbin UVWTP: Study/Pilot	1,142	1,142	Complete	100.0%	
<b>545 Blue Hills Covered Storage</b>	<b>40,695</b>	<b>39,841</b>	<b>97.9%</b>	<b>97.9%</b>		
53385_6215	Tech Support/Permit Comp	104	26	25.0%	25.0%	Dec-15
53386_6216	Design Build	37,694	37,445	Complete	99.3%	
53460_7213	Roadway Resurfacing Design	56	0	Future	0.0%	Jul-12
53461_7214	Roadway Resurfacing Const	284	0	Future	0.0%	Apr-13
68025_6139	EIR/Preliminary Design/OR	2,557	2,370	92.7%	92.7%	
<b>550 Spot Pond Storage Facility</b>	<b>71,696</b>	<b>5,373</b>	<b>7.5%</b>	<b>7.5%</b>		
53400_6455	Env Rev	233	233	Complete	100.0%	
53402_6457	Design/Build	61,683	0	Future	0.0%	Sep-11
53447_6868	Easement/Land Acquisition	5,930	5,099	86.0%	86.0%	
53462_7233	Owners's Representative	2,892	41	1.4%	1.4%	Jul-15
53463_7314	Early Constr Water Connection	958	0	Future	0.0%	Jun-11
<b>597 Winsor Dam Hydroelectric</b>	<b>26,082</b>	<b>933</b>	<b>3.6%</b>	<b>3.6%</b>		
60032_6276	Preliminary Permit Study & Licensing	38	38	Complete	100.0%	
60077_7017	Quabbin Rel Pipeline Des ESDC/RI	683	0	Future	0.0%	Oct-11
60087_7114	Qubb Aqued & WPS Upg DES/CA/RI	2,320	110	4.7%	4.7%	Jun-15
60088_7115	Winsor PWR STN Rehab & Improve	20,350	0	Future	0.0%	Oct-12
60101_7212	Winsor Power St. Chapman Valve Repair	416	416	Complete	100.0%	
60105_7234	Purchase of Sleeve Valves	368	368	Complete	100.0%	
60106_7235	Quabbin Release Pipeline Const	1,906	0	Future	0.0%	Dec-12

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>604 MetroWest Tunnel</b>	<b>710,719</b>	<b>647,170</b>	<b>91.1%</b>	<b>91.1%</b>		
59794_5043	Study	415	415	Complete	100.0%	
59795_5044	Design/EIR - Tunnel/ESDC	37,939	37,939	Complete	100.0%	
59796_5048	Construction-Sudbury Pipe Bridge	296	296	Complete	100.0%	
59798_6054	West Tunnel Segment - CP1	147,787	147,787	Complete	100.0%	
59799_5284	Const. Mgmt/Resident Inspect	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	54	51	94.4%	94.4%	Sep-14
60013_6055	Midd.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	5,872	5,872	Complete	100.0%	
60017_6063	Local Sup Cont Des/CA/RI	859	859	Complete	100.0%	
60018_6067	Community Technical Assistance	297	297	Complete	100.0%	
60020_6117	Prof. 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	Loc. Support Cont. Constr	4,308	4,298	Complete	99.8%	
60025_6131	Loc. Sup Cont. Legal/Easement	9	9	Complete	100.0%	
60026_6140	Hultman Repair Band	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	CP6B Upper Hultman Rehab	8,785	0	Future	0.0%	Dec-11
60038_6366	Southboro MOA	255	255	Complete	100.0%	
60039_6367	Weston MOA	1,006	1,006	Complete	100.0%	
60040_6374	East Tunnel Segment-CP3A	55,976	55,976	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/Fin Des/CA Insp	6,388	3,930	61.5%	61.5%	Sep-14
60072_6950	Valve Chamber Mod Design CA/RI	1,056	0	Future	0.0%	Jan-13
60073_6975	CP6A Lower Hultman Rehab	51,189	12,018	23.5%	23.5%	Mar-14
60083_7082	Hultman Interconnect RI/Svcs	2,500	310	12.4%	12.4%	Sep-14
60085_7105	CP6 Easements	175	22	12.6%	12.6%	Apr-14
60086_7106	CP6A Demolition	57	57	Complete	100.0%	
60109_7283	Valve Chamber Storage Tank Access Imp	3,000	0	Future	0.0%	Jul-13
60128_7367	Shaft 5 Electrical Upgrade	1,000	0	Future	0.0%	Jan-19
60129_7368	Shaft 5A/5 Surface Piping Insp/Restorati	1,500	0	Future	0.0%	Jan-14
75525_7755	Valve Chamber Mod Constr	4,225	0	Future	0.0%	Jul-14

