

Massachusetts Water Resources Authority



Combined Sewer Overflow Control Plan



North Dorchester Bay CSO Storage Tunnel and Related Facilities
Pump Station and Ventilation Building Construction Progress, Fall 2010

Annual Progress Report 2010

March 2011

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1. INTRODUCTION

The Massachusetts Water Resources Authority (MWRA) files this Combined Sewer Overflow Annual Progress Report for 2010 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 reviews key CSO control accomplishments and design and construction progress in calendar year 2010, and through the quarterly period December 16, 2010, to March 15, 2011, and it 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 plan-wide progress to date and benefits achieved, including reductions in CSO discharges and impacts and measured improvement in water quality in Boston Harbor and other area waters affected by CSOs.

The Long-Term Control Plan as mandated by the Federal Court Order 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 set forth in Schedule Seven of the Order. 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. The Federal Court Order also mandates specific, numerical long-term levels of control at each of the 84 outfalls. For certain outfalls, such as the Dorchester Brook Conduit (BOS070) and the Charles River Basin outfalls related to MWRA’s Cottage Farm CSO Facility, MWRA and/or its member communities with CSOs (the “CSO communities”) are implementing system improvements that supplement to the 35 stipulated projects to meet the required levels of control. These are also discussed in this report.

2. CSO CONTROL PROGRESS AND ACCOMPLISHMENTS IN 2010

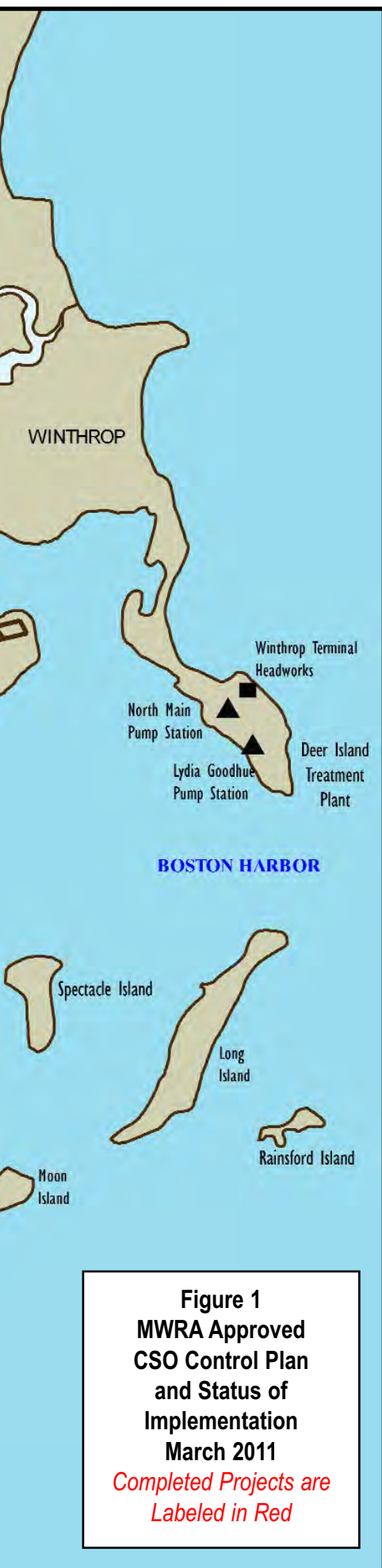
2.1 2010 Progress Summary

In 2010, 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, 2008¹ (the “Second CSO Stipulation”).

MWRA and the CSO communities attained substantial completion of three CSO projects in 2010, bringing the total number of completed projects to 27 of the 35 projects in the Long-Term Control Plan. Highlights of progress attained in 2010 include:

- Completion of the \$87 million East Boston Branch Sewer Relief Project, one of the most technically difficult and challenging projects undertaken by MWRA. The project included installation of 18,000 linear feet of sanitary sewer by micro-tunneling, pipe-bursting and open-cut methods in heavily congested East Boston with extensive utility conflicts;

¹ 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.”



Projects Completed

Complete⁽¹⁾

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
Bulfinch Triangle Sewer Separation	2010
East Boston Branch Sewer Relief	2010
Alewife Interceptor Connection Relief and Floatables Controls	2010

In Construction⁽²⁾

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 ⁽³⁾	2011
CAM004 Outfall and Wetland Basin	2013

Future Start

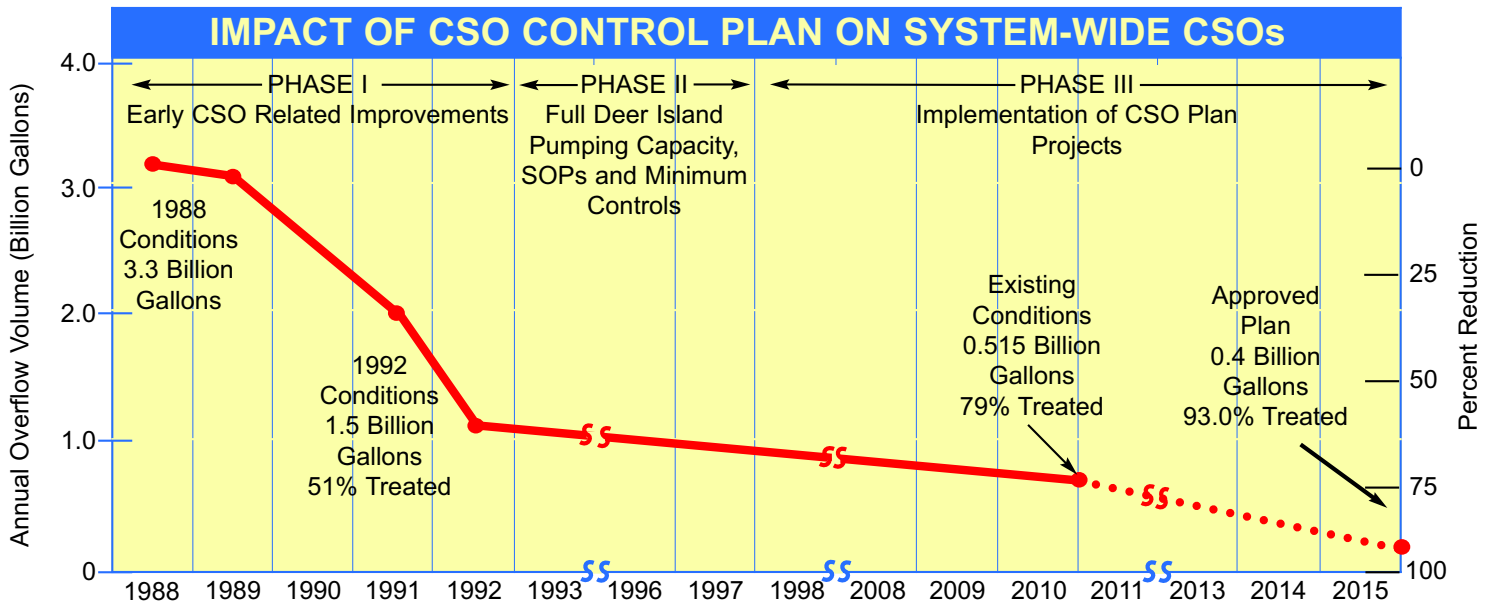
MWR003 Gate Rindge Ave. Siphon Relief and SOM 001A	2015
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(1) Actual or Scheduled construction completion

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

(3) MWRA has recommended deleting this project.

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



BENEFITS

- 84 CSO Outfalls: 34 Closed
46 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 remaining active 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	2018 - 2020

COSTS

Planning, Design & Construction
\$867.9 Million
Net Annual O&M
\$1.5 Million

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- Continued progress implementing the \$272 million North Dorchester Bay CSO Control Plan that will virtually eliminate CSO discharges and greatly control stormwater discharges to the South Boston beaches.
- Completion of the \$10 million Bulfinch Triangle Sewer Separation project that further reduces CSO discharges to the Charles River - three years ahead of the federal court schedule. The project consisted of 5,063 feet of storm drain and 1,181 feet of sanitary sewer in a 14-acre area near North Station that also provided a stormwater outlet for an additional 47-acre area of Government Center served by separate storm drains that previously tied back into the combined sewer system.
- Completion of Interceptor Connection Relief and Floatables Control at CAM002 and CAM401B and Floatables Control at CAM001, one of the five projects that comprise the CSO control plan for Alewife Brook and part of an ongoing \$3.9 million construction contract that also includes the CAM400 Manhole Separation project that the City of Cambridge expects to complete in March 2011.
- Completion of the remaining sections of the 2,400-foot, 24-inch-diameter force main in South Boston associated with the dewatering pump station for the North Dorchester Bay CSO Storage Tunnel.
- Continued substantial progress with construction of the North Dorchester Bay tunnel-dewatering pump station at Conley Terminal.
- Installation of 4,915 feet of storm drain and 1,523 feet of sanitary sewer to complete the first construction contract for the Reserved Channel Sewer Separation project.

Hydraulic model results comparing system conditions at the beginning and end of 2010 show a reduction in total average annual CSO discharge volume of approximately 100 million gallons. This includes reductions of 38 million gallons of treated discharge volume to the Upper Inner Harbor from the Prison Point CSO facility with completion of the Bulfinch Triangle sewer separation project and 50 million gallons of untreated discharge volume to the Inner Harbor and Chelsea Creek with completion of the East Boston Branch Sewer Relief project. In addition, while the CSO benefits of the completed Alewife Brook interceptor connection relief and floatables control project will not be realized until remaining Alewife Brook CSO projects are complete, MWRA reduced untreated annual CSO volume from the various outfalls that discharge to the Alewife Brook by approximately 12 million gallons (31%) with the completion of interim improvements to the pumps and pump operations at its Alewife Brook Pump Station.

Progress in 2010 was primarily driven by significant construction activity, mostly involving the construction of new sewers and storm drains along with the pumping station and ventilation building MWRA is constructing related to the North Dorchester Bay CSO Storage Tunnel. In 2010, MWRA and the CSO communities installed 14,333 linear feet (2.7 miles) of sanitary sewer and storm drain, contributing to significant construction progress toward the completion of projects in several areas.

MWRA and the CSO communities also made progress with remaining design work in 2010. Cambridge resumed design of the CAM004 Sewer Separation project while it also completed construction of one Alewife Brook project, continued with construction of another, and prepared a third Alewife Brook project (CAM004 Stormwater Outfall and Wetland Basin) for construction award. Brookline advertised the construction documents for a major contract to complete the Brookline Sewer Separation project and was able to award the contract in January 2011. BWSC continued with design of several contracts associated

with the Reserved Channel Sewer Separation project and was able to award three contracts in 2010, in addition to the contract it awarded in 2009.

MWRA spent \$65.9 million in 2010 to implement CSO projects and fund the eligible CSO work of BWSC, Cambridge and Brookline. Of this amount, \$63.9 million (97%) was related to construction activities, including \$23.9 million to complete the East Boston Branch Sewer Relief project, \$22.2 million for ongoing construction of the North Dorchester Bay tunnel-related facilities, and \$16.4 million for sewer separation construction at Bulfinch Triangle, Reserved Channel and Alewife Brook.

Capital Spending on CSO Control in 2010

Construction:	\$55.9 million
Engineering Services During Construction:	6.8 million
Land/Easement/Permits (for construction):	1.2 million
<i>Subtotal Construction Related:</i>	<i>\$63.9 million</i>
<u>Design:</u>	<u>2.0 million</u>
Total CSO Capital Spending in CY10:	\$65.9 million

Spending in 2010 brought MWRA’s total capital expenditure for the CSO program to \$730 million (84%) of the \$867.9 million CSO budget in the Proposed FY12 Capital Improvement Program (CIP). With only eight of the 35 projects remaining to be implemented (including one that MWRA recommends to delete), CSO program activity and spending will continue to wind down. CSO capital spending is estimated to be \$55 million in FY11, \$42 million in FY12, \$35 million in FY13, and \$19 million in FY14.

2.2 CSO Accomplishments in 2010

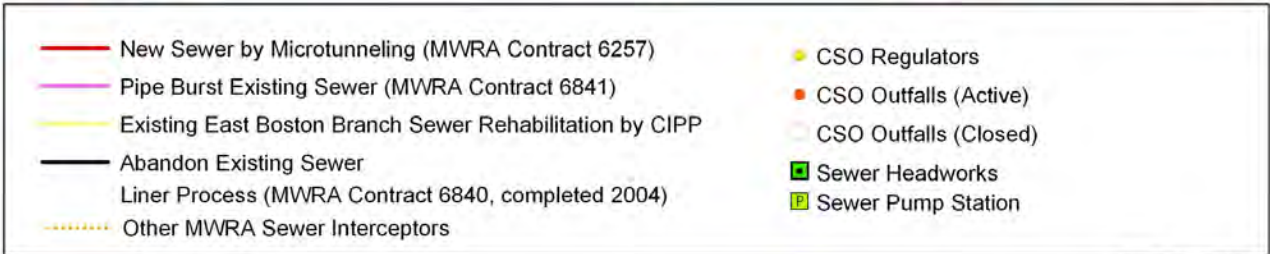
Completed Projects

- MWRA completed the \$87 million East Boston Branch Sewer Relief project (“interceptor relief for outfalls BOS003-014” in Scheduled Seven) in July 2010. For this project (see Figure 3), MWRA installed 18,000 linear feet of sanitary sewer by micro-tunneling, pipe-bursting, and open-cut in East Boston streets and rehabilitated (relined) 6,000 feet of trunk sewer along Bremen and Chelsea streets. The upgraded MWRA interceptor system in East Boston is performing as intended to meet the long-term levels of CSO control at the eight BWSC outfalls that remain active along Chelsea Creek and Boston Inner Harbor. For these outfalls, the project reduces average annual CSO activations from 31 times a year to six times a year, and reduces total annual CSO discharge volume from 41 million gallons to 8.6 million gallons (79% reduction). With this long-term level of control, the remaining CSO discharges comply with Massachusetts’ Class B(cso) water quality standard for these outfalls and will attain Class B (fishable and swimmable) water quality standards at least 98% of the time.



New underflow baffle for floatables control at RE-003-2 in Maverick & Cottage, East Boston

Figure 3
 East Boston Branch Sewer Relief Project



map1102-28, 1/18/2011

- BWSC completed the \$10 million Bulfinch Triangle Sewer Separation project in July 2010, three years ahead of the respective milestone in Schedule Seven. The project involved the installation of 3,687 linear feet of main-line storm drain, 1,376 linear feet of minor drain, and 1,181 linear feet of sanitary sewer to separate the BWSC combined sewers serving a 14-acre area bounded by Causeway, Merrimac and Canal streets in the Downtown/North Station area (see Figure 4). This separation work also allowed BWSC to remove connections between separate storm drains serving a 47-acre area of Government Center and the combined sewer system by providing a means to carry the storm flows to a receiving water (Lower Charles River Basin via Outfall BOS049). The Bulfinch Triangle Sewer Separation project reduces CSO discharges to the Charles River Basin and the Upper Inner Harbor, including a 14% reduction in treated discharge at MWRA's Prison Point CSO facility. The project also allowed BWSC to eliminate CSO discharges at Outfall BOS049, which BWSC has converted to a storm drain.
- In October, 2010, the City of Cambridge completed construction of the \$1.2 million "Interceptor Relief and Floatables Controls at CAM002 and CAM401B and Floatables Control at CAM001" project. Completion of this project was in accordance with the Alewife Brook project schedules and revised court schedule milestones MWRA and Cambridge proposed to the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) in September 2009. The project is one of five that comprise the long-term CSO control plan for Alewife Brook. The work included upgrading connections between the local sewer system and MWRA's Alewife Brook Parkway and Massachusetts Avenue and installing underflow baffles for floatables control at outfalls CAM002, CAM401B and CAM001. While the floatables control benefits of the project are now attained, the hydraulic relief provided by the upgraded local connections will be realized when the CAM002-004 Sewer Separation project is complete and the stormwater burden on the interceptor system is reduced. Cambridge's \$3.9 million construction contract not only includes this project, but also includes the CAM400 Manhole Separation project, which is scheduled to be complete by March 2011.



