

# Massachusetts Water Resources Authority



## Combined Sewer Overflow Control Plan



## Annual Progress Report 2009

March 2010

On the cover:

1. Installation of secant piles to construct Jacking Shaft JS1A, Central Square, East Boston.
2. Construction of Receiving Shaft RS6A, Condor St., East Boston.
3. 66-inch diameter microtunnel boring machine (“MTBM”) at staging area, Chelsea St., East Boston.
4. Launch of 66-inch diameter MTBM in Jacking Shaft JS9A, Chelsea St., East Boston.
5. Construction of manhole on newly installed sewer in Jacking Shaft JS3A, Border St., East Boston.

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## 1. INTRODUCTION

The Massachusetts Water Resources Authority (MWRA) files this Combined Sewer Overflow Annual Report for 2009 in compliance with the Federal District Court Order in the Boston Harbor Case (U.S. v. M.D.C, et al., No. 85-0489-RGS) (the “Court Order”). The Court Order requires annual and quarterly reports on the progress of MWRA’s approved plan to control combined sewer overflows to surface waters in the metropolitan Boston area (the “Long-Term Control Plan”). The reports describe the progress of work to implement the Long-Term Control Plan relative to milestones in the Court-ordered schedule.

This Annual Report for 2009 reviews key accomplishments and design and construction progress in calendar year 2009 and through the quarterly period December 16, 2009, to March 15, 2010, and discusses issues that may affect MWRA’s ability to complete the CSO projects on schedule. Like previous annual CSO reports, it also presents updated information on the scope, goals, benefits and costs of the Long-Term Control Plan and its projects, as well as information on the overall progress made to date to control CSO discharges, comply with the Court Order and the National Pollutant Discharge Elimination System (NPDES) permits related to CSO discharges, and improve water quality in Boston Harbor and its tributaries.

The Long-Term Control Plan comprises 35 wastewater system improvement projects to bring CSO discharges at 84 outfalls in the metropolitan Boston area into compliance with the Federal Clean Water Act and Massachusetts Water Quality Standards. Design and construction milestones for each of the 35 projects are mandated by the Court Order and set forth in Schedule Seven. Figure 1 maps the 35 projects and presents the general status of implementation for each project. Figure 2 summarizes the scope, schedule and predicted benefits of the system-wide Long-Term Control Plan.

## 2. CSO CONTROL PROGRESS AND ACCOMPLISHMENTS IN 2009

### 2.1 2009 Progress Summary

In 2009, MWRA and its CSO communities continued to implement the Long-Term Control Plan at a high level of design and construction activity to meet the Federal Court ordered obligations defined in Schedule Seven and in the March 15, 2006 Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows, as amended by the Federal District Court on May 7, 2008<sup>1</sup> (the “Second CSO Stipulation”).

In 2009, MWRA completed construction of the Cottage Farm Brookline Connection and Inflow Controls project, and BWSC completed construction of the Morrissey Boulevard Storm Drain, bringing the total number of completed CSO projects to 24 of the 35 projects in MWRA’s long-term CSO control plan. Also in 2009, MWRA attained substantial completion of the CSO storage tunnel contract in the North Dorchester Bay CSO control plan, including the 10,832-foot-long, 17-foot-diameter tunnel and all appurtenant surface piping and diversion chambers, and awarded the two construction contracts for the tunnel dewatering pumping station and force main and the tunnel ventilation building.

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<sup>1</sup> The May 7, 2008 amendment to the Second CSO Stipulation revised the level of control for the Prison Point CSO Facility in accordance with MWRA’s letter report entitled “Proposed Modification of Long-Term Level of Control for the Prison Point CSO Facility, April 2008.”



**MEDFORD**  
ALEWIFE BROOK PUMP STATION  
SOM004  
SOM002A/003  
SOM002  
ALEWIFE BROOK  
SOM001  
CAM002  
CAM401B  
CAM400  
NEW CHANNEL  
CAM001A  
CAM001  
CAM003  
CAM004

**SOMERVILLE**  
SOMERVILLE BAFFLE MANHOLE SEPARATION  
SOM006  
UPPER MYSTIC RIVER  
SOM007A/MWR205A  
SOM007  
SOMERVILLE MARGINAL CSO FACILITY MWR205  
SOM009 (TO PRISON PT)

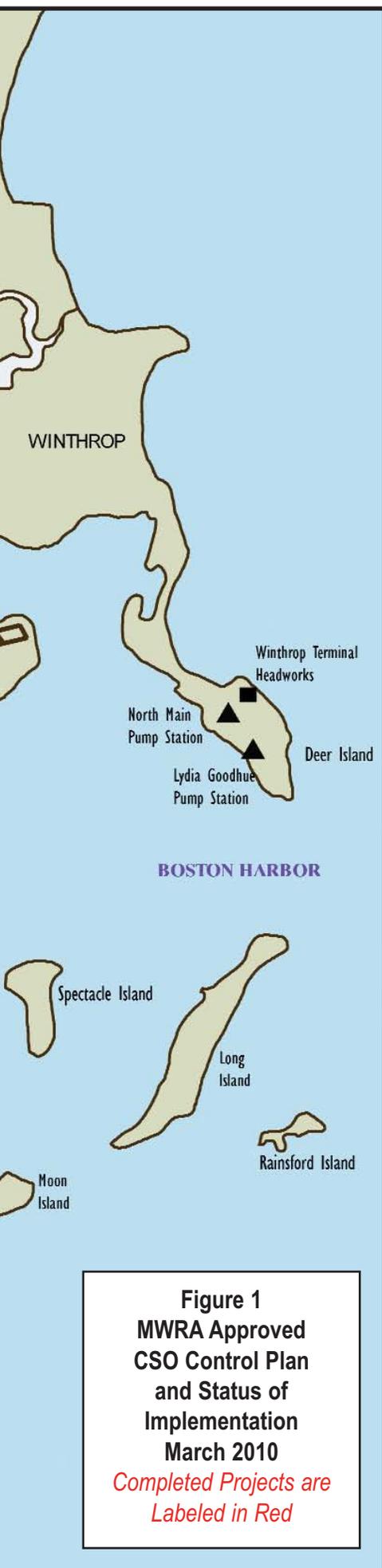
**MALDEN**  
EVERETT  
CHARLESTOWN DELAURI PUMP STATION  
MYSTIC RIVER/CHELSEA CREEK

**CHELSEA**  
CHELSEA TRUNK SEWER RELIEF  
CHELSEA CREEK HEADWORKS  
CHELSEA BRANCH SEWER RELIEF  
CHELSEA OUTFALL REPAIRS  
CONSTITUTION BEACH SEWER SEPARATION  
EAST BOSTON CARLOS PUMP STATION  
Constitution Beach CSO Facility  
BOS002/MWR207

**BOSTON**  
PRISON POINT CSO FACILITY  
PRISON POINT OPTIMIZATION  
PRISON POINT STORAGE CONDUIT UPGRADE  
BOS019  
BOS017  
BOS012  
BOS013  
BOS014  
BOS015  
BOS010  
BOS009  
BOS006  
BOS004  
BOS005  
BOS003  
UPPER INNER HARBOR  
LOWER INNER HARBOR  
RESERVED CHANNEL SEWER SEPARATION  
RESERVED CHANNEL  
FORT POINT CHANNEL SEWER SEPARATION AND SYSTEM OPTIMIZATION  
PLEASURE BAY STORM WATER RELOCATION  
NORTH DORCHESTER BAY STORAGE TUNNEL  
COLUMBUS PARK HEADWORKS  
MORRISSEY BOULEVARD STORM DRAIN  
FOX POINT UPGRADE  
FOX POINT CSO FACILITY  
COMMERCIAL POINT UPGRADE  
COMMERCIAL POINT CSO FACILITY  
SOUTH DORCHESTER BAY SEWER SEPARATION  
NEPONSET SEWER SEPARATION  
NEPONSET RIVER  
BOS093  
BOS095  
SQUANTUM PUMP STATION

**CAMBRIDGE**  
CAMBRIDGE HYDRAULIC RELIEF  
CAM005  
CAM007  
CAM009  
CAM011  
COTTAGE FARM BROOKLINE CONNECTION AND IN-FLOW CONTROLS  
BOS032  
BOS033  
CHARLES RIVER INTERCEPTOR GATE CONTROLS AND ADDITIONAL INTERCEPTOR CONNECTIONS  
BROOKLINE SEWER SEPARATION  
COTTAGE FARM UPGRADE  
COTTAGE FARM CSO FACILITY  
LOWER CHARLES RIVER  
MWR201  
MWR202  
MWR203  
MWR018  
MWR019  
MWR200  
MWR202  
MWR203  
BULFINCH TRIANGLE SEWER SEPARATION  
Stony Brook Conduit  
BACK BAY FENS  
WARD STREET HEADWORKS  
BOS042  
BOS046  
UNION PARK DETENTION/TREATMENT FACILITY  
UNION PARK PUMP STATION  
NORTH DORCHESTER BAY STORAGE TUNNEL  
BOS070  
BOS064  
BOS065  
BOS072  
BOS073  
BOS068  
BOS076  
BOS077  
BOS078  
BOS079  
BOS080  
BOS081  
BOS082  
BOS083  
BOS084  
BOS085  
BOS086  
BOS087  
BOS088  
BOS089/MWR209  
BOS090/MWR211

**BROOKLINE**  
STONY BROOK SEWER SEPARATION



**Projects Completed**

**Complete<sup>(1)</sup>**

Somerville Baffle Manhole Separation	1996
Chelsea Trunk Sewer Replacement	2000
Cottage Farm CSO Facility Upgrade	2000
Hydraulic Relief at CAM005 (Cambridge)	2000
Hydraulic Relief at BOS017 (Charlestown)	2000
MWRA Floatables/Outfall Closing Projects	2000
Neponset River Sewer Separation	2000
Constitution Beach Sewer Separation	2000
Chelsea Branch Sewer Relief	2001
CHE008 Floatables Control and Outfall Repair	2001
Prison Point CSO Facility Upgrade	2001
Somerville Marginal CSO Facility Upgrade	2001
Commercial Point CSO Facility Upgrade	2001
Fox Point CSO Facility Upgrade	2001
Pleasure Bay Storm Drain Improvements	2006
Stony Brook Sewer Separation	2006
Charlestown BOS019 Storage Conduit	2007
South Dorchester Bay Sewer Separation	2007
Fort Point Channel Sewer Separation & System Optimization	2007
Union Park Detention/Treatment Facility	2007
Regionwide Floatables Controls	2007
Prison Point Facility Optimization	2008
Morrissey Boulevard Storm Drain	2009
Cottage Farm Brookline Connection and Inflow Controls	2009

**In Construction<sup>(2)</sup>**

East Boston Branch Sewer Relief	2010
Bulfinch Triangle Sewer Separation	2010
Alewife Interceptor Connection Relief and Floatables Controls	2010
CAM400 Manhole Separation	2011
North Dorchester Bay Storage Tunnel and Related Facilities	2011
Brookline Sewer Separation	2013
Reserved Channel Sewer Separation	2015
CAM004 Sewer Separation	2015

**In Design**

Charles River Interceptor Gate Controls	2011
CAM004 Outfall and Basin	2012

**Future Start**

MWR003 Gate Rindge Ave. Siphon Relief and SOM 001A	2015
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*(1) Actual or Scheduled construction completion*

*(2) For each project, at least one construction contract is completed or underway*

**FIGURE 2: Approved Long-Term CSO Control Plan and Benefits**



### BENEFITS

- 84 CSO Outfalls: 36 Closed  
44 Reduced to a Minimal Number of CSO Discharges per year  
4 Treated
- Eliminates or Reduces CSO Activations to Achieve a Level of CSO Control Consistent with Water Quality Standards
- Treats More Frequent Discharges
- Controls Floatable Materials at All CSO Outfalls

### CSO CONTROL PROJECTS

Sewer Separation
Existing CSO Treatment Facility Upgrades
New CSO Treatment Facility
CSO Consolidation /Storage Conduits
Relief Sewers
Localized Hydraulic Relief
Outfall Repairs
Region Wide Floatables Controls
System Optimization

### PROGRAM SCHEDULE

Final CSO Conceptual Plan	Dec 1994
Final Facilities Plan and EIR	Jul 1997
Final Approved Plan	Apr 2006
Design and Construction	1995 - 2015
Assessment Phase	2015 - 2020

### COSTS

Planning, Design & Construction	\$876.3 Million
Net Annual O&M	\$1.5 Million

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During 2009, MWRA and the CSO communities commenced five new construction contracts (including the two North Dorchester Bay contracts noted above) and continued progress with four other construction contracts. Progress in the year was driven by significant construction activity, with most of the construction involving the installation of new sewers and storm drains. Construction was recently completed or is well underway in several areas of South Boston and East Boston, as well as in downtown Boston, Dorchester, Cambridge (Charles River and Alewife Brook areas) and Brookline, where 2.1 miles of CSO storage conduit, more than 2.8 miles of sewer pipe, and 3.4 miles of storm drain have been installed, as described below:

- Substantial Completion of 10,832-foot-long, 17-foot-diameter North Dorchester CSO Storage Tunnel and all appurtenant surface piping and diversion chambers;
- Commencement of construction of the 15-million-gallon-per-day North Dorchester Bay Dewatering Pump Station;
- Commencement of construction of the North Dorchester Bay Tunnel Ventilation Building;
- Installation of 2,300 feet of 24-inch-diameter force main associated with the North Dorchester Bay CSO Dewatering Pump Station;
- Substantial Completion of 2,800-foot-long, 12-foot x 12-foot Morrissey Boulevard storm drain, along with 675 feet of 8-foot x 8-foot storm drain, relocated sanitary sewers totaling 1,610 feet, the relocation of 3,500 feet of water main, 460 feet of minor drains and associated manholes, particle separators and catch basins;
- Installation of 2,500 feet of new sewers by pipebursting in East Boston;
- Installation of 9,540 feet of new sewers by microtunneling in East Boston;
- Installation of 2,800 feet of storm drain in the Reserved Channel area;
- Installation of 4,500 feet of storm drain in the Bulfinch Triangle area of Boston;
- Installation of 6,800 feet of storm drain in Brookline; and
- Substantial Completion of construction necessary to bring into service the existing but previously unutilized 560-foot-long, 54-inch diameter Cottage Farm Brookline Connection.

MWRA and the CSO communities also made progress with design work in 2009. Of special note, after several years of delay for the Alewife Brook CSO control plan due to a project reassessment and appeals of a key wetlands permit, the City of Cambridge was able to make substantial progress with design of three of the five Alewife Brook projects in 2009 and award a contract for two of the projects in January 2010. Other significant design progress was made with the North Dorchester Bay and Charles River interceptor optimization projects by MWRA, with the Reserved Channel Sewer Separation project by BWSC, and with the Brookline Sewer Separation project by the Town of Brookline.

MWRA spent \$89.4 million in 2009 to implement CSO projects and fund the eligible CSO work of BWSC, Cambridge and Brookline. This was the second highest level of annual spending for CSO control. While the level of CSO control activity and spending is expected to be sustained at the current level through 2010, with capital spending estimated to be \$88.6 million for this year, CSO spending is projected to begin a downward trend near the end of 2010.

Of the \$89.4 million spent in calendar year 2009, \$86.3 million (97%) was for construction related activities, with approximately \$45 million of that for ongoing construction of the East Boston Branch Sewer Relief project and \$29 million for the North Dorchester Bay CSO storage tunnel, associated tunnel facilities and related Morrissey Boulevard storm drain in South Boston.

Capital Spending on CSO Control in 2009

Design:	\$3.1 million
Construction:	\$77.6 million
Engineering Services During Construction:	\$6.5 million
<u>Land/Easement/Permits:</u>	<u>\$2.2 million</u>
Total CSO Capital Spending in CY09:	\$89.4 million

**2.2 CSO Project Accomplishments in 2009**

- MWRA and BWSC continued to make substantial progress to implement the \$269 million North Dorchester Bay CSO Control Plan that will virtually eliminate CSO discharges and greatly control stormwater discharges to the South Boston beaches<sup>2</sup>. MWRA achieved substantial completion of the CSO storage tunnel contract on November 30, 2009, and BWSC achieved substantial completion of the related Morrissey Boulevard storm drain on July 15, 2009. MWRA also issued Notices to Proceed for the construction contracts for the 15 million-gallon-per-day tunnel dewatering pump station and force main and the below-ground tunnel ventilation building on May 4, 2009, and November 4, 2009, respectively. Construction of these facilities is now well underway to meet substantial completion and bring the entire project on-line by May 2011 in compliance with Schedule Seven.



<sup>2</sup> Includes MWRA's North Dorchester Bay tunnel and facilities (\$219.3 M) and Pleasure Bay project (\$3.2 M), BWSC's Morrissey Boulevard Storm Drain (\$36.4 M), and related land, easement and construction permit costs (\$10.1 M).

- On April 27, 2009, MWRA issued the Notice to Proceed for the third and final construction contract to complete the \$85.2 million East Boston Branch Sewer Relief project. This contract (Contract 6841) involves replacing and upgrading approximately 5,000 feet of interceptor sewers in upstream reaches of MWRA's East Boston interceptor system along Marginal, New, Maverick, Border and Jefferies streets using "pipebursting" methods. As of March 1, 2010, the contractor had installed 2,500 feet of new pipe. MWRA also continued to make substantial progress with the second contract (Contract 6257), the largest of the three contracts. Contract 6257 involves installing approximately 13,000 feet of new interceptor sewers along Border, Condor, East Eagle and Chelsea streets and replacing existing sewers with larger diameter pipes along Marginal, Orleans, Gove, Bremen and Porter streets primarily using microtunneling methods. As of March 1, 2010, the contractor had installed 9,540 feet of new pipe. MWRA completed the first construction contract (Contract 6840), which involved relining the main trunk sewer along Chelsea Street, East Boston, in 2004.



Utility conflicts, as well as soil and groundwater conditions, continue to present difficulties with both of the East Boston contracts, and MWRA is working closely with its contractor and the utility owners to resolve conflicts as they are identified. Though many problems have been encountered and the contractors have submitted requests for time extension, the contractors and MWRA have been able to mitigate the delays and remain on schedule for all work to be substantially complete by July 2010.

- On June 30, 2009, MWRA achieved substantial completion of the construction contract for the \$3.3 million Cottage Farm Brookline Connection and Inflow Controls project, in compliance with Schedule Seven. The project reduces treated CSO discharges from the Cottage Farm CSO Facility to the Charles River Basin by increasing the conveyance of wet weather flows to MWRA's Ward Street Headworks and Deer Island Wastewater Treatment Plant. The improvements optimize the combined conveyance capacity of the two MWRA sewers that carry flows across the Charles River and increase this conveyance capacity by bringing into service a parallel, previously unutilized 560-foot-long, 54-inch diameter sewer (the "Brookline Connection") constructed nearly 40 years ago by the Metropolitan District Commission.

MWRA's Field Operations Department immediately took over operation of the new facilities upon substantial completion and has implemented new standard operating procedures to minimize CSO flows at the Cottage Farm facility. Flow level sensors were installed with the project in the two overflow chambers outside the facility and at upstream and downstream locations in the interceptor system, complementing the level sensor MWRA separately installed within the facility's influent chamber that is used for gate operation. MWRA is presently adding a redundant level sensor at the downstream interceptor location and upgrading the solar power elements at both interceptor locations before bringing these sensors on-line.



New 60-inch PCCP pipe interconnection between the North & South Charles Relief Sewer overflow chambers in the Cottage Farm yard.

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- In September 2009, MWRA submitted the findings from its \$1.2 million Charles River Valley/South Charles River Relief Sewer gate controls and interceptor interconnections study to the Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP). The Charles River interceptor evaluations were originally proposed by MWRA in 2005 and incorporated into Schedule Seven in 2006 for the purpose of achieving an optimized allocation of flow among the major interceptors related to the Cottage Farm CSO facility and other Charles River outfalls, with the goal of further controlling CSO discharges at these locations to the extent possible. CSO benefits achieved from any recommended alternatives would add to and exceed, but not be necessary to attain, the approved long-term level of CSO control for the Charles River.

Over an 18-month period, MWRA and its study consultant performed extensive evaluations of existing system performance, alternatives to add interconnections between the interceptors, and alternatives to modify existing interconnections and existing control gates. From the results, MWRA concluded that additional interceptor interconnections will not reduce CSO discharges and that there is no other feasible



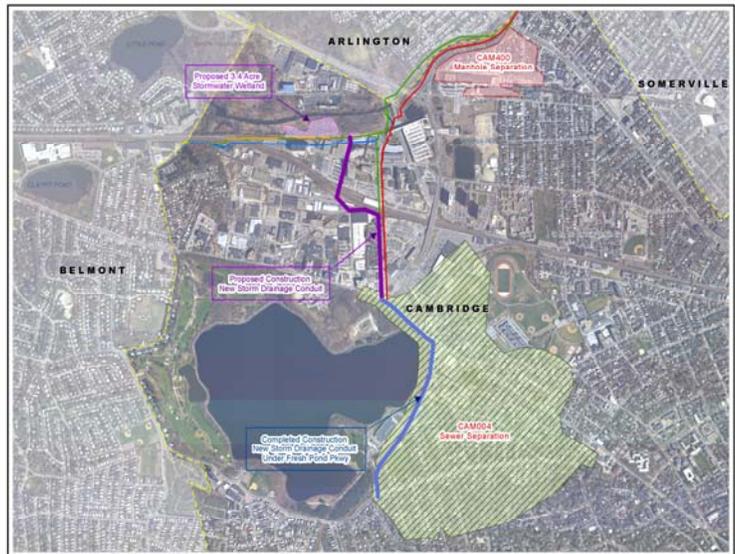
Installation of storm drain on Causeway Street

means to improve upon the hydraulic performance of the interceptors to increase the level of CSO control without also increasing the risk of system flooding in very large storms. Therefore, MWRA did not recommend system improvements beyond the measures in the approved long-term control plan. Accordingly, MWRA is seeking approval from the court parties to delete the related April 2009, January 2010 and January 2011 milestones in Schedule Seven that require implementation of recommended improvements. The FY10 CIP includes \$1.2 million for related construction. EPA has not yet approved MWRA's recommendation and has requested additional supporting information.