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>616 Quabbin Transmission System</b>	<b>13,547</b>	<b>4,513</b>	<b>33.3%</b>	<b>33.3%</b>		
60055_6828	Facilities Inspection	1,007	1,007	Complete	100.0%	
60075_7007	Equipment Pre-purchase	534	534	Complete	100.0%	
60103_7229	Oakdale Phase 1A Elec Des	800	89	11.1%	11.1%	Jan-14
60104_7230	Oakdale Phase 1A Elec Constr	2,224	0	Future	0.0%	Nov-11
60108_7282	Ware River Intake Valve Replacement	1,200	0	Future	0.0%	Jul-14
60112_7332	CVA Intake Motorized Screen Replace	500	0	Future	0.0%	Jul-17
60113_7333	Wachusett Lower Gatehouse Rehab	2,200	0	Future	0.0%	Jul-14
60135_7378	Rehabilitate Oakdale Turbine	1,000	0	Future	0.0%	May-20
60136_7379	Geo-Thermal Heat Wach Gatehouse	200	0	Future	0.0%	May-19
60137_7380	Rehab Wach Gatehouse Chamber 4 Piping	1,000	0	Future	0.0%	Jan-19
75491_6690	Phase 1 Oakdale Valves Const.	1,811	1,811	Complete	100.0%	
75496_6831	Ph 1 Oakdale Valves Study/Des	1,070	1,070	Complete	100.0%	
<b>617 Sudbury/Weston Aqued. Repair</b>	<b>4,288</b>	<b>651</b>	<b>15.2%</b>	<b>15.2%</b>		
60056_6838	Sudbury Aqueduct Inspection	370	370	Complete	100.0%	
60057_6839	Technical Assistance	25	16	64.0%	64.0%	Dec-11
60070_6947	Weston Aqueduct Inspection	150	0	Future	0.0%	Jul-13
60076_7016	Sudbury Short-Term Repairs	380	0	Future	0.0%	Jul-12
60110_7317	Sudbury Short-Term Repairs-PH 2	2,098	0	Future	0.0%	Jul-13
60130_7369	Ash Street Sluice Gates	1,000	0	Future	0.0%	Jan-15
75486_6617	Haz Material Sudbury Aqueduct	265	265	Complete	100.0%	
<b>618 North High NW Tran Sec 70</b>	<b>1,000</b>	<b>0</b>	<b>Future</b>	<b>0.0%</b>		
60063_6895	Planning	1,000	0	Future	0.0%	Jul-13
<b>620 Wachusett Res Spillway Improvement</b>	<b>9,498</b>	<b>9,305</b>	<b>98.0%</b>	<b>98.0%</b>		
60078_7018	Equipment Pre-purchase	546	546	Complete	100.0%	
60079_7019	Design	2,456	2,456	Complete	100.0%	
60080_7020	Construction	4,960	4,960	Complete	100.0%	
60097_7207	Technical Assistance	115	115	Complete	100.0%	
60098_7209	Cosgrove and Shaft A PCB Removal	875	875	Complete	100.0%	
60099_7210	Wachusett Dam PCB Removal	345	345	Complete	100.0%	
60102_7221	PH2 PCB Material Remediation	202	9	4.5%	4.5%	Jul-10
<b>621 Watershed Land</b>	<b>19,000</b>	<b>13,419</b>	<b>70.6%</b>	<b>70.6%</b>		
60081_7069	Land Acquisition	19,000	13,419	70.6%	70.6%	Jun-12
<b>623 Dam Projects</b>	<b>8,181</b>	<b>354</b>	<b>4.3%</b>	<b>4.3%</b>		
60094_7194	Dam Safety Modif & Repairs-Constr	4,696	0	Future	0.0%	Oct-11
60100_7211	Dam Safety Modif & Rep-Des & CA/RI	1,535	354	23.1%	23.1%	Jun-14
60119_7347	Oakdale Dam Design/ESDC/RI	200	0	Future	0.0%	Jan-13
60120_7348	Oakdale Dam Removal Const	750	0	Future	0.0%	Jul-14
60131_7370	Goodnough Dike Drainage Impr	1,000	0	Future	0.0%	Jul-13
<b>625 Long Term Redundancy</b>	<b>338,053</b>	<b>730</b>	<b>0.2%</b>	<b>0.2%</b>		
60035_6273	Water Transmission Redun Plan	1,919	730	38.0%	38.0%	Sep-11
60090_7156	Cosgrove Tunnel Redund PS Des/ESDC/RI	8,284	0	Future	0.0%	Oct-11
60091_7157	Cosgrove Tunnel Redund PS Constr	41,420	0	Future	0.0%	Apr-13
60092_7159	Sudbury Aqued Des/CA/RI	46,203	0	Future	0.0%	Jan-14
60093_7160	Sudbury Aqued SliplineConstr	85,473	0	Future	0.0%	Jan-19
60107_7291	MWWST/ Sudbury Aq. Connection Const	141,166	0	Future	0.0%	Jan-18
60122_7352	Sudbury Aqued Prel Des/EIR	5,077	0	Future	0.0%	Oct-11
60123_7353	Chestnut Hill Final Connect Constr	3,515	0	Future	0.0%	Jan-17
60126_7356	Tops of Shafts Rehab Des/CA/RI	999	0	Future	0.0%	Jul-17
60127_7357	Tops of Shafts Rehab Constr	3,996	0	Future	0.0%	Jul-19

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	<u>Status</u> Based on % of Budget Expended	<u>% Complete</u>	Planned Start	Planned End
<b>677 Valve Replacement</b>	<b>20,032</b>	<b>9,144</b>	<b>45.6%</b>	<b>45.6%</b>		
67559_5126	Construction 1	718	718	Complete	100.0%	
67560_5124	Technical Assistance	113	113	Complete	100.0%	
68005_6088	Equip. 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	2,385	0	Future	0.0%	Apr-11
68239_6859	Permits	1	1	Complete	100.0%	
68240_6860	Easements	6	6	Complete	100.0%	
68300_7195	Construction 8	2,788	0	Future	0.0%	Jan-14
68307_7236	Construction 9	2,788	0	Future	0.0%	Dec-15
<b>692 NHS - Section 27 Improvement</b>	<b>3,308</b>	<b>124</b>	<b>3.7%</b>	<b>3.7%</b>		
67769_6333	Construction Sect 27	3,183	27	0.8%	0.8%	Nov-18
68192_6589	Easements	23	0	Future	0.0%	Apr-15
68211_6712	Technical Assistance	64	60	93.8%	93.8%	Mar-17
68229_6809	Surveying	37	37	Complete	100.0%	
<b>693 NHS - Revere &amp; Malden Pipe</b>	<b>33,612</b>	<b>26,833</b>	<b>79.8%</b>	<b>79.8%</b>		
67780_5185	Design/CS/RI-Revere/Malden	1,786	1,786	Complete	100.0%	
67781_5186	Constr-Revere Beach	6,314	6,314	Complete	100.0%	
67782_5176	Constr-Malden Sect 53	10,026	10,026	Complete	100.0%	
67784_5177	Const-Revere Sect 53	2,938	2,938	Complete	100.0%	
67785_5191	Constr-Control Valves	949	949	Complete	100.0%	
67786_5179	Const.-DI Pipeline C&L	158	158	Complete	100.0%	
67787_5178	Constr-Win C&L	575	575	Complete	100.0%	
67790_6335	Constr 68 & 53A	5,544	0	Future	0.0%	Jun-16
67791_5986	Technical Assistance	246	246	Complete	100.0%	
67792_5238	Construction - Linden Square	1,849	1,849	Complete	100.0%	
67793_5239	Construction Admin.-Linden Squar	125	125	Complete	100.0%	
67996_6033	Des/CA/RI-Rd Restoration	77	77	Complete	100.0%	
67997_6034	Construction Road Restoration	1,714	1,714	Complete	100.0%	
68020_6113	Landscaping Malden Section 53	20	20	Complete	100.0%	
68033_6183	Sidewalk Restoration	54	54	Complete	100.0%	
68258_6958	Shaft 9A-D Ext Construction	1,200	0	Future	0.0%	Mar-18
68265_6978	Survey	30	0	Future	0.0%	
68280_7049	Permits	5	0	Future	0.0%	