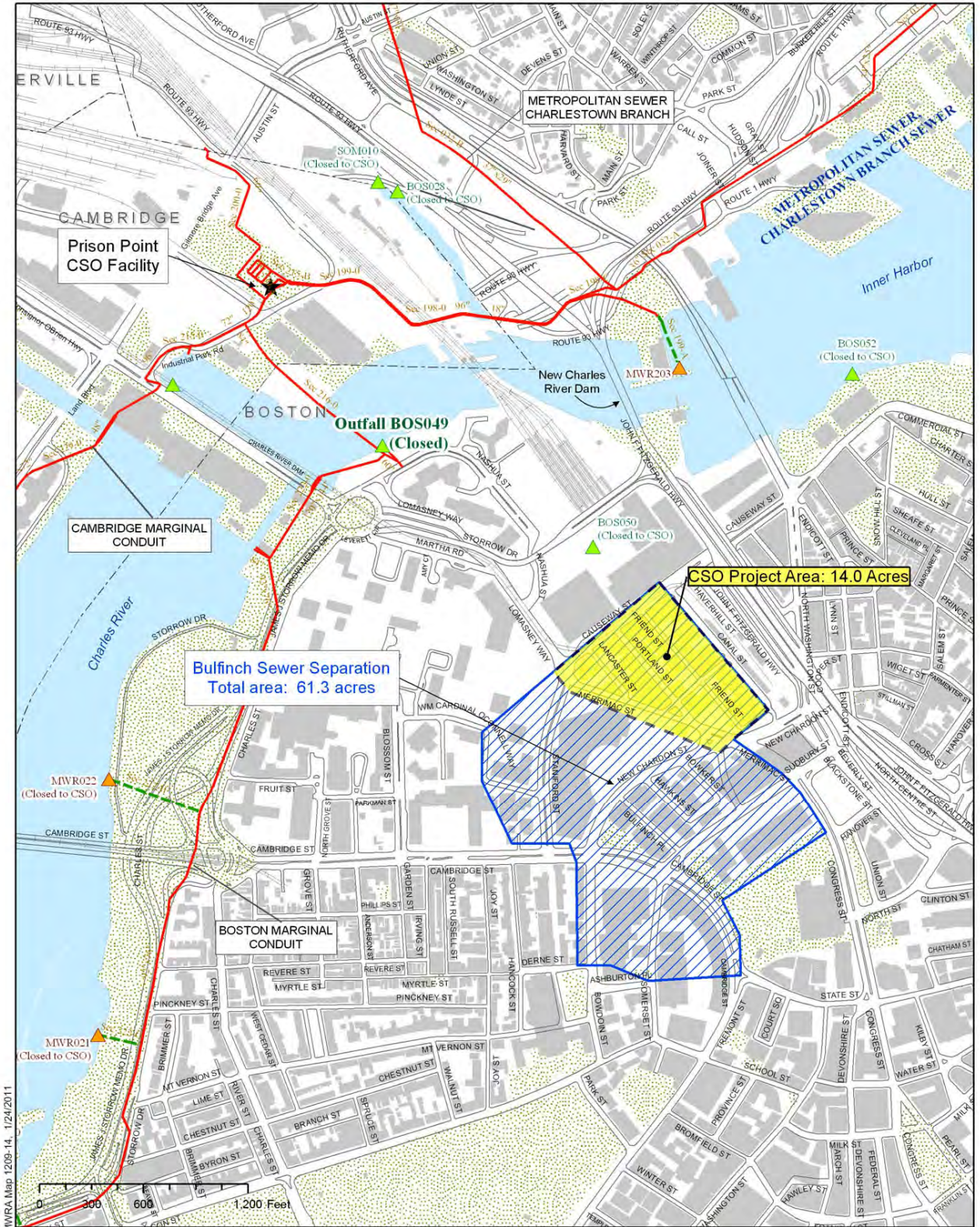
CAM400 new drain manhole at Whittemore Ave, Cambridge, MA

Design and Construction Progress

- MWRA continued to make substantial progress implementing the \$272 million North Dorchester Bay CSO Control Plan² that will virtually eliminate CSO discharges and greatly control stormwater discharges to the South Boston beaches. MWRA's contractor for the CSO storage tunnel portion of the plan attained substantial completion of the tunnel in November 2009. Since then, MWRA has continued to make progress with the construction contracts for the tunnel-dewatering pumping station and associated force main at the downstream end of the tunnel in MassPort's Conley Terminal and the

² Includes MWRA's North Dorchester Bay tunnel and facilities (\$222.7 M) and Pleasure Bay project (\$3.2 M), BWSC's Morrissey Boulevard Storm Drain (\$36.2 M), and related land, easement and construction permit costs (\$10.1 M).

Figure 4
Bulfinch Triangle Sewer Separation



below-ground tunnel ventilation building at the upstream end of the tunnel near the State Police Barracks on Day Boulevard. As of December 2010, the \$26.9 million pumping station and force main contract was 75% complete and the \$5.2 million ventilation building contract was 64% complete. Both contracts remain on schedule to attain substantial completion and allow MWRA to bring the entire North Dorchester Bay CSO tunnel project on-line by May 2011, in compliance with Schedule Seven. In the meantime, MWRA has been coordinating activities to support the successful commissioning of the facilities in May 2011. The start-up support activities, include the documentation of Standard Operating Procedures, training of MWRA staff, and checkout and performance testing of all equipment.



Three 250 hp pumps that are located in the pump room of the dewatering pump station at Massport's Conley Terminal

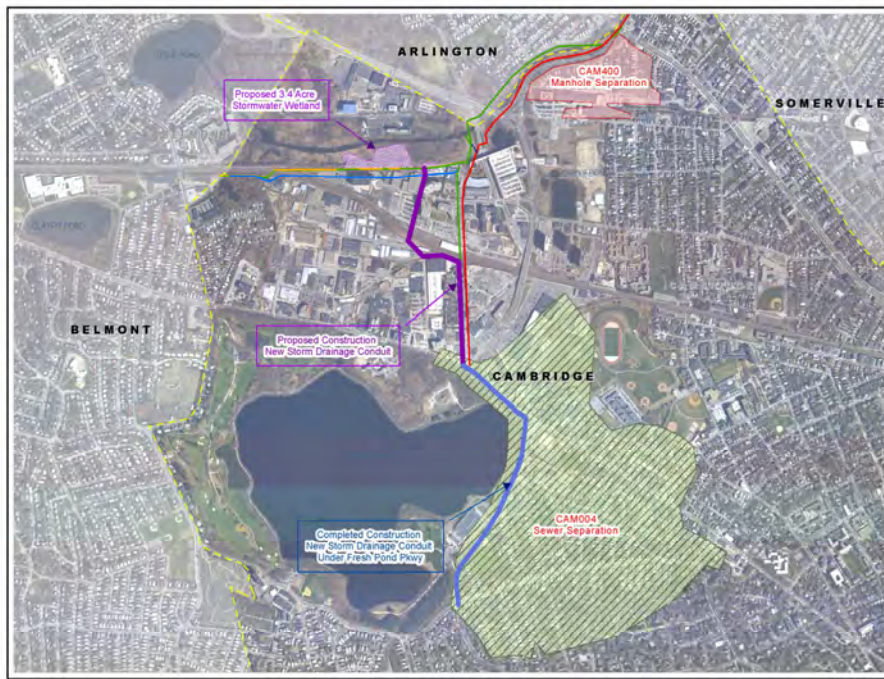
- BWSC continues to make scheduled progress with the first of nine planned contracts for the \$67.2 million Reserved Channel Sewer Separation project. In December 2010, BWSC attained substantial completion of the first construction contract, which involved the installation of 8,379 linear feet of storm drain, approximately 3,961 linear feet of minor drain, and 3,372 linear feet of sanitary sewer to separate combined sewers in a 55-acre area of South Boston bounded by East First Street, Farragut Road, East Fourth Street and N Street. The work removed stormwater from the local sewers tributary to the upstream end of BWSC's South Boston Interceptor, South Branch, with the benefit of reducing CSO overflows to the Reserved Channel at Outfall BOS080. By the end of 2010, BWSC also issued notices to proceed with three additional construction contracts for Reserved Channel, and expects to issue the notice to proceed with a fifth construction contract soon. These additional construction awards include a contract to rehabilitate the four Reserved Channel CSO outfalls to accommodate the stormwater flows removed from the sewer system, two contracts for storm drain installation to separate combined sewers, and a contract for pavement restoration. In the meantime, BWSC continues to make progress with its project design activities and



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plans to issue notices to proceed with the remaining four construction contracts sequentially through April 2013 and complete all work by December 2015, in compliance with Schedule Seven.

- On January 19, 2011, the Town of Brookline issued the notice to proceed with the second of two construction contracts for its portion of the \$25.7 million Brookline Sewer Separation project. The 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 (most of the Town of Brookline is served by separate sewer and storm drain systems). The project is intended to reduce treated discharges to the Charles River at MWRA's Cottage Farm Facility. Brookline completed the first construction contract in January 2010, installing 5,658 linear feet of storm drain in areas on the north and south sides of Beacon Street. The recently awarded \$16.6 million second construction contract involves the installation of large sanitary sewers in Beacon, St. Mary's, and Monmouth streets and the conversion of existing combined sewers to storm drains. The Brookline Sewer Separation project also includes MWRA's plan to rehabilitate Outfall MWR010, which will be used to convey Brookline's separated stormwater to the Charles River.
- In 2010, the City of Cambridge continued to make progress with its design work for the Alewife Brook CSO projects, in addition to its construction progress described above. However, the anticipated progress in obtaining private and public easements for the CAM004 Stormwater Outfall and Wetland Basin project (Cambridge Contract 12) has not been achieved and continues to be problematic. Cambridge completed design of Contract 12 and received construction bids in July 2010. Cambridge plans to issue a Notice to Proceed for construction once it has obtained the remaining necessary construction and long-term maintenance easements from private land owners. On August 9, 2010, a significant milestone was met when the Governor signed legislation pursuant to Article 97 of the Massachusetts Constitution allowing the transfer of easements to Cambridge on state land within the Alewife Brook Reservation managed by DCR. Cambridge has also obtained 8(m) permits from MWRA, permits for railroad crossings from the Massachusetts Bay Transportation Authority and the construction permit from DCR.



Alewife Brook CSO Control - Revised Plan

But Cambridge continues to face hurdles in completing negotiations for remaining easements on private property due to the number and variety of private property interests involved and due to the fact that several of the parcels were either foreclosed and/or subject to negotiations for sale. Cambridge hopes to obtain the remaining easements, submit related documentation to DEP for authorization to award, and issue the Notice to Proceed with construction of Contract 12 soon. In the meantime, Cambridge is making design progress on the last of the four Alewife Brook CSO projects it is implementing (CAM004 Sewer Separation), and MWRA plans to commence design of the one Alewife Brook project it is implementing (Control Gate/Floatables Control at Outfall MWR003, MWRA Rindge Avenue Siphon Relief, and Interconnection Relief and Floatables Control at Outfall SOM01A) in 2012.

- In 2010, MWRA continued to respond to questions and requests for additional information from EPA on the results and MWRA recommendations from the \$1.2 million study of the Charles River Valley/ South Charles River Relief Sewer gate controls and interceptor interconnections. Over an 18-month period from January 2008 to September 2009, MWRA and its study consultant performed extensive evaluations of existing interceptor system performance and evaluated alternatives to add interconnections between the interceptors and alternatives to modify existing interconnections and control gates. From the results, MWRA concluded that additional interceptor interconnections would not reduce CSO discharges, and MWRA also concluded that there is no other feasible means to improve the hydraulic performance of the interceptors and increase the level of CSO control.

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. Any CSO benefits achieved from recommended alternatives would have added to and exceeded, but not been necessary to attain, the approved long-term level of CSO control for the Charles River.

Since September 2009, MWRA has submitted written responses to a series of EPA correspondence seeking additional information. MWRA submitted its most recent response to EPA on December 14, 2010. In a filing to the Federal District Court on December 22, 2010, the U.S. Department of Justice indicated that EPA would review the MWRA's letter and hoped to resolve any issues promptly.

MWRA continues to conclude from the results of extensive system data reviews and hydraulic model evaluations that the interceptor system is operating at maximum conveyance in wet weather and that there is no feasible means to optimize the gates, the gate controls or the structures at existing interconnections between the Charles River Valley Sewer and South Charles Relief Sewer because any such modification would increase the risk of system flooding, backups and/or sanitary sewer overflows and would not provide meaningful CSO benefit. Accordingly, MWRA will be seeking approval from the Court to delete the April 2009, January 2010 and January 2011 milestones in Schedule Seven that require implementation of any recommended improvements.

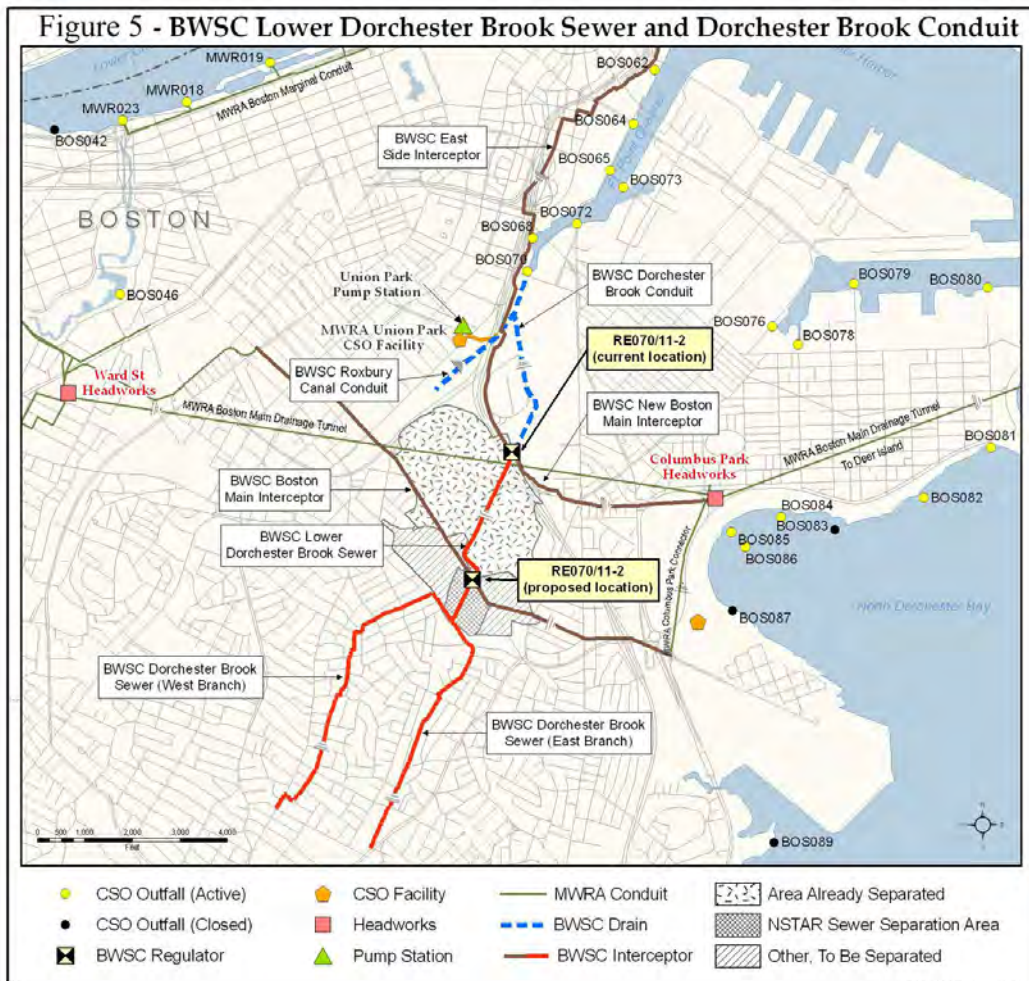
Meanwhile the CSO control measures that were added to MWRA's long-term CSO control plan and Second Stipulation of the United States and MWRA on Responsibility and Legal Liability for CSO control in 2006 to further reduce discharges to the Charles River are complete with the exception of the Brookline Sewer Separation project, which is in construction. The current cost to complete these added projects is \$41 million in MWRA's Proposed FY12 CIP, more than twice the original estimated cost of \$19 million.