- On May 26, 2009, BWSC issued the Notice to Proceed for the first of nine planned construction contracts for the \$78.6 million Reserved Channel Sewer Separation project. The work of this contract involves storm drain construction in the area of South Boston roughly bounded by East First, Farragut, East Fourth and N streets. The contractor has completed the installation of large drain pipes in the Farragut and East First streets area and is proceeding with smaller diameter storm drain installations in connecting streets. The contractor has installed approximately 2,700 linear feet (21%) of the 12,700 linear feet of new storm drain included in this contract. BWSC also continues to make progress with final design of the remaining contracts. It plans to award the second construction contract by June 2010 to rehabilitate and upgrade the Reserved Channel CSO outfalls to accommodate the separated stormwater flows. It also plans to award two additional storm drain installation contracts in the summer of 2010. BWSC's plans call for issuing notices to proceed for the remaining contracts through April 2013 and completing all work by December 2015, in compliance with Schedule Seven.
- BWSC is on schedule to complete the sole construction contract for the \$9.6 million Bulfinch Triangle Sewer Separation project by July 2010, three years ahead of the court milestone. The contractor has installed all 4,500 linear feet of new storm drain included in the contract and is continuing with sewer system work. This project is intended to minimize CSO discharges to the Charles River, especially at MWRA's Prison Point CSO facility, and allow BWSC to eliminate CSO discharges at Outfall BOS049.

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- The Town of Brookline has achieved substantial completion of the first of two construction contracts for the \$24.0 million Brookline Sewer Separation project, in compliance with Schedule Seven. This project involves sewer separation in 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 MWRA's Cottage Farm facility. With the \$1.4 million first contract, Brookline installed 6,800 linear feet of new storm drain in town streets along the north and south sides of Beacon Street. Brookline is completing final design for the second construction contract and plans to advertise this contract, with an estimated value of \$22 million, this spring. It includes installation of sanitary sewers in Beacon, St. Mary's, and Monmouth streets. Existing combined sewers will be converted to storm drains. MWRA is developing plans to rehabilitate Outfall MWR010, which will convey the separated stormwater to the Charles River.
- After several years of delay due to a project reassessment and then a citizens' appeal of a key wetlands permit, MWRA and the City of Cambridge were able to move the Alewife Brook Sewer Separation plan forward at the end of 2008. In the CSO Memorandum of Understanding and Financial Assistance Agreement with Cambridge, the financial award amount (MWRA cost share) is \$60.0 million, in addition to \$3.4 million MWRA will spend to implement its MWR003 Gate and Rindge Avenue Siphon Relief project. The total cost of the Alewife Brook sewer separation plan, including MWRA and Cambridge cost shares, is \$117.4 million. In October 2008, Cambridge resumed design work for three of the five projects that comprise the Alewife Brook plan: CAM400 manhole separation (Contract 4); interceptor connection relief and floatables control at CAM002 and CAM401B and floatables control at CAM001 (Contract 13); and CAM004 stormwater outfall and wetland basin (Contract 12). Cambridge made substantial final design progress through 2009, and was able to issue the Notice to Proceed for the contract that includes the first two projects on January 26, 2010. Cambridge plans to issue a Notice to Proceed for Contract 12 in July 2010.

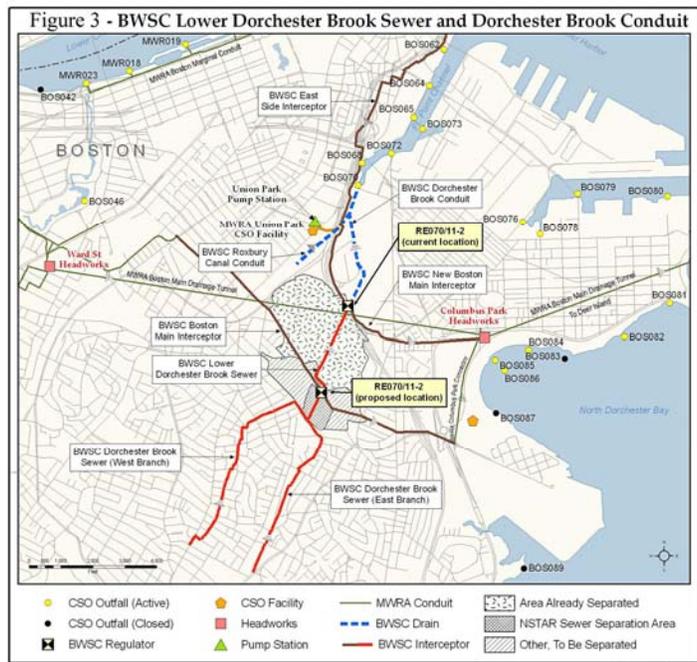


Alewife Brook CSO Control - Revised Plan

The five Alewife Brook projects were delayed a total of 27 months beyond their respective design and construction milestones in Schedule Seven due to the citizens' appeals. This delay was tracked and reported in compliance and progress reports MWRA submitted to the Federal Court during and at the conclusion of the appeal process. With resolution of the appeal sustaining the wetlands Superseding Order of Conditions for Contract 12, Cambridge was able to resume design work in October 2008. With new information collected since then, Cambridge has updated the construction, easement and permit requirements for the projects and has developed new project schedules incorporating estimates of the time needed to complete the construction contract documents and obtain the necessary easements and permits for each project. MWRA and Cambridge are planning to seek approval from the court parties to amend the Schedule Seven milestones in accordance with the new proposed project schedules.

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- BWSC continues to remove stormwater flows from separated sewer systems in Dorchester after substantially completing the \$118.4 million South Dorchester Bay Sewer Separation project in 2007. The project eliminated CSO discharges to the Commercial Point and Fox Point CSO treatment facilities and the beaches of South Dorchester Bay, allowing MWRA to decommission the two facilities in November 2007. BWSC issued a report in September 2008 on its evaluation of the separated sewer system’s performance, concluding that remaining levels of stormwater inflow to the sewer system carry a risk for system flooding and overflows in large storms, including the 10-year design storm that is a performance criterion for the project. BWSC recommended and is pursuing additional inflow removal, primarily by expanding its downspout disconnection program in the tributary area, with funds in MWRA’s CIP designated for this purpose.
- BWSC also made progress with design of improvements to relieve a portion of its Lower Dorchester Brook Sewer to reduce CSO discharges to the Dorchester Brook Conduit and attain the level of CSO control in MWRA’s long-term control plan for Fort Point Channel. This work is funded in part by MWRA in accordance with the terms and conditions of the CSO Memorandum of Understanding and Financial Assistance Agreement with BWSC. The work includes relocating CSO regulator RE-070/11-2 and separating combined sewers in a limited area tributary to the new regulator (see Figure 3). Relocating the regulator will allow stormwater flows in already separated drainage systems that now tie back into the sewer system to be redirected to the Dorchester Brook Conduit and Fort Point Channel. BWSC has completed the design work and recently advertised the construction contract. BWSC expects to award the contract in March 2010 and complete the work by December 2010.



**2.3 Related Compliance with MWRA’s NPDES Permit and CSO Variances**

In 2008, MWRA also continued to respond to the requirements and conditions in its NPDES Permit and in the CSO variances for the Lower Charles River and the Alewife Brook/Upper Mystic River.

- In April 2009, MWRA submitted to EPA and DEP its estimates of CSO discharge activations and volumes at permitted CSO outfalls for all storms in 2008. The information included updated CSO discharge activation and volume predictions at every outfall in a typical year, and compared the updated performance at each outfall with the level of control in the Long-Term Control Plan.
- MWRA continued to conduct its harbor and river water quality sampling and testing program.

### 3. LONG-TERM CONTROL PLAN

#### 3.1 Regulatory Background

In 1987, through a stipulation entered in the Boston Harbor Case (U.S. v. M.D.C., et al., No. 85-0489 MA), MWRA accepted responsibility for developing a control plan to address the discharges from all CSOs hydraulically connected to the MWRA sewer system, including outfalls owned by its member communities. Under a Court-ordered schedule, MWRA recommended a CSO Conceptual Plan in 1994 that included 25 site-specific CSO projects located in Boston, Cambridge, Chelsea and Somerville. The CSO Conceptual Plan was later refined in the 1997 Facilities Plan/EIR.

In March 2006, MWRA reached an agreement with the United States and DEP on the scope and schedule for additional CSO projects, which was filed with the Court as part of a joint motion to amend the Court Schedule. In April 2006, the Court allowed the joint motion and issued an Order with a new schedule. As a result, MWRA's Long-Term Control Plan now includes 35 projects. Under the Order, MWRA has until 2020 to complete the remaining CSO work and subsequent system monitoring which will be used to verify that the Long-Term Control Plan goals are achieved.

The United States and MWRA also agreed to withdraw their February 27, 1987 Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows and replace it with a "Second CSO Stipulation" that requires MWRA to implement the CSO requirements set forth in the Court Schedule and to meet the levels of control described in MWRA's Long-Term Control Plan. The documents that recommend MWRA's Long-Term Control Plan, including the 1997 Final CSO Facilities Plan/EIR as amended by subsequent notices of project change and supplemental plans, are identified in the March 15, 2006 Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability For Combined Sewer Overflows, which was amended on May 7, 2008.<sup>1</sup>

#### 3.2 Scope, Benefits and Cost of the Approved Plan

The approved Long-Term Control Plan is described in Table 1 for each receiving water segment. The CSO control costs by receiving water segment and the total plan cost of \$876.3 million (in December 2010 dollars)<sup>3</sup> are from MWRA's Proposed FY11 CIP.

MWRA's Long-Term Control Plan is predicted to reduce annual CSO discharge volume in a typical year from 3.3 billion gallons in 1988 to 0.4 billion gallons in 2015. Of the remaining discharge volume, 93% will receive treatment at MWRA's four CSO facilities: Cottage Farm, Prison Point, Somerville Marginal and Union Park. The overall performance goals of this approved plan measured as average annual volume of CSO discharge to each receiving water segment are presented in Table 1 and in Figure 4. The Long-Term Control Plan also calls for closing 36 of the 84 CSO outfalls addressed in the plan, including the CSO treatment facilities and associated outfalls at Constitution Beach, which MWRA decommissioned in October 2000, and at Fox Point and Commercial Point (South Dorchester Bay), which MWRA decommissioned in November 2007. To date, 27 of the 84 outfalls have been closed to CSO discharges. The City of Cambridge has tentatively closed two additional outfalls, CAM009 and CAM011, pending further hydraulic monitoring.

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<sup>3</sup> MWRA's Proposed FY11 CIP anticipates a total spending for CSO control of \$894.3 million, including escalation to the midpoint of construction and contingency, to complete the plan on schedule.

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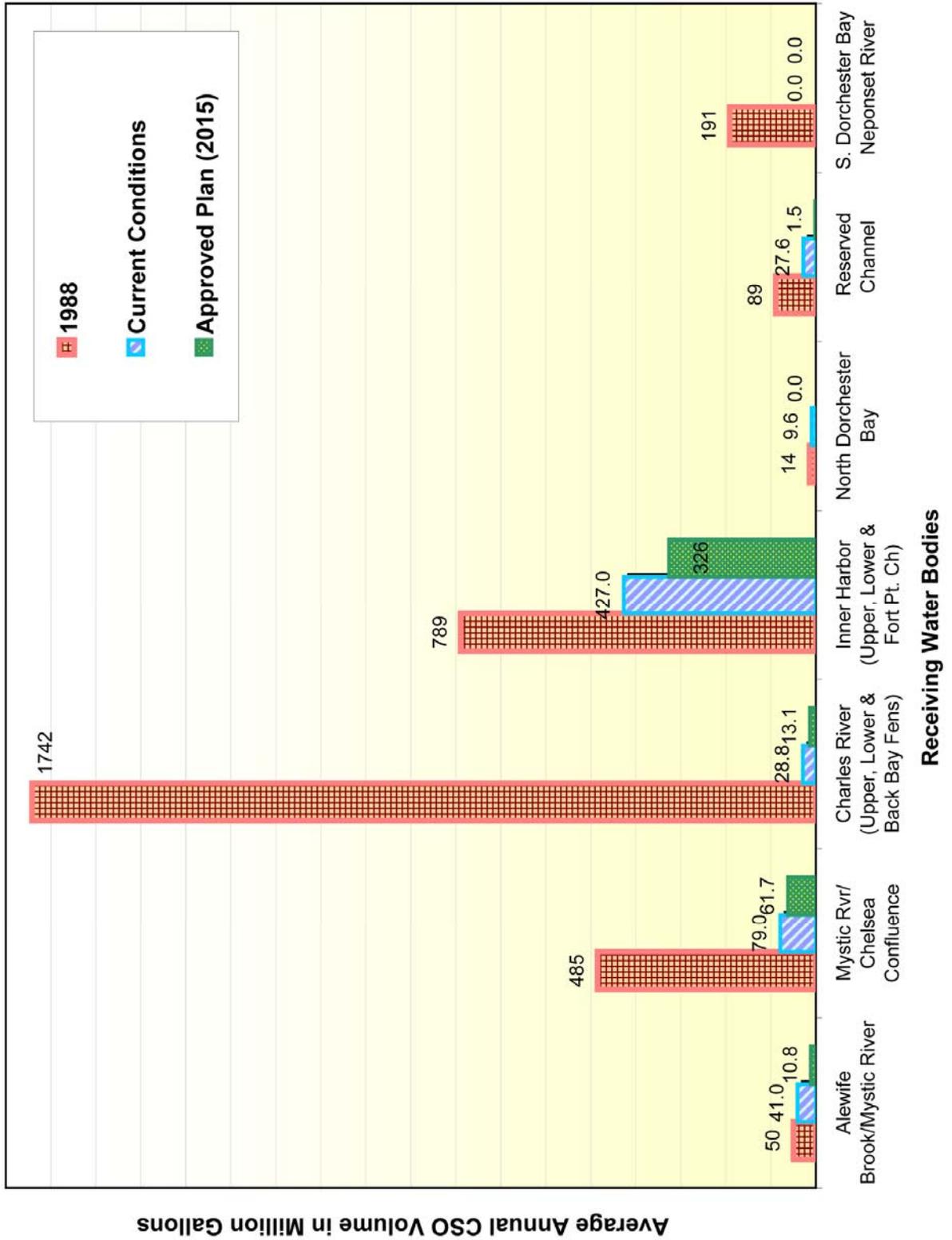
**Table 1**  
**Long-Term Level of CSO Control and Cost by Receiving Water Segment**

<u>Receiving Water</u>	CSO Discharge Goals (typical rainfall year)		Projects <sup>(1)</sup>	Capital Cost <sup>(2)</sup> (\$ 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>	64.2
Mystic River/Chelsea Creek Confluence and Chelsea Creek	1 untreated and 39 treated @ Somerville Marginal	0.6 60.6	<ul style="list-style-type: none"> <li>• Somerville Marginal CSO Facility Upgrade</li> <li>• Somerville Baffle Manhole Separation</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>	77.5
Charles River (including Stony Brook and Back Bay Fens)	2 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>	90.0
Inner Harbor	6 untreated and 17 treated @ Prison Point	9.6 243.0	<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>	61.5
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>	62.4
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>	258.9
Reserved Channel	3 untreated	1.5	<ul style="list-style-type: none"> <li>• Reserved Channel Sewer Separation</li> </ul>	78.6
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>	126.3
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>	50.7
<b>TOTAL</b>		<b>413.1</b>		<b>876.4</b>
<b>Treated</b>		<b>384.8</b>		

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

(2) From MWRA's Proposed FY11 Capital Improvement Program.

Figure 4  
 Predicted Typical Year CSO Discharge Volumes 1988-2015



Schedule Seven requires MWRA to undertake a three-year, system-wide performance assessment commencing in January 2018 to verify attainment of the level of CSO control at every outfall in accordance with the plan and in compliance with water quality standards. Schedule Seven also requires MWRA to submit a report on the results of the performance assessment by December 2020. It is at that time that EPA and DEP propose to make final decisions regarding water quality standards for the Charles River and Alewife Brook. If additional CSO control beyond the levels of control in MWRA's long-term plan is deemed by EPA and DEP to be warranted at any outfall, remediation will be the individual responsibility of the respective discharge permittee: MWRA, BWSC, Cambridge or Somerville.

### 3.3 Status of Plan Implementation and Benefits Already Achieved

Through 2009, MWRA spent \$664.8 million of the total \$876.3 million CSO control budget in the Proposed FY11 CIP. With the cooperation of its CSO communities, MWRA has completed 24 of the 35 CSO projects, and ten projects are currently in construction or design (see Figure 1 and Table 2). CSO discharges to South Dorchester Bay, the Neponset River, and Constitution Beach have been eliminated with the completion of the sewer separation projects in those areas.

Since 1987, when MWRA assumed responsibility for developing and implementing a regional CSO control plan, improvements to MWRA's wastewater transport and treatment systems have produced huge reductions in CSO discharges and dramatic improvement in water quality in many areas. These wastewater system improvements included the \$3.8 billion investment MWRA made in the new Deer Island Treatment Plant and associated conveyance systems and the 24 CSO projects completed to date.



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Average annual volume of CSO discharge has been reduced from 3.3 billion gallons in 1988 to 613 million gallons today, an 81% reduction, with 73% of the current discharge volume receiving treatment at MWRA's four CSO facilities. Figure 3 shows this reduction by receiving water segment. To date, 27 of the 84 outfalls have been closed to CSO discharges, as reported last year. No additional outfalls were closed or were scheduled to be closed in 2009. The City of Cambridge has tentatively closed two additional outfalls, CAM009 and CAM011, pending further hydraulic monitoring. Nine more outfalls are scheduled to be closed with completion of the remaining CSO work by December 2015.

Tremendous water quality improvement has been seen in the Charles River Basin, where average annual CSO discharge has been drastically cut from about 1.7 billion gallons in 1988 to 39 million gallons today, a 98% reduction. Approximately 88% of this remaining overflow is treated at MWRA's Cottage Farm CSO facility. These improvements are the result of major wastewater system projects MWRA has completed over the past 20 years, most notably the new Deer Island Wastewater Treatment Plant and related conveyance and pumping systems. MWRA, with the cooperation of its member communities along the Charles River, completed a set of improvements in the late 1980s that eliminated dry weather sewage overflows. They also completed a set of system optimization projects in the mid-1990s that maximized the existing system's hydraulic performance. MWRA and the communities have also completed four CSO control projects along the Charles River: Stony Brook Sewer Separation, Cottage Farm Facility Upgrade, CAM005 Hydraulic Relief, and floatables controls. The communities have undertaken other sewer separation work and have closed several CSO outfalls in the past two decades.

In the same period, the communities along the Charles River have continued programs aimed at reducing pollution in separate stormwater discharges, including identifying and removing illicit sewer connections or cross connections to their storm drain systems. The CSO and stormwater related improvements, together with sanitary sewer overflow control programs in upstream communities (above the Watertown Dam), have resulted in significant and steady water quality improvement to the Charles River Basin during dry and wet weather conditions, as shown in Figure 5.

CSO discharges to South Boston beaches were cut almost in half with the improvements to pumping capacity at Deer Island from 1989 to 2000. For Boston Harbor, a decrease in wet-weather bacteria counts harbor-wide since the late 1980s (Figures 6 and 7) shows the cumulative effect of the Boston Harbor Project and CSO control projects. Improvement in the quality of Boston Inner Harbor waters is also seen in the changes to *Enterococcus* bacteria counts over the period 1989 to 2009, shown in Figure 6. Improvement was greatest in the Upper Inner Harbor and in Chelsea Creek, which had more serious wet weather pollution problems.

Bacteria data in Figure 7 show that water quality conditions improved greatly with the significant increase in wastewater transport and treatment capacity (delivery to the Deer Island Treatment Plant) in the period 1989 to 1991. This increase in delivery capacity greatly reduced CSO discharges at most outfalls. Since then, wet-weather water quality continues to improve in Boston Harbor and its tributary rivers, but at a slower pace, due in part to diminishing returns on wastewater pollution investments and the dominance of other sources of pollution, including urban stormwater. The time periods shown in the figure correspond to improvements in MWRA's wastewater transport and treatment systems and the implementation of CSO controls that could affect water quality in the Inner Harbor, as follows.

1987-1991: In this period, MWRA and the CSO communities were eliminating dry weather overflows and implementing other early pollution controls at CSO outfalls. MWRA was completing the "fast-track" pumping improvements at Deer Island and other major wastewater transport improvements that greatly increased the rate and reliability of wet weather flow conveyance to the Deer Island Treatment Plant.

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Reliable pumping capacity at MWRA's North Main Pump Station on Deer Island increased from about 450 million gallons per day (mgd) in 1988 to more than 700 mgd in 1991. MWRA also ceased the discharge of scum and sludge to Boston Harbor in 1989 and 1991, respectively.