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>702 New Connect Mains-Shaft 7</b>	<b>31,632</b>	<b>7,153</b>	<b>22.6%</b>	<b>22.6%</b>		
67846_5163	Routing Study	397	397	Complete	100.0%	
68035_6199	Watertown MOU	167	167	Complete	100.0%	
68110_6383	Design/CA/RI DP1	3,537	3,533	Complete	99.9%	
68111_6384	Des/CA/RI DP2/4 Meter 120	1,278	1,278	Complete	100.0%	
68112_6385	Final Design/CA/RI (CP3)	1,457	0	Future	0.0%	Oct-14
68114_6387	Easements CP1 A&B	17	17	Complete	100.0%	
68115_6388	Easements CP3	40	0	Future	0.0%	Jan-16
68117_6390	Easements CP5	29	22	75.9%	75.9%	Jan-11
68119_6392	South Segment (CP3)	6,680	0	Future	0.0%	Oct-16
68121_6394	Northeast Segment (CP5)	5,305	1,739	32.8%	32.8%	Nov-11
68174_6548	Constr CP2 C&L Sec 59&60	4,489	0	Future	0.0%	Jan-18
68175_6547	Easements CP2	33	0	Future	0.0%	May-17
68255_6955	Repl of Sect 25-Design CA/RI	484	0	Future	0.0%	Apr-16
68256_6956	Repl of Sect 25-Construction	2,421	0	Future	0.0%	Apr-18
68286_7086	Design CA/RI Sec 59&60	898	0	Future	0.0%	Jan-16
68315_7284	Section 75 Extension	4,400	0	Future	0.0%	Oct-15
<b>704 Rehab of Other Pump Stations</b>	<b>55,144</b>	<b>29,962</b>	<b>54.3%</b>	<b>54.3%</b>		
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	21,925	Complete	100.4%	
68179_6557	Legal	6	6	Complete	100.0%	
68204_6676	Proprietary Equipment Purchases	158	158	Complete	100.0%	
68266_6980	Design 2 CS/RI	4,596	4,337	94.4%	94.4%	Jun-11
75522_7383	Pump Station Rehabilitation	25,000	0	Future	0.0%	Jul-19
<b>708 Nor Ext High Serv New Pipe</b>	<b>6,690</b>	<b>3,632</b>	<b>54.3%</b>	<b>54.3%</b>		
67970_5242	Design/CA/RI	588	588	Complete	100.0%	
67972_6340	Construction	3,032	3,032	Complete	100.0%	
68162_6522	Construction-Sections 34,45	2,997	0	Future	0.0%	May-15
68176_6554	Public Participation	5	0	Future	0.0%	Jul-99
68177_6555	Legal	5	0	Future	0.0%	Jul-99
68210_6707	Technical Assistance	54	8	14.8%	14.8%	Nov-15
68215_6749	PLC Equipment Purchases	4	4	Complete	100.0%	
68281_7050	Permits	5	0	Future	0.0%	Nov-10
<b>712 Cathodic Protection of Distribution Mains</b>	<b>1,458</b>	<b>141</b>	<b>9.7%</b>	<b>9.7%</b>		
68002_6058	Planning Phase I	108	108	Complete	100.0%	
68129_6438	Test Station Installation 2	439	0	Future	0.0%	Jun-19
68130_6439	Test Station Installation 3	439	0	Future	0.0%	Jun-20
68131_6440	Test Station Installation 4	439	0	Future	0.0%	Jun-21
68216_6751	Technical Assistance	33	33	Complete	100.0%	

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>713 Spot Pond Supply Mains Rehab</b>	<b>66,127</b>	<b>60,995</b>	<b>92.2%</b>	<b>92.2%</b>		
60114_7334	Section 4 Webster Ave Bridge Design	500	0	Future	0.0%	Jan-12
60115_7335	Section 4 Webster Bridge Pipe Rep Con	1,500	0	Future	0.0%	Jan-13
60116_7336	Section 50 Pipe Rehab Design /ESDC/RI	500	0	Future	0.0%	Jul-12
60117_7337	Section 50 Pipe Rehab Const	1,500	0	Future	0.0%	Jul-13
68038_6223	Prelim 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 Equip. Purchase	161	161	Complete	100.0%	
68209_6697	Construction 4-Trusses	1,147	0	Future	0.0%	Apr-17
68274_7003	CA/RI CP3	925	940	Complete	101.6%	
<b>719 Chestnut Hill Connecting Mains</b>	<b>29,361</b>	<b>17,462</b>	<b>59.5%</b>	<b>59.5%</b>		
68026_6141	Des/CA/RI PS Potable Connection	1,360	1,360	Complete	100.0%	
68051_6301	Preliminary Engineering	457	432	94.5%	94.5%	
68052_6302	Des & Const Shft 7 Bldg	5,111	0	Future	0.0%	Jul-21
68053_6303	Easements	81	81	Complete	100.0%	
68155_6501	Const - Emer. Pump Relocation	6,502	6,502	Complete	100.0%	
68157_6503	Design/CA/RI - Emer. Pump Relocation	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	Const.- Pump Station Potable Connection	7,132	7,132	Complete	100.0%	
68230_6814	Equipment pre-purchase	154	154	Complete	100.0%	
68231_6820	Demolition of Garages	72	72	Complete	100.0%	
68244_6869	Utilities	44	44	Complete	100.0%	
68267_6982	CHEPS Emerg Generation Const	4,210	0	Future	0.0%	Jul-14
68268_6995	CHEPS Emerg Gen Final Design CA/RI	1,053	0	Future	0.0%	Jul-12
75521_7382	CH Underground PS Electrical Rehab	1,500	0	Future	0.0%	Jul-12