- BWSC continues to pursue additional stormwater removal (i.e. downspout disconnections) from separated sewer systems in Dorchester following substantial completion of the \$118.7 million South

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Dorchester Bay Sewer Separation project in 2007. The purpose of the work is to mitigate the remaining risks of sewer system flooding in large storms after BWSC closed all of the CSO relief points. The sewer separation 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. On November 11, 2010, BWSC awarded a design contract to identify and recommend additional sources of inflow for removal. BWSC's consultant has initiated field investigations and is developing a flow metering program. The contract schedule calls for the consultant to submit the results of the investigations and its recommendations for inflow removal to BWSC in early 2012.

- On August 16, 2010, BWSC issued Notice Proceed with a \$6.0 million construction contract for relocation of CSO regulator RE-070/11-2 and sewer separation in a portion of the South Bay area associated with BWSC's Lower Dorchester Brook Sewer (see Figure 5). The work is funded in part by MWRA and is intended to lower CSO discharges to BWSC's Dorchester Brook Conduit and help attain the level of CSO control in MWRA's long-term control plan for Fort Point Channel. The work includes relocating CSO regulator RE-070/11-2 and separating combined sewers in a limited area tributary to the new regulator. 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 expects to complete the work in July 2011.



CSO Variances to Water Quality Standards

On August 26, 2010, DEP issued Final Determinations to extend the CSO-related variances to the water quality standards for Alewife Brook/Upper Mystic River and the Lower Charles River/Charles River Basin. The variance extensions have three-year terms ending in 2013. The variances apply only to the permitted CSO outfalls to these receiving waters and do not otherwise modify Class B water quality standards. In

accordance with the variances, CSO discharges from permitted outfalls are not required to meet effluent limits based on the Class B criteria when flow in the collection system exceeds the system's conveyance capacity as a result of precipitation or snow melt. Through its continued implementation of the Nine Minimum Controls, MWRA maintains the conveyance capacity of its collection system and has improved the handling of wet weather flows through system optimization efforts,



Lower Charles River Basin, view from Cambridge, Memorial Drive.

most recently through improvements to the operation of influent gates at the Prison Point and Cottage Farm CSO treatment facilities implemented in the last few years. The variances require continued implementation of CSO long term control measures consistent with MWRA's Long-Term Control Plan.

Federal and state approval of the variance extensions acknowledges that it is not feasible to fully attain the Class B bacteria criteria and associated recreational uses for these receiving waters within the next three-year variance period. The agreement reached by EPA, DEP and MWRA in March 2006 included re-issuances of three-year variance extensions to 2020. This agreement was based in part on the determination that implementation of controls necessary for full attainment of the Class B bacteria criteria and associated use would result in substantial and widespread economic and social impact. MWRA expects DEP will reissue and EPA will approve the variance extensions through 2020 in accordance with the agreement. At that time, with information MWRA is required to provide to verify the level of CSO control attained by MWRA's completed Long-Term Control Plan, MWRA expects that DEP will assess the feasibility of attaining Class B uses and may make long-term water quality standards determinations for these receiving waters.

Other Regulatory Compliance

In 2010, MWRA continued to respond to the CSO-related requirements and conditions in its NPDES Permit and in the CSO variances for the Alewife Brook/Upper Mystic River and the Lower Charles River Basin. In April 2010, MWRA submitted to EPA and DEP its estimates of CSO discharge activations and volumes at permitted CSO outfalls (MWRA's and the CSO communities') for all storms in 2009. The information included updated CSO discharge activation and volume predictions at every outfall in a typical year. It also included a comparison of the updated performance at each outfall with the level of control in the Long-Term Control Plan.

Also in April 2010, MWRA distributed public information on CSOs, potential health risks of exposure to CSO discharges, locations of CSO discharges, and the status of MWRA's CSO abatement program for the Alewife Brook/Upper Mystic River watershed and for the Lower Charles River Basin. MWRA, the City of

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Cambridge and the City of Somerville jointly issued an annual press release with this information for the Alewife Brook/Upper Mystic River to watershed advocacy groups, local health agents, and property owners subject to flooding in the watershed. MWRA, BWSC and the City of Cambridge jointly issued a poster (copied below) with this information for the Lower Charles River Basin to watershed advocacy groups, boathouses, and local health agents.

MWRA also continued to conduct its harbor and river water quality sampling and testing program and collected water quality data throughout the year.

I just wanted to thank you for the poster you sent to our boathouse. I know CSO's might not be the most popular poster item in college boathouses, but I think it's good for our athletes to know about the health of the Charles River. Thank you for that.

Stacey Rippetoe – Head Coach, Women’s Rowing, Boston University

CSOs

Controlling Combined Sewer Overflows in the Lower Charles River Basin

WHAT IS A CSO?
Some older sewer systems, like those in Boston and Cambridge, have “combined sewers” that carry both sanitary flows and stormwater runoff. During normal conditions flows are delivered to treatment plants. During heavy rains, when flows can double and even triple, these systems become overloaded. Built-in overflows (called combined sewer overflows or “CSOs”) must then act as relief points by releasing excess flows into the nearest body of water. This prevents sewage backups but with considerable impact to local water quality.

WHAT'S BEING DONE ABOUT CSOs IN THE CHARLES RIVER?
The Massachusetts Water Resources Authority, Boston Water and Sewer Commission and the City of Cambridge have completed a number of projects to reduce combined sewer overflows to the Charles River which have already reduced average annual CSO discharge volume to the Charles River Basin by 98% since 1988.

Other wastewater system improvements already completed have dramatically reduced combined sewer overflows to the Charles River by transporting much more flow to MWRA's Deer Island Treatment Plant. Also, the MWRA's Cottage Farm CSO facility on the Charles River at the BU Bridge has been upgraded to optimize treatment system performance and minimize potential harm to aquatic life in the river posed by discharges.

The CSO work is in part guided by the Lower Charles River Basin CSO Variance issued by the Massachusetts Department of Environmental Protection (www.mass.gov/dep/water/wastewater/sewersys.htm). Each year, EPA provides a detailed summary of the progress that has been accomplished toward cleaning up the lower Charles River. The “Charles River Report Card” has been released each year since 1995 (www.epa.gov/region1/charles/). Since that time, the River's grade has gone from “D” to a “B+” for 2007.

IMPORTANT HEALTH INFORMATION
During large storms, however, CSOs can still be released in the Charles River. Public health officials recommend avoiding contact with the river during rainstorms and for 48 hours afterwards, as there may be increased health risks due to bacteria or other pollutants associated with urban stormwater runoff and CSOs.

IMPROVEMENTS IN Lower Charles River WATER QUALITY OVER TIME

Basin	Location	1989-1991 (E. coli/100 ml)	1992-1998 (E. coli/100 ml)	1999-2008 (E. coli/100 ml)
UPPER BASIN (Watershed Dam to upstream of Cottage Farm)	Worst weather	~1000	~400	~100
	Swimming standard (30 counts per 100 ml)	~1000	~400	~100
MID-BASIN (Cottage Farm to Science Museum)	Worst weather	~250	~100	~50
	Swimming standard (30 counts per 100 ml)	~250	~100	~50
DOWNSTREAM OF BASIN (Science Museum to New Charles Dam)	Worst weather	~200	~100	~50
	Swimming standard (30 counts per 100 ml)	~200	~100	~50

FOR MORE INFORMATION:

Boston Water and Sewer Commission
Web: www.bwsc.org
E-mail: www.bwsc.org/SERVICE/contact.asp
Phone: 617-989-7000, 24 hours

City of Cambridge Public Works
Web: www.cambridgema.gov/TheWorks/
E-mail: TheWorks@cambridgema.gov
Phone: 617-349-4800, 24 hours

Massachusetts Water Resources Authority
Web: www.mwra.com
E-mail: Jeffrey.McLaughlin@mwra.state.ma.us
Phone: 617-660-7976

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 performance assessment 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 would require 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, amended on May 7, 2008.

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 \$867.9 million (in December 2011 dollars)³ are from MWRA's Proposed FY12 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, an 88% reduction. 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 34 of the 84 CSO outfalls addressed in the plan.

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.

³ MWRA's Proposed FY12 CIP anticipates a total spending for CSO control of \$878.9 million, including escalation to the midpoint of construction and contingency, to complete the plan on schedule.

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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.



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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 ⁽¹⁾	Capital Cost ⁽²⁾ (\$ 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"> • Cambridge/Alewife Sewer Separation • MWR003 Gate and Rindge Siphon Relief • Interceptor Connection Upgrades • Somerville Baffle Manhole Separation • Cambridge Floatables Control (portion) 	59.6
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"> • Somerville Marginal CSO Facility Upgrade • Hydraulic Relief at BOS017 • Chelsea Trunk Sewer Replacement • Chelsea Branch Sewer Relief • CHE008 Outfall Repairs • East Boston Branch Sewer Relief (portion) 	78.4
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"> • Cottage Farm CSO Facility Upgrade • Stony Brook Sewer Separation • Hydraulic Relief at CAM005 • Cottage Farm Brookline Connection and Inflow Controls • Charles River Interceptor Gate Controls • Brookline Sewer Separation • Bulfinch Sewer Separation • MWRA Outfall Closings and Floatables Control • Cambridge Floatables Control (portion) 	91.6
Inner Harbor	6 untreated and 17 treated @ Prison Point	9.6 243.0	<ul style="list-style-type: none"> • Prison Point CSO Facility Upgrade • Prison Point Optimization • BOS019 Storage Conduit • East Boston Branch Sewer Relief (portion) 	62.5
Fort Point Channel	3 untreated and 17 treated @ Union Park	2.5 71.4	<ul style="list-style-type: none"> • Union Park Treatment Facility • BOS072-073 Sewer Separation and System Optimization • BWSC Floatables Control • Lower Dorchester Brook Sewer Modifications 	62.5
Constitution Beach	Eliminate		<ul style="list-style-type: none"> • Constitution Beach Sewer Separation 	3.8
North Dorchester Bay	Eliminate		<ul style="list-style-type: none"> • N. Dorchester Bay Storage Tunnel and Related Facilities • Pleasure Bay Storm Drain Improvements • Morrissey Blvd Storm Drain 	262.1
Reserved Channel	3 untreated	1.5	<ul style="list-style-type: none"> • Reserved Channel Sewer Separation 	67.2
South Dorchester Bay	Eliminate		<ul style="list-style-type: none"> • Fox Point CSO Facility Upgrade (interim improvement) • Commercial Pt. CSO Facility Upgrade (interim improvement) • South Dorchester Bay Sewer Separation 	126.7
Neponset River	Eliminate		<ul style="list-style-type: none"> • Neponset River Sewer Separation 	2.4
Regional			<ul style="list-style-type: none"> • Planning, Technical Support and Land Acquisition 	51.1
TOTAL		413.1		
Treated		384.8		867.9

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

(2) From MWRA's Proposed FY12 Capital Improvement Program.

3.3 Status of Plan Implementation and Benefits Already Achieved

Through 2010, MWRA spent \$730 million of the total MWRA budget of \$867.9 million for CSO control in the Proposed FY12 CIP. With the cooperation of its CSO communities, MWRA has completed 27 of the 35 CSO projects, and 7 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 27 CSO projects completed to date. Average annual volume of CSO discharge has been reduced from 3.3 billion gallons in 1988 to 515 million gallons today (an 84% reduction) with 79% of the current discharge volume receiving treatment at MWRA's four long-term CSO facilities. Figure 6 shows this reduction for each receiving water segment.

CSO discharges have been eliminated at 27 of the 34 outfalls recommended to be closed in MWRA's Long-Term Control Plan, including Outfall BOS049 to the Lower Charles River Basin, which BWSC converted to a stormwater-only outfall in July 2010 with completion of the Bulfinch Triangle Sewer Separation project. CSO discharges to the Neponset River, South Dorchester Bay and Constitution Beach were eliminated. The CSO communities have eliminated, or have closed on a test basis, additional CSO outfalls beyond those recommended for closure by MWRA. These include two outfalls BWSC eliminated in East Boston (outfalls BOS006 and BOS007). The City of Cambridge continues to evaluate hydraulic conditions associated with two additional outfalls (Charles River Basin outfalls CAM009 and CAM011) it closed in 2007 on an interim basis pending the outcome of hydraulic impact evaluations.

Tremendous water quality improvements have been seen and measured in the Charles River Basin, where average annual CSO discharge has been drastically cut from about 1.7 billion gallons in 1988 to 27 million gallons today, a greater than 98% reduction. Approximately 86% of this remaining overflow is treated at MWRA's Cottage Farm CSO facility. These improvements are the result of major wastewater system projects, most notably the new Deer Island Wastewater Treatment Plant and related conveyance and pumping systems, as well as the CSO control projects completed to date. 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 six CSO control projects along the Charles River: Cottage Farm Facility Upgrade (2000), CAM005 Hydraulic Relief (2000), the Independent Floatables Controls and Outfall Closings Project (2001), Stony Brook Sewer Separation (2006), Cottage Farm Brookline Connection and Inflow Controls (2009) and Bulfinch Triangle Sewer Separation (2010).

In the same period, 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 7.

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Table 2: CSO Project Cost and Schedules

Shading indicates completed project.