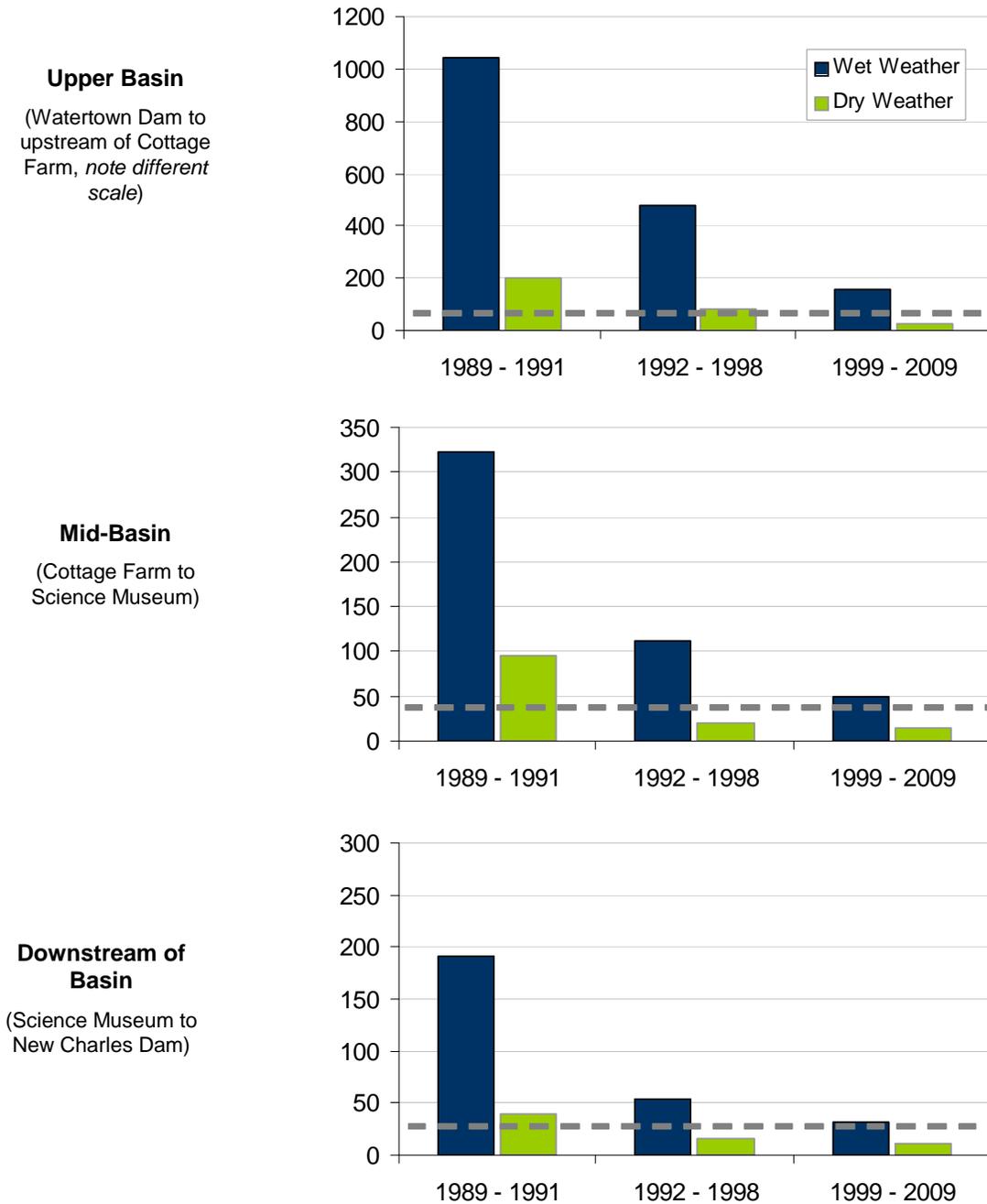
1992-1998: MWRA and the CSO communities implemented the CSO Nine Minimum Controls, including system optimization projects (primarily raising overflow weirs) at more than 100 CSO regulators, and also improved inspection and maintenance programs.

1999-2009: MWRA completed several CSO control projects that reduced or eliminated CSO discharges at outfalls to Boston Inner Harbor and its tributaries, Charles River, Mystic River and Chelsea Creek (see Figure 1). In the same period, efforts were underway by many communities along these waters to control separate urban stormwater pollution.



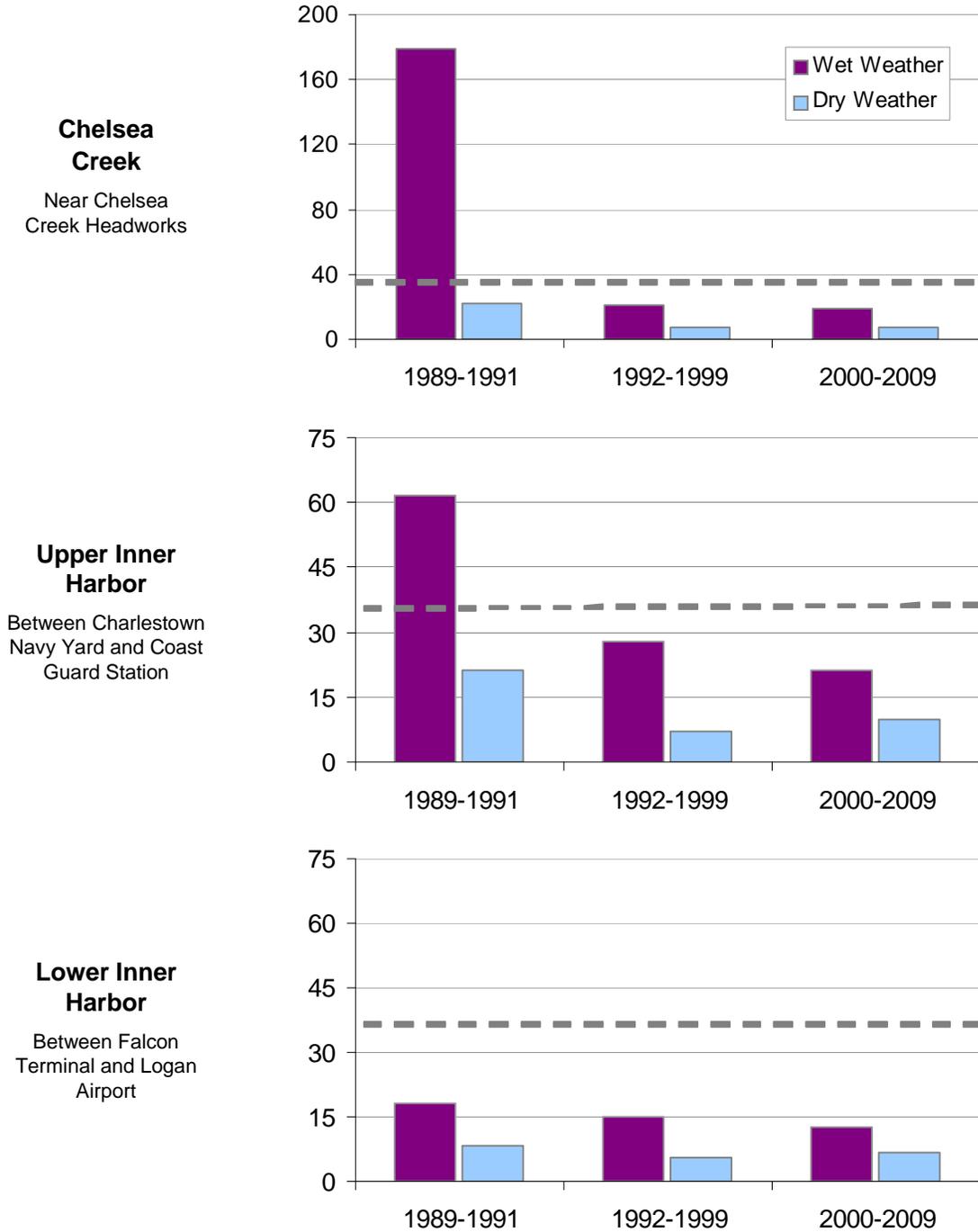
**Figure 5**  
**Change in Lower Charles River Water Quality Over Time**

*Enterococcus* bacteria counts, 1989 - 2009 (note change in scale)



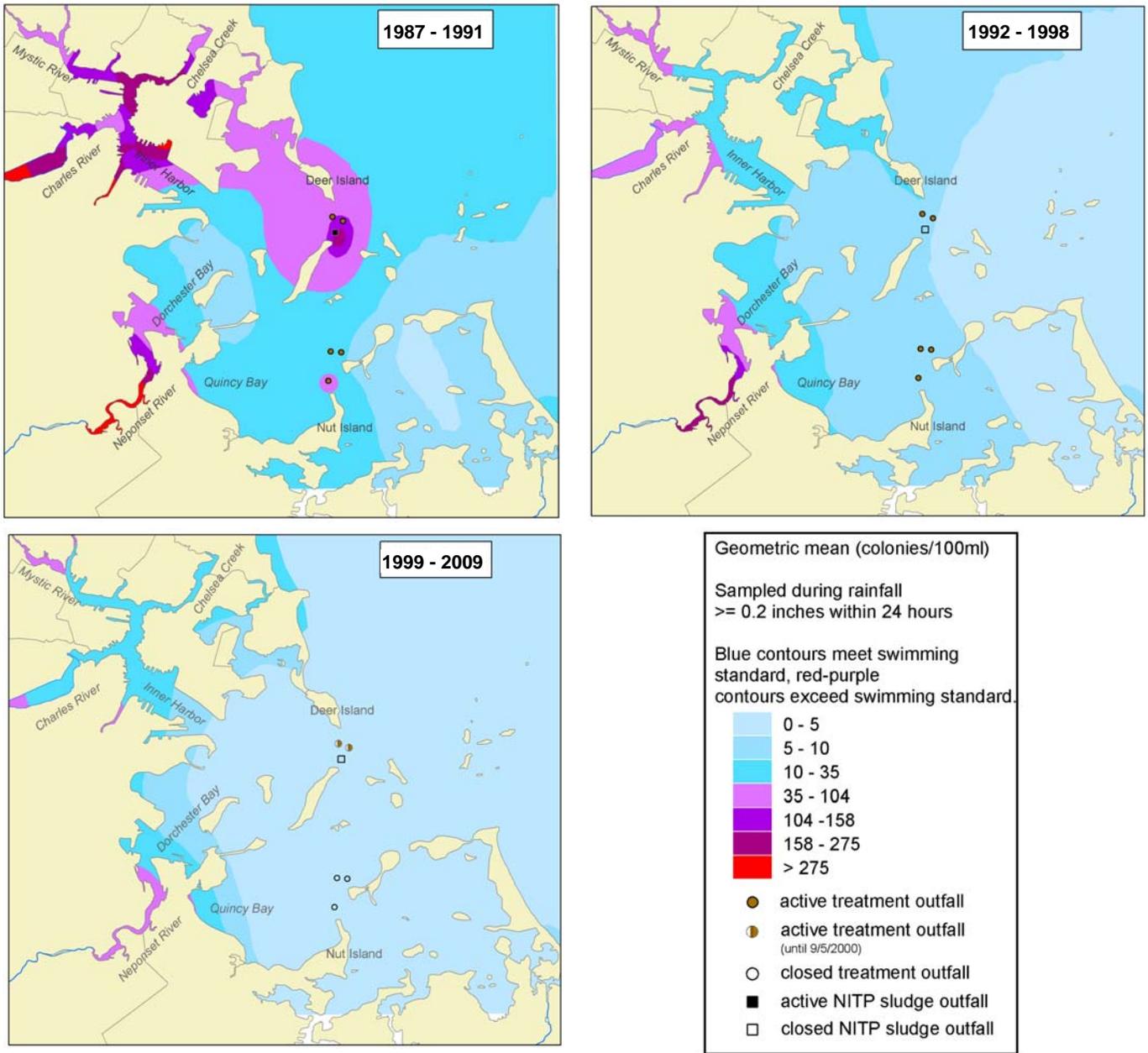
Dotted lines are *Enterococcus* swimming standard for freshwater, 33 counts per 100 mL. Results are *Enterococcus* counts per 100 milliliters water (geometric means). Dry weather is no rain for day of sampling and two previous days; wet weather is >0.5 inches rainfall within two previous sampling days. Other weather conditions are excluded. Results for MWRA stations 001 - 012 and 145, grouped by region.

**Figure 6**  
**Change in Inner Harbor Water Quality Over Time**  
*Enterococcus* bacteria counts, 1989 - 2009 (note change in scale)



Dotted lines are *Enterococcus* swimming standard for marine water, 35 counts per 100 mL. Results are *Enterococcus* counts per 100 milliliters water (geometric mean). Dry weather is no rain for day of sampling and two previous days; wet weather is >0.5 inches rainfall within two previous sampling days. Other weather conditions are excluded. Results for MWRA monitoring stations 027, 014, and 024.

**Figure 7**  
**Changes in Boston Harbor *Enterococcus* Counts in Wet Weather**



Contours show the geometric means of *Enterococcus* data collected when more than 0.2 inches of rain fell in the previous 24 hours. Blue areas meet the EPA geometric mean standard and red-purple areas exceed the standard.

- 1987 - 1991** This period shows data collected prior to when the Boston Harbor project and CSO plans began, through the last year that sludge was discharged (1991). In wet weather, areas affected by the discharge of sewage and sludge from the Deer Island Treatment Plant and Nut Island Treatment plant, and most of the Inner Harbor and tributary rivers, failed to meet the standard.
- 1992 - 1998** Data from these years reflect the effects of CSO upgrades, the ending of sludge discharge, full pumping at DITP, improved primary and beginning secondary treatment at DITP. Most of the harbor meets standards except for the tributary rivers, Fort Point Channel and along Wollaston Beach.
- 1999 - 2009** The current period shows continued improvement due to the closure of 22 CSO outfalls, upgrades of CSO facilities, ending of harbor treatment plant effluent discharges as the new outfall began operating in 2000, and local efforts to abate stormwater pollution.

## **4. IMPLEMENTATION SCHEDULE AND COST**

### **4.1 CSO Project Schedules**

Most of the CSO projects are complete, and the remaining projects are on schedules that are in accordance with the milestones set forth in Schedule Seven, with the exceptions of the two ongoing East Boston construction contracts that are scheduled to be complete one month after the June 2010 court milestone. Table 2 presents the schedules for implementing the 35 projects in the Long-Term Control Plan. Comparisons of the schedules of projects not yet completed to respective milestones in Schedule Seven are included within the project reports in Section 5.

### **4.2 MWRA's CSO Related Capital Budget and Spending Projections**

As shown in Figure 8, the total cost of the CSO plan (planning, design and construction) has risen from \$398 million when MWRA issued the Final CSO Conceptual Plan in 1994, to \$487 million when EPA and DEP approved the Final CSO Facilities Plan and Environmental Impact Report in 1997, to \$876.3 million today, as reflected in MWRA's Proposed FY11 CIP. The Proposed FY11 CIP estimate is in December 2010 dollars. With escalation of these budgeted dollars to the mid-point of construction and contingency, MWRA projects that it will spend a total \$894.3 million to complete the plan on its current schedule.

In the Proposed FY11 CIP, projected spending on the CSO control plan in FY10 and beyond totals \$254.7 million, which is 12% of total projected capital spending by MWRA and 21% of wastewater related capital spending. As shown in Figure 2 on the following page, annual spending on CSO control escalated greatly in the past few years and peaked in FY08 at \$116.7 million. CSO related spending will continue at a high level over the next year with the major construction that is underway, most notably the North Dorchester Bay CSO facilities (pumping station, force main and ventilation building), the East Boston Branch Sewer Relief project, and the Reserved Channel, Brookline and Cambridge sewer separation projects.

MWRA has met the qualification requirements for federal stimulus funding for four CSO Program contracts: North Dorchester Bay pumping station and force main, North Dorchester Bay ventilation building, East Boston Branch Sewer Relief Contract 3, and Reserved Channel Sewer Separation Contract 2. The federal stimulus funding will be provided to MWRA through the State Revolving Fund program, which is administered by the Massachusetts Pollution Abatement Trust and the Department of Environmental Protection.

CSO spending is scheduled to continue through FY21, when MWRA will complete a sewer system performance assessment verifying attainment of the long-term CSO control levels. Spending will be minor after December 2015 when the last two CSO projects, BWSC's Reserved Channel Sewer Separation and Cambridge's Alewife Brook Sewer Separation, are scheduled to be completed.

### **4.3 Cost Risk**

The approvals MWRA secured from EPA and DEP in 2006 on the revised Long-Term Control Plan, along with the associated changes to the Court Order, provide MWRA more certainty of the scope of its CSO obligations and related capital program supporting revenue need, borrowing calculations, and determination of future rate increases. However, the remaining projects will continue to carry cost and schedule risk until they are completed. This is in part due to the historically and densely urban areas and waterfront environments in which they must be constructed. Subsurface conditions, including soil and groundwater characteristics, soil and groundwater contamination, and utilities and other subsurface obstructions, and traffic management, are the key contributors to a continuing level of risk during construction.

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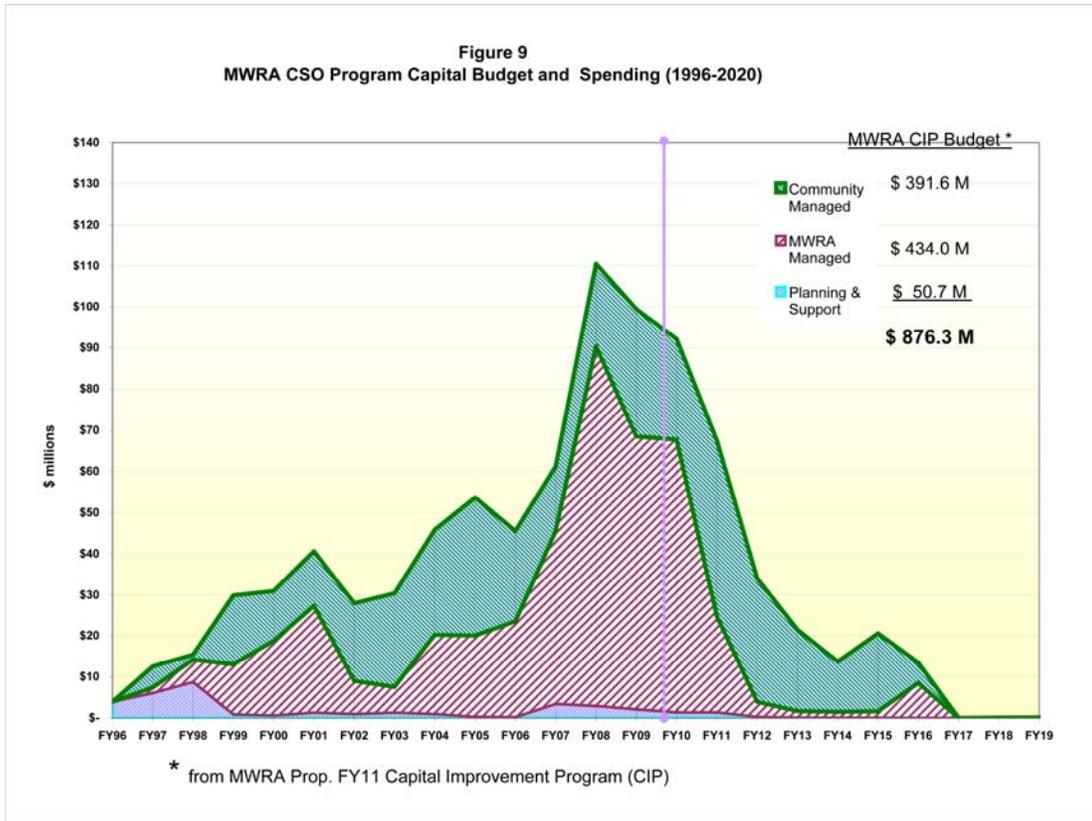
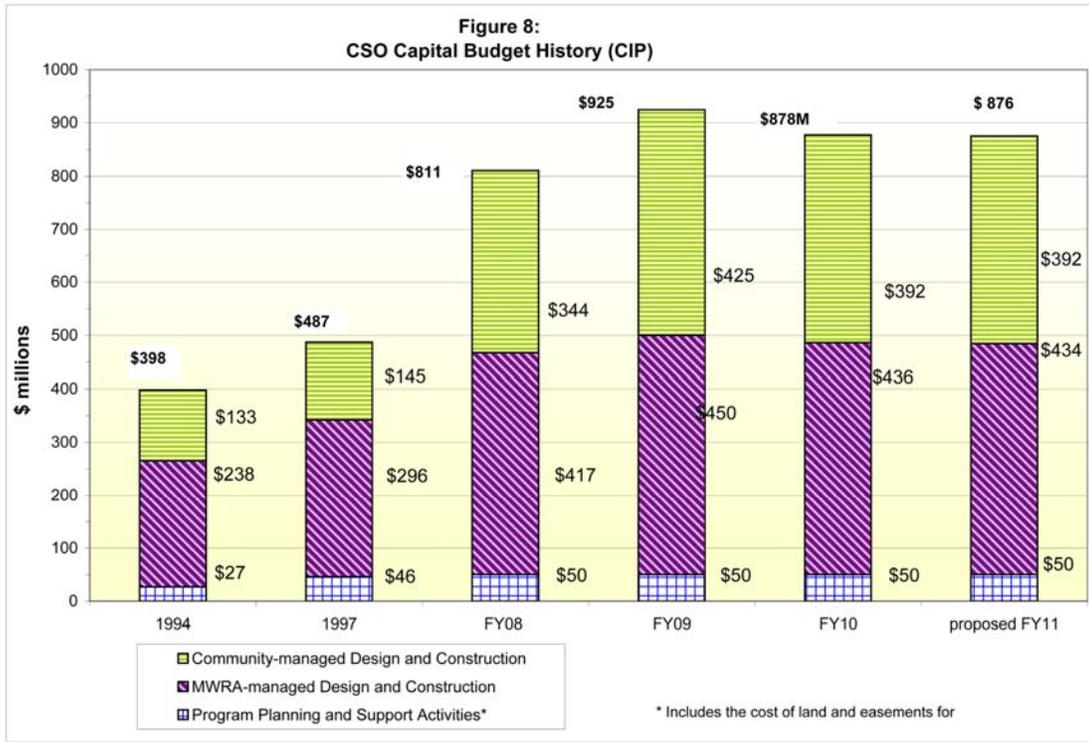
**Table 2: CSO Project Cost and Schedules**

Shading indicates completed project.