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>721 South Spine Distribution Mains</b>	<b>70,668</b>	<b>24,985</b>	<b>35.4%</b>	<b>35.4%</b>		
68083_6290	Sec 21,43,22 Design	7,776	5,697	73.3%	73.3%	May-13
68084_6291	Sec 21,43,22 Easements	134	78	58.2%	58.2%	May-12
68085_6292	Section 22 South Construction	4,993	4,993	Complete	100.0%	
68089_6296	Sec 20 & 58 Design	2,603	0	Future	0.0%	Jun-18
68090_6297	Sec 20 & 58 Easements	35	0	Future	0.0%	Sep-16
68091_6298	Sec 20 & 58 Construction	12,248	0	Future	0.0%	Sep-20
68122_6396	Adams Street Bridge	154	154	Complete	100.0%	
68193_6601	Southern High Public Part	15	15	Complete	100.0%	
68194_6602	Southern High Ext Study	242	242	Complete	100.0%	
68228_6787	Boston Paving	200	3	1.5%	1.5%	May-17
68235_6844	Section 22 North Construction	14,947	0	Future	0.0%	Jan-19
68236_6845	Section 107 Ph 1 Constr	6,184	6,212	Complete	100.5%	
68237_6846	Legal	5	1	20.0%	20.0%	Jun-10
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 Ph2 Construction	14,610	4,567	31.3%	31.3%	May-12
68291_7104	Milton Pressure Reg Valve	135	135	Complete	100.0%	
68298_7120	Section 22 North Design/ESDC	2,500	0	Future	0.0%	Jul-16
68299_7155	Southern Spine Sect 22 N Fac Plan/EIR	1,000	0	Future	0.0%	Jul-13
<b>722 NIH Redundancy &amp; Storage</b>	<b>79,070</b>	<b>1,260</b>	<b>1.6%</b>	<b>1.6%</b>		
53454_6954	Concept Plan	827	769	93.0%	93.0%	Aug-10
68093_6306	Easements	300	0	Future	0.0%	Jul-12
68252_6906	Section 89/29 Redundancy Design	4,644	0	Future	0.0%	Mar-11
68276_7026	Purchase Mobile Pump Unit	291	252	86.6%	86.6%	Jan-10
68277_7045	Design CA/RI NIH Short Term Improveme	825	239	29.0%	29.0%	Sep-13
68278_7047	Permits	5	0	Future	0.0%	Jan-10
68279_7048	Technical Assistance	18	0	Future	0.0%	Jan-10
68282_7066	Sec 89 & 29 Redundancy Const Ph 1	19,359	0	Future	0.0%	Jan-13
68283_7067	Sec 89 & 29 Redundancy Const Ph 2	19,701	0	Future	0.0%	Apr-13
68284_7068	NIH Storage Construction	15,715	0	Future	0.0%	Jan-19
68294_7116	Section 89/29 Rehab Design	1,327	0	Future	0.0%	Jul-14
68295_7117	Section 89/29 Rehab Construction	6,634	0	Future	0.0%	Jul-16
68309_7260	Gillis Pump Station Improvements	3,582	0	Future	0.0%	Oct-11
68310_7261	Reading/Stoneham Interconnections	2,653	0	Future	0.0%	Sep-11
68316_7311	NIH Storage Design	3,189	0	Future	0.0%	Jan-17
<b>723 Northern Low Service Rehab Sec 8</b>	<b>20,233</b>	<b>2,262</b>	<b>11.2%</b>	<b>11.2%</b>		
68094_6321	Survey	80	0	Future	0.0%	Jul-11
68095_6322	Sec 8 Construction	12,181	0	Future	0.0%	Jul-18
68262_6962	Rehab Sects 37,46 Chel/EB Con	3,200	0	Future	0.0%	Jul-15
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	1,933	97.0%	97.0%	
68287_7092	Design CA/RI Sec 8	2,436	0	Future	0.0%	Jul-15



Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>727 SEH Redundancy &amp; Storage</b>	<b>97,179</b>	<b>6,663</b>	<b>6.9%</b>	<b>6.9%</b>		
53397_6452	Concept Plan/Prelim Des/Env Rev	840	525	62.5%	62.5%	Feb-12
53398_6453	SEH Red./Storage Final Des/CA/RI Ph 1	5,501	0	Future	0.0%	Jul-13
53399_6454	SEH Red. Pipe/Storage Ph 1	27,504	0	Future	0.0%	Jul-16
68135_6444	SEH Red. Pipe Final Des/CA/RI Ph 2	4,219	0	Future	0.0%	Jul-16
68136_6445	University Ave Water Main	6,137	6,137	Complete	100.0%	
68292_7112	Design Sect 77/88 Rehab	1,179	0	Future	0.0%	Jul-23
68293_7113	Section 77/88 Rehab	4,714	0	Future	0.0%	Jul-25
68302_7223	Des CA/RI Short Term Impr	200	0	Future	0.0%	Jul-12
68303_7224	Construction Short Term Impr	750	0	Future	0.0%	Jul-14
68305_7226	Easements	300	0	Future	0.0%	
68306_7227	Permits	5	0	Future	0.0%	
68308_7245	SEH Red. Pipe Construction Ph 2	21,094	0	Future	0.0%	Jul-18
68311_7262	Constr Ph 4 2nd Tank	9,011	0	Future	0.0%	Jul-23
68312_7263	Design Ph 4 2nd Tank	1,802	0	Future	0.0%	Jul-21
68313_7264	Constr Ph 3 PS	11,139	0	Future	0.0%	Jul-21
68314_7265	Design Ph 3 Pump Station	2,785	0	Future	0.0%	Jun-19
<b>730 Weston Aqueduct Supply Mains</b>	<b>265,772</b>	<b>63,120</b>	<b>23.7%</b>	<b>23.7%</b>		
59774_5034	Construction Newton Water Mains	669	669	Complete	100.0%	
59776_5975	Technical Assistance	186	186	Complete	100.0%	
67865_5147	Design/CA/RI - W4	6,013	6,013	Complete	100.0%	
68027_6142	Design/CA/RI-PhA/W1&2	5,066	5,075	Complete	100.2%	
68030_6174	Appraisal/Easement	753	293	38.9%	38.9%	Oct-18
68031_6175	Auburndale WASM 1,2&4	4,001	4,001	Complete	100.0%	
68032_6176	Construction Meter 103	61	61	Complete	100.0%	
68041_6280	Newton WASM 1&2	9,219	9,219	Complete	100.0%	
68042_6281	Boston WASM 1&2	7,039	7,039	Complete	100.0%	
68069_6312	Newton WASM 2&4	8,282	8,282	Complete	100.0%	
68070_6313	Allston WASM 4 & W. Ave. Sewer	17,331	17,331	Complete	100.0%	
68166_6539	MEPA/Design/CA/RI WASM 3	29,951	0	Future	0.0%	Jan-12
68167_6540	Des /CA/RI Sect 36/WS/Waltham Conn.	2,988	0	Future	0.0%	Jan-11
68170_6543	Waltham WASM 3-CP2	59,459	0	Future	0.0%	Jan-15
68171_6544	Belmont WASM 3 - CP3	73,479	0	Future	0.0%	Apr-18
68172_6545	Arlington WASM 3 - CP4	15,096	0	Future	0.0%	Jul-19
68173_6546	Section 28, Arlington-CP1	2,309	1,542	66.8%	66.8%	Feb-11
68245_6870	Survey	210	89	42.4%	42.4%	Oct-18
68269_6996	Arlington Pipe Work	401	253	63.1%	63.1%	
68272_7000	Section PCCP W-12 ...	2,114	2,114	Complete	100.0%	
68273_7001	WASM3 SPL12 PCCP Des	266	266	Complete	100.0%	
68285_7083	Design/CA/RI Section 28	867	688	79.4%	79.4%	Apr-11
68301_7222	Sect 36/WS/Waltham Conn. Constr.	20,012	0	Future	0.0%	Jan-13
<b>731 Lynnfield Pipeline</b>	<b>5,042</b>	<b>583</b>	<b>11.6%</b>	<b>11.6%</b>		
68187_6584	Construction (Phase 2)	3,811	0	Future	0.0%	Jan-11
68196_6619	Easem/Legal/License/Permits	200	3	1.5%	1.5%	Jul-11
68251_6905	Design CA/RI	759	307	40.4%	40.4%	Jul-13
68289_7096	Temporary Interconnect Constr(Ph 1)	272	272	Complete	100.0%	
<b>735 Section 80 Rehabilitation</b>	<b>8,485</b>	<b>0</b>	<b>Future</b>	<b>0.0%</b>		
68249_6891	Section 80 Construction	6,788	0	Future	0.0%	Jan-19
68250_6892	Section 80 Design CS/RI	1,697	0	Future	0.0%	Jan-17