Project		Cost ⁽¹⁾ Prop. FY 12	Commence Design	Commence Construction	Complete Construction
North Dorchester Bay Storage Tunnel and Related Facilities		222.7	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		87.1	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	22.3	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
Cottage Farm Brookline Connection & Inflow Controls		3.1	Sep-06	Jun-08	Jun-09
Charles River Interceptor Gate Controls & Additional Connections Design Only		1.2	Jan-08	(2)	
Prison Point CSO Facility Optimization			Mar-06	Mar-07	Apr-08
South Dorchester Bay Sewer Separation		118.7	Jun-96	Apr-99	Dec-06
Stony Brook Sewer Separation		44.3	Jul-98	Jul-00	Sep-06
Neponset River Sewer Separation		2.4		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		12.0	Jul-02	Mar-05	Mar-07
Morrissey Boulevard Storm Drain		36.2	Jun-05	Dec-06	Jun-09
Reserved Channel Sewer Separation		67.2	Jul-06	May-09	Dec-15
Bulfinch Triangle Sewer Separation		10.0	Nov-06	Sep-08	Jul-10
Brookline Sewer Separation		25.7	Nov-06	Nov-08	Jul-13
Somerville Baffle Manhole Separation		(3)		Apr-96	Dec-96
Cambridge/Alewife Brook Sewer Separation	CAM004 Outfall and Wetland Basin	11.6		Mar-11*	Mar-13*
	CAM004 Sewer Separation	38.3	Jan-97	Jul-12*	Dec-15*
	CAM400 Manhole Separation	3.9	Oct-08	Jan-10	Mar-11
	Interceptor Connection Relief/Floatables	1.2	Oct-08	Jan-10	Oct-10
	MWR003 Gate and Rindge Ave. Siphon	3.7	Jul-11	Apr-12*	Aug-15*
Region-wide Floatables Control and Outfall Closings		2.1	Sep-96	Mar-99	Dec-07
Planning & Support		51.1	55.0		
Total Cost		867.9			

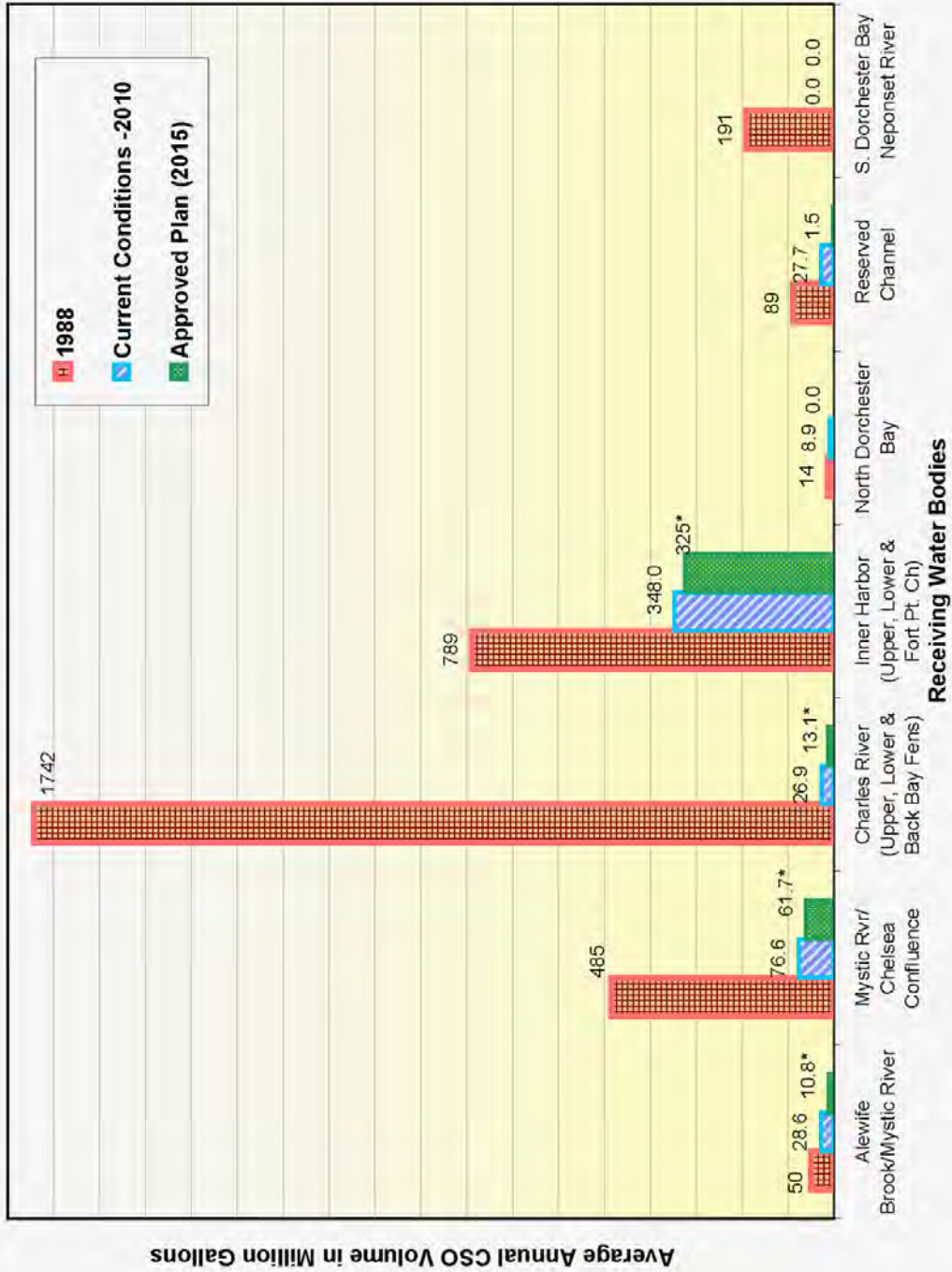
⁽¹⁾ From MWRA Proposed FY12 Capital Improvement Program.

⁽²⁾ MWRA has recommended deleting this project.

⁽³⁾ Costs in "Planning & Support," below.

* Pending Cambridge's acquisition of remaining land easements for Contract 12 and DEP authorization to award.

Figure 6
 Predicted Typical Year CSO Discharge Volumes 1988-2015



*Includes treated flow:
 Alewife Brook/Upper Mystic River: 3.5 MG (32%) at Somerville Marginal Facility; Mystic River/Chelsea Confluence: 60.6 MG (98%) at Somerville Marginal Facility;
 Charles River: 6.3 MG (48%) at Cottage Farm Facility; and Inner Harbor: 314.4 MG (97%) at Prison Point and Union Park facilities.

Figure 9 shows similar water quality (average bacteria concentration) improvement over time in the Neponset River. CSO discharges were eliminated in 2000 with completion of the Neponset River Sewer Separation projects. Prior to the project, CSO flows were discharged at two BWSC outfalls in the Granite Street area. Water quality data show improvement after 2000 in the Granite Avenue area, but also in the stretch of the river immediately upstream. Average bacteria level continues to meet water quality standards at the mouth of the Neponset River, where there is considerable dilution with the waters of South Dorchester Bay.

CSO discharges to South Boston beaches were cut almost in half with the improvements to pumping capacity at Deer Island from 1989 to 2000. Improvement in the quality of Boston Inner Harbor waters is also seen in the changes to *Enterococcus* bacteria counts over the period 1989 to 2010, shown in Figure 8. Improvement was greatest in the Upper Inner Harbor and in Chelsea Creek, which had more serious wet weather pollution problems.

Bacteria data in Figure 10 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 Figure 9 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.

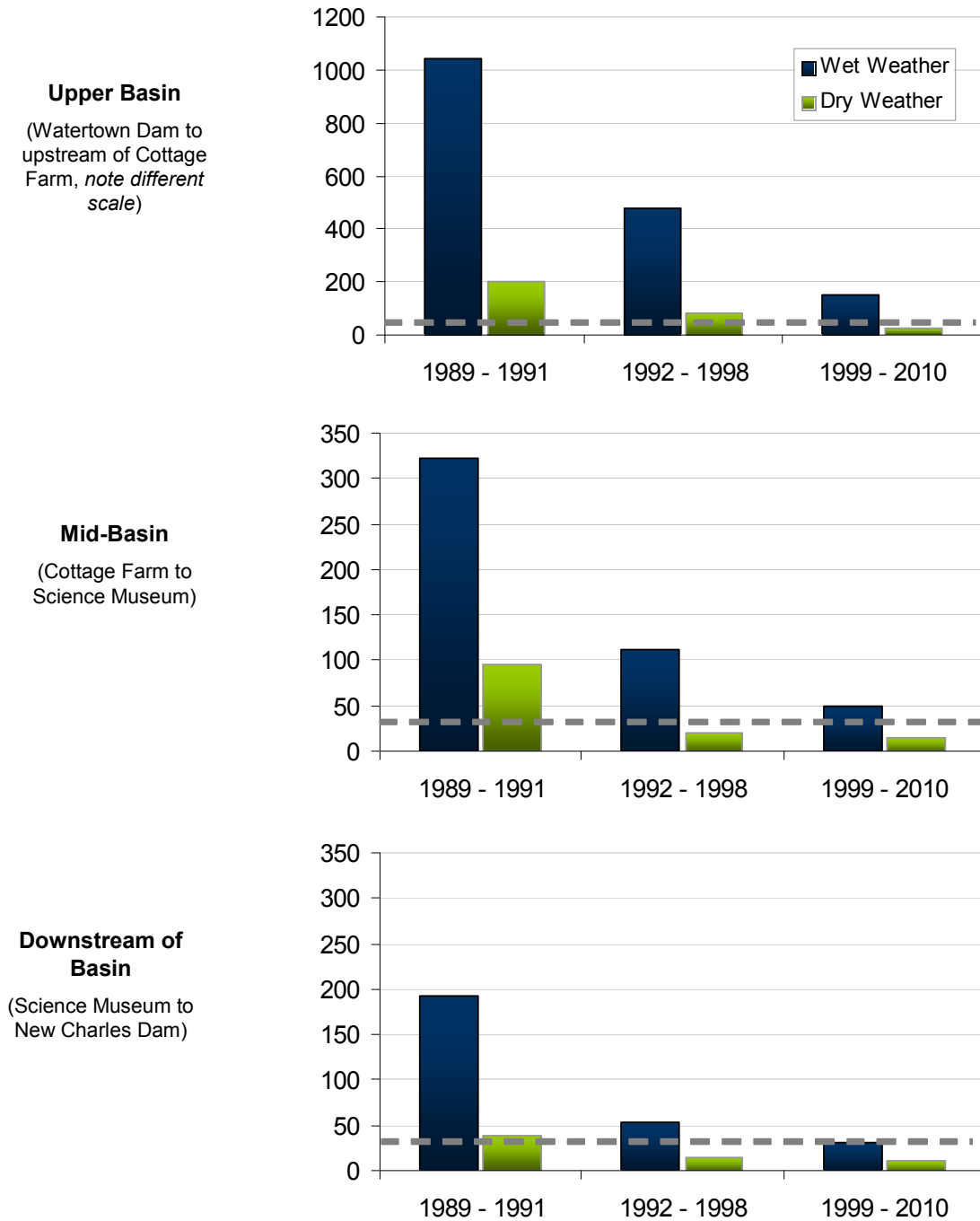
1987-1991: In this period, MWRA and the CSO communities were eliminating dry weather overflows and implementing other early pollution controls at CSO outfalls. MWRA was completing the "fast-track" pumping improvements at Deer Island and other major wastewater transport improvements that greatly increased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

1999-2010: 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 7
Change in Lower Charles River Water Quality Over Time

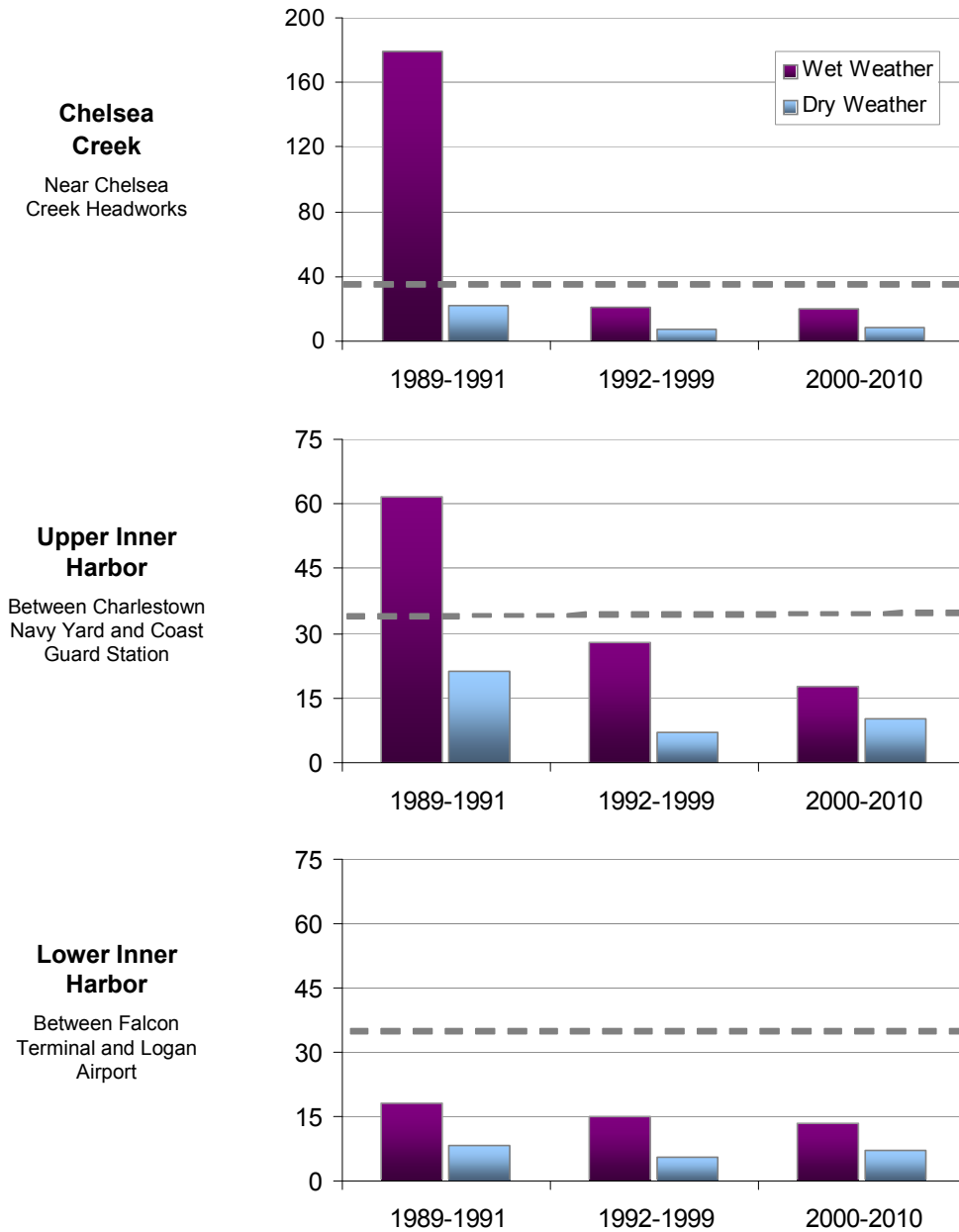
Enterococcus bacteria counts, 1989 - 2010 (note change in scale)



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 8
Change in Inner Harbor Water Quality Over Time

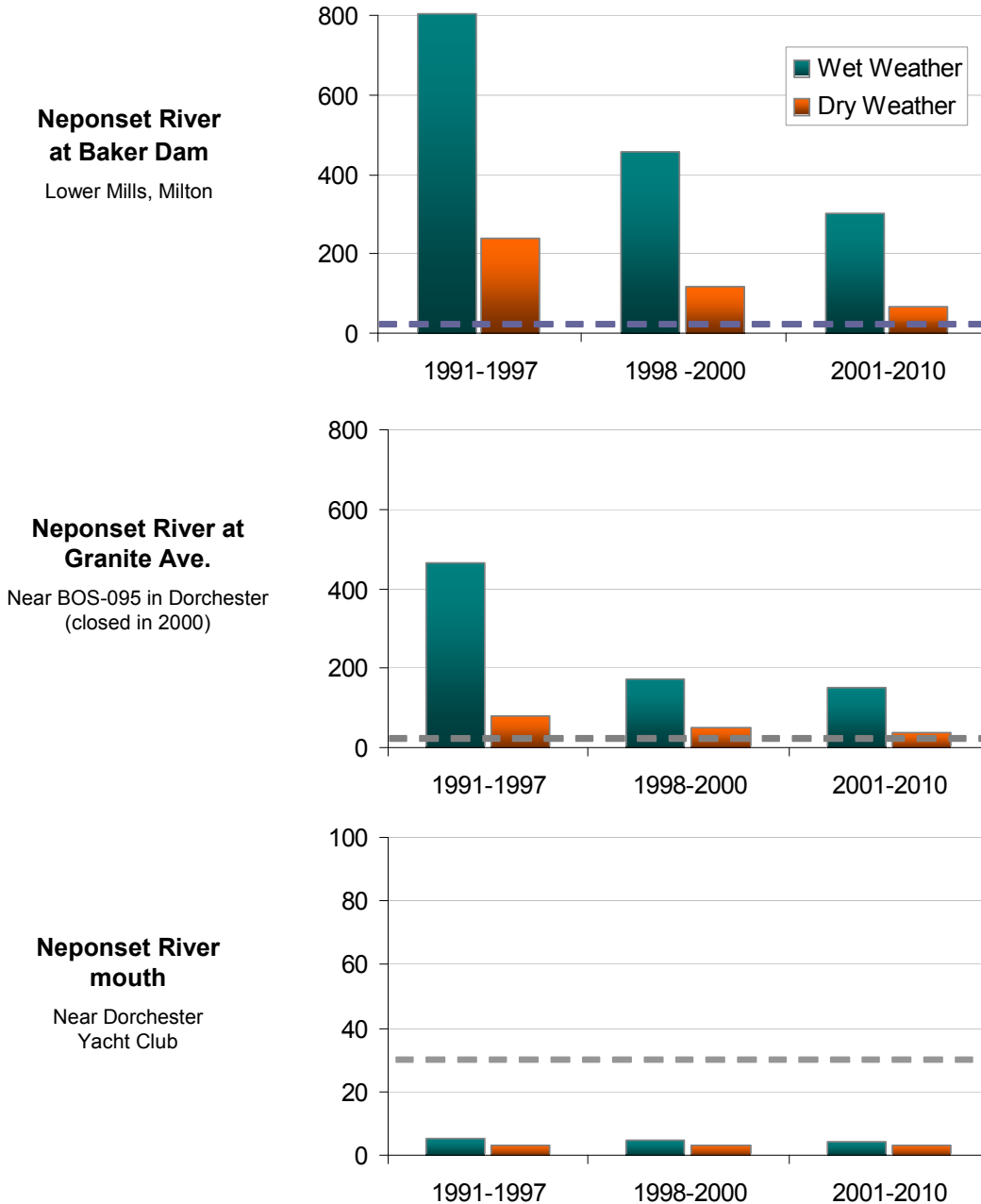
Enterococcus bacteria counts, 1989 - 2010 (note change in scale)



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.