Project		Cost* Prop. FY 11	Commence Design	Commence Construction	Complete Construction	
North Dorchester Bay Storage Tunnel and Related Facilities		219.3	Aug-97	Aug-06	May-11	
Pleasure Bay Storm Drain Improvements		3.2	Sep-04	Sep-05	Mar-06	
Hydraulic Relief Projects	CAM005 Relief	2.3	Aug-97	Jul-99	May-00	
	BOS017 Relief			Jul-99	Aug-00	
East Boston Branch Sewer Relief		85.2	Mar-00	Mar-03	Jul-10	
BOS019 CSO Storage Conduit		14.3	Jul-02	Mar-05	Mar-07	
Chelsea Relief Sewers	Chelsea Trunk Sewer Relief	29.8	Jun-97	Sep-99	Aug-00	
	Chelsea Branch Sewer Relief			Dec-99	Jun-01	
	CHE008 Outfall Repairs			Dec-99	Jun-01	
Union Park Detention and Treatment Facility		49.6	Dec-99	Mar-03	Apr-07	
CSO Facility Upgrades and MWRA Floatables Control	Cottage Farm Facility Upgrade	22.4	Jun-96	Mar-98	Jan-00	
	Prison Point Facility Upgrade			May-99	Sep-01	
	Commercial Point Facility Upgrade			Nov-99	Sep-01	
	Fox Point Facility Upgrade			Nov-99	Sep-01	
	Somerville-Marginal Facility Upgrade			Nov-99	Sep-01	
	MWRA Floatables and Outfall Closings			Mar-99	Mar-00	
Brookline Connection and Cottage Farm Overflow Interconn. and Gate		3.4	Sep-06	Jun-08	Jun-09	
Charles River Interceptor Gate Controls and Additional Connections/ Design Only		1.1	Jan-08		Jan-11	
Prison Point CSO Facility Optimization			Mar-06	Mar-07	Apr-08	
South Dorchester Bay Sewer Separation		118.4	Jun-96	Apr-99	Dec-06	
Stony Brook Sewer Separation		44.1	Jul-98	Jul-00	Sep-06	
Neponset River Sewer Separation		2.7		Apr-96	Jun-00	
Constitution Beach Sewer Separation		3.8	Jan-97	Apr-99	Oct-00	
Fort Point Channel Conduit Sewer Separation and System Optimization		11.3	Jul-02	Mar-05	Mar-07	
Morrisey Boulevard Storm Drain		36.5	Jun-05	Dec-06	Jun-09	
Reserved Channel Sewer Separation		78.6	Jul-06	May-09	Dec-15	
Bulfinch Triangle Sewer Separation		9.7	Nov-06	Sep-08	Jul-10	
Brookline Sewer Separation		24.1	Nov-06	Nov-08	Jul-13	
Somerville Baffle Manhole Separation		0.4		Apr-96	Dec-96	
Cambridge/Alewife Brook Sewer Separation	CAM004 Outfall and Wetland Basin	60	Jan-97	Jul 10	Jul-12	
	CAM004 Sewer Separation			Jul-98	Dec-15	
	CAM400 Manhole Separation			Jul-12		
	Interceptor Connection Relief and Floatables Control at CAM002 and CAM401B and Floatables Control at CAM001			Oct-08	Jan 10	Mar-11
	Control Gate/Floatables Control at Outfall MWR003 Gate and Rindge Ave. Siphon Relief, and Interconnection Relief and Floatables Control at Outfall SOM01A			Oct-08	Jan 10	Oct-10
Region-wide Floatables Control and Outfall Closings		3.5	Apr-12	Nov 13	Jan-15	
Region-wide Floatables Control and Outfall Closings		2.6	Sep-96	Mar-99	Dec-07	
Planning & Support		50.1				
<b>Total Cost</b>		<b>876.4</b>				

\* From MWRA Proposed FY11 Capital Improvement Program

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Subsurface conditions and related engineering requirements are not known until detailed subsurface exploration programs have been conducted, usually during preliminary design. Utilities and utility conflicts are also determined when the layout of new facilities and pipelines is set. For sewer separation projects, the quantity and specific sources of stormwater inflow that must be removed from the existing combined sewer system and carried in a new storm drain system are determined only with intensive field investigations and hydraulic modeling evaluations. These kinds of design investigations continue with the BWSC Reserved Channel sewer separation project and will be underway over the next few years by the City of Cambridge for the CAM004 sewer separation project and by MWRA for the Outfall MWR003, MWRA Rindge Avenue Siphon relief, and Interconnection Relief and Floatables Control at Outfall SOM01A project.

On the construction side, the North Dorchester Bay CSO Storage Tunnel was earlier identified as carrying risk for cost change, but the tunnel itself is now complete. There is, however, construction cost risk associated with the ongoing East Boston Branch Sewer Relief contracts and with the remaining contracts for Reserved Channel Sewer Separation and Brookline Sewer Separation, because subsurface conditions weigh heavily in construction progress.

## 5. PROJECT IMPLEMENTATION

This section defines the scope and schedule of each of the projects in the approved Long-Term Control Plan not yet complete, and describes progress made in 2009 and through the first quarter of 2010. Each project section also describes any significant project changes since 2008, as well as any issues that have affected or may affect MWRA’s ability to comply with Schedule Seven.

### 5.1 MWRA Managed Projects

#### North Dorchester Bay Storage Tunnel and Related Facilities

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Construction	August 2006	August 2006
Complete Construction	May 2011	May 2011

#### *Approved Plan and Implementation Schedule*

In April 2004, the MWRA Board of Directors voted to approve a revised recommended plan for CSO Control for North Dorchester Bay and the Reserved Channel, and MWRA filed the Supplemental Facilities Plan and Environmental Impact Report (“SFP/EIR”) presenting the revised plan. The recommended plan was subsequently approved by EPA and DEP and incorporated into Schedule Seven. It calls for eliminating CSO discharges up to a 25-year storm and providing up to a 5-year level of separate stormwater control for the North Dorchester Bay (South Boston) beaches. It also calls for eliminating stormwater discharges to Pleasure Bay by redirecting them to the Reserved Channel. The long-term CSO control plan for Reserved Channel, also recommended in the SFP/EIR, is described in Section 5.2 of this report. The components of the approved long-term plan for North Dorchester Bay and their respective schedules are presented in Table 3 below. Figure 10 shows the plan, along with the implementation progress MWRA and BWSC have made to date.

MWRA’s Proposed FY11 CIP includes a budget of \$269 million for the North Dorchester Bay CSO plan, including the Pleasure Bay and Morrissey Boulevard storm drains and the costs for land and easement acquisition and construction permits. Once completed, the North Dorchester Bay CSO control plan is expected to eliminate CSO discharges except in catastrophic storms (greater than 25-year storm), compared

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to 16 discharges per year on average today and 21 discharges per year prior to 2007 when MWRA and BWSC completed the South Dorchester Bay and Fort Point Channel sewer separation projects. The sewer separation projects reduced the amount of separate stormwater entering the system upstream of the Columbus Park Headworks, allowing more flow to enter the headworks from the local South Boston system.

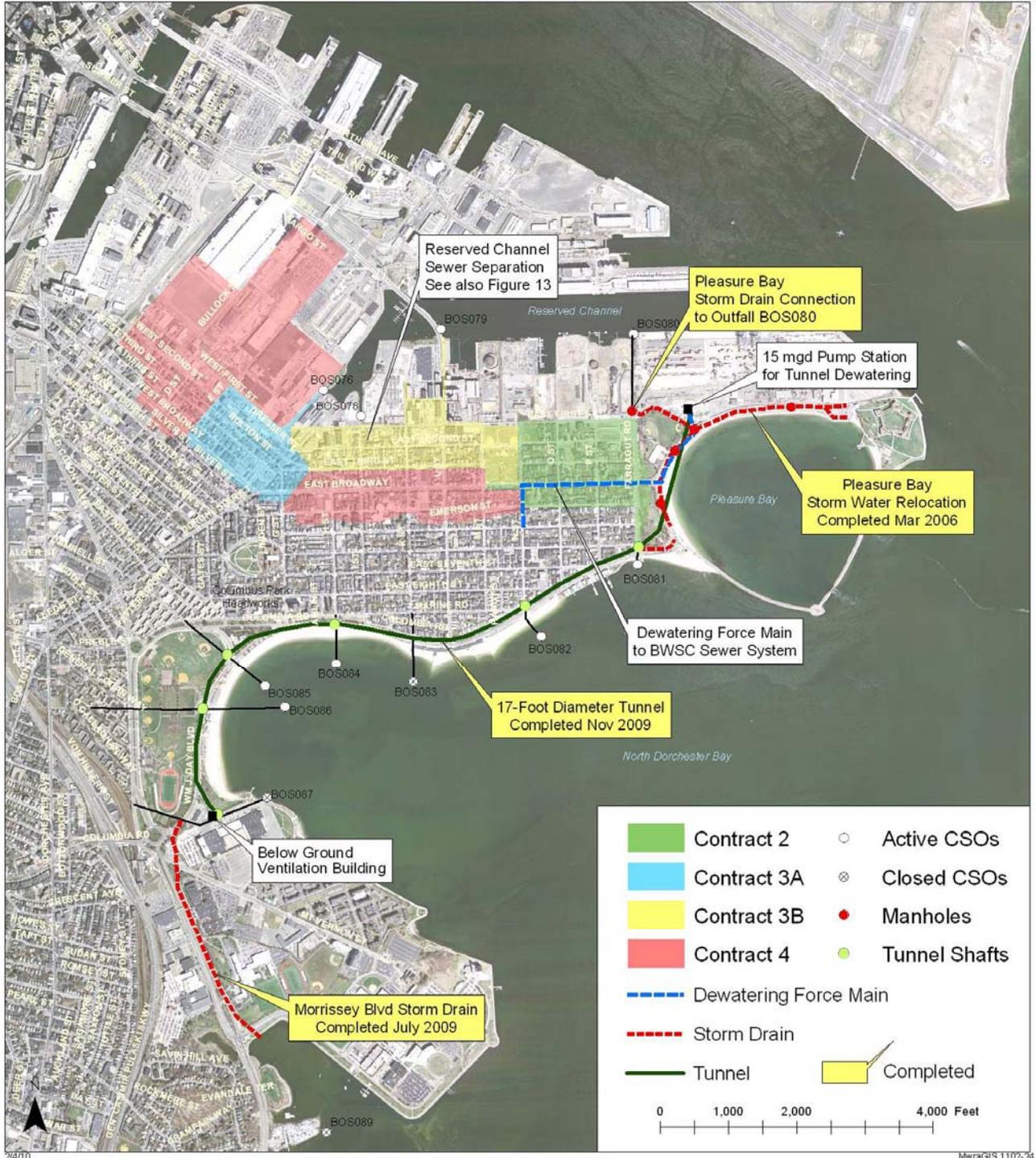
**Table 3: Approved Plan for North Dorchester Bay**

COMPONENT	DESCRIPTION	PROJECT SCHEDULE		
		Commence Design	Commence Construction	Complete Construction
North Dorchester Bay Storage Tunnel	<ul style="list-style-type: none"> <li>• 10,832-ft. long, 17-ft. diameter soft-ground tunnel with mining shaft and equipment removal shaft</li> <li>• Drop shafts, diversion structures and associated piping at CSO Outfalls BOS081 to BOS087, including gates to control stormwater</li> </ul>	Sep 04	Aug 06	Nov 09
North Dorchester Bay Related Facilities	<ul style="list-style-type: none"> <li>• 15 mgd dewatering pump station at Conley Terminal and 24-inch force main</li> <li>• Ventilation Building at upstream end of tunnel</li> </ul>	Nov 06	May 09 Nov 09	May 11
Pleasure Bay Storm Drain Improvements	<ul style="list-style-type: none"> <li>• Stormwater piping and appurtenances to relocate stormwater discharges from Pleasure Bay to Reserved Channel</li> </ul>	Sep 04	Sep 05	Mar 06
Morrissey Boulevard Storm Drain	<ul style="list-style-type: none"> <li>• 2,800-foot long, 12x12 foot box conduit for stormwater conveyance to Savin Hill Cove/South Dorchester Bay</li> <li>• Gated connection to CSO Storage Tunnel</li> </ul>	Jun 05	Dec 06	Jul 09

The project includes the control of separate stormwater discharges to the South Boston beaches. It is important to note that MWRA has no statutory or regulatory responsibility for managing separate stormwater and that this project and its various stormwater elements do not set a precedent for MWRA to adopt such responsibilities.

Stormwater control was added to the North Dorchester Bay CSO control plan to optimize the water quality benefits of the CSO project by taking advantage of the otherwise unused portion of storage volume in the large North Dorchester Bay tunnel in storms smaller than the 25-year design storm. With the project, separate stormwater discharges from drainage systems owned and operated by BWSC and the Department of Conservation and Recreation (DCR) will occur only in storms greater than the 5-year design storm (or once every five years on average), compared to current discharges with every rainstorm (about 100 times per year on average).

Figure 10  
 North Dorchester Bay and Reserved Channel  
 Recommended CSO Control Plans



Stormwater now discharging to the beaches will be redirected into the CSO tunnel in most storms. BWSC stormwater discharges from the Outfall BOS087 area to Carson Beach will be removed from the beach by directing the flows into the CSO tunnel up to the 1-year storm. In storms greater than the 1-year design storm, the BOS087 stormwater will be redirected through the proposed Morrissey Boulevard Storm Drain to a non-swimming area of South Dorchester Bay (Savin Hill Cove). Approximately one million gallons of the “first flush” of stormwater from the BOS087 tributary area will be diverted to the new tunnel up to the 5-year storm event. It is this redirection of some stormwater that allows the project to attain a 5-year level of stormwater control for the beaches.

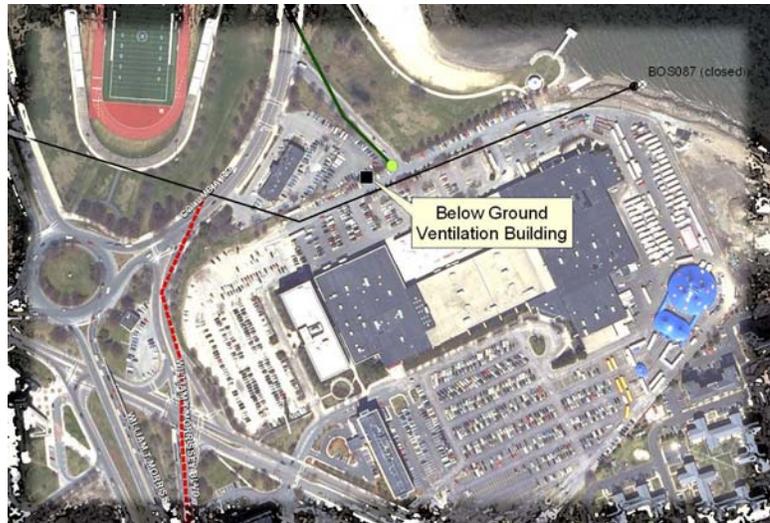


In March 2006, MWRA completed construction of the Pleasure Bay storm drain improvements, ending wet weather discharges to Pleasure Bay Beach and physically removing a dozen storm drain outfalls along the beach. The project relocated the Pleasure Bay stormwater discharges to the less sensitive Reserved Channel, which is primarily a shipping channel.

BWSC is managing implementation of both the Morrissey Boulevard storm drain (construction completed July 2009) and the Reserved Channel sewer separation project (design and phased construction ongoing) under the CSO Memorandum of Understanding and Financial Assistance Agreement, and BWSC will own the constructed facilities. More information about the completed Morrissey Boulevard storm drain is presented in Section 6 of this report. More information about the Reserved Channel sewer separation project, including work progress, is presented in Section 5.2.

### *Progress Constructing the Storage Tunnel and Tunnel Related Facilities*

By the end of 2008, the tunnel contractor had completed mining and lining the 10,832-foot-long, 17-foot diameter tunnel and had removed the tunnel boring machine and construction support apparatus from it. In 2009, the contractor proceeded to complete the remaining work of the tunnel contract, including the finish work on the main shafts at each end of the tunnel, the CSO and stormwater diversion structures and associated near-surface piping at each outfall connection to the tunnel, and the diversion structure gate controls. The contractor completed installation of the reinforced concrete liners and roofs at the two main shafts. The contractor installed a piped connection between the upstream shaft, adjacent to the State Police Building on Day Boulevard, and the Outfall BOS087 stormwater diversion structure and also prepared this shaft to accept a dry-pipe connection to the below-ground ventilation building that will be installed



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under the separate construction contract for the ventilation building (described below). The contractor prepared the downstream shaft, at Massport's Conley Terminal, to accept a wet-pipe connection to the dewatering pump station that will be installed as part of the separate construction contract for the pump station and force main (also described below).

The contractor also completed the work to install CSO and stormwater diversion structures and associated connections to the tunnel at the existing outfalls that will remain in-service (though rarely active) in the long-term, including outfalls BOS081, BOS082, BOS084, BOS085, BOS086 and BOS087. Earlier completed



South Boston CSO Storage Tunnel  
Dewatering Pump Station Construction at Conley Terminal  
Installation of 43 mini-piles for pump station foundation

work established pipe connections to redirect CSO and stormwater flows from Outfall BOS083 to the Outfall BOS084 diversion structures, and Outfall BOS083 will be abandoned when the tunnel project is brought on-line in 2011. The contractor also completed the storm drain system in Logan Way, upstream of Outfall BOS085, that had been delayed due to utility conflicts and contaminated soils.

On November 30, 2009, MWRA issued certification of substantial completion to the tunnel contractor. MWRA has accepted the constructed facilities, including the tunnel, the tunnel shafts, and the near-surface CSO and stormwater diversion structures and related piping. The contractor is now completing punch list items.

In 2009, MWRA also made progress with design and construction of the tunnel related facilities, including the 15 million-gallon per day dewatering pump station at Conley Terminal and associated 4,000-foot-long, 24-inch force main and the below-ground ventilation building. MWRA completed final design of the pump station and force main in the spring and, on May 4, 2009, issued the Notice to Proceed with the \$25.9 million construction contract. The contractor quickly mobilized on the Conley Terminal site and completed preconstruction surveys. During the summer, the contractor completed the relining of BWSC sewers that will accept flows from the pumping station and force main and, in the fall, completed construction of the slurry wall for the pumping station foundation and wet well. By the end of 2009, the contractor also completed the installation of mini-piles to support the pump station foundation, installed the dewatering system and geotechnical instruments and commenced excavation within the slurry walls. This excavation is now complete, and the contractor is preparing to install the mud mat, base slab and walls for the pump station wet well. The contractor has installed more than 2,300 feet of the 24-inch diameter force main and plans to complete the remaining 1,700 feet of force main in the summer of 2010 to avoid impacts to a public school on East Broadway. The contractor has also commenced construction of a 10-inch water line on Shore Road to service the MWRA pumping station. Work to construct a larger gravity sewer on N Street to accept the force main flows is planned to commence this spring.



Supported trench for installation  
of 24" forced main in East Broadway



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**East Boston Branch Sewer Relief**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	March 2000	March 2000
Commence Construction	March 2003	March 2003 (Contract 1)
Resume Design	June 2006	June 2006
Commence Construction	June 2008	July 2008 (Contract 2)
		April 2009 (Contract 3)
Complete Construction	June 2010	June 2004 (Contract 1)
		July 2010 (Contract 2)
		July 2010 (Contract 3)

The \$85.2 million East Boston Branch Sewer Relief project calls for upgrading MWRA's 115-year-old interceptor system serving most of East Boston to minimize CSO discharges to Boston Harbor and Chelsea Creek through outfalls BOS003-014. The current plan, originally recommended in the 1997 Facilities Plan/EIR, includes replacing, relieving or rehabilitating approximately 4.5 miles of existing interceptor sewers using a combination of construction methods: microtunneling, pipebursting, open-cut excavation and pipe relining.

MWRA commenced design services in March 2000, in compliance with the Court Schedule. Early design plans called for three construction contracts to implement the project. In 2002, MWRA suspended the design work on two of the contracts when it determined that the original plan would cost twice as much as estimated in the 1997 Facilities Plan/EIR and would not fully attain the recommended level of CSO control. MWRA continued design work on the first construction contract, which involved relining portions of the existing East Boston Branch Sewer to extend the useful life of the sewer and improve its hydraulic capacity. At the same time, MWRA began a reassessment of the remaining project components, to evaluate the cost effectiveness of the plan against alternatives that might provide higher benefit and/or cost less.

MWRA completed the project reassessment in early 2004. One conclusion from the reassessment was that CSO overflows in East Boston were slightly less than estimated in 1997. The number of CSO discharges at the most active outfall dropped from the previously estimated 37 per year in the 1997 Plan to 31 per year. The total annual volume of CSO discharge from all 10 outfalls in East Boston dropped from 45 million gallons to 41 million gallons. The results confirmed that the interceptor relief project (Figure 11), at a total estimated capital cost of \$73 million at that time (December 2003 dollars), would reduce CSO discharges from 31 to six in a typical year and reduce annual discharge volume from 41 million gallons to 8.6 million gallons, compared to the 1997 plan goals of five activations and 4.0 million gallons.

Based on the results of the reassessment, MWRA determined that the interceptor relief plan, even at the higher cost estimate, continued to be cost-effective and would significantly reduce CSO discharges at all of the East Boston outfalls, keeping with the intent and benefits of the 1997 plan. Ongoing work by BWSC and others to separate sewers in East Boston is expected to further reduce CSO discharges. The reassessed interceptor relief project, with its revised CSO discharge activations and volume was incorporated into Schedule Seven in 2006 with new design and construction milestones.

MWRA commenced the first of three construction contracts for this project in March 2003, in compliance with the Court Schedule. This first contract, Contract 6840, involved installing a structural liner in approximately 6,000 feet of the main trunk line of the East Boston Branch Sewer, primarily along Chelsea and Bremen streets. MWRA completed the contract in June 2004. Construction of the two remaining construction contracts is underway, as described below.



***Progress in 2009 and Ongoing Work – Contract 6257***

The \$60.8 million second construction contract, Contract 6257, is the largest of the contracts. It involves the installation of a total of 2.5 miles of new sewer interceptor along Border, Condor, East Eagle and Chelsea streets and larger replacement sewer along Marginal, Orleans and Bremen streets, primarily using microtunneling methods. The contractor's work plan and schedule splits the contract work into three phases. Each phase is described below, along with the contractor's construction progress to date.

Phase I involves 8,037 feet of microtunneling to install 48-inch and 66-inch diameter pipe from an intermediate point along Border Street to the downstream end of the project at MWRA's Caruso Pump Station. The Phase I alignment follows Border, Condor, East Eagle and Chelsea streets. The contractor received the first 48-inch micro-tunnel boring machine ("MTBM") in December 2008 and began Phase I mining operations in March 2009. Later in 2009, the contractor took delivery of a second 48-inch diameter MTBM and a 66-inch diameter MTBM. The contractor has since completed the Phase I microtunneling and installed all sections of the 48-inch and 66-inch diameter pipe from Border Street to MWRA's Caruso Pump Station. The contractor has also completed installing a cured-in-place liner through the new 48-inch pipe sections.