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>753 Central Monitoring System</b>	<b>16,992</b>	<b>15,705</b>	<b>92.4%</b>	<b>92.4%</b>		
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	1,814	86.3%	86.3%		Dec-11
75304_5160 Communications Structures	161	161	Complete	100.0%		
75305_5173 CS/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%		
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 Study & Design Monitoring & Control	1,808	1,808	Complete	100.0%		
75494_6816 Microwave Comm for Waterworks Facil	1,957	1,957	Complete	100.0%		
75495_6825 Ludlow Communications	41	41	Complete	100.0%		
75512_7338 Winsor Dam High Line Replacement	1,000	0	Future	0.0%	Nov-11	
<b>763 Distribut Systems Facility Map</b>	<b>1,799</b>	<b>1,036</b>	<b>57.6%</b>	<b>57.6%</b>		
75458_5162 Planning Design	936	936	Complete	100.0%		
75476_6152 Data Purchase	100	100	Complete	100.0%		
75484_6525 Records Development	763	0	Future	0.0%	Jul-12	
<b>765 Local Water Pipeline Imp.</b>	<b>0</b>	<b>105,810</b>				
75485_6608 Community Loans	251,797	185,250	73.6%	73.6%		Jun-13
75493_6759 Community Repayment	-251,797	-79,440	31.5%	31.5%		Jun-23
75513_7339 Local Water System Loans	200,000	0	Future	0.0%	Aug-10	
75514_7340 Local Water System Repayment	-200,000	0	Future	0.0%	Aug-11	
75515_7350 CVA Loans	10,000	0	Future	0.0%	Nov-10	
75516_7351 CVA Repayments	-10,000	0	Future	0.0%	Nov-11	
<b>766 Waterworks Facility Asset</b>	<b>16,884</b>	<b>221</b>	<b>1.3%</b>	<b>1.3%</b>		
75490_6689 Meter Vault Manhole Retrofits	1,752	0	Future	0.0%	Sep-15	
75497_6832 Design-Walnut Hill Tank	300	0	Future	0.0%	Jul-12	
75498_6833 Construction-Walnut Hill Tank	1,000	0	Future	0.0%	Jan-14	
75501_6910 Waltham Pipe/Bridge Repl	238	221	92.9%	92.9%		
75502_6920 Permits/Legal Fees	15	0	Future	0.0%		
75506_7023 Design Cosgrove Turbine Isolation	480	0	Future	0.0%	Jul-13	
75509_7064 Cosgrove Valve Seat Repl	500	0	Future	0.0%	Jul-13	
75510_7065 Des Cosgrove Valve Seat Repl	100	0	Future	0.0%	Jul-12	
75511_7228 Transformer at Cosgrove Intake Bldg	500	0	Future	0.0%	Jun-11	
75520_7381 Shaft 9 Rehab	2,000	0	Future	0.0%	Jul-13	
75523_7384 Elev Water Stor Tank Repainting	5,000	0	Future	0.0%	Jul-13	
75524_7385 Covered Storage Tank Rehab	5,000	0	Future	0.0%	Jul-19	
<b>881 Equipment Purchase</b>	<b>15,655</b>	<b>8,000</b>	<b>51.1%</b>	<b>51.1%</b>		
92374_6760 Security Equip & Installation	6,835	5,164	75.6%	75.6%		Jun-13
92379_6808 ICP-MS Lab Testing Equip	117	117	Complete	100.0%		
92411_7239 High Lift Fork Loader(Lull)	121	0	Future	0.0%	Oct-10	
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 FY09-13 Vehicle Purchases	1,842	0	Future	0.0%	Jul-09	
98456_7308 FY14-18 Vehicle Purchases	2,900	0	Future	0.0%	Jul-13	
98457_7309 FY09-13 Major Lab Instrumentation	1,000	0	Future	0.0%	Jan-12	
98467_7325 Front-End Loader	121	0	Future	0.0%	Oct-10	