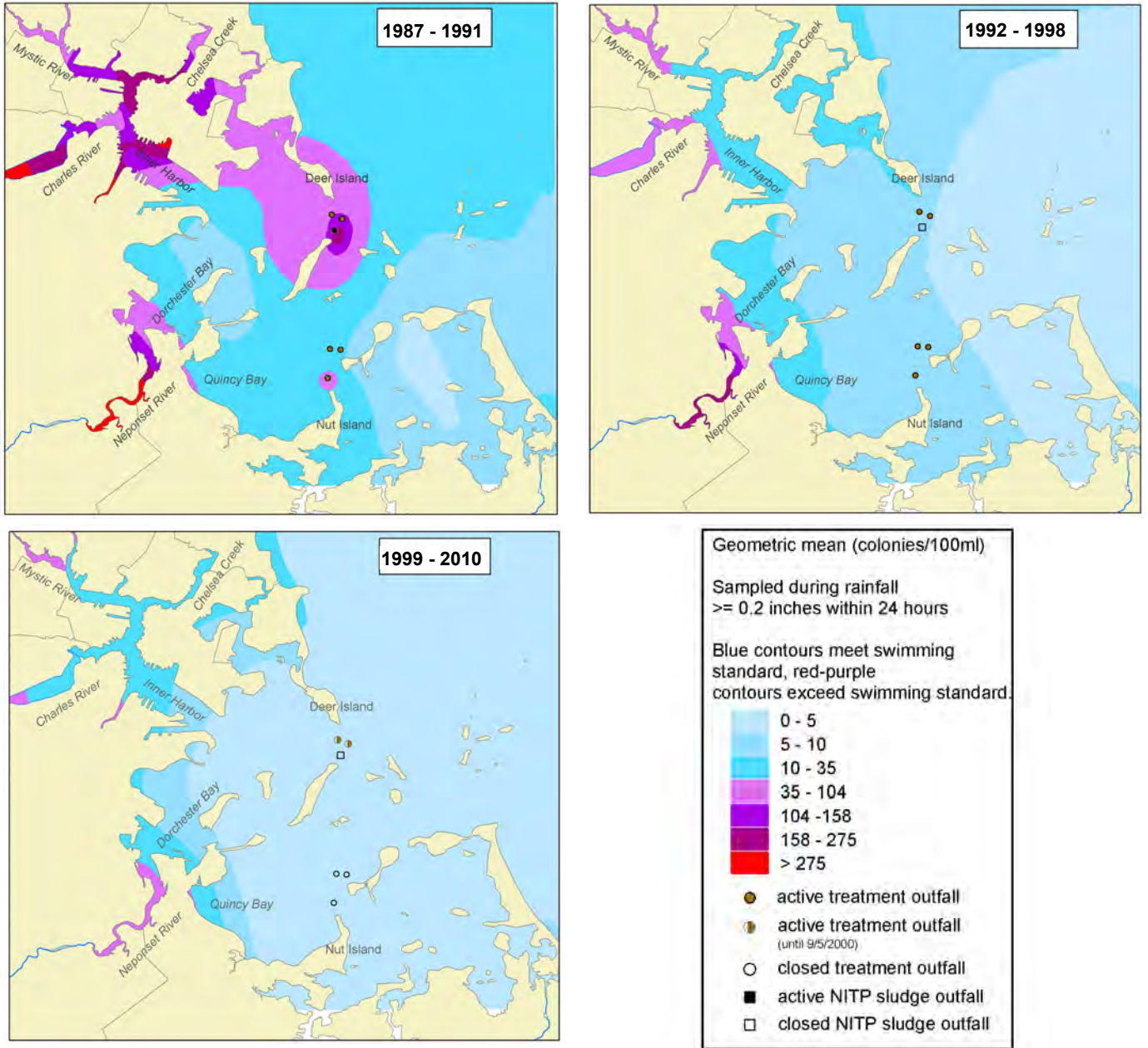
Figure 9
Change in Neponset River Water Quality Over Time

Enterococcus bacteria counts, 1991 - 2010 (note changes 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 055, 054, and 042.

Figure 10
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 - 2010** 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 exception of the Alewife Brook projects that were delayed, due to environmental permit appeals and easement issues and the Charles River Gate Controls project that MWRA is seeking to delete. Table 2 presents the schedules for implementing the 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 11, 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 \$867.9 million in MWRA's Proposed FY12 CIP (in December 2011 dollars). With escalation of the CIP budget estimate to the mid-point of construction and contingency, MWRA projects that it will spend a total \$878.9 million to complete the plan on its current schedule.

In the Proposed FY12 CIP, projected spending on the CSO control plan in FY11 and beyond totals \$157.0 million, which is 7% of total projected capital spending by MWRA and 14% of wastewater related capital spending. As shown in Figure 12, annual spending on CSO control escalated greatly a few years ago and peaked in FY08 at \$110.5 million. With the anticipated deletion of the Charles River Valley Sewer and South Charles River Relief Sewer gate controls project from Schedule Seven and only seven other projects remaining to be implemented, CSO program activity and spending will continue to wind down. CSO capital spending is estimated to be \$55 million in FY11, \$42 million in FY12, \$35 million in FY13, and \$19 million in FY14.

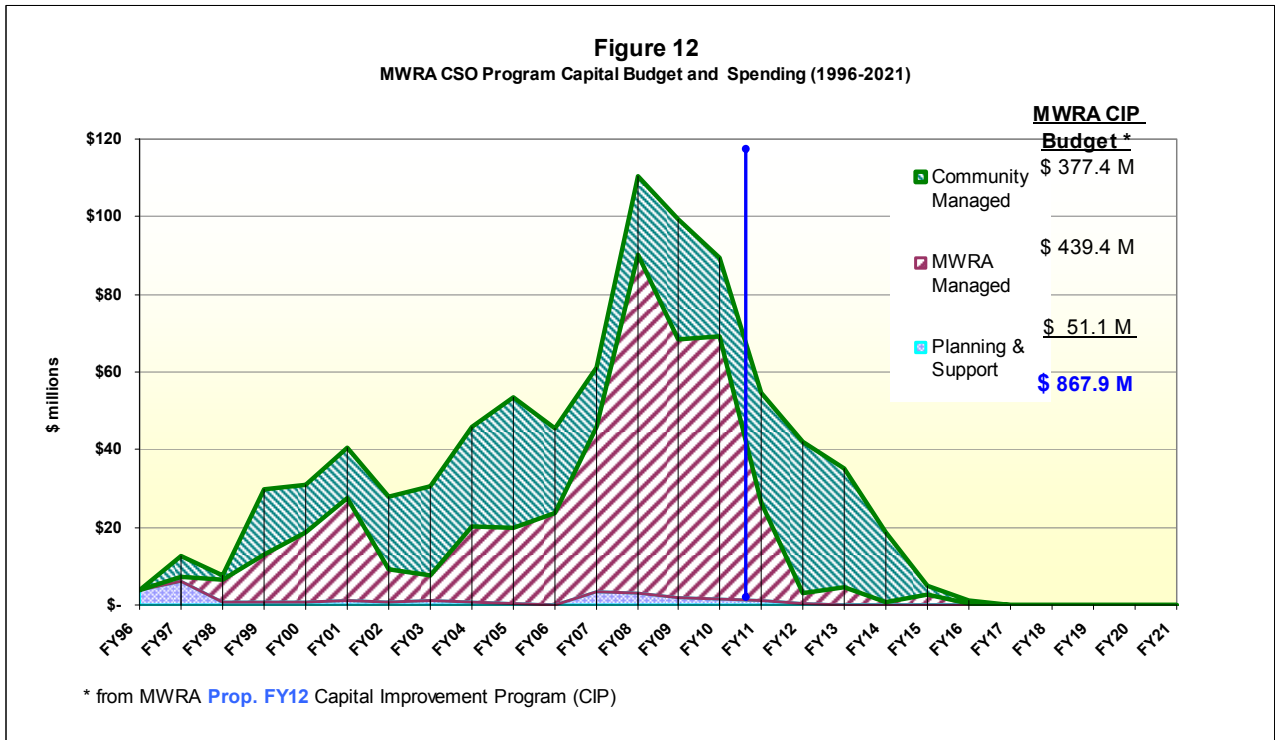
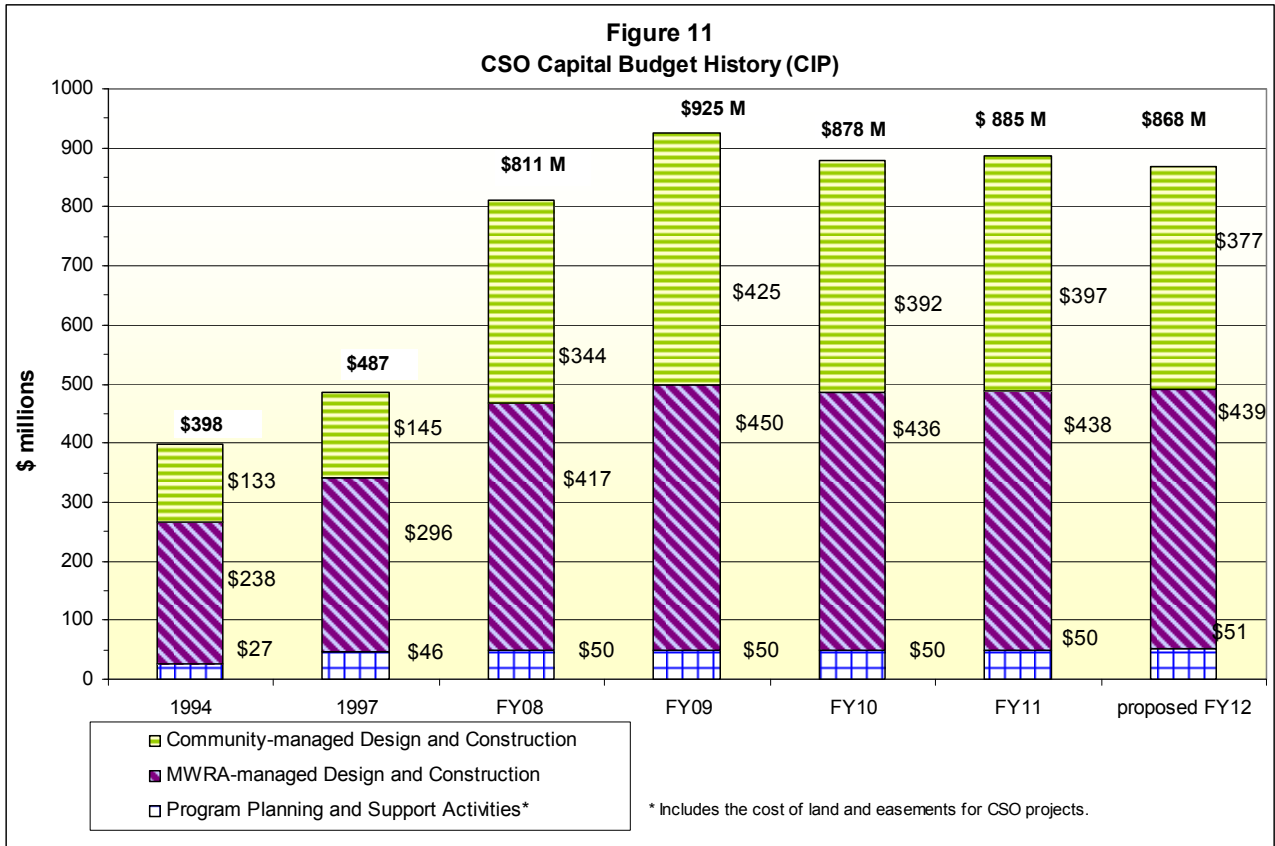
MWRA has met the qualification requirements for federal stimulus funding for four CSO Program contracts: North Dorchester Bay pumping station and force main, North Dorchester Bay ventilation building, East Boston Branch Sewer Relief Contract 3, and Reserved Channel Sewer Separation Contract 2. The federal stimulus funding is provided to MWRA through the State Revolving Fund (SRF) program, which is administered by the Massachusetts Pollution Abatement Trust and DEP. With the stimulus funding, MWRA received \$13.8 million in forgiveness of the principle on the SRF loans for these four construction contracts.

CSO spending is scheduled to continue through FY21, when MWRA will complete a sewer system performance assessment verifying attainment of the long-term levels of CSO control. CSO 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 complete.

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 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 historical 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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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 are continuing with the BWSC Reserved Channel sewer separation project and will also 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, there is cost risk associated with the Reserved Channel Sewer Separation and Brookline Sewer Separation contracts, because subsurface conditions, including utility conflicts and the need for protection of utilities, 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 2010 and through the first quarter of 2011. Each project section also describes any significant project changes since 2009, 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 13 shows the plan, along with the implementation progress MWRA and BWSC have made to date.

MWRA's Proposed FY12 CIP includes a budget of \$272 million for the North Dorchester Bay CSO plan, including the engineering and construction costs of all components of the plan described in Table 3 below and the cost for related land and easement acquisition and construction permits. Once completed, the North Dorchester Bay CSO control plan is predicted to eliminate CSO discharges except in catastrophic storms (greater than 25-year storm), compared to 17 discharges per year on average today.