The remaining work of Phase I includes construction of a special junction chamber (RS8A) on Chelsea Street and installation of a short section of 66-inch diameter pipe to connect the downstream end of the new relief sewer to an existing junction chamber that directs flows into MWRA's Caruso Pump Station. The contractor encountered excessive groundwater infiltration into the junction chamber RS8A excavation, which slowed excavation and installation of the chamber and caused additional costs and delay, but has not upset the contract substantial completion date of July 2010.

Phase II involves 1,500 linear feet of microtunneling to install a 48-inch diameter pipe that will be slip-lined with a 36-inch diameter PVC liner. The Phase II alignment extends from the end of Phase I south along Border Street and through Central Square. Construction of the two shafts in Phase II are complete, and the contractor plans to begin the Phase II mining and pipe installation in the spring of 2010.

Phase III involves 2,500 linear feet of microtunneling along Orleans, Gove and Bremen streets to install a 48-inch diameter pipe which will be slip-lined with a 36-inch diameter PVC liner. Phase III also includes open cut excavations on Marginal Street and Porter Street to install 631 linear feet of 24-inch diameter pipe and 81 linear feet of 36-inch diameter pipe, respectively. The contractor has completed all five of the Phase III shafts and has completed 1,500 linear feet of the 48-inch microtunneling and pipe installation on Orleans and Bremen streets and 36-inch diameter sliplining within a 1,040-foot section of the new pipe on Orleans Street.

MWRA and the contractor maintain continuous coordination with private utility companies and public utility agencies to identify and resolve physical conflicts or protect utilities in-place. MWRA and the contractors regularly maintain and submit utility relocation priority lists and priority relocation orders to the utility companies. Efforts also continue to regularly identify construction strategies for offsetting any delays associated with utility conflicts or unforeseen subsurface conditions and keeping to the original contract schedule. With these approaches, MWRA and its contractor have been able to maintain the original contract completion date of July 2010, one month later than the respective milestone in Schedule Seven.

***Progress in 2009 and Ongoing Work – Contract 6841***

On April 27, 2009, MWRA issued the Notice to Proceed with the third and final construction contract, Contract 6841. This \$7.3 million contract includes replacement and upgrade of approximately one mile of interceptor sewers in upstream reaches of MWRA's East Boston sewer system along Marginal, New,

Maverick, Border and Jefferies streets using “pipebursting” methods. The contract has a substantial completion date of July 2010.

The contractor has completed 2,075 linear feet of pipebursting and simultaneous new pipe insertion to increase a 12-inch pipe to 16-inch pipe along Marginal, Border, Maverick and New streets and also installed 170 feet of 16-inch pipe by open cut excavation. The contractor has also completed three shafts and 422 linear feet of pipebursting and pipe installation to upsize 15-inch pipe to 20-inch pipe along Maverick Street. Construction of four more shafts along Maverick Street is now underway. A total of 2,975 feet of the existing 15-inch diameter pipe along Maverick Street will be upsized to 20-inch diameter with this project. During shaft construction and pipebursting, bypass pump systems provide wastewater flow conveyance around the work.



East Boston Branch Sewer Interceptor Relief Contract 3: Pipe Bursting 16" diameter pipe fusion HDPE on Marginal Street, East Boston

Although the contractor has faced a number of difficulties that have lowered the pipebursting production rate to date and significantly increased the contract cost, MWRA and the contractor have so far been able to maintain the original contract completion date of July 2010.

**Charles River Valley/South Charles Relief Sewer Gate Controls and Additional Interceptor Connections**

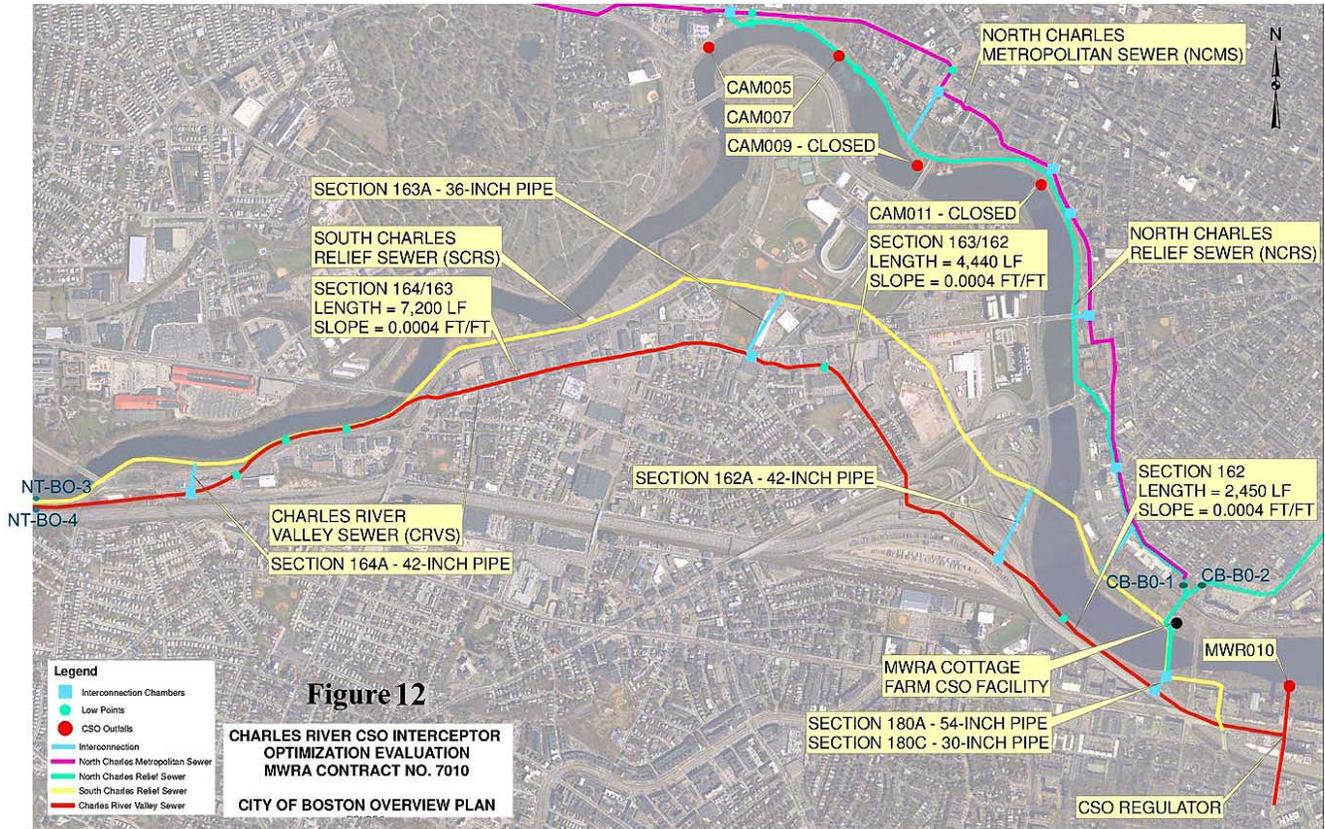
	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	January 2008	January 2008
Submit Report on Additional Connections	January 2009	January 2009
Commence Construction	January 2010	MWRA is seeking relief from these milestones.
Complete Construction	January 2011	

The Charles River CSO interceptor optimization evaluations were originally proposed by MWRA in 2005 and incorporated into Schedule Seven in 2006 for the purpose of providing an optimized allocation of flow among the major interceptors related to the Cottage Farm CSO facility (“Cottage Farm”) and related Charles River CSO outfalls, with the goal of further controlling CSO discharges at these locations to the extent possible. Any CSO benefits achieved from these evaluations were intended to improve upon, but not be necessary to attain, the approved long-term level of CSO control for the Charles River.

One element of the scope of these optimization evaluations was to identify and analyze alternatives for additional low-cost interconnections between the MWRA wastewater interceptors along the south side of the Charles River (including Boston) and the MWRA wastewater interceptors along the north side of the Charles River (including Cambridge) that could improve the conveyance and/or in-system storage of wet weather flows and further reduce CSO discharges and volumes. The south Charles River interceptors include the South Charles Relief Sewer (“SCRS”), which conveys flows to MWRA’s Ward Street Headworks and can

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overflow to Cottage Farm, and the Charles River Valley Sewer ("CRVS"), which also conveys flows to the Ward Street Headworks and can overflow to the SCRS. The north Charles River interceptors include the North Charles Metropolitan Sewer ("NCMS") and the North Charles Relief Sewer ("NCRS"), which together convey flows to the Ward Street Headworks and can overflow to Cottage Farm. From the evaluations, a decision to incorporate any additional interconnections between the interceptors into the CSO control plan was to be based on technical feasibility, low cost, construction impacts, and the ability to meaningfully reduce the frequency and/or volume of CSO discharge (see Figure 12).



The scope of the optimization evaluations also included identifying and implementing a control strategy for existing gates at two of three interconnections between the CRVS and the SCRS or otherwise modifying the gates or interconnections to optimize flow allocation between the SCRS and the CRVS. MWRA anticipated that by modifying the gates or operating them differently it would be able to implement a low cost optimization project that would provide a meaningful reduction to the activation frequency and/or volume of CSO discharge without also causing adverse impacts along the interceptors and in upstream collection systems in large storms.

MWRA commenced its hydraulic evaluations in January 2008 and completed the scoped evaluations in June 2009. The Authority documented its findings in three reports as the study progressed: the Final Hydraulic Modeling Technical Report, December 2008 (the "Final HMTR"), the Report on Evaluation of Additional Charles River Interceptor Connection Alternatives, January 2009, (the "Additional Interconnections Report") and the Supplemental Hydraulic Modeling Technical Report, September 8, 2009 (the "SHMTR"). On October 13, 2009, EPA submitted comments to the Authority on these technical presentations and findings,

and the Authority performed additional evaluations that were presented in a December 14, 2009 response to EPA. MWRA is currently responding to additional questions raised by EPA in January 2010 and plans to submit additional information to support its recommendation, described below.

#### ***Additional Interceptor Interconnections***

On January 31, 2009, MWRA submitted the Additional Interconnections Report to EPA and DEP in compliance with Schedule Seven. This report presented the Authority's analyses and conclusions regarding the evaluation of creating additional interconnections among the interceptors. The report also included a summary of the Authority's progress on its broader interceptor optimization study. The Additional Interconnections Report presented model results and the Authority's conclusion from these results that the existing interceptor interconnections and planned interconnection of the Cottage Farm overflow chambers (now constructed) are effective and sufficient to optimize the allocation of wet weather flows and that additional interceptor interconnections would not provide incremental CSO control or other hydraulic benefit. The report included the following key findings relative to the evaluation of additional interconnections:

- The NCMS and the NCRS on the Cambridge (north) side of the Charles River are interconnected at several locations, and an additional interconnection of these interceptors would not provide significant hydraulic benefit or a higher level of CSO control.
- The CRVS and the South Charles Relief Sewer SCRS on the Boston (south) side of the Charles River are interconnected at three locations, and an additional interconnection of these interceptors would not provide significant hydraulic benefit or a higher level of CSO control.
- Construction of an interconnection of the NCRS and SCRS overflow chambers that the Authority completed at the Cottage Farm CSO Facility in June 2009 provides some hydraulic relief, especially for the north side interceptors in Cambridge. Additional interconnections or modifications to existing interconnections between the NCRS and the SCRS would not provide further hydraulic or CSO benefit.

#### ***Charles River Valley Sewer/South Charles River Relief Sewer Gate Controls***

Following completion of the Final HMTR and submission of the January 2009 report on additional interconnections, MWRA conducted a series of additional model runs to attempt to find an alternative for optimizing the allocation of flow between the CRVS and the SCRS that could provide CSO control and flow velocity benefits without adverse increases in hydraulic grade lines and greater flooding risks in large storms. These additional evaluations and model results are presented in the Supplemental HMTR, which was submitted to EPA and DEP on September 14, 2009.

From model results that had earlier been presented in the Final HMTR, MWRA concluded that increasing the weir heights at the CRVS/SCRS interconnections could lower CSO discharges at Cottage Farm but would also elevate hydraulic grade lines to unacceptable levels and increase flooding risks in large storms. In the additional evaluations conducted for the Supplemental HMTR, the Authority considered other alternatives that might sustain the CSO benefits without the adverse hydraulic grade line impacts in large storms. These options, described in the Supplemental HMTR, primarily involved revising the operating protocols for the two existing gates between these interceptors. Various protocols were evaluated that involved keeping the gates closed in dry weather and in small to moderate storms to attempt to maximize CSO control, and opening the gates in large storms to maintain needed hydraulic relief and flood control.

In the Supplemental HMTR, MWRA concluded that the hydraulic grade line impacts associated with the earlier recommended high weirs could be avoided by opening the existing gates in advance of forecasted larger storms. However, the size storm for which the gates would need to be open to avoid flooding was on the order of a 1-year storm, and having the gates open in this size storm removed most of the CSO control benefit, because CSO discharges to the Charles River at Cottage Farm and other CSO outfalls were already controlled to this level. Therefore, opening the existing gates in advance of forecasted larger storms avoided the risks of flooding but provided little or no CSO benefit.

From the hydraulic evaluations, which are documented in MWRA’s December 2008 Final HMTR, January 2009 Additional Interconnections Report and September 2009 Supplemental HMTR, the Authority concluded that there is no feasible means to optimize the hydraulic performance of its existing Charles River interceptors to increase the level of CSO control.

***Additional Evaluations in Response to EPA's Comments***

On October 13, 2009, EPA submitted comments on the December 2008 Final HMTR, the January 2009 Additional Interconnections Report and the September 2009 Supplemental HMTR to the Authority. In response to EPA's comments, the Authority confirmed the actual baseline (future planned) conditions in its model as consistent with the long-term CSO control plan and reevaluated certain interceptor optimization measures and model results specifically questioned in the EPA comments. The results of these reviews supported the Authority’s earlier conclusions. EPA agreed for the most part, but continues to question whether some form of real-time control can be provided at the existing interconnections between the CRVS and the SCRS to further reduce CSO discharges at Cottage Farm without increasing flooding risk. In response, MWRA is making a closer evaluation and providing additional information to EPA.



**5.2 Community Managed Projects**

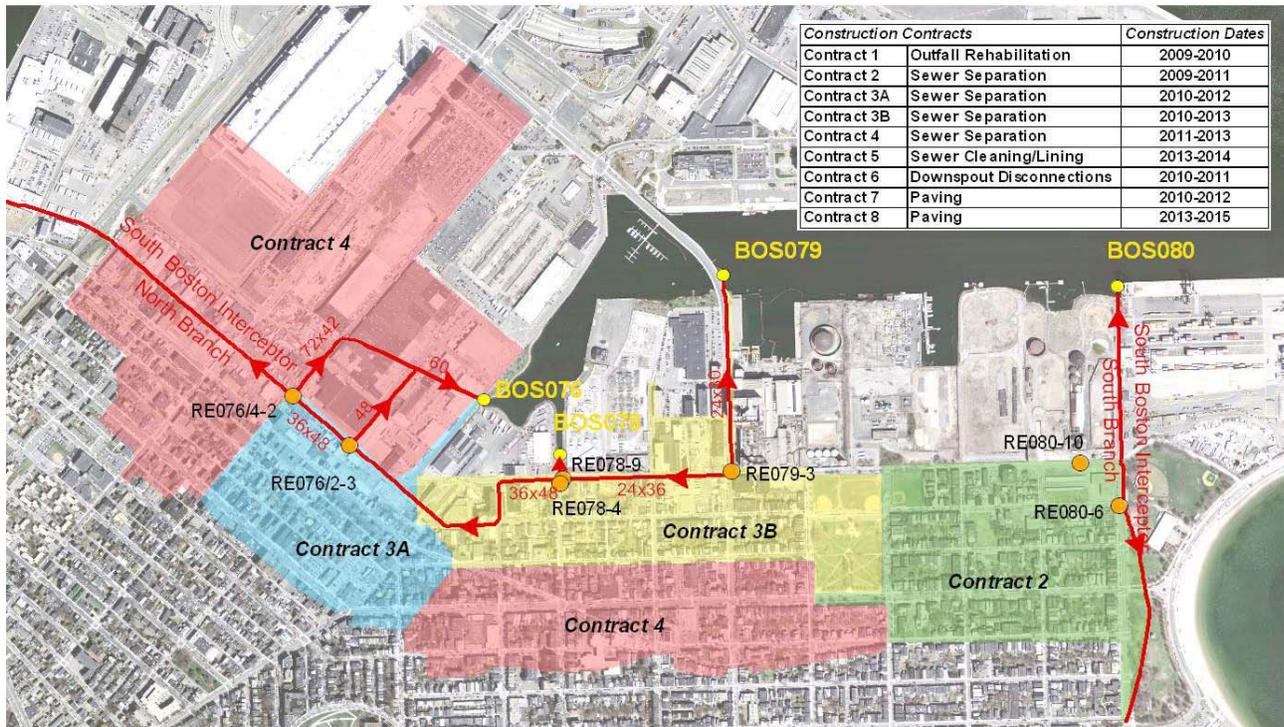
**Reserved Channel Sewer Separation**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	July 2006	July 2006
Commence Construction	May 2009	May 2009
Complete Construction	December 2015	December 2015

The \$78.6 million Reserved Channel Sewer Separation project is intended to minimize CSO discharges and impacts to the Reserved Channel by separating combined sewer systems in a portion of South Boston tributary to CSO Outfalls BOS076, BOS078, BOS079 and BOS080 (see Figure13). Implementation of the approved sewer separation plan will reduce the number of CSO activations to the Reserved Channel from 37 events to three events in a typical year. The work includes the installation of approximately 35,000 linear feet of new storm drain, along with an additional 6,500 feet of minor drain to connect catch basins to the new

storm drains. To remove enough stormwater inflow from the sewer system and attain the long-term level of CSO control, many building downspout connections and parking lot drains will also be disconnected from the sewer and tied into the new storm drains. The project also includes rehabilitating and/or upgrading the four CSO outfalls to ensure they have the capacity to deliver the separated stormwater flows, as well as remaining, infrequent CSO flows, to the Reserved Channel for the long term.

Figure 13. Reserved Channel Sewer Separation



The project area encompasses approximately 365 acres of South Boston that comprise the drainage areas tributary to the four Reserved Channel outfalls. This area is an urban mix of residential properties along with non-residential properties of commercial, industrial and recreational land uses. East First Street is the primary roadway through the project area and is characterized by heavily congested utilities and truck traffic primarily associated with transportation of containers from Massport’s Conley Terminal.

MWRA and BWSC added this project to their CSO Memorandum of Understanding and Financial Assistance Agreement in June 2006. BWSC is responsible for managing design and construction of the project and ensuring that CSO control goals and other project objectives are met, and it will own the new storm drains and upgraded sewers. MWRA is funding design and construction costs pursuant to the eligibility terms of the agreement. BWSC commenced design in July 2006, in compliance with Schedule Seven. The design work and construction contracts for the Reserved Channel sewer separation project will follow an approach similar to the South Dorchester Bay and Stony Brook sewer separation projects, with multiple construction contracts sequenced over several years. BWSC proposes nine, phased construction contracts for this project, including four sewer separation contracts (BWSC Contracts 2, 3A, 3B, and 4), an outfalls rehabilitation contract (BWSC Contract 1), a sewer cleaning and lining contract (BWSC Contract 5), a downspout disconnection contract (BWSC Contract 6), and two final paving contracts (BWSC Contracts 7 and 8).

***Progress in 2009 and Ongoing Work***

BWSC has made substantial progress with design of the project since issuing the Preliminary Design Report in early 2008, and construction of a portion of the project is now underway. On May 26, 2009, BWSC issued the Notice to Proceed with “Contract 2,” the first of the nine planned construction contracts, in compliance with Schedule Seven. BWSC awarded this contract in the low bid amount of \$6,938,141, \$5,874,700 of which is eligible for MWRA funding. Contract 2 includes the installation of approximately 12,700 linear feet of storm drain ranging from 12-inch diameter to 60-inch diameter and the removal of stormwater flows from the combined sewer system tributary to Outfall BOS080, one of the four CSO outfalls that discharge to the Reserved Channel.

Most of the contractor’s work in 2009 involved the installation of large drain pipes in the area of Farragut and East First streets, with more recent construction involving smaller diameter storm drain laterals within connecting streets. To date, the contractor has installed approximately 2,800 feet of storm drain, 22 percent of all storm drain called for in this contract. The contract calls for completion of work by March 2011.