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	Status Based on % of Budget Expended	% Complete	Planned Start	Planned End
<b>925 Technical Assistance</b>	<b>1,200</b>	<b>0</b>	<b>Future</b>	<b>0.0%</b>		
77000_LAND Land Appraisal	150	0	Future	0.0%		
80000_SURV Surveying	150	0	Future	0.0%		
90000_HAZM Hazardous Material	900	0	Future	0.0%		
<b>931 Business Systems Plan</b>	<b>38,800</b>	<b>23,910</b>	<b>61.6%</b>	<b>61.6%</b>		
92322_6015 Network-Phase I	142	142	Complete	100.0%		
92338_6014 Phase I (FY95-97)	1,146	1,146	Complete	100.0%		
92339_6013 Hardware-Phase I	441	441	Complete	100.0%		
92343_6177 Phase II FY97-99	4,174	4,084	97.8%	97.8%		
92347_6362 Phase III (FY99-01)	10,748	10,748	Complete	100.0%		
92352_6508 Phase IV / Year 2000 Imp.	3,038	3,038	Complete	100.0%		
92353_6509 Phase V	1,942	1,875	96.5%	96.5%		Jun-12
92380_6865 Phase VI	2,608	2,071	79.4%	79.4%		Jun-13
92404_7200 Computer Center - OCC Infrastructure	1,500	0	Future	0.0%	Jul-14	
92405_7201 Net 2020	1,500	0	Future	0.0%	Mar-11	
92406_7203 SAN II	600	0	Future	0.0%	Jul-11	
92407_7204 SAN III	600	0	Future	0.0%	Jul-14	
92408_7205 Telecommunications	750	0	Future	0.0%	Jul-13	
92410_7238 Laboratory Instrument Data Mgmt	250	0	Future	0.0%	Oct-11	
92412_7240 Corporate Server Infra & Doc Dist	1,000	0	Future	0.0%	Jun-12	
92418_7249 DITP/OMS	142	0	Future	0.0%		
92419_7250 GIS/TV Inspection	45	21	46.7%	46.7%		
92420_7251 GIS Upgrades & Enhancements	300	0	Future	0.0%		
92422_7253 MIS Strategic Plan	500	0	Future	0.0%	Jan-12	
92423_7254 MIS Licensing	24	0	Future	0.0%		
92424_7255 Lawson Conversion	430	185	43.0%	43.0%		Jun-11
92425_7256 Cyber Security	330	5	1.5%	1.5%		Jun-14
92426_7257 Original SAN	290	154	53.1%	53.1%		Jun-12
92434_7285 Cyber Security	1,200	0	Future	0.0%	Sep-11	
92435_7286 Lawson System Upgrade	1,550	0	Future	0.0%	Sep-13	
92436_7287 Laboratory Infor Mgmt Sys (LIMS)	600	0	Future	0.0%	Sep-14	
92437_7288 PRE-Treatment Infor Mgmt Sys (PIMS)	600	0	Future	0.0%	Sep-14	
92438_7289 Doc Control Sys Software App Replace	250	0	Future	0.0%	Jul-12	
92469_7386 NET 2020 DITP/Southboro	2,100	0	Future	0.0%	Jul-11	
<b>932 Environmental Remediation</b>	<b>1,556</b>	<b>1,500</b>	<b>96.4%</b>	<b>96.4%</b>		
92369_6745 Tech Asst./ Env. Remediation	544	545	Complete	100.2%		
92370_6746 Prision Point Tank Removal - Const.	530	472	89.1%	89.1%		Jan-13
92371_6747 Cottage Farm Tank Replace - Const	428	428	Complete	100.0%		
92376_6805 Oakdale Power Station	47	47	Complete	100.0%		
92377_6806 Cosgrove Power Station	8	8	Complete	100.0%		
<b>933 Capital Maintenance Planni</b>	<b>11,549</b>	<b>5,631</b>	<b>48.8%</b>	<b>48.8%</b>		
19175_6421 Inventory & Evaluation-1&2	2,579	2,579	Complete	100.0%		
92387_6976 As-needed Design Contract 1	314	314	Complete	100.0%		
92393_6988 As Needed Design Contract 2	318	318	Complete	100.0%		
92399_7070 As-Needed Des Contract 5	676	614	90.8%	90.8%		Mar-11
92402_7101 As-Needed Des Contract 3	579	581	Complete	100.3%		
92403_7102 As-Needed Des Contract 4	344	344	Complete	100.0%		
92413_7242 As-Needed Des Contract 6	761	707	92.9%	92.9%		Aug-10
92414_7243 As-Needed Des Contract 7	1,444	169	11.7%	11.7%		Jan-12
92415_7244 As-Needed Des Contract 8	1,334	5	0.4%	0.4%		Feb-12

Subphase/Project	Total Contract Amount	Projected Pmts. Thr. FY10	<u>Status</u> Based on % of Budget Expended	<u>% Complete</u>	Planned Start	Planned End
<b>934 MWRA Facilities Management</b>	<b>2,151</b>	<b>371</b>	<b>17.2%</b>	<b>17.2%</b>		
92389_6983 Design/Engineering Services	150	0	Future	0.0%	Sep-11	
92390_6984 Facilities Construction	2,001	371	18.5%	18.5%		Jan-13
<b>935 Alternative Energy Initiat</b>	<b>26,377</b>	<b>8,011</b>	<b>30.4%</b>	<b>30.4%</b>		
19285_6974 Deer Island Solar	904	904	Complete	100.0%		
92428_6974C DI Wind	4,014	3,999	Complete	99.6%		
92430_7270 NI Wind	4,191	0	Future	0.0%	Sep-13	
92432_6974E Loring Road Hydro Design	2	2	Complete	100.0%		
92439_7274 Technical Assistance Solar	385	67	17.4%	17.4%		May-12
92440_6974B Energy Adv Cons Svcs	59	46	78.0%	78.0%		
92441_OP67 Wind Power Feas Study	658	338	51.4%	51.4%		Jun-10
92442_7292 DI Photovoltaic System Phase 1 - Constr	1,119	1,119	Complete	100.0%		
92443_7274A Tech Assist Energy Efficiency	500	0	Future	0.0%	May-09	
92444_7274B Technical Assistance Solar II	380	33	8.7%	8.7%		May-12
92445_7274C Tech Asst Emerging Technology	200	0	Future	0.0%		
92446_7274D Technical Assistance Wind	750	162	21.6%	21.6%		May-12
98448_7300 Wachusett Hydro Design & Const	1,314	0	Future	0.0%	Jul-12	
98450_7302 Charlestown Wind Project-Const	5,121	651	12.7%	12.7%		Aug-11
98452_7304 JJ Carroll WTP Solar - Construction	2,423	100	4.1%	4.1%		Aug-11
98459_6974F Loring Road Hydro Const	1,857	591	31.8%	31.8%		May-11
98463_7321 DI Wind Phase II - Const	2,500	0	Future	0.0%	Nov-11	

# APPENDIX 7

## Municipality and Project Reference by Municipality

**APPENDIX 7**  
**PROJECT/MUNICIPALITY(s)**

<b>Project</b>	<b>Number/ Project</b>	<b>Community(s) Served</b>
104	Braintree-Weymouth Relief Facilities	Braintree, Hingham, Holbrook, Randolph, Weymouth, Quincy
128	Infiltration/Inflow Local Financial Assistance Program	All Wastewater Communities
130	Siphon Structure Rehabilitation	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, Needham,
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	Morrissey 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, 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)**

<b>Project</b>	<b>Number/ Project</b>	<b>Community(s) Served</b>
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