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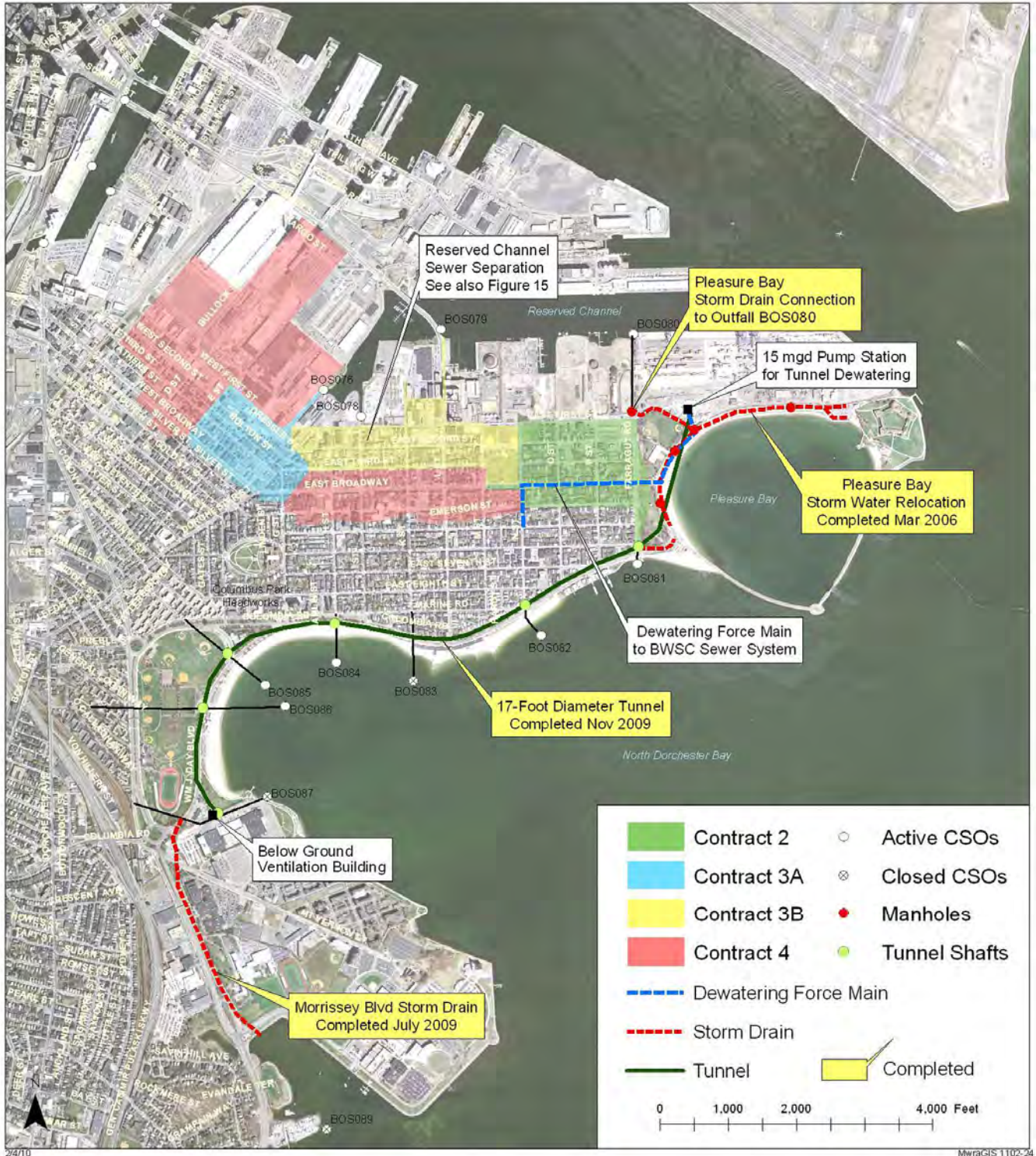
Table 3: Approved Plan for North Dorchester Bay

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

CSO discharges to North Dorchester Bay occur at five active CSO outfalls owned by and permitted to BWSC: BOS081, BOS082, BOS084, BOS085 and BOS087. These outfalls also discharge separate stormwater collected by BWSC and Department of Conservation and Recreation (DCR) storm drains that primarily serve Columbia Road, Moakley Park, parts of the Old Colony Housing Development and the DCR properties and parkways. Outfall BOS083 was closed a few years ago by MWRA's tunnel contractor, and its CSO and stormwater flows are now redirected to Outfall BOS084. Outfall BOS087, located at the south end of Carson Beach adjacent to Mother's Rest, was converted to a stormwater-only outfall when BWSC completed sewer separation in areas upstream of this outfall several years ago and closed the CSO regulators.

Because the tunnel's storage capacity is driven by the predicted CSO volume that would be captured in a 25-year storm, in smaller storms the CSO volume will be much less than the tunnel's capacity. Therefore, MWRA was able to include the capture of separate stormwater that discharges to the South Boston beaches up to a certain level depending on storm size. 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 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 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

Figure 13
 North Dorchester Bay and Reserved Channel
 Recommended CSO Control Plans



average). 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.

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 that had previously lain across and discharged onto the beach. The project relocated the Pleasure Bay stormwater discharges to the less sensitive Reserved Channel, which is primarily used as a shipping channel.

BWSC managed design and construction 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 (“Completed Projects”) 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

As previously reported, on November 30, 2009, MWRA’s tunnel contractor attained substantial completion of the storage tunnel, the finish work on the main shafts at each end of the tunnel, the CSO and stormwater diversion structures, associated near-surface piping at each outfall connection to the tunnel, and the CSO and stormwater diversion structure gate controls. Since then, the tunnel contractor has continued to work on punch list items, change orders for certain equipment and controls associated with the CSO and stormwater diversion structures, and surface restoration.

MWRA’s contractors for the tunnel related facilities, including the 15 million-gallon per day dewatering pump station at Massport’s Conley Terminal and associated 4,000-foot-long, 24-inch force main and the below-ground ventilation building, made substantial progress in 2010 and remain on schedule for substantial completion in May 2011, despite certain work delays and schedule corrections associated with the ventilation building, described below. The pump station will remove stored flows from the tunnel and direct them through the force main to the BWSC local sewer system on N Street for delivery to MWRA’s sewer system and Deer Island Treatment Plant after each storm. A dry-weather pump in the station will routinely drain the tunnel of any groundwater infiltration that enters through upstream storm drains (stormwater diversion gates directing flows into the tunnel will be kept in the open position during dry weather and in most storms). The below-ground ventilation building will continuously pull air from the tunnel into the facility between storms and as CSO and stormwater flows enter the tunnel during storms. Ventilated air will be treated through activated carbon units for odor control. This ventilation and odor control approach is intended to prevent the release of odiferous air into the neighborhood from any part of the tunnel system.

MWRA commenced the construction contract for the \$26.9 million dewatering pump station and force main in May 2009, and the contract is 88% complete as of March 2011. In the first half of 2010, the contractor completed foundation work for the pump station and the substructure concrete walls for the wet well and the station, to-grade, and installed the pipe connection from the main tunnel shaft to the pump station wet well. Since then, the contractor has completed the above and below ground building structures, including the concrete slab over the “wet area” of the station, the masonry walls, and most of the veneer brick and cast-stone facing of the building. The contractor has completed the erection and welding of the steel framing for the roof and has commenced installation of the metal roof panels. The contractor recently commenced interior painting of ceilings, walls and piping systems. The contractor is also installing yard drainage and roads and parking areas surrounding the pump station and has commenced construction of a new Massport access roadway, drainage and lighting around the permanent 1-acre MWRA easement area.

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Following completion of factory tests on the three 7.5-mgd wet-weather related pumps and the 2-mgd dry weather pump, the contractor received delivery of the pumps on December 9, 2010. All of the pumps are now fully installed along with the motor control centers, and the contractor is completing the related power and control panel installations and wiring. The contractor has completed connection to the primary power source and plans to perform wet testing of the pumps and pump systems later this month. The contractor has completed the installation of the slide gate in the influent channel between the tunnel shaft and the station and has commenced installation of the mechanical screens and completed installation of the related local and remote control panels. Work to install the fire protection, lighting and plumbing is complete and is scheduled for outside party inspections.

In 2010, the contractor also completed remaining sections of the 3,200-foot 24-inch diameter force main that passes from Conley Terminal through Marine Park and along Broadway to N Street, as well as the replacement and upsizing of a BWSC gravity sewer on N Street with 640-foot long, 30-inch diameter PVC pipe to accommodate the force main flows along with the local neighborhoods' sanitary flows. The N Street sewer conveys flows to BWSC's South Boston Interceptor South Branch, which in turn delivers flows to MWRA's Columbus Park Headworks for transport to the Deer Island Treatment Plant. By December 2010, the contractor completed trench pavement over the new force main and gravity sewer pipes on East Broadway and N Street. Full-width milling and overlay of the affected roads and reconstruction of wheelchair ramps are scheduled to be undertaken in the spring of 2011. The contractor also completed installation of a 10-inch water main from the new pump station to a water meter pit located on Farragut Street.

MWRA commenced the construction contract for the \$5.2 million below-ground tunnel ventilation building in November 2009, and the contract is 88% complete as of March 2011. Early in 2010, the contractor installed and tested the foundation piles, placed the sub-grade, and constructed the foundation slab. Later in 2010, the contractor constructed the concrete exterior and interior walls and installed the roof beams and roof slab. The contractor has since completed application of the waterproof membrane to roof and walls of the below-ground building and the installation of interior architectural elements, such as frames and doors and stairs. The contractor has also commenced the painting of interior surfaces and piping systems and the final backfilling of the building. The contractor continues to install the interior plumbing and fire protection systems and the electrical conduit, and is preparing to install and wire the motor control center. The contractor has also begun installation of the HVAC equipment.

The contractor has, however, experienced delays with the delivery of the two activated carbon adsorption vessels for odor control, which must first be factory tested for conformance with the hydraulic performance criteria in the contract specifications. The contractor received one of the approved vessels, but hydraulic testing of the vessel at the work site identified problems that are now being corrected in the field. A second vessel did not satisfy the factory test criteria, and the vendor is fabricating a replacement unit. In addition, the electrical subcontractor's work is behind schedule. The general contractor has taken corrective action and submitted a recovery schedule which complies with the contract completion date but with no spare time. The general contractor and the electrical subcontractor have expressed commitments to increase their resources and work hours, including extending work days and adding Saturdays, to support an aggressive conclusion to the project. After considerable discussion with the contractor, MWRA believes the fabrication problems with the adsorption vessels and the delays with the electrical work can be resolved by the contractor to allow completion of the work by May 2011, on schedule.

In parallel with the construction activities, the control systems integrator is nearing completion of the SCADA programming and initial standard operating procedures. MWRA's construction management consultant is drafting training manuals and facility handbooks. The two facility contractors are scheduled to commence checkout and performance testing of equipment and training of MWRA staff in March 2011 to

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support a complete commissioning of the system in May 2011. MWRA plans to accept ownership of the facilities and commence start-up operation of the facilities and tunnel by the end of May, in compliance with Schedule Seven. Once functional use of all facilities is confirmed, BWSC will decommission Outfall BOS087 and remove the associated surface structure from the shore of Carson Beach. MWRA plans to perform extensive start-up testing and performance evaluations on tunnel operation for an extended time period following commissioning toward establishing an optimized operational plan that will provide an assurance of attainment of the long-term levels of CSO and stormwater control.



15 mgd dewatering pump station for the North Dorchester Bay
CSO storage tunnel at Massport's Conley Terminal

**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
Implement recommended additional connections	April 2009	There were no recommended additional interconnections.
Commence Construction	January 2010	MWRA is seeking relief from these milestones.
Complete Construction	January 2011	

The Charles River CSO interceptor optimization project was originally proposed by MWRA in 2005 and incorporated into Schedule Seven in 2006 for the purpose of ensuring 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 the interceptor modifications were intended to improve upon, but not be necessary to attain, the approved long-term level of CSO control for the Charles River.

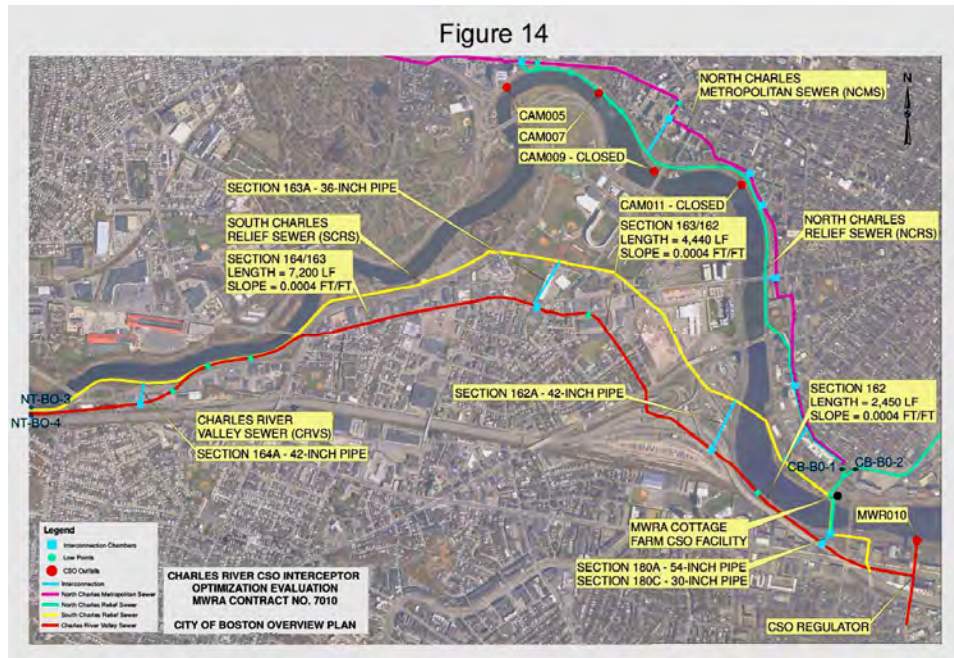
MWRA commenced the design contract for this project in January 2008. The contract included hydraulic evaluations of a range of interceptor and gate optimization modifications, preliminary design, and final design of the specific improvements recommended from the hydraulic evaluations and preliminary design. The hydraulic evaluations included identification and analysis of alternatives for adding 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 interceptors on the south side of the Charles river include the South Charles Relief Sewer (“SCRS”), which conveys flows to MWRA’s Ward Street Headworks and can 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 South Charles Relief Sewer. The north Charles River interceptors include the North Charles Metropolitan Sewer and the North Charles Relief Sewer, 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 14).

The hydraulic evaluations also included identifying 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 these interceptors. 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.

By September 2009, MWRA completed the hydraulic evaluations scoped in the contact, as well as supplemental hydraulic evaluations recommended during the work and evaluation of early results. MWRA documented its findings in three reports as the study progressed: the Final Hydraulic Modeling Technical Report, December 2008 (the “Modeling Report”), 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 “Supplemental Modeling Report”). On October 13, 2009, EPA submitted comments to MWRA on these technical presentations and findings, and MWRA performed additional evaluations that were presented in a December 14, 2009 response to EPA. MWRA has since performed additional investigations in support of responses to more recent questions or requests for additional information from EPA. The responses were also copied to DEP.



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 MWRA’s analyses and conclusions regarding the evaluation of creating additional interconnections among the interceptors. The report also included a summary of MWRA’s progress on its broader interceptor optimization study. The Additional Interconnections Report presented model results and MWRA’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 North Charles Metropolitan Sewer and the North Charles Relief Sewer 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 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 North Charles Relief Sewer and South Charles Relief Sewer overflow chambers that MWRA 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 these interceptors would not provide further hydraulic or CSO benefit.

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

Following completion of the Modeling Report 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 Modeling Report, which was submitted to EPA and DEP on September 14, 2009.

From model results that had earlier been presented in the Modeling Report, 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 Modeling Report, MWRA 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 Modeling Report, 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 Modeling Report, 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 Modeling Report, January 2009 Additional Interconnections Report and September 2009 Supplemental Modeling Report, MWRA 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 Modeling Report, the January 2009 Additional Interconnections Report and the September 2009 Supplemental Modeling Report to MWRA. In a December 14, 2009 response to EPA's comments, MWRA 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 MWRA's earlier conclusions. EPA agreed for the most part, but continued to question, in comments submitted to MWRA on January 11, 2010, whether some form of real-time control could 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 conducted a closer evaluation and providing additional information to EPA on June 15, 2010. This response included additional information on the alternative means for real-time controls, which had been evaluated in the preliminary design report; the limited potential for additional CSO control from these controls; and clarification of the risks for system flooding.