**Installation of special manhole at East Second and O Streets**

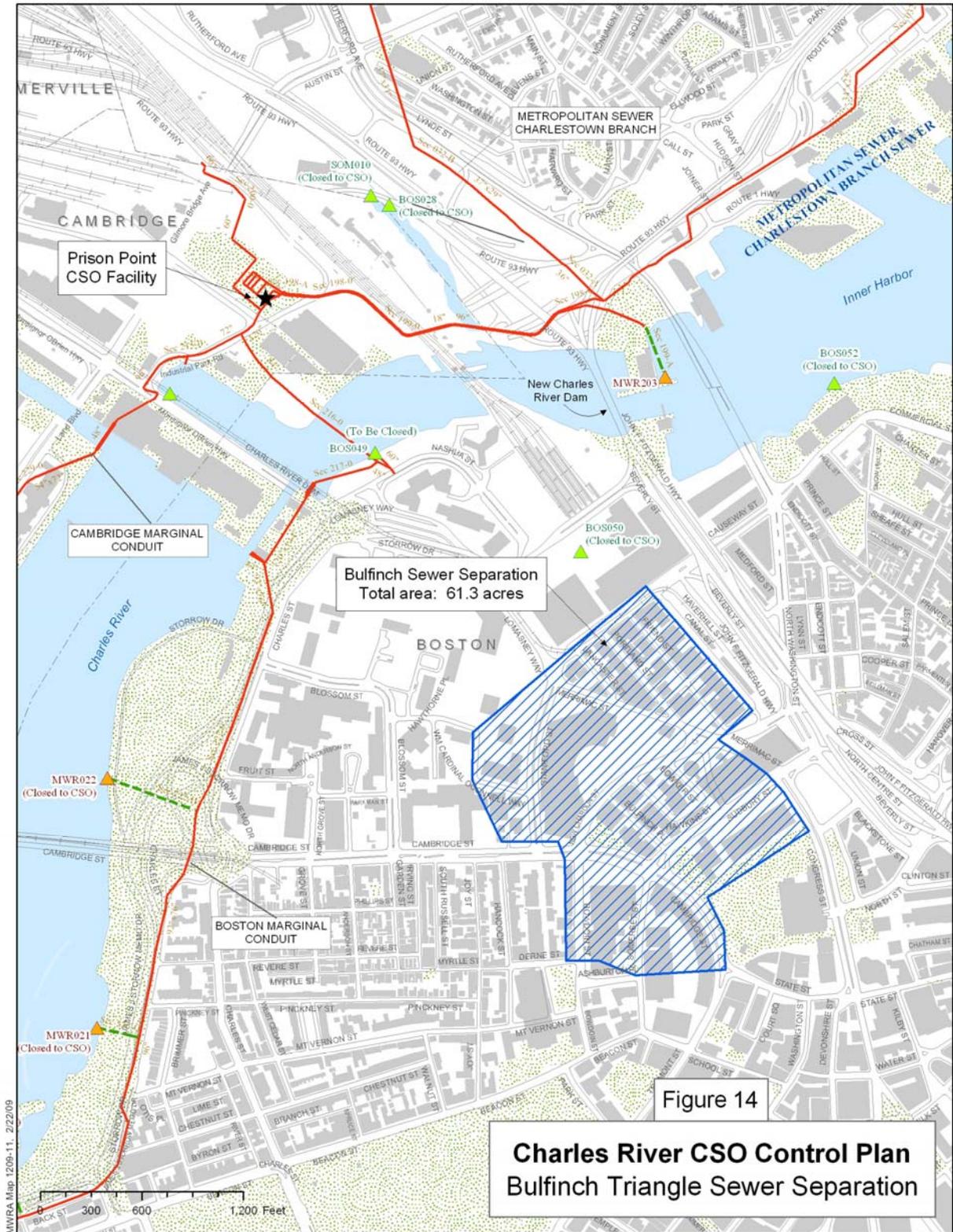
In the meantime, BWSC continues to make scheduled progress with final design of the other Reserved Channel contracts, which BWSC plans to award sequentially from June 2010 through April 2013. BWSC plans to award the second construction contract, which involves rehabilitation of the CSO outfalls (Contract 1), in June 2010. BWSC plans to award two additional sewer separation contracts in the summer of 2010. These two contracts, Contracts 3A and 3B, involve the installation of storm drains and the removal of stormwater flows from the combined sewer system tributary to Outfall BOS076 and Outfalls BOS078/ BOS079, respectively, in the summer of 2010. BWSC’s project schedule calls for all work to be completed by December 2015, in compliance with Schedule Seven.

**Bulfinch Triangle Sewer Separation**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	November 2006	November 2006
Commence Construction	November 2008	September 2008
Complete Construction	July 2013	July 2010

The goal of the \$9.6 million Bulfinch Triangle sewer separation project is to minimize CSO discharges to the Charles River by separating combined sewer systems in a 14-acre area bounded by Causeway, Merrimac and Canal streets (see Figure 14). This separation work will also allow BWSC to remove the storm drain systems serving a previously separated 47-acre area of Government Center from the combined sewer system. Land use in the project area is characterized by multi-story mixed residential and commercial buildings. Implementation of the recommended sewer separation plan will reduce CSO discharges to the Charles River,

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reduce overflows to the Prison Point CSO facility, and allow BWSC to eliminate CSO discharges at Outfall BOS049, which will then serve as a stormwater outfall to the Charles River Basin.

MWRA and BWSC added this project to their CSO Memorandum of Understanding and Financial Assistance Agreement in October 2006. BWSC is managing design and construction of the project and is responsible for ensuring that CSO control goals and other project objectives are met. BWSC will also own the new storm drain system. MWRA is funding the design and construction costs pursuant to the eligibility terms of the agreement.

The project includes the installation of approximately 4,500 feet of new storm drain of 12- to 54-inch diameter and 1,360 feet of new sanitary sewer of 12- to 24-inch diameter. Existing stormwater connections from all streets and parking areas will be disconnected from the combined sewer system and reconnected to the new drains. Stormwater connections from buildings will be removed to the extent possible while avoiding major internal plumbing work. The new drainage system will also have sufficient capacity to convey stormwater flows from an adjacent separated storm drain system located in Congress Street that currently ties back into the combined sewer system. BWSC's construction contract also includes extensive replacement of old water lines, with MWRA funding of this work limited to relocation of existing water lines that are in conflict with the sewer separation work.

#### ***Progress in 2009 and Ongoing Work***

BWSC issued the Notice to Proceed with the sole construction contract for this project in September 2008. As of March 2010, the contractor has completed the installation of the 4,500 feet of new storm drain and is continuing with the installation of sewer system special structures and performing TV inspections and sewer cleaning. The contract completion date is July 8, 2010, well in advance of the July 2013 milestone in Schedule Seven.

Wastewater generated in the Bulfinch Triangle area will continue to be collected by BWSC's West Side Interceptor and conveyed to MWRA's Ward Street Headworks at Mission Hill. Overflow connections from the West Side Interceptor to CSO Outfall BOS049 have been removed or closed off with the sewer separation project, allowing BWSC to convert CSO Outfall BOS049 to a storm drain and to disconnect this outfall from MWRA's Boston Marginal Conduit and Prison Point CSO Facility system. When the isolation of the outfall is complete, CSO will no longer discharge to the Charles River Basin at Outfall BOS049.



**Installation of storm drain on Merrimac Street**

**Brookline Sewer Separation**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	November 2006	November 2006
Commence Construction	November 2008	November 2008
Complete Construction	July 2013	July 2013

The \$24.0 million Brookline sewer separation project is intended to provide separate sewer and storm drains for approximately 72 acres of the Town of Brookline that are served by local combined sewers tributary to MWRA’s Charles River Valley Sewer (see Figure 15). The project goal is to reduce treated CSO discharges to the Charles River at MWRA’s Cottage Farm Facility. MWRA and the Town of Brookline executed a CSO Memorandum of Understanding and Financial Assistance Agreement in July 2006 by which Brookline agrees to manage design and construction of the project and ensure that CSO control goals and other project objectives are met. Brookline will also own the constructed storm drains and sewers. MWRA is funding the design and construction costs pursuant to the eligibility terms of the agreement

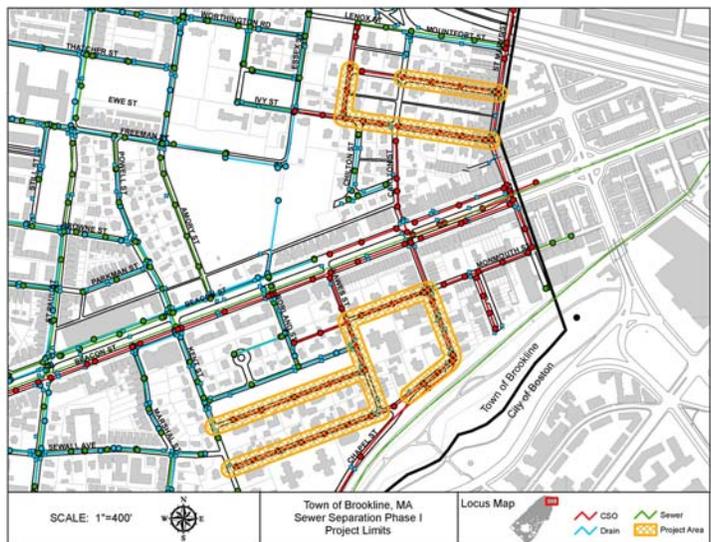
***Progress in 2009 and Ongoing Work***

The project includes two construction contracts. Construction Contract 1 includes the installation of 6,800 linear feet of storm drain in secondary streets along the north and south sides of Beacon Street. Brookline issued the Notice to Proceed for this \$1.4 million contract in November 2008, in compliance with Schedule Seven. The contractor completed the storm drain installations and attained substantial completion of the contract in November 2009. The contractor will lay final paving through Spring 2010.

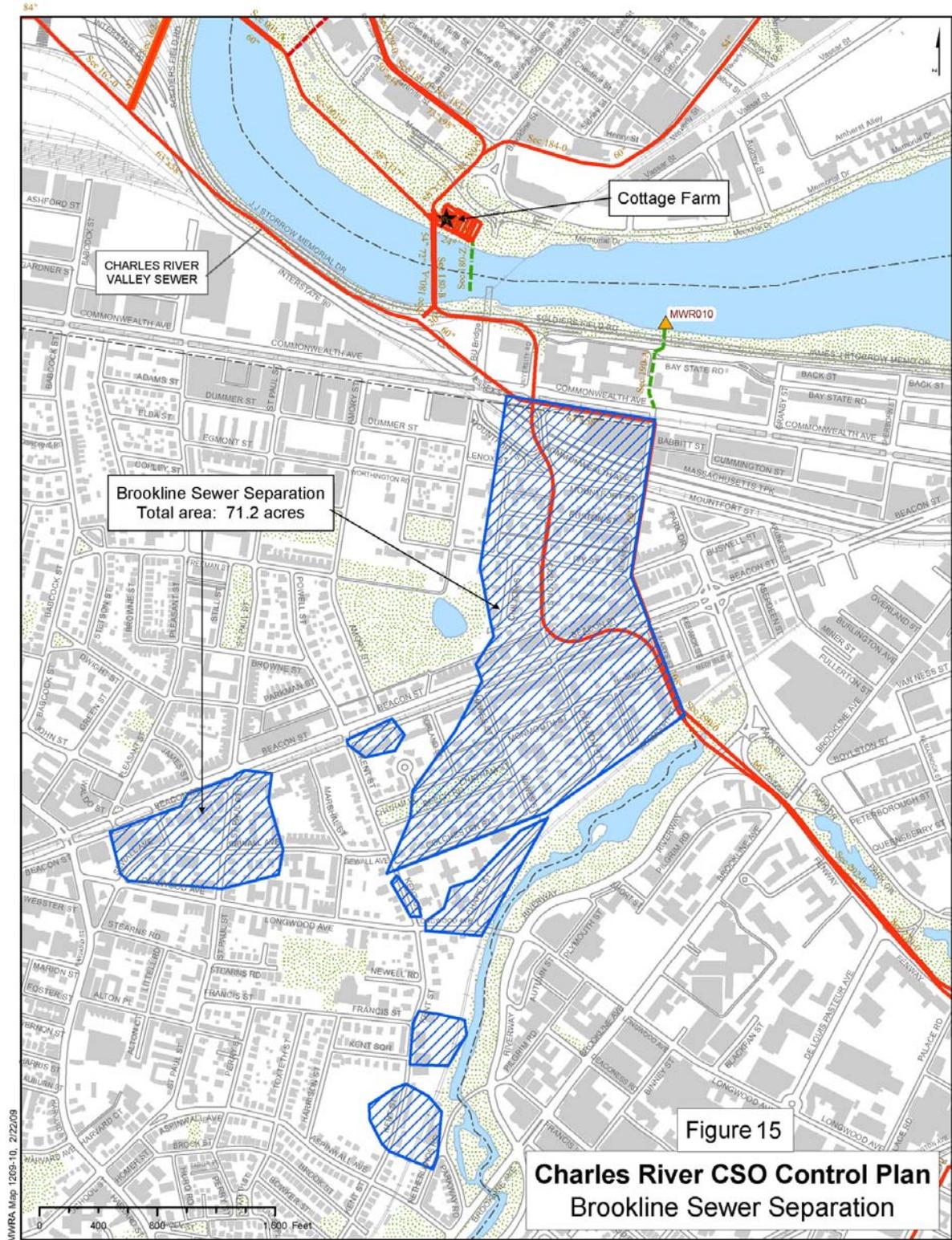
Brookline is also continuing with final design of the second and much larger separation contract, which has an estimated value of \$22 million. The second contract calls for microtunneling to install large diameter sewers at significant depths along Beacon and Monmouth streets; installation or rehabilitation of smaller-diameter sewers and installation of storm drains along Beacon, Monmouth and St. Mary’s streets, and conversion of a large-diameter combined sewer to a storm drain along St. Mary’s Street. Several special structures will be constructed to connect the new sewers to existing town laterals and to create new connections to MWRA’s interceptor system, including the Charles River Valley Sewer and the South Charles Relief Sewer, which carries flows to MWRA’s Ward Street Headworks and can overflow in large storms to the Cottage Farm facility.

Brookline submitted the 95 percent design documents to MWRA in November 2009 and expects to complete design, obtain necessary permits and advertise the construction bid documents in the spring of 2010. Brookline plans to complete construction ahead of the July 2013 milestone in Schedule Seven.

In the meantime, MWRA is developing a scope of services for inspection and cleaning of CSO Outfall MWR010, which will be used to carry the separated Brookline stormwater to the Charles River. MWRA plans to complete the work, including any necessary outfall repairs, by the time Brookline brings its new stormwater system on-line.



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**Alewife Brook CSO Control Plan Projects**

Alewife Brook Project	Commence Design		Commence Construction		Complete Construction	
	Court Milestone	Project Schedule	Court Milestone	Project Schedule	Court Milestone	Project Schedule
CAM004 Stormwater Outfall and Wetland Basin			Jul 10*	Jul 10	Jul 12*	Jul 12
CAM004 Sewer Separation	Jan 97	Jan 97	Jul 98	Jul 98	Dec 15*	Dec 15
			Jul 12*	Jul 12		
CAM400 Manhole Separation	Jul 06	Oct 08	Jan 10*	Jan 10	Mar 11*	Mar 11
Interceptor Connection Relief and Floatables Control at CAM002 and CAM401B and Floatables Control at CAM001	Jul 06	Oct 08	Jan 10*	Jan 10	Oct 10*	Oct 10
Control Gate/Floatables Control at Outfall MWR003, MWRA Rindge Avenue Siphon Relief, and Interconnection Relief and Floatables Control at Outfall SOM01A	Apr 12*	Apr 12	Nov 13*	Nov 13	Jan 15*	Jan 15

(\*) indicates milestones recently proposed by MWRA.

***Background and Description of the Alewife Brook CSO Control Plan***

The Alewife Brook CSO control plan is intended to minimize CSO flows to Alewife Brook primarily by separating combined sewer systems in parts of Cambridge, but also by upgrading hydraulic capacities at local connections to MWRA interceptors. A new stormwater outfall and wetland basin will be constructed to accommodate the separated stormwater flows, prevent any increase in flooding along Alewife Brook, and provide a level of stormwater treatment. Most of the design and construction work is managed by the City of Cambridge with MWRA funding, under a Memorandum of Understanding and Financial Assistance Agreement. Cambridge began construction of the sewer separation plan in July 1998, in accordance with the recommended plan in the 1997 Facilities Plan/EIR and in compliance with the original set of milestones for this project in the Court Schedule. Cambridge completed all four of the construction contracts it awarded at that time. The completed work significantly reduced CSO discharges to Alewife Brook. Hydraulic model simulations predict that CSO discharges were reduced from 63 activations and 50 million gallons annual volume in a typical year to 25 activations and 33 million gallons with these completed contracts.

In 2000, MWRA and Cambridge suspended further design work and construction contract awards related to the 1997 plan because new information showed that conditions in the Cambridge combined sewer system were markedly different from conditions assumed in 1997. MWRA and Cambridge determined that considerably more work, as well as changes to the scope of work, would be necessary to meet the 1997 CSO control goals for Alewife Brook. In April 2001, MWRA and Cambridge submitted a Notice of Project Change for public review recommending an expanded and much more costly sewer separation plan to meet the goals. The Secretary's Certificate on the Notice of Project Change, issued in June 2001, required MWRA and Cambridge to prepare a document responding to all public comments, including comments related to the feasibility of obtaining necessary federal and state permits and other approvals to build the project. In May 2003, MWRA and the City of Cambridge submitted the response to MEPA, addressing all public comments. The Response to Comments was two years in the making and involved extensive interactions with regulatory agencies, community officials in Arlington, Belmont and Cambridge, DCR and the public.

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The Response to Comments also presented a final project plan that incorporated adjustments made during the public review process to address the various concerns that had been raised. In particular, significant adjustments were made to Cambridge’s proposed stormwater system and wetland basin to ensure that the stormwater flows generated by the sewer separation work would have no adverse impact on Alewife Brook flood elevations and that the wetland basin would contribute to the ecological and recreational goals in DCR’s Master Plan for the Alewife Reservation. Submission of the Response to Comments document effectively marked satisfaction and completion of the MEPA review requirements for the Alewife plan, allowing MWRA and Cambridge to move the projects in the plan into design and construction.

The revised CSO control plan for Alewife Brook comprises several component projects that were individually incorporated into the Court Schedule in April 2006. They are shown in Figure 16 and described in Table 4 below.

**Table 4: Alewife Brook CSO Control Plan**

Project	Capital Cost <sup>(1)</sup> (millions)	Cambridge Contract No.	Benefit
CAM004 Stormwater Outfall and Wetland Basin	\$29.0	12	Convey stormwater flows to wetland system for attenuation and treatment.
CAM004 Sewer Separation <sup>(2)</sup>	76.5	8A,8B, 9	Remove large quantities of stormwater from the sewer system; eliminate CSO at Outfall CAM004.
CAM400 Manhole Separation	5.9	4/13	Remove stormwater from the sewer system; eliminate CSO at Outfall CAM400.
Interceptor Connection Relief and Floatables Control	3.3		Upgrade connections between Cambridge and MWRA systems to provide relief; add floatables control.
MWR003 Control Gate and Rindge Ave. Siphon Relief	2.4	MWRA Contract	Optimize hydraulic conveyance; minimize overflows while controlling system flooding in large storms.
<b>Total Alewife Brook CSO Plan</b>	<b>\$117.1</b>		

<sup>(1)</sup> Total plan cost to be shared by MWRA and the City of Cambridge pursuant to Memorandum of Understanding and Financial Assistance Agreement. Does not reflect updated costs in the Prop. FY11 CIP or from the recent award of Contract 4/13.

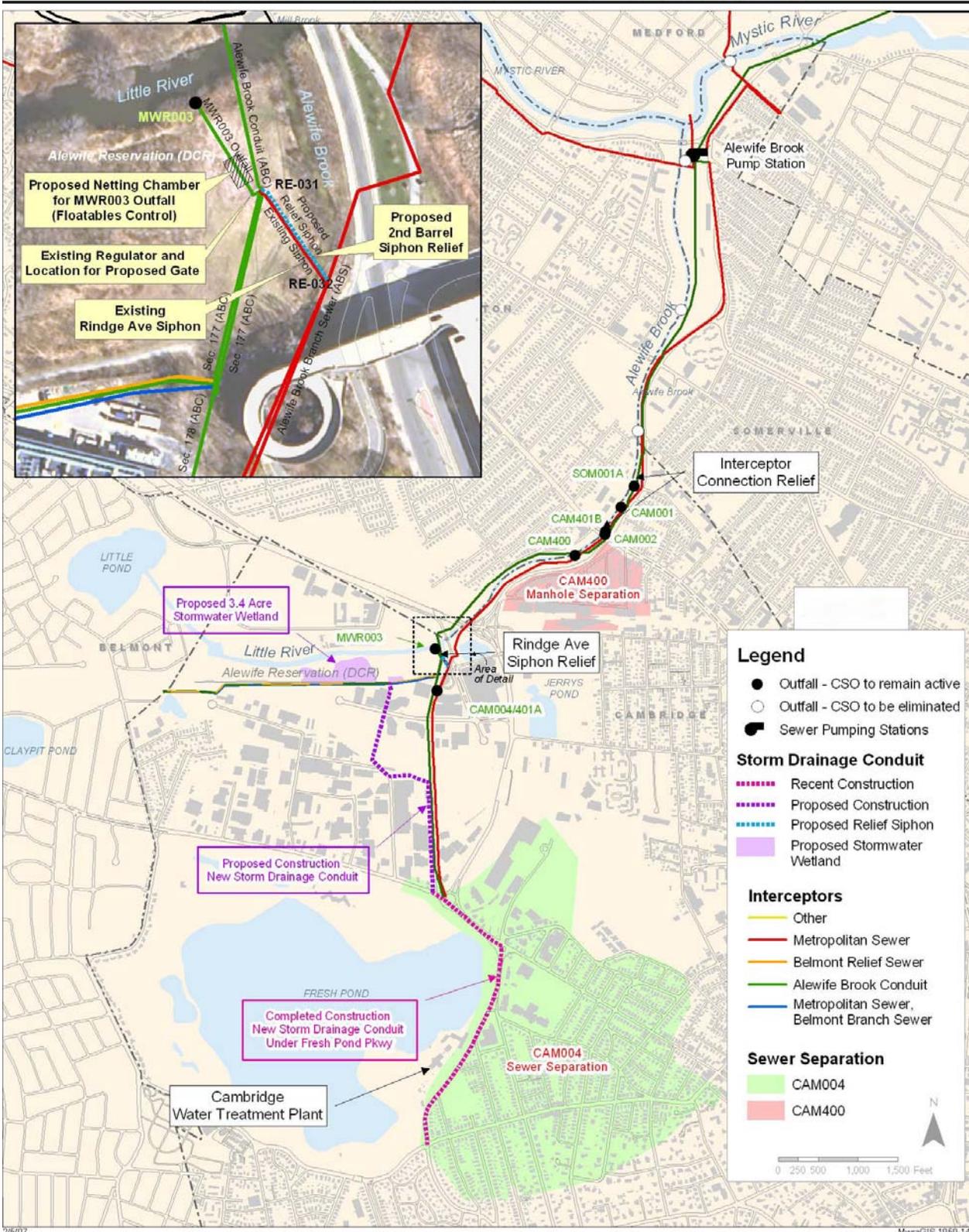
<sup>(2)</sup> Also includes earlier construction contracts completed by Cambridge.