# APPENDIX 8

## Municipality and Project Reference by Project



**APPENDIX 8**  
**MUNICIPALITY/PROJECT(s)**

<b>Municipality</b> <b>Project Number/Project</b>	<b>Municipality</b> <b>Project Number/Project</b>
<b>All MWRA COMMUNITIES</b>	<b>Ashland</b>
211 Laboratory Services	136 West Roxbury Tunnel
881 Equipment Purchase	
925 Technical Assistance	<b>Bedford</b>
931 Business Systems Plan	702 New Connecting Mains - Shaft 7 to WASM 3
932 Environmental Remediation	704 Rehabilitation of Other Pump Stations
933 Capital Maintenance Planning/Development	708 Northern Extra High Service - New Pipelines
934 MWRA Facilities Management	
935 Alternative Energy Initiatives	<b>Belmont</b>
	702 New Connecting Mains - Shaft 7 to WASM 3
	704 Rehabilitation of Other Pump Stations
	730 Weston Aqueduct Supply Mains
<b>ALL WASTEWATER COMMUNITIES</b>	<b>Boston</b>
128 Infiltration/Inflow Local Financial Assistance Program	131 Upper Neponset Valley Sewer System
130 Siphon Structure Rehabilitation	136 West Roxbury Tunnel
132 Corrosion & Odor Control Study	139 South System Relief Project
137 Wastewater Central Monitoring	324 CSO Support
141 Wastewater Process Optimization	339 North Dorchester Bay & Reserve Channel Conduits/CSO
142 Wastewater Metering System Equipment Replacement	340 South Dorchester Bay Sewer Separation (Fox Point)
145 Interception & Pumping Facilities Asset Protection	341 South Dorchester Bay Sewer Separation (Commercial Pt.)
146 D.I. Cross Harbor Tunnel	347 East Boston Branch Sewer Relief
147 Randolph Trunk Sewer Relief	355 MWR003 Gate and Siphon
206 Deer Island Treatment Plant Asset Protection	356 Fort Point Channel Sewer Separation
271 Residuals Asset Protection	357 Charles River CSO Controls
	358 Morrissey Boulevard Drain
	359 Reserved Channel Sewer Separation
	361 Bulfinch Triangle Sewer Separation
	545 Blue Hills 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
<b>ALL WATER COMMUNITIES</b>	
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	
<b>ALL WATER COMMUNITIES (except South Hadley, Chicopee, Wbraham, Worcester, Clinton, and Leominster)</b>	<b>Braintree</b>
542 Walnut Hill Treatment Plant	104 Braintree-Weymouth Relief Facilities
544 Norumbega Covered Storage	147 Randolph Trunk Sewer Relief
604 MetroWest Tunnel	
<b>Arlington</b>	
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	

**APPENDIX 8**  
**MUNICIPALITY/PROJECT(S)**

<b>Municipality</b> <b>Project Number/Project</b>	<b>Municipality</b> <b>Project Number/Project</b>
<b>Brookline</b>	<b>Chicopee</b>
131 Upper Neponset Valley Sewer System	543 Quabbin Water Treatment Plant
136 West Roxbury Tunnel	615 Chicopee Valley Aqueduct Redundancy
357 Charles River CSO Controls	616 Quabbin Transmission System
360 Brookline Sewer Separation	
704 Rehabilitation of Other Pump Stations	<b>Clinton</b>
719 Chestnut Hill Connecting Mains	210 Clinton Wastewater Treatment Plant
721 Southern Spine Distribution Mains	
727 SEH Redundancy & Storage	<b>Dedham</b>
	131 Upper Neponset Valley Sewer System
<b>Burlington</b>	136 West Roxbury Tunnel
127 Cummingsville Replacement Sewer	727 SEH Redundancy & Storage
	<b>Dover</b>
<b>Cambridge</b>	136 West Roxbury Tunnel
324 CSO Support	
346 Cambridge CAM002-004 Sewer Separation	<b>Everett</b>
355 MWR003 Gate and Siphon	347 East Boston Branch Sewer Relief
357 Charles River CSO Controls	713 Spot Pond Supply Mains Rehabilitation
713 Spot Pond Supply Mains Rehabilitation	723 Northern Low Service Rehab. - Sections 8 & 57
730 Weston Aqueduct Supply Mains	
	<b>Framingham</b>
<b>Canton</b>	136 West Roxbury Tunnel
545 Blue Hills Covered Storage	617 Sudbury/Weston Aqueduct
704 Rehabilitation of Other Pump Stations	
714 Southern Extra High - Sections 41, 42, and 74	<b>Hingham</b>
721 Southern Spine Distribution Mains	104 Braintree-Weymouth Relief Facilities
727 SEH Redundancy & Storage	
	<b>Holbrook</b>
<b>Chelsea</b>	104 Braintree-Weymouth Relief Facilities
324 CSO Support	617 Sudbury/Weston Aqueduct
347 East Boston Branch Sewer Relief	
713 Spot Pond Supply Mains Rehabilitation	<b>Lexington</b>
723 Northern Low Service Rehab. - Sections 8 & 57	702 New Connecting Mains - Shaft 7 to WASM 3
	704 Rehabilitation of Other Pump Stations
<b>Lynn</b>	708 Northern Extra High Service - New Pipelines
618 Northern High NW Trans Section 70-71	
692 Northern High Service Section 27 Improvements	<b>Nahant</b>
693 Northern High Service Pipe Improvements - Revere/Malden	618 Northern High NW Trans Section 70-71
	692 Northern High Service Section 27
<b>Lynnfield</b>	693 Northern High Service Pipe Improvements - Revere/Malden
618 Northern High NW Trans Section 70-71	
731 Lynnfield Pipeline	<b>Natick</b>
	136 West Roxbury Tunnel
<b>Malden</b>	617 Sudbury/Weston Aqueduct Repairs
693 Northern High Service Pipe Improvements - Revere/Malden	
713 Spot Pond Supply Mains Rehabilitation	<b>Needham</b>
	136 West Roxbury Tunnel
	735 Section 80 Rehabilitation

**APPENDIX 8**  
**MUNICIPALITY/PROJECT(S)**

<b>Municipality</b>	<b>Municipality</b>
<b>Project Number/Project</b>	<b>Project Number/Project</b>
<b>Marblehead</b>	<b>Newton</b>
618 Northern High NW Trans Section 70-71	131 Upper Neponset Valley Relief Sewer
692 Northern High Service Section 27	136 West Roxbury Tunnel
693 Northern High Service Pipe Improvements - Revere/Malden	702 New Connecting Mains - Shaft 7 to WASM 3
<b>Medford</b>	719 Chestnut Hill Connecting Mains
547 Fells Covered Storage	730 Weston Aqueduct Supply Mains
702 New Connecting Mains - Shaft 7 to WASM 3	<b>Norwood</b>
713 Spot Pond Supply Mains Rehabilitation	545 Blue Hills Covered Storage
<b>Melrose</b>	704 Rehabilitation of Other Pump Stations
618 Northern High NW Trans Section 70-71	714 Southern Extra High - Sections 41 and 42
<b>Milton</b>	721 Southern Spine Distribution Mains
545 Blue Hills Covered Storage	727 SEH Redundancy & Storage
704 Rehabilitation of Other Pump Stations	<b>Peabody</b>
714 Southern Extra High - Sections 41, 42, and 74	618 Northern High NW Trans Section 70-71
721 Southern Spine Distribution Mains	693 Northern High Service Pipe Improvements - Revere/Malden
727 SEH Redundancy & Storage	721 Southern Spine Distribution Mains
<b>Quincy</b>	722 NIH Redundancy & Storage
104 Braintree-Weymouth Relief Facilities	<b>Wilbraham</b>
545 Blue Hills Covered Storage	543 Quabbin Water Treatment Plant
721 Southern Spine Distribution Mains	616 Quabbin Transmission System
<b>Randolph</b>	<b>Wakefield</b>
104 Braintree-Weymouth Relief Facilities	618 Northern High NW Trans Section 70-71
147 Randolph Trunk Sewer Relief	722 NIH Redundancy & Covered Storage
<b>Reading</b>	<b>Waltham</b>
722 NIH Redundancy & Covered Storage	702 New Connecting Mains - Shaft 7 to WASM 3
<b>Revere</b>	704 Rehabilitation of Other Pump Stations
349 Chelsea Trunk Sewer	708 Northern Extra High Service - New Pipelines
693 Northern High Service Pipe Improvements - Revere/Malden	730 Weston Aqueduct Supply Mains
<b>Saugus</b>	<b>Watertown</b>
618 Northern High NW Trans Section 70-71	702 New Connecting Mains - Shaft 7 to WASM 3
693 Northern High Service Pipe Improvements - Revere/Malden	704 Rehabilitation of Other Pump Stations
731 Lynnfield Pipeline	730 Weston Aqueduct Supply Mains
	<b>Wellesley</b>
	136 West Roxbury Tunnel
	617 Sudbury/Weston Aqueduct Repairs
	735 Section 80 Rehabilitation