On September 9, 2010, MWRA received additional correspondence from EPA in response to MWRA's June 15, 2010, submission, in which EPA continued to seek additional information on the potential to further improve CSO control by implementing active controls at the CRVS/SCRS interconnections. On December 14, 2010, MWRA sent further correspondence to EPA and DEP to attempt to clarify the basis for its conclusion that no feasible optimization measure can be implemented and recommending that the project be deleted from Schedule Seven. In its December 14 letter, MWRA addressed existing high-flow level conditions in the interceptors in large storms and the potential for any new structural modification, including static weirs, adjustable weirs or bending weirs, to impose further hydraulic restriction at the interconnections, thereby limiting the transfer of flow from the CRVS to the SCRS during larger and extreme storms and contributing to higher hydraulic grade lines in the Charles River Valley Sewer above already threatening levels.



Lower Charles River Basin

The December 14 letter also summarized the hydraulic model results MWRA previously submitted to EPA and DEP on the evaluation of control strategies for operating the gates existing in two of the three interconnections. These evaluations were an attempt to identify the potential for higher CSO control without adding new structural elements to the interconnections in order to avoid further restricting flow transfer in large storms. From the gate operating strategy evaluations, MWRA concluded that to avoid water level impacts, the gates would have to open even in the storms that are predicted to begin to cause CSO discharges at Cottage Farm under Long-Term Control Plan conditions, removing any CSO benefit.

The December 14 letter also repeated information previously submitted to EPA and DEP that existing flow levels and system conditions violate the CSO system criteria established by MWRA in 1993 and since used to optimize the system and reduce CSO discharges at dozens of outfall locations through the region (e.g. the system optimization plans implemented in 1995-6, the Prison Point facility gate controls implemented in 2007, and the Cottage Farm facility inflow controls completed in 2009).

Conclusion, Recommendation and Related Motion to the Court

MWRA continues to conclude from the results of extensive system data reviews and hydraulic model evaluations that the interceptor system is operating at maximum conveyance in wet weather and that there is no feasible means to optimize the gates, the gate controls or the structures at existing interconnections between the CRVS and the SCRS because any such modification would increase the risk of system flooding, backups and/or sanitary sewer overflows and would not provide meaningful CSO benefit. MWRA plans to file a motion by the end of March 2011 with the Federal District Court seeking to amend Schedule Seven by deleting the April 2009, January 2010 and January 2011 milestones that require implementation of any recommended improvements.

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 \$67.2 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 Figure 15). 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 and reduce total annual CSO volume to the Reserved Channel from 28 million gallons to 1.5 million gallons. 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 primarily to connect catch basins to the new storm drains. The work also includes the installation or rehabilitation of 17,300 linear feet of sanitary sewer. 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.

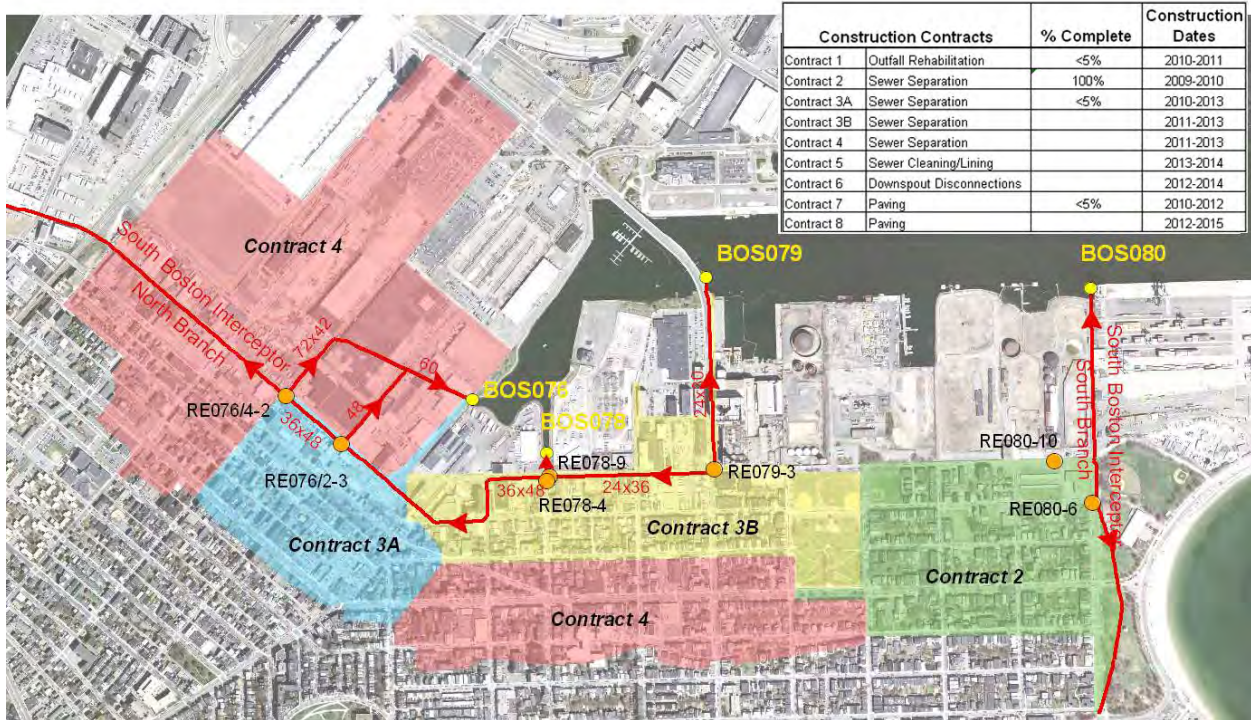
The project area encompasses approximately 365 acres of South Boston that comprise the drainage areas tributary to the four Reserved Channel outfalls. This area is an urban mix of residential properties and extensive commercial, industrial and recreational land uses primarily along or close to the channel. 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 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 follow an approach similar to the South Dorchester Bay and Stony Brook sewer separation projects, with multiple design packages and 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).

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Figure 15 Reserved Channel Sewer Separation



Progress in 2010 and Ongoing Work

BWSC has made substantial progress with design and construction of the project since issuing the Preliminary Design Report in early 2008. In December 2010, BWSC attained substantial completion of the \$6.9 million first construction contract, which involved the installation of 8,379 linear feet of storm drain, approximately 3,961 linear feet of minor drain, and 3,372 linear feet of sanitary sewer to separate combined sewers in a 55-acre area of South Boston approximately bounded by East First Street, Farragut Road, East Fourth Street and N Street. The work removed stormwater from the local sewers tributary to the upstream end of BWSC’s South Boston Interceptor, South Branch (“SBI-SB”), with the benefits of 1) reducing CSO overflows to the Reserved Channel at Outfall BOS080 and 2) reducing surcharging within the SBI-SB and its overflows to North Dorchester Bay (presently) and the North Dorchester Bay CSO storage tunnel (in the near future when the tunnel is brought on line).

BWSC also recently made tremendous progress in moving several design packages into construction:

- On November 1, 2010, BWSC issued Notice to Proceed with the \$1.2 million construction contract for roadway resurfacing (Contract 7). The contract completion date is April 19, 2012.
- On November 29, 2010, BWSC issued Notice to Proceed with the \$4.0 million construction contract for rehabilitation of the four CSO outfalls that discharge to the Reserved Channel (Contract 1). The contract completion date is November 30, 2011.
- On December 16, 2010, BWSC issued Notice to Proceed with the \$9.9 million construction contract for sewer separation in a 33-acre area of South Boston approximately bounded by West First Street,

G Street, West Broadway and E Street (Contract 3A). The contract completion date is July 31, 2013. Contract 3A includes the installation of 8,905 linear feet of new drain ranging from 12 to 84 inches diameter. Approximately 22 new catch basins will be installed, and 76 existing catch basins will be disconnected from the combined sewer system and reconnected to the new storm drain system.

- BWSC expects to issue a Notice to Proceed with the \$10.9 million construction contract for sewer separation in a 66-acre area of South Boston approximately bounded by East First Street, N Street, East Third Street and Dorchester Street, and including Elkins Street and Summer Street to the edge of the Reserved Channel (Contract 3B) soon. Contract 3B includes the installation of 10,840 linear feet of new drain ranging from 12 to 72 inches diameter. Approximately 14 new catch basins will be installed, and 120 existing catch basins will be disconnected from the combined sewer system and reconnected to the new storm drain system.

In the meantime, BWSC continues to make progress with its remaining project design packages. BWSC plans to issue notices to proceed with the remaining four construction contracts sequentially through April 2013 and complete all work by December 2015, in compliance with Schedule Seven.



66" drain installation in Farragut Rd.

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 \$25.7 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 16). 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.

The Brookline sewer separation project includes two sewer separation construction contracts managed by the Town of Brookline, as well as MWRA contracts to inspect and rehabilitate Outfall MWR010, which will be used to convey the stormwater removed from Brookline’s combined sewer system to the Charles River Basin.

Progress in 2010 and Ongoing Work

Brookline completed the \$1.4 million Construction Contract 1 in January 2010. This contract involved the installation of 5,658 linear feet of storm drain in secondary streets on the north and south sides of Beacon Street. On January 19, 2011, Brookline issued the Notice to Proceed with Construction Contract 2 in the low bid amount of \$16,556,563. This much larger contract includes micro-tunneling for large-diameter sewers at significant depths along Beacon and Monmouth Streets; installing or rehabilitating smaller-diameter sewers along Beacon, Monmouth and St. Mary’s Streets; installing storm drains along Beacon, Monmouth and St. Mary’s Streets, and converting a large-diameter combined sewer to a storm drain along St. Mary’s Street. Several special structures will be constructed to connect the new town sewers to existing town laterals and to MWRA’s interceptor system, including the Charles River Valley Sewer and the South Charles Relief Sewer. Construction Contract 2 has a substantial completion date of January 2013, in advance of the July 2013 milestone in Schedule Seven.

Related to the separation work implemented by Brookline, MWRA plans to clean CSO Outfall MWR010 to ensure the outfall has adequate capacity to convey Brookline’s separated stormwater, as well as the existing BWSC stormwater and infrequent CSO discharges from MWRA’s Charles River Valley Sewer the outfall currently conveys. Outfall MWR010 discharges to the Charles River Basin. MWRA completed an internal inspection of the outfall and an analysis of the sediments in 2010 and is presently preparing a contract for final design, preparation of specifications, and permitting. It is anticipated that cleaning work will begin in December 2011 and be complete by August 2012, in advance of the completion of Brookline’s sewer separation project and the need for the upgraded stormwater discharge capacity.

The Town of Brookline currently anticipates that it will be able to complete construction of the entire project ahead of the July 2013 milestone in Schedule Seven. When implemented, this project, together with the other projects added to the CSO control plan for the Charles River by agreement with EPA and DEP in 2006, is predicted to reduce discharges from the Cottage Farm CSO treatment facility.

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Alewife Brook CSO Control Plan

Alewife Brook CSO 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 (Contract 12)			Jul 07	Mar 11*	Jul 09	Mar 13*
CAM004 Sewer Separation	Jan 97	Jan 97	Jul 98	Jul 98	Jan 13	Dec 15*
			Jul 09	Jul 12		
CAM400 Manhole Separation	Jul 06	Oct 08	Jul 07	Jan 10	Jul 08	Mar 11
Interceptor Connection Relief and Floatables Control at CAM002 and CAM401B and Floatables Control at CAM001	Jul 06	Oct 08	Jan 08	Jan 10	Dec 08	Oct 10
Control Gate/Floatables Control at Outfall MWR003, MWRA Rindge Avenue Siphon Relief, and Interconnection Relief and Floatables Control at Outfall SOM01A	Apr 09	Apr 12*	Nov 10	Jun 14*	Jan 12	Aug 15*

* Pending Cambridge's acquisition of remaining land easements for Contract 12 and DEP authorization to award.

Background and Description of the Alewife Brook CSO Control Plan

The Alewife Brook CSO control plan is intended to minimize CSO flows to the 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 the 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 the 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, the Department of Conservation and Recreation (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 the Alewife Brook comprises several component projects that were individually incorporated into the Court Schedule in April 2006. They are shown in Figure 17 and described in Table 4 below.

Table 4: Alewife Brook CSO Control Plan

Project	Capital Cost ⁽¹⁾ (millions)	Cambridge Contract No.	Benefit
CAM004 Stormwater Outfall and Wetland Basin	\$24.5	12	Convey stormwater flows to wetland system for attenuation and treatment.
CAM004 Sewer Separation ⁽²⁾	76.6	8A,8B, 9	Remove large quantities of stormwater from the sewer system; eliminate CSO at Outfall CAM004.
CAM400 Manhole Separation	5.4	4/13	Remove stormwater from the sewer system; eliminate CSO at Outfall CAM400.
Interceptor Connection Relief and Floatables Control	1.9		Upgrade connections between Cambridge and MWRA systems to provide relief; add floatables control.
MWR003 Control Gate and Rindge Ave. Siphon Relief	3.7	MWRA Contract	Optimize hydraulic conveyance; minimize overflows while controlling system flooding in large storms.
Total Alewife Brook CSO Plan	\$112.1		

⁽¹⁾ Total plan cost to be shared by MWRA and the City of Cambridge pursuant to Memorandum of Understanding and Financial Assistance Agreement.

⁽²⁾ Also includes earlier construction contracts completed by Cambridge.

Together, these projects are predicted to reduce annual CSO volume to the 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.

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.

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 \$110.5 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).

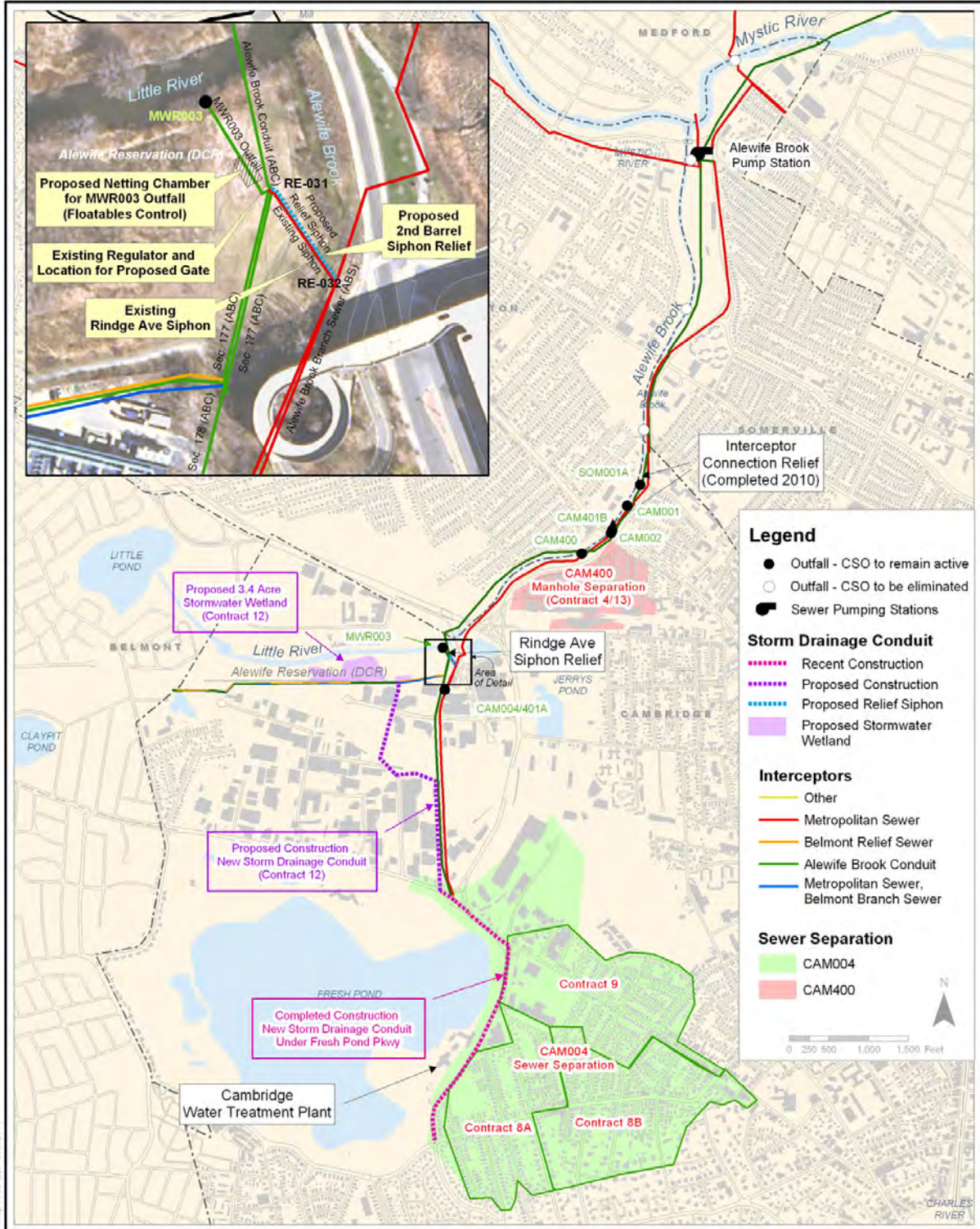
On December 11, 2008, the plaintiffs filed a notice of appeal, which was dismissed in Superior Court on January 12, 2009, but then re-filed on January 16, 2009, as a motion requesting reconsideration of the dismissal and relief from judgment. On February 17, 2009, Cambridge filed an opposition to the 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.