Together, these projects are predicted to reduce annual CSO volume to Alewife Brook by 85% in a typical year, from 50 million gallons in 1997 to 7.3 million gallons. CSO activations in a typical year will be reduced from 63 in 1997 to seven. MWRA hydraulic model and water quality model simulations predict that the recommended control levels will comply with Class B (fishing and swimming) water quality criteria 98.5 percent of the time. Other sources of pollution, primarily stormwater, will continue to cause more frequent water quality standards violations in Alewife Brook.

***Delays in Implementing the Approved Plan***

After completion of MEPA review in 2003, Cambridge updated its preliminary design plans to reflect several additional project modifications that resulted from MEPA review, public comments and new field information. Cambridge also updated its design and construction schedules and cost estimates. At the same time, Cambridge pursued final design of “Contract 12,” which is key to the overall Alewife CSO plan and is necessary for remaining contracts to move forward. Contract 12 involves construction of the CAM004 wetland basin and new storm drain outfall in the Alewife Reservation, as well as a bending weir structure to maximize the volume of stormwater that will be directed to the wetland system for treatment and attenuation. These facilities must be in place to accommodate the stormwater that will be removed from the combined sewer system and redirected to Alewife Brook.

Figure 16  
**Alewife Brook CSO Control - Revised Plan**



In the period 2005 through 2008, Cambridge's progress on Contract 12 incurred delay from citizens' appeals of DEP's approval of the wetland basin and stormwater outfall pursuant to the Wetlands Protection Act. Cambridge received a Superseding Order of Conditions for Contract 12 from DEP on March 31, 2005.

The administrative appeal was filed by a group of citizens on April 13, 2005. More than two years into the appeals process, on June 1, 2007, the Acting Commissioner of DEP issued a final decision sustaining the Superseding Order of Conditions for Contract 12. The Acting Commissioner's decision was subject to the petitioners' right to request reconsideration within 30 days. The petitioners filed a motion for reconsideration on June 12, 2007. On October 16, 2007, DEP issued a decision denying the petitioner's motion for reconsideration and again sustaining the Superseding Order of Conditions. On November 14, 2007, the petitioners appealed this DEP decision in a complaint filed in Massachusetts Superior Court. The complaint in part requested the Court to enjoin the City of Cambridge from taking any action toward construction of any portion of the project until the matters of the appeal are resolved. On October 1, 2008, the Court allowed a Cambridge motion to dismiss the case, and plaintiffs appealed this court decision on December 11, 2008. The Court subsequently denied a motion for reconsideration on February 27, 2009, and allowed Cambridge's motion to dismiss the notice of appeal on May 5, 2009.

In the meantime, the Superseding Order of Conditions remained in effect, allowing MWRA and the City of Cambridge to move forward to implement Contract 12 and the rest of the Alewife Brook CSO control plan. Cambridge and MWRA amended their CSO Memorandum of Understanding and Financial Assistance Agreement ("MOU and FAA") to replace the 1997 Alewife Brook plan with the revised plan and increase the MWRA financial assistance amount (MWRA cost share) accordingly. On July 16, 2008, the MWRA Board of Directors approved an amendment to the MOU and FAA that increased the financial assistance amount from \$21.6 million to \$60.0 million, in addition to the \$3.4 million that MWRA will separately spend to implement its MWR003 Gate and Rindge Avenue Siphon Relief project. The total cost of the Alewife Brook Sewer Separation plan, including MWRA and Cambridge cost shares, is \$117.4 million. In October 2008, Cambridge resumed design work for three of the five projects that comprise the Alewife Brook plan: CAM004 stormwater outfall and wetland basin (Contract 12); CAM400 manhole separation (Contract 13); and interceptor connection relief and floatables control at CAM002 and CAM401B and floatables control at CAM001 (Contract 4).

On December 11, 2008, the plaintiffs filed a notice of appeal, which was dismissed in Superior Court on January 12, 2009, but then re-filed on January 16, 2009, as a motion requesting reconsideration of the dismissal and relief from judgment. On February 17, 2009, Cambridge filed an opposition to the plaintiff's motion for reconsideration together with a motion to dismiss the second notice of appeal. Superior Court denied the motion for reconsideration on February 27, 2009, and on May 5, 2009, allowed Cambridge's motion to dismiss the January 16, 2009 notice of appeal.

### ***Progress in 2009 and Ongoing Work***

Soon after commencing the design work in October 2008, Cambridge determined that it could effect technical efficiencies and cost savings by combining two of the Alewife Brook projects – Interceptor Connection Relief and Floatables Control at CAM002 and CAM401B and Floatables Control (Contract 4) and CAM400 Manhole Separation (Contract 13) – into one construction package, appropriately called "Contract 4/13." The projects are located along and near the same stretch of Alewife Brook Parkway at the intersection with Massachusetts Avenue. Through 2009, Cambridge's final design work for these projects assumed one construction contract, and the design work progressed rapidly. Cambridge completed final design in the fall of 2009 and advertised the contract for construction bids on November 19, 2009. Cambridge issued the Notice to Proceed for Contract 4/13 to the lowest responsive bidder on January 26,

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2010. This commencement of construction was a major milestone in implementing the revised Alewife Brook sewer separation plan several years after design and construction efforts were suspended due to the project reassessment and subsequent wetlands appeals.

Cambridge has also continued to make progress with final design of the CAM004 wetland basin and stormwater outfall (Contract 12) and is working to obtain numerous construction and long-term maintenance easements from private and public land owners prior to awarding the contract. Some of the property owners have changed since the wetlands appeal forced a suspension of design work several years ago. Cambridge is coordinating land interests with them, which, in turn, has caused some limited project design changes. Cambridge expects to complete final design, obtain all necessary easements and permits, and award Contract 12 by July 2010.

Design and construction milestones for the five Alewife Brook projects were added to Schedule Seven in 2006 when EPA and DEP approved the regional long-term CSO control plan, and when resolution of the wetlands appeal seemed imminent. But the appeals process continued through 2007 and into 2008. MWRA and Cambridge are currently negotiating with the Court parties to the Boston Harbor Case to revise certain milestones in Schedule Seven related to the CSO control plan for Alewife Brook. MWRA and Cambridge met with EPA and DEP in the fall of 2009 to discuss the proposed milestone changes, together with the proposed deletion of construction milestones for the Charles River, and are currently working to finalize the negotiations and obtain EPA and DEP support. MWRA plans to circulate a motion seeking to amend Schedule Seven of the Boston Harbor Case to the Court parties once negotiations are finalized and to file the motion with the Court thereafter.

In the proposed milestone changes, the new construction schedule for Contract 12 maintains the original two-year construction duration but moves the start and end dates out nine months further than a schedule resulting from the wetlands appeal delay alone. This additional time is necessary to obtain easements and permits for construction, including private and public property easements, permits for a railroad crossing, and approval by the state legislature pursuant to Article 97 of the Massachusetts Constitution for work in the Department of Conservation and Recreation's (DCR) Alewife Reservation.

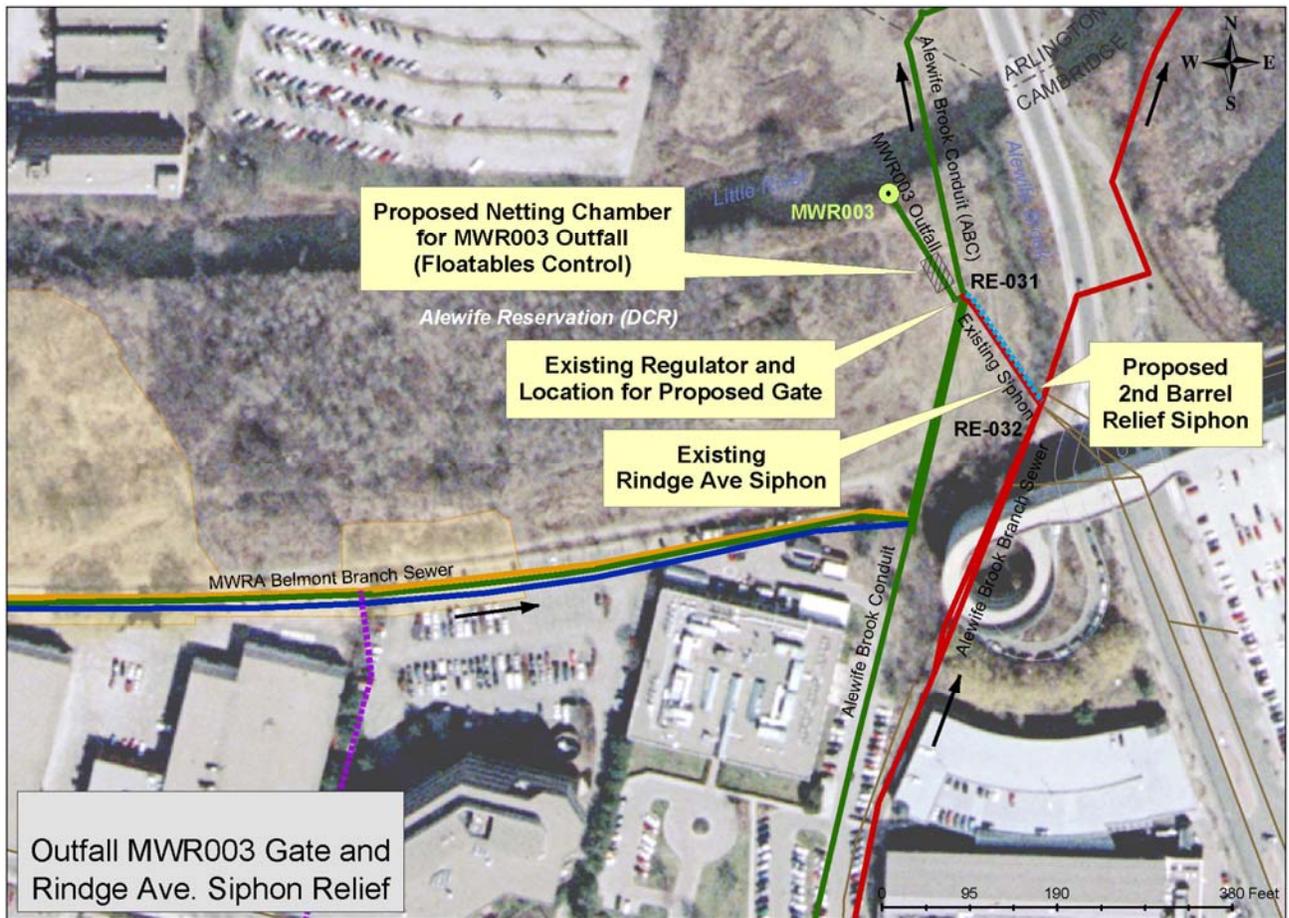
The proposed schedules for CAM400 Manhole Separation and for Interceptor Relief and Floatables Controls, both Cambridge implemented, show revised construction durations - longer and shorter, respectively - to reflect the complexity of each project. The new schedules also reflect the decision by Cambridge to combine these projects into one construction contract that will include separate project substantial completion dates. The later of the completion dates is unchanged from what would result from the 27-month wetlands appeal delay alone.



The new completion date for CAM004 Sewer Separation is dependent on the schedule for Contract 12, so is also pushed out nine months more than the delay caused by the wetlands appeal alone. The schedule for this last Alewife Brook project calls for completion of construction by December 2015.

***MWRA Improvements at Outfalls MWR003 and SOM01A and at Rindge Avenue Siphon***

While the City of Cambridge will implement most of the projects in the Alewife Brook CSO control plan, MWRA plans to design and construct one project that includes the elements of the plan dealing directly with MWRA sewers, an MWRA CSO outfall, and a City of Somerville CSO outfall. This work involves an automated hydraulic relief gate and associated controls at the overflow weir associated with Outfall MWR003; floatables control for this outfall; relief of a 30-inch MWRA siphon associated with Outfall MWR003; and hydraulic relief and floatables control at Outfall SOM01A. The project schedule for design and construction is directly dependent on the schedule for Cambridge's Contract 12. Accordingly MWRA's project schedule and proposed Schedule Seven milestones call for commencement of design by April 2012, commencement of construction by November 2013, and completion of construction by January 2015. MWRA plans to begin the procurement of design services in 2011.



**6. COMPLETED CSO PROJECTS**

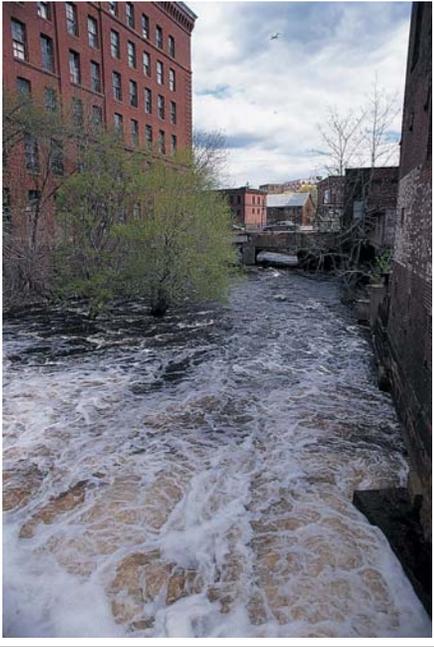
<b>1. SOMERVILLE BAFFLE MANHOLE SEPARATION</b>		
	<p><b>Receiving Water:</b> Alewife Brook, Upper Mystic River</p> <p><b>Completed:</b> 1996</p> <p><b>Capital Cost:</b> \$400,000</p> <p><b>Description:</b> Separated common manholes connecting local sewer and storm drain systems. City of Somerville performed design and construction with MWRA financial assistance.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Eliminated CSO discharges at three City of Somerville outfalls.</p> <p><b>CSO Outfalls:</b> SOM001, SOM006, SOM007</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 2  <b>With project:</b> Eliminated</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 0.04 million gallons  <b>With project:</b> Eliminated</p> <p><b>CSO Reduction by Volume: 100%</b></p>
<b>2. CONSTITUTION BEACH SEWER SEPARATION</b>		
 <p style="font-size: small; margin-top: 5px;">MWRA decommissioned its Constitution Beach CSO Facility after CSO flows were eliminated by BWSC sewer separation.</p>	<p><b>Receiving Water:</b> Boston Harbor/Constitution Beach</p> <p><b>Completed:</b> 2000</p> <p><b>Capital Cost:</b> \$3,768,888</p> <p><b>Description:</b> Installed approximately 14,000 linear feet of storm drain to separate the combined sewer system, removed stormwater flows from area sewers, and eliminated CSO discharges to Constitution Beach, allowing MWRA to decommission the Constitution Beach CSO treatment facility. BWSC performed design and construction with MWRA financial assistance.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Eliminated CSO discharges to Constitution Beach to comply with Class B water quality standards.</p> <p><b>CSO Outfalls:</b> MWR207(BOS002)</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 16 treated  <b>With project:</b> Eliminated</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 1.35 million gallons  <b>With project:</b> Eliminated</p> <p><b>CSO Reduction by Volume: 100%</b></p>

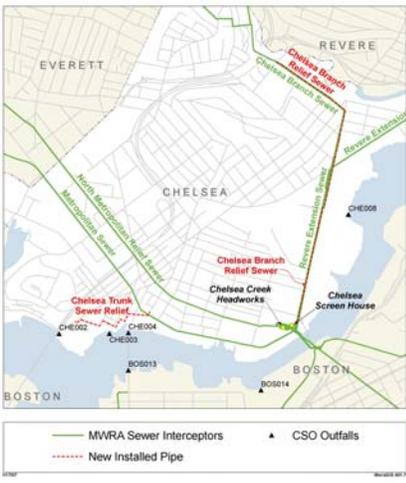
**Completed CSO Projects (continued)**

**3. HYDRAULIC RELIEF AT OUTFALL CAM005**  
**4. HYDRAULIC RELIEF AT OUTFALL BOS017**

		CSO Control
	<p><b>Receiving Water:</b>                      CAM005: Upper Charles River Basin                      BOS017: Mystic R./Chelsea Creek Confluence</p> <p><b>Completed:</b>                      2000</p> <p><b>Capital Cost:</b>                      \$2,294,549</p> <p><b>Description:</b>                      CAM005: In Cambridge, the 40-foot long, 24-inch diameter dry weather connection between the CAM005 regulator and MWRA's North Charles Metropolitan Sewer was relieved with a 54-inch additional connection.</p> <p>BOS017: In Charlestown, 190 feet of 36-inch diameter pipe were installed in Sullivan Square to divert two local (BWSC) combined sewers to a direct connection with MWRA's Cambridge Branch Sewer. In addition, a 10-foot long restriction between the Charlestown and Cambridge Branch Sewers, adjacent to Sullivan Square, was eliminated.</p>	<p><b>Water Quality Benefit:</b>                      Minimized CSO discharges to meet B(cso) water quality standards (&gt;95% compliance with Class B).</p> <p><b>CSO Outfalls:</b>                      CAM005, BOS017</p> <p><b>CAM005:</b>  <b>Frequency of Discharge (typical year):</b>                      Before project: 11                      With project: 3</p> <p><b>Annual Discharge Volume (typical year):</b>                      Before project: 3.8 million gallons                      With project: 0.84 million gallons</p> <p><b>CSO Reduction by Volume: 78 %</b></p> <p><b>BOS017:</b>  <b>Frequency of Discharge (typical year):</b>                      Before project: 18                      With project: 1</p> <p><b>Annual Discharge Volume (typical year):</b>                      Before project: 2.5 million gallons                      With project: 0.02 million gallons</p> <p><b>CSO Reduction by Volume: 99 %</b></p>

**Completed CSO Projects (continued)**

<b>5. NEPONSET RIVER SEWER SEPARATION</b>		
	<p><b>Receiving Water:</b> Neponset River</p> <p><b>Completed:</b> 2000</p> <p><b>Capital Cost:</b> \$2,444,394</p> <p><b>Description:</b> Installed approximately 8,000 linear feet of storm drain to separate the combined sewer system, removed stormwater flows from area sewers, and closed CSO regulators, eliminating CSO discharges at the two remaining CSO outfalls to the Neponset River. BWSC performed design and construction with MWRA financial assistance.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Eliminated CSO discharges to Neponset River to comply with Class B water quality standards and protect South Dorchester Bay beaches (Tenean Beach).</p> <p><b>CSO Outfalls:</b> BOS093, BOS095</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 17  <b>With project:</b> Eliminated</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 5.8 million gallons  <b>With project:</b> Eliminated</p> <p><b>CSO Reduction by Volume: 100%</b></p>

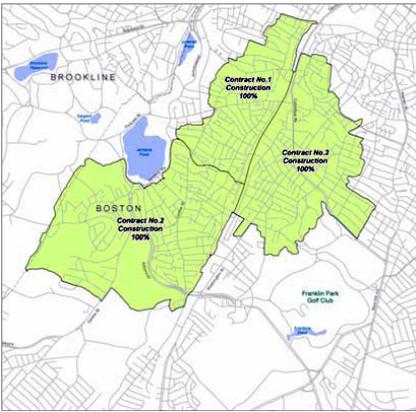
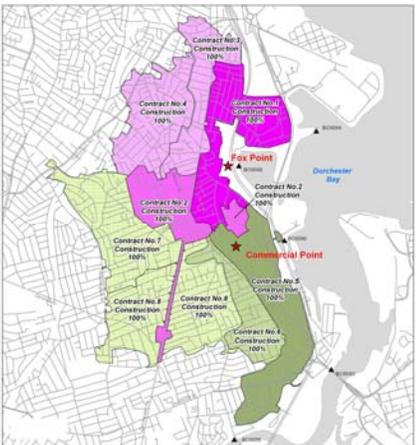
<b>6. CHELSEA TRUNK SEWER REPLACEMENT 7. CHELSEA BRANCH SEWER RELIEF 8. CHE008 OUTFALL REPAIRS</b>		
	<p><b>Receiving Water:</b> Mystic River/Chelsea Creek Confluence Chelsea Creek</p> <p><b>Completed:</b> 2000-2001</p> <p><b>Capital Cost:</b> \$29,779,319</p> <p><b>Description:</b> Replaced 18-inch diameter city-owned trunk sewer with 30-inch pipe, relieved MWRA's Chelsea Branch and Revere Extension Sewers with 48-inch to 66-inch diameter pipe, rehabilitated Outfall CHE008, and installed underflow baffles for floatables control at all outfalls.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Minimized CSO discharges to meet B(cso) water quality standards (&gt;95% compliance with Class B).</p> <p><b>CSO Outfalls:</b> CHE002, CHE003, CHE004, CHE008</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 8  <b>With project:</b> 4</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 9.0 million gallons  <b>With project:</b> 0.58 million gallons</p>

**Completed CSO Projects (continued)**

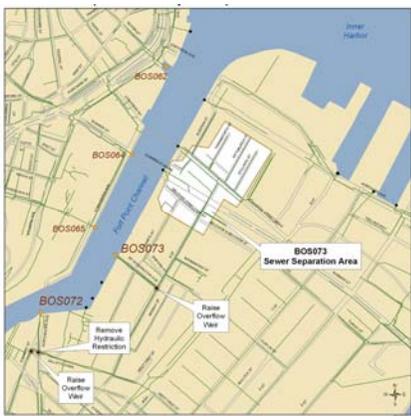
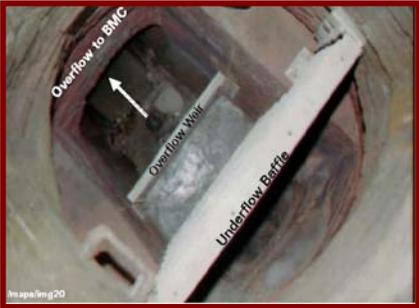
<p><b>9. UPGRADE COTTAGE FARM CSO FACILITY</b>  <b>10. UPGRADE PRISON POINT CSO FACILITY</b>  <b>11. UPGRADE SOMERVILLE MARGINAL CSO FACILITY</b>  <b>12. UPGRADE FOX POINT CSO FACILITY</b>  <b>13. UPGRADE COMMERCIAL POINT CSO FACILITY</b></p>		
	<p><b>Receiving Water:</b>                  Lower Charles River Basin                  Upper Inner Harbor                  Upper Mystic River                  Mystic River/Chelsea Creek Confluence                  South Dorchester Bay</p> <p><b>Completed:</b>                  2001</p> <p><b>Capital Cost:</b>                  \$22,261,200</p> <p><b>Description:</b>                  Upgraded chlorine disinfection systems, added dechlorination systems, process control and safety improvements.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b>                  Upgrade treatment to meet Class B water quality criteria, including residual chlorine limits.</p> <p><b>CSO Outfalls:</b>                  MWR201                  MWR203                  MWR205, MWR205A(SOM007A)                  MWR209(BOS088/BOS089)                  MWR211(BOS090)</p> <p>These projects improved treatment performance, but did not affect treated discharges frequency or volume.</p>
<p><b>14. PLEASURE BAY STORM DRAIN IMPROVEMENTS</b></p>		
	<p><b>Receiving Water:</b>                  North Dorchester Bay</p> <p><b>Completed:</b>                  2006</p> <p><b>Capital Cost:</b>                  \$3,200,000</p> <p><b>Description (cont):</b>                  Stormwater piping and appurtenances to relocate stormwater dischargers from Pleasure Bay to Reserved Channel.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b>                  Eliminated storm water discharges to Pleasure Bay Beach.</p>