**APPENDIX 8**  
**MUNICIPALITY/PROJECT(s)**

<b>Municipality</b> <b>Project Number/Project</b>	<b>Municipality</b> <b>Project Number/Project</b>
<b>Somerville</b>	<b>West Roxbury</b>
702 New Connecting Mains - Shaft 7 to WASM 3	131 Upper Neponset Valley Relief Sewer
713 Spot Pond Supply Mains Rehabilitation	<b>Weston</b>
730 Weston Aqueduct Supply Mains	617 Sudbury/Weston Aqueduct Repairs
<b>South Hadley</b>	730 Weston Aqueduct Supply Mains
543 Quabbin Water Treatment Plant	<b>Westwood</b>
616 Quabbin Transmission System	721 Southern Spine Distribution Mains
<b>Stoneham</b>	727 SEH Redundancy & Storage
618 Northern High NW Trans Section 70-71	<b>Weymouth</b>
722 NIH Redundancy & Covered Storage	104 Braintree-Weymouth Relief Facilities
<b>Stoughton</b>	<b>Winchester</b>
714 Southern Extra High - Sections 41, 42, and 74	702 New Connecting Mains - Shaft 7 to WASM 3
721 Southern Spine Distribution Mains	704 Rehabilitation of Other Pump Stations
727 SEH Redundancy & Storage	722 NIH Redundancy & Covered Storage
<b>Sudbury</b>	<b>Winthrop</b>
617 Sudbury/Weston Aqueduct Repairs	693 Northern High Service Pipe Improvements - Revere/Malden
<b>Swampscott</b>	<b>Woburn</b>
618 Northern High NW Trans Section 70-71	722 NIH Redundancy & Covered Storage
692 Northern High Service Section 27	

# APPENDIX 9

## MWRA Completed Projects

## Appendix 9

### MWRA Completed Projects (as of June 30, 2011)

Project	Total Cost (\$000)	Completion Date	Summary
<b>Wastewater</b>	\$4,297,578		
<b>Waterworks</b>	\$397,138		
<b>Business and Operations Support</b>	\$41,171		
<b>MWRA Total</b>	\$4,735,887		

<b>Wastewater System Improvements</b>			
Boston Harbor Project	\$3,513,290	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	\$25,908	Sep-03	Constructed 3 new pumpstation 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.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 Extention 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 pumpstation.
S.108 Alewife Brk Pkwy Pump St Rehab	\$1,465	May-95	Replacement of equipment, construction of building addition and wetwell modifications.
S.110 East Boston Pump Facilities	\$48,234	Jan-93	Constructed to eliminate sewage back-ups.
S.113 Millbrook Valley Intermediate Relief	-\$1	Mar-90	Evaluation of current siphon condition and development of a system for improved waste disposal.
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.

**Appendix 9**

S.117 Slade's Siphon	\$0	Sep-88	Elimination of seawater inflows and sewage overflows.
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.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.

### Appendix 9

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	\$33,456	Sep-08	Capital investment to optimize the operation of the Deer Island Treatment Plant. Remaining initiatives rolled into DI Plant Asset Protection.
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.342 Neponset River Sewer Separation	\$2,444	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.
<b>S.344 Stony Brook Sewer Separation</b>	<b>\$44,333</b>	<b>Sep-06</b>	<b>Minimize CSO discharges to the Stony Brook conduit and the Backbay Fens.</b>
<b>S.348 BOS019 Storage Conduit</b>	<b>\$14,288</b>	<b>Mar-07</b>	<b>To reduce CSO activations and annual volume to the Little Mystic Channel.</b>
S.349 Chelsea Trunk Sewer	\$29,779	Jun-02	To control CSO discharges at outfalls CHE002, CHE003, CHE004, and CHE008.



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<b>S.350 Union Park Detention Treatment Facility</b>	<b>\$49,583</b>	<b>Jun-07</b>	<b>To reduce the frequency and impacts of CSO discharges from outfall BOS070.</b>
S.351 BWSC Floatables Controls	\$933	Mar-02	Limit the discharge of floatable materials from 5 BWSC combined sewer 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.
<b>S.352 Cambridge Floatables Controls</b>	<b>\$1,087</b>	<b>Dec-08</b>	<b>Limit the discharge of floatable materials from Cambridge CSO outfalls.</b>
S.354 Hydraulic Relief Projects	\$2,295	Aug-00	Elimination of hydraulic restrictions between local and MWRA Systems.
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.
<b>Sub-Total Wastewater System</b>	<b>\$4,297,578</b>		

## Appendix 9

<b>Waterworks System Improvements</b>			
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.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.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.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.

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S.615 Chicopee Valley Aqed. Redundancy	\$8,667	Apr-08	To provide redundancy for water service for the three communities supplied by the Chicopee Valley Aqeduct (CVA) in case of a CVA failure or shutdown.
<b>S.620 Wachusett Res Spillway Improvement</b>	<b>\$9,498</b>	<b>Jul-10</b>	<b>Provide the necessary improvements to the Wachusett Reservoir Dam.</b>
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 Hieght distribution system.

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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	\$19,365	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	\$33,419	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 NHS - Con. 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.

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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 Rehab	\$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.732 Walnut St. & Fisher Hill Pipeline Rehab.	\$2,717	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 Rehab 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 Infrastr Rehab Ast Progr	\$7,488	Jun-04	To provide financial support to MWRA waterworks communities to replace, rehabilitate, and maintain their waterworks system infrastructures.
<b>Sub-Total Water System Improvements</b>	<b>\$397,138</b>		

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<b>Business &amp; Operations Support</b>			
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	\$9,851	Mar-08	To improve MWRA operations by consolidating facilities.
<b>Sub-Total Business &amp; Operations Support</b>	<b>\$41,171</b>		

# 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