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**Completed CSO Projects (continued)**

15. STONY BROOK SEWER SEPARATION		
	<p><b>Receiving Water:</b> Lower Charles River Basin</p> <p><b>Completed:</b> 2006</p> <p><b>Capital Cost:</b> \$44,198,623</p> <p><b>Description:</b> Installed 74,000 linear feet of new storm drain to remove stormwater runoff from local sewers serving a 609-acre area in Jamaica Plain, Mission Hill and Roxbury, and disconnected an already-separated storm drain system serving an adjacent 548-acre area from the sewer system.</p>	<p align="center"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Minimized CSO discharges to meet B(cso) water quality standards (&gt;95% compliance with Class B).</p> <p><b>CSO Outfalls:</b> MWR023 (Stony Brook Conduit)</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 22  <b>With project:</b> 2</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 44.5 million gallons  <b>With project:</b> 0.13 million gallons</p> <p><b>CSO Reduction by Volume: 99.7 %</b></p>
16. SOUTH DORCHESTER BAY SEWER SEPARATION		
	<p><b>Receiving Water:</b> South Dorchester Bay</p> <p><b>Completed:</b> 2007</p> <p><b>Capital Cost:</b> \$118,394,583</p> <p><b>Description:</b> Installed 135,700 linear feet (25.7 miles) of storm drain to remove stormwater runoff from local sewers serving a 1,750-acre area in Dorchester. Closed all CSO regulators, allowing decommissioning of MWRA's Fox Point and Commercial Point CSO facilities.</p>	<p align="center"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Eliminated CSO discharges to Savin Hill, Malibu and Tenean beaches, in compliance with Class B water quality standards.</p> <p><b>CSO Outfalls:</b> MWR209(BOS088/BOS089) MWR211(BOS090)</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 20 (treated)  <b>With project:</b> Eliminated</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 30 million gallons  <b>With project:</b> Eliminated</p> <p><b>CSO Reduction by Volume: 100 %</b></p>

**Completed CSO Projects (continued)**

<b>17. FORT POINT CHANNEL SEWER SEPARATION</b>		
	<p><b>Receiving Water:</b> Fort Point Channel</p> <p><b>Completed:</b> 2007</p> <p><b>Capital Cost:</b> \$11,866,775</p> <p><b>Description:</b> Removed stormwater runoff from local and MWRA combined sewers by installing 4,550 feet of new storm drains serving 55 acres in the Fort Point Channel area. Also overflow weirs were raised, at BOS072 &amp; BOS073. At both locations new tide gates were installed, and underflow baffles were constructed for floatables control.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Minimized CSO discharges to meet B(cso) water quality standards (&gt;95% compliance with Class B).</p> <p><b>CSO Outfalls:</b> BOS072, BOS073</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 9  <b>With project:</b> 0</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 3.0 million gallons  <b>With project:</b> 0.0</p> <p><b>CSO Reduction by Volume: 100 %</b></p>
<b>18. REGIONWIDE FLOATABLES CONTROL</b> <b>19. MWRA FLOATABLES CONTROL AND OUTFALL CLOSING PROJECTS</b>		
	<p><b>Receiving Water:</b> Regional Application</p> <p><b>Completed:</b> 2007</p> <p><b>Capital Cost:</b> \$2,469,970</p> <p><b>Description:</b> Projects involved floatables controls and regulator or outfall closings that are independent of the larger projects.</p> <p>In March 2000, MWRA closed Outfalls MWR021 and MWR022 to CSO discharges.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Complied with EPA Policy Nine Minimum Controls requirement to control solid and floatable material. Eliminated CSO discharges at select outfalls.</p> <p><b>CSO Outfalls:</b> Various outfalls system-wide.</p> <p>The floatables controls did not affect CSO discharge frequency or volume.</p>

**Completed CSO Projects (continued)**

20. UNION PARK DETENTION/TREATMENT FACILITY		
	<p><b>Receiving Water:</b> Fort Point Channel</p> <p><b>Completed:</b> 2007</p> <p><b>Capital Cost:</b> \$49,583,406</p> <p><b>Description:</b> Added CSO treatment facility to existing BWSC Union Park Pumping Station with fine screens, chlorine disinfection, dechlorination, and 2 million gallons of detention storage.</p>	<p><b>CSO Control</b></p>
	<p><b>Water Quality Benefit:</b> Provided treatment of Union Park pumping station discharges to Fort Point Channel to meet Class B water quality criteria, including residual chlorine limits, and lowered discharge frequency and volume with on-site detention basins.</p> <p><b>CSO Outfall:</b> BOS 070</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 25 (untreated)  <b>With project:</b> 17 (treated)</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 132.0 million gallons  <b>With project:</b> 71.4 million gallons/year</p> <p><b>CSO Reduction by Volume: 46 %</b></p>	

21. BOS019 CSO STORAGE CONDUIT		
	<p><b>Receiving Water:</b> Upper Inner Harbor (Little Mystic Channel)</p> <p><b>Completed:</b> 2007</p> <p><b>Capital Cost:</b> \$14,287,800</p> <p><b>Description:</b> Installed twin-barrel 10'x17'box conduit to provide 670,000 gallons of off-line storage, between Chelsea St. and the Mystic Tobin Bridge, Charlestown. Included above ground dewatering Pump Station.</p>	<p><b>CSO Control</b></p>
	<p><b>Water Quality Benefit:</b> Minimized CSO discharges to meet B(cso) water quality standards (&gt;95% compliance with Class B).</p> <p><b>CSO Outfalls:</b> BOS019</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 13  <b>With project:</b> 2</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 4.4 million gallons  <b>With project:</b> 0.6 million gallons</p> <p><b>CSO Reduction by Volume: 86 %</b></p>	

**Completed CSO Projects (continued)**

<b>22. PRISON POINT CSO FACILITY OPTIMIZATION</b>		
	<p><b>Receiving Water:</b> Upper Inner Harbor</p> <p><b>Completed:</b> 2008</p> <p><b>Capital Cost:</b> \$50,000</p> <p><b>Description:</b> Minimized treated CSO discharges to the Inner Harbor by optimizing the operation of existing facility gates and pumps to maximize in-system storage and convey more flow to Deer Island</p>	<p><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Reduced treated CSO discharges to Upper Inner Harbor.</p> <p><b>CSO Outfall:</b> MWR203</p> <p><b>Frequency of Discharge (typical year):</b>  <b>Before project:</b> 30 (treated)  <b>With project:</b> 17 (treated)</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 335 million gallons  <b>With project:</b> 243 million gallons</p> <p><b>CSO Reduction by Volume: 27 %</b></p>

<b>23. COTTAGE FARM BROOKLINE CONNECTION AND INFLOW CONTROLS</b>		
	<p><b>Receiving Water:</b> Lower Charles River Basin</p> <p><b>Completed:</b> 2009</p> <p><b>Capital Cost:</b> \$3,326,823</p> <p><b>Description:</b> Optimized the combined conveyance capacity of the two MWRA sewers that carry flows across the Charles River by interconnecting overflow chambers outside the Cottage Farm CSO facility; increased this conveyance capacity by bringing into service a parallel, previously unutilized 54-inch diameter sewer (the "Brookline Connection")</p>	<p><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Minimized treated CSO discharges to the Charles River Basin.</p> <p><b>CSO Outfall:</b> MWR201</p> <p><b>Frequency of discharges (typical year):</b>  <b>Before project:</b> 7 (treated)  <b>With project:</b> 7 (treated)</p> <p><b>Annual Discharge Volume (typical year):</b>  <b>Before project:</b> 44.5 million gallons  <b>With project:</b> 24 million gallons</p> <p><b>CSO Reduction by Volume: 46 %</b></p>

**Completed CSO Projects (continued)**

<b>24. MORRISSEY BOULEVARD STORM DRAIN</b>		
	<p><b>Receiving Water:</b> North Dorchester Bay</p> <p><b>Completed:</b> 2009</p> <p><b>Capital Cost:</b> \$36,405,252</p> <p><b>Description:</b> Installed 2,800 linear feet of 12-foot by 12-foot box conduit for stormwater conveyance, with gated connection to North Dorchester Bay CSO Storage Tunnel at upstream end, new outfall to Savin Hill Cove, and pollution prevention measures.</p>	<p style="text-align: center;"><b>CSO Control</b></p> <p><b>Water Quality Benefit:</b> Maximize level of stormwater control along the South Boston beaches by redirecting some stormwater to Savin Hill Cove in large storms.</p>



## 7. PLANNED CSO CONTROL EFFORTS IN 2010 AND BEYOND

### 7.1 Planned Progress and Benefits by Receiving Water

#### *North Dorchester Bay*

The North Dorchester Bay CSO control plan for the South Boston beaches comprises five major construction contracts: MWRA contracts for the CSO storage tunnel, the tunnel dewatering pumping station and force main, the tunnel ventilation building, and Pleasure Bay storm drain improvements, and the BWSC contract for the Morrissey Boulevard storm drain. MWRA completed the construction contracts for the Pleasure Bay storm drain improvements and the CSO storage tunnel in March 2006 and November 2009, respectively. BWSC completed construction of the Morrissey Boulevard storm drain in July 2009. MWRA plans to



complete construction of the remaining two components, the tunnel dewatering pumping station and force main and the tunnel ventilation building, in May 2011, in accordance with the completion dates in the contracts and in compliance with Schedule Seven.

The Pleasure Bay storm drain improvements eliminated point source discharges to Pleasure Bay in 2006. The BWSC Morrissey Boulevard storm drain is presently collecting stormwater runoff from the adjacent portion of Morrissey Boulevard, abutting properties, and parts of the Columbia Point area for conveyance and discharge to Savin Hill Cove. Completion of the two remaining construction contracts in May 2011 will allow MWRA to bring the storage tunnel, tunnel facilities, and Morrissey Boulevard storm drain into joint service to collect CSO and stormwater that presently discharge to the South Boston beaches.

#### *Reserved Channel*

BWSC commenced the first of nine construction contracts for this project in May 2009, and plans to complete this contract in 2011. The first contract involves the construction of storm drains to separate the combined sewer system in the area tributary to Outfall BOS080. BWSC plans to issue notices to proceed with two additional sewer separation contracts, a contract to rehabilitate the four existing outfalls (BOS076, BOS078, BOS079 and BOS080), a contract to disconnect certain building downspouts, and a pavement restoration contract in 2010. The three remaining contracts are scheduled to be awarded in the period 2011 through 2013. With completion of the nine contracts by December 2015, CSO discharges to the Reserved Channel will be greatly reduced to comply with the Class B(cso) water quality standard.

#### *South Dorchester Bay*

Since completing the South Dorchester Bay sewer separation project and closing the related CSO regulators in 2007, BWSC has monitored the performance of its Dorchester Interceptor and tributary sewers to determine whether hydraulic conditions during wet weather are acceptable. BWSC will continue to remove stormwater inflow (e.g. building downspout connections) from the sewer system to meet the system's hydraulic performance criteria. BWSC plans to advertise a contract for design services in April 2010, to evaluate and identify further downspout disconnection work. While this work and related MWRA funding continue, CSO discharges to South Dorchester Bay are eliminated.

### ***Inner Harbor and Fort Point Channel***

MWRA completed the first construction contract (trunk line rehabilitation) for the East Boston Branch Sewer Relief project in 2004. MWRA expects to complete the two remaining construction contracts, now well underway, by July 2010. With completion of all three contracts, CSO discharges to the Inner Harbor and Chelsea Creek from the East Boston outfalls will be greatly reduced to comply with the Class B(cso) water quality standard.

BWSC expects to complete construction of the Bulfinch Triangle sewer separation project by July 2010. The project is predicted to significantly lower CSO discharges to MWRA's Prison Point CSO treatment facility, which discharges to the Charles River/Inner Harbor, immediately downstream of the Charles River Dam. Removal of stormwater from the sewer system in the Bulfinch Triangle area is also expected to relieve CSO conditions at other outfalls to the Inner Harbor and at outfalls along the Charles River Basin.

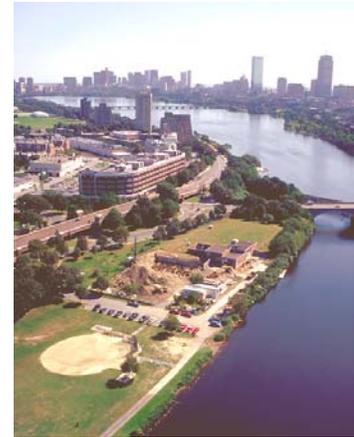


For Fort Point Channel, BWSC and MWRA completed the Fort Point Channel sewer separation project and the Union Park Detention and Treatment Facility in 2007. BWSC and MWRA are also developing plans for sewer separation and sewer system optimization in the South Bay area (Lower

Dorchester Brook Sewer) which, together with the projects already completed, are intended to attain the long-term levels of CSO control for the Fort Point Channel.

### ***Charles River Basin***

The Town of Brookline plans to commence the second and last construction contract for the Brookline sewer separation project in 2010 and complete all work by November 2013, in compliance with Schedule Seven. In a related effort, MWRA is currently developing plans to inspect and clean its Outfall MWR010 to ensure this outfall can convey the stormwater flows that will be removed from Brookline's sewer system. The Brookline sewer separation project is the last of the Charles River related CSO projects in MWRA's Long-Term Control Plan. Separately, the City of Cambridge continues to make progress with its sewer separation projects tributary to the Charles River, especially in the Cambridgeport area, and these projects will contribute to the predicted long-term levels of CSO control for the Charles River Basin.



### ***Alewife Brook***

Over the next year, Cambridge will continue to make progress with the construction contract it commenced in January 2010 for Interceptor Connection Relief and Floatables Control at CAM002 and CAM401B and Floatables Control at CAM001 and CAM400 Manhole Separation. The contract is scheduled to be complete by March 2011. In addition, Cambridge plans to commence the two-year construction contract for the CAM004 stormwater outfall and wetland basin by July 2010. Also in 2010, Cambridge plans to resume design work for sewer separation in large neighborhood areas upstream of Outfall CAM004 that will allow Cambridge to eliminate CSO discharges at this outfall, which will remain for stormwater use.

## 7.2 Annual CSO Discharge Reporting and Performance Tracking

In compliance with its NPDES permit and CSO variances for the Charles River and Alewife Brook/Upper Mystic River, MWRA reviews facility records, meter data and other system performance indicators and conducts hydraulic modeling to estimate CSO discharges for all storms that occur each calendar year. MWRA plans to submit the CSO discharge estimates for 2009 to EPA and DEP by April 30, 2010, in compliance with variance conditions. MWRA will share the results with its CSO communities to validate the estimates and coordinate with their own submissions to EPA and DEP, in compliance with similar reporting requirements in their NPDES permits and CSO variances. MWRA uses the annual CSO discharge estimates to verify progress in controlling CSO discharges to attain the levels of control in the Long-Term Control Plan and meet corresponding NPDES permit limits that are the basis for compliance with water quality standards.

## 7.3 Compliance with Schedule Seven Milestones Through 2020

Schedule Seven in the Federal Court Order includes six CSO milestones in 2010 and 13 additional CSO milestones in the period 2011 and beyond. The last CSO milestone date in the Federal Court Order is December 2020. Table 5 identifies the remaining milestones and general compliance plans.

**Table 5: Schedule Seven Milestones and Corresponding Project Schedules in 2010 and Beyond**

Milestone Date	Milestone Description	Project Schedule
Jan 2010*	<i>MWRA, in cooperation with Cambridge, to commence construction of interceptor connection relief and floatables control at CAM002 and CAM401B and floatables control at CAM001.</i>	On January 26, 2010, the City of Cambridge issued the Notice to Proceed with the construction contract that includes both the Alewife Brook interceptor connection relief and floatables control project and the CAM400 sewer separation project.
	<i>MWRA, in cooperation with Cambridge, to commence construction of CAM400 manhole separation.</i>	
Mar 2010 (and every March to 2016)	<i>MWRA to submit annual report which describes progress in planning, design, and construction of each CSO project, and identifies any issues which may interfere with timely completion of any project.</i>	MWRA submitted the Annual Report for 2009 on March 15, 2010.
Jun 2010	<i>MWRA to complete construction of interceptor relief for BOS003-014.</i>	As previously reported to the Court, MWRA plans to complete construction of the East Boston Branch Sewer Relief project in July 2010, one month later than the milestone, in accordance with the completion dates in both remaining construction contracts.
Jul 2010*	<i>MWRA, in cooperation with Cambridge, to commence construction of CAM004 stormwater outfall and detention basin.</i>	The City of Cambridge plans to complete the construction contract documents for the CAM004 stormwater outfall and wetland basin and advertise the contract by April 2010, for Notice to Proceed in July.

\*proposed milestone

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<b>Milestone Date</b>	<b>Milestone Description</b>	<b>Project Schedule</b>
Oct 2010*	<i>MWRA, in cooperation with Cambridge, to complete construction of interceptor connection relief and floatables control at CAM002 and CAM401B and floatables control at CAM001.</i>	The construction contract the City of Cambridge commenced in January 2010 includes a completion date for the interceptor connection relief and floatables control work of October 31, 2010.
Mar 2011*	<i>MWRA, in cooperation with Cambridge, to complete construction of CAM400 manhole separation.</i>	The construction contract the City of Cambridge commenced in January 2010 includes a completion date for the CAM400 manhole separation work of March 31, 2011.
May 2011	<i>MWRA to complete construction of North Dorchester Bay storage tunnel and related facilities.</i>	MWRA attained substantial completion of the storage tunnel contract on November 30, 2009. Contract completion dates for the dewatering pumping station and force main and the tunnel ventilation building are May 4, 2011, and May 8, 2011, respectively.
Apr 2012*	<i>MWRA to commence design of control gate/floatables control at outfall MWR003, MWRA Rindge Avenue Siphon relief, and interconnection relief and floatables control at outfall SOM01A.</i>	MWRA's Capital Improvement Program includes design and construction of this project in accordance with Schedule Seven.
Jul 2012*	<i>MWRA, in cooperation with Cambridge, to complete construction of CAM004 stormwater outfall and detention basin.</i>	The City of Cambridge plans to attain substantial completion on the construction contract for the CAM004 stormwater outfall and wetland basin by July 2012.
	<i>MWRA, in cooperation with Cambridge, to commence construction of CAM004 sewer separation.</i>	The City of Cambridge plans to commence remaining construction of the CAM004 sewer separation project by July 2012.
Jul 2013	<i>MWRA, in cooperation with BWSC, to complete construction of Bulfinch Triangle sewer separation.</i>	The BWSC construction contract completion date for the Bulfinch Triangle sewer separation project is July 2010.
	<i>MWRA, in cooperation with Brookline, to complete construction of Brookline sewer separation.</i>	The Town of Brookline plans to issue the Notice to Proceed with the remaining construction contract for the Brookline sewer separation project this spring and attain substantial completion by July 2013.
Nov 2013*	<i>MWRA to commence construction of control gate/floatables control at outfalls MWR003, MWRA Rindge Avenue Siphon relief, and interconnection relief and floatables control at outfall SOM01A.</i>	MWRA's Capital Improvement Program includes design and construction of this project in accordance with Schedule Seven.
Jan 2015*	<i>MWRA to complete construction of control gate/floatables control at outfalls MWR003, MWRA Rindge Avenue Siphon relief, and interconnection relief and floatables control at outfall SOM01A.</i>	MWRA's Capital Improvement Program includes design and construction of this project in accordance with Schedule Seven.

\*proposed milestone

Continues next page.

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<b>Milestone Date</b>	<b>Milestone Description</b>	<b>Project Schedule</b>
Dec 2015*	<i>MWRA, in cooperation with Cambridge, to complete construction of CAM004 sewer separation.</i>	The City of Cambridge plans to complete construction of the CAM004 sewer separation project by December 2015.
Dec 2015	<i>MWRA, in cooperation with BWSC, to complete construction of Reserved Channel sewer separation.</i>	BWSC issued the Notice to Proceed with the first of nine construction contracts for the Reserved Channel sewer separation project in May 2009. BWSC plans to award the remaining contracts sequentially, through April 2014 and complete all work by December 2015.
Jan 2018	<i>MWRA to commence three-year performance assessment of its Long-Term CSO Control Plan. The assessment shall include post-construction monitoring in accordance with EPA's Combined Sewer Overflow (CSO) Policy, 59 Fed. Reg. 18688 (Apr. 19, 1994).</i>	MWRA's Capital Improvement Program includes a three-year performance assessment of its Long-Term CSO Control Plan beginning in January 2018.
Dec 2020	<i>MWRA to submit results of its three-year performance assessment of its Long-Term CSO Control Plan to the EPA and DEP. MWRA to demonstrate that it has achieved compliance with the levels of control (including as to frequency of CSO activation and as to volume of discharge) specified in its Long-Term CSO Control Plan.</i>	MWRA's Capital Improvement Program includes preparation of a report on the results of a three-year performance assessment of its Long-Term CSO Control Plan, to be submitted to EPA and DEP by December 2020.



***The End***