Project Schedules and Court Milestones

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. Following resolution of the wetlands appeals, Cambridge conducted work in 2008 and 2009 to update its preliminary design recommendations, including project design and construction requirements and schedules.

In September 2009, MWRA and Cambridge met with EPA and DEP to begin negotiating new schedules with the Court parties to the Boston Harbor Case to revise certain milestones in Schedule Seven related to the Alewife Brook projects.

Figure 17
Alewife Brook CSO Control - Revised Plan



In the proposed milestone changes presented to EPA and DEP then, the new construction schedule for Contract 12 maintained the original two-year construction duration, but moved the start and end dates out nine months further than a schedule resulting from the wetlands appeal delay alone, for a total shift of 36 months from the milestones that were (and continue to be) in Schedule Seven. The nine months additional time was estimated by Cambridge to be 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 DCR's Alewife Reservation.

The schedules proposed in September 2009 for CAM400 Manhole Separation and for Interceptor Relief and Floatables Controls, both Cambridge implemented, showed revised construction durations - longer and shorter, respectively - to reflect the complexity of each project. The new schedules also reflected the decision by Cambridge to combine these projects into one construction contract, for which Cambridge would stipulate separate project substantial completion dates. The later of the proposed completion dates for these two projects was 27 months beyond the later construction date for these projects in Schedule Seven, meaning that the overall schedule for completing these projects was affected only by the wetlands appeal delay.

In Cambridge's project schedule sequencing, the completion date for CAM004 Sewer Separation was dependent on the schedule for Contract 12, so was also pushed out nine months more than the delay caused by the wetlands appeal alone, for a total of 36 months. MWRA and Cambridge proposed completing this last Alewife Brook project by December 2015.

Some of the project schedules have since changed for reasons discussed below. MWRA plans to circulate to the Court parties a motion seeking to amend the Schedule Seven milestones once the construction of Contract 12 commences and a final schedule for completing the Alewife Brook plan can then be established.

Progress in 2010, Ongoing Work and Schedule Impacts

The City of Cambridge continues to make progress with the implementation of certain projects within MWRA's long-term CSO control plan for Alewife Brook, including completion of an interceptor connection and floatables control project, construction of the CAM400 Manhole Separation project, and design of the CAM004 Sewer Separation project. Cambridge has, however, experienced delays in obtaining the remaining easements needed to issue the Notice to Proceed with construction for the CAM004 stormwater outfall and wetland basin (Contract 12).

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. Cambridge completed final design and advertised the combined contract for construction bids in November 2009. Cambridge issued the Notice to Proceed with Contract 4/13 on January 26, 2010, in accordance with the schedule for these projects MWRA and Cambridge had proposed to EPA and DEP in September 2009. Commencement of this construction was a major milepost in moving the revised Alewife Brook sewer separation plan forward after several years of delay.

Cambridge attained substantial completion of the Interceptor Relief and Floatables Controls at CAM002 and CAM401B and Floatables Control at CAM001 project in October 2010, in accordance with the Alewife Brook project schedules MWRA and Cambridge proposed to EPA and DEP in September 2009. This project included the construction of upgraded connections between Cambridge's local collection systems tributary to

CSO outfalls CAM002 and CAM401B and the MWRA interceptors. The project also included the installation of underflow baffles for floatables control in the CSO regulators associated with these two outfalls and with Outfall CAM001. The construction work occurred in localized areas in and near the intersection of Alewife Brook Parkway and Massachusetts Avenue in Cambridge. The project is intended to increase the hydraulic capacities of the local connections to MWRA's system thereby reducing the need for local system relief with the CSO discharges.

As part of the same construction contract, Cambridge expects to complete the CAM400 Manhole Separation project by March 31, 2011, also in accordance with the schedules proposed in 2009. This project involves the replacement of common storm drain and sewer manholes with separate manholes and associated piping in the local, mostly residential streets bounded by Alewife Brook Parkway, Massachusetts Avenue, Magoun Street and Whittemore Avenue, as well as a portion of the WR Grace property off Whittemore Avenue.

In addition, Cambridge is making progress with design of the CAM004 Sewer Separation project, which it resumed last fall. Cambridge completed design and construction of initial pieces of this project by 2002. Remaining work involves the separation of sewers in large areas near Fresh Pond Parkway and Huron Avenue that will reduce stormwater flows to MWRA's interceptors and allow Cambridge to close Outfall CAM004. The separated stormwater flows will be directed through the CAM004 stormwater outfall and wetland basin for detention and treatment before draining into the Little River and Alewife Brook. Cambridge plans to commence the first of three construction contracts for the CAM004 sewer separation project (contracts 8A, 8B and 9) by July 2012, as previously proposed.



New sewer installation along Whittemore Avenue in Cambridge

Cambridge reports that it has worked diligently to procure the easements, rights of entry, and licenses required regarding six different property owners in connection with the CAM004 stormwater outfall and wetland basin (Contract 12) project. Cambridge has successfully been able to obtain from four of the six property owners the required easements, rights of entry, licenses, and other approvals necessary in order to issue the Notice to Proceed with construction of Contract 12. However, Cambridge has been unable to issue the Notice of Proceed because of continued difficulties in finalizing negotiations with the other two property owners for the remaining easements on six private property parcels due in part to the fact that the parcels owned by those two property owners were either foreclosed and/or subject to negotiations for sale.

Regarding work within the Department of Conservation and Recreation's ("DCR") Alewife Brook Reservation, Cambridge had anticipated receiving a state grant of long-term easements and a DCR construction permit by January 2011. DCR issued the construction permit to Cambridge on February 24, 2011, and Cambridge has indicated to MWRA that given that it now has the construction permit from DCR, it can issue the Notice to Proceed with Contract 12 once it obtains the remaining private property easements. In the meantime, DCR, Cambridge, and the Department of Capital Asset Management are finalizing the language of the long-term Cambridge easements on Commonwealth property that were approved by the State Legislature and the Governor in August 2010 pursuant to Article 97 of the Massachusetts Constitution.

Cambridge continues to work with the current and prospective owners of property located at 55 Wheeler Street and 70 Fawcett Street to secure necessary easements on those properties. In early February 2011, after many months of negotiation with the property owner of 55 Wheeler Street and 70 Fawcett Street as well as with the current tenant of 55 Wheeler Street, Cambridge and the property owner finalized agreed-upon language of the necessary easements and rights of entry. The property owner has informed Cambridge that it has forwarded all of the documents to its lender for final approval and to the prospective buyer of 70 Fawcett Street, who has been kept informed of the impending grant of the easements and rights of entry for the properties. Cambridge expects to receive the fully executed easements and rights of entry from the property owner soon.

Regarding necessary easements on private property located at 125, 150, 180 and 180R Cambridge Park Drive, the City of Cambridge forwarded the draft easements and right of entry to the new owner, Barclays Bank, in November 2010 and met with Barclays' counsel immediately thereafter. Barclays raised numerous questions and issues, the most significant of which related to unrecorded parking easements that existed on the properties that had not been previously disclosed to Cambridge by the former owner. Cambridge drafted and forwarded to Barclays a revised right of entry that was intended to address all of Barclays' concerns except as to the parking issue. However, Cambridge also had its surveyor conduct an extensive study on the parking issues and existing easements at the properties, and Cambridge underwent a significant effort in developing a means by which to avoid the parking issues that Barclays identified by changing the directional drilling technique used for the Project. The new drilling technique requires the use of less of Barclays' property and significantly reduces the number of parking spaces needed during construction, thereby eliminating any parking problems related to construction. In early February, Barclays informed Cambridge that it was in the process of obtaining appraisals in order to establish a value for the granting of property rights on the properties and expressed another concern to Cambridge relative to the placement of utilities in connection with future development on the property. Cambridge thereafter made a proposal to Barclays to address the future placement of utilities, which appears to have alleviated Barclays' concerns.

Cambridge hopes to obtain the easements from these remaining two property owners, submit related documentation to DEP for authorization to award, and issue the Notice to Proceed with construction of Contract 12 as soon as possible. In addition, Cambridge continues to work with its contractor in reviewing shop drawings and submittals and purchasing materials to accelerate mobilization once the contract is signed in an effort to mitigate further delay. Cambridge also continues to plan to condense the construction duration of the CAM004 sewer separation project, the last of the Alewife Brook projects, in order to maintain its previously proposed December 2015 construction completion date. Further delay in securing Contract 12 easements is affecting the start of construction of Contract 12 and may affect the schedules for construction of the CAM004 sewer separation project and MWRA's project for relief of its Rindge Avenue Siphon and controls at outfalls MWR003 and SOM01A. MWRA plans to resume discussions with EPA and DEP on Cambridge's proposed schedules for the Alewife Brook projects and related proposed changes to respective milestones in Schedule Seven once Cambridge issues the Notice to Proceed with construction of Contract 12.

MWRA Improvements at Outfalls MWR003 and SOM01A and 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.


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In order for MWRA to finalize design and construct the Control Gate and Floatables Control at Outfall MWR003 and MWRA Rindge Avenue Siphon Relief project, the City of Cambridge must first complete construction of the CAM004 wetland basin and stormwater outfall and preliminary design of the CAM004 sewer separation project. The sequencing of Contract 12, the CAM004 sewer separation project and the control gate and floatables control at outfall MWR003 and MWRA Rindge Avenue siphon relief project in Schedule Seven and in MWRA's and Cambridge's currently proposed project schedules is necessary to avoid cumulative construction impacts and to take account of the system hydraulic conditions predicted from preliminary design to result from the CAM004 projects. Design of the CAM004 sewer separation project, which is currently underway, will provide this information to MWRA and will be incorporated into the design scope for the control gate and floatables control at outfall MWR003 and MWRA Rindge Avenue siphon relief project.

Despite the most recent Contract 12 delay, MWRA continues to plan to commence design of the control gate and floatables control at outfall MWR003 and MWRA Rindge Avenue siphon relief project in April 2012 and complete construction sometime in 2015. When Cambridge secures the remaining easements and is able to move forward with construction of the CAM004 wetland basin and stormwater outfall project, MWRA will finalize its schedule for the commencement and completion of construction of the Control Gate and Floatables Control at Outfall MWR003 and MWRA Rindge Avenue Siphon Relief project.



6. COMPLETED CSO PROJECTS

1. SOMERVILLE BAFFLE MANHOLE SEPARATION		
	<p>Receiving Water: Alewife Brook, Upper Mystic River</p> <p>Completed: 1996</p> <p>Capital Cost: \$400,000</p> <p>Description: 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;">CSO Control</p> <p>Water Quality Benefit: Eliminated CSO discharges at three City of Somerville outfalls.</p> <p>CSO Outfalls: SOM001, SOM006, SOM007</p> <p>Frequency of Discharge (typical year): Before project: 2 With project: Eliminated</p> <p>Annual Discharge Volume (typical year): Before project: 0.04 million gallons With project: Eliminated</p> <p>CSO Reduction by Volume: 100%</p>

2. CONSTITUTION BEACH SEWER SEPARATION		
 <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>Receiving Water: Boston Harbor/Constitution Beach</p> <p>Completed: 2000</p> <p>Capital Cost: \$3,769,000</p> <p>Description: Installed 14,000 linear feet of storm drain to separate the combined sewer system, remove stormwater flows from area sewers, and eliminate CSO discharges to Constitution Beach, allowing MWRA to decommission the Constitution Beach CSO treatment facility.</p>	<p style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Eliminated CSO discharges to Constitution Beach to comply with Class B water quality standards.</p> <p>CSO Outfalls: MWR207(BOS002)</p> <p>Frequency of Discharge (typical year): Before project: 16 (treated) With project: Eliminated</p> <p>Annual Discharge Volume (typical year): Before project: 1.35 million gallons With project: Eliminated</p> <p>CSO Reduction by Volume: 100%</p>

Completed CSO Projects (continued)

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



Receiving Water:
 CAM005: Upper Charles River Basin
 BOS017: Mystic River/Chelsea Creek Confluence

Completed:
 2000

Capital Cost:
 \$2,295,000

Description:
 CAM005: In Cambridge, relieved the 40-foot long, 24-inch diameter dry weather connection between the CAM005 regulator and MWRA's North Charles Metropolitan Sewer with a 54-inch additional connection.

BOS017: In Charlestown, installed 190 feet of 36-inch diameter pipe in Sullivan Square to divert two local (BWSC) combined sewers to a direct connection with MWRA's Cambridge Branch Sewer. In addition, eliminated a 10-foot long restriction between the Charlestown and Cambridge Branch Sewers, adjacent to Sullivan Square.

CSO Control

Water Quality Benefit:
 Minimized CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).

CSO Outfalls:
 CAM005, BOS017

CAM005:

Frequency of Discharge (typical year):
Before project: 11
With project: 3

Annual Discharge Volume (typical year):
Before project: 3.8 million gallons
With project: 0.84 million gallons

CSO Reduction by Volume: 78%


BOS017:

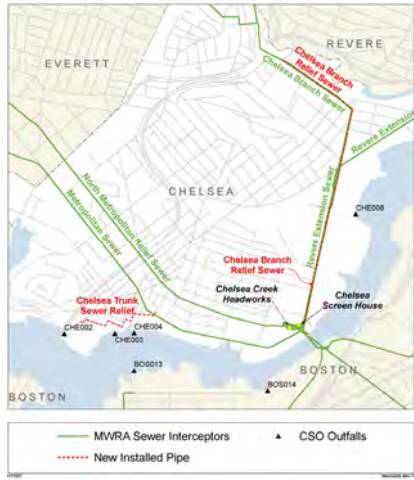
Frequency of Discharge (typical year):
Before project: 18
With project: 1

Annual Discharge Volume (typical year):
Before project: 2.5 million gallons
With project: 0.02 million gallons


CSO Reduction by Volume: 99%


Completed CSO Projects (continued)

5. NEPONSET RIVER SEWER SEPARATION		
	<p>Receiving Water: Neponset River</p> <p>Completed: 2000</p> <p>Capital Cost: \$2,445,000</p> <p>Description: Installed 8,000 linear feet of storm drain to separate the combined sewer system, remove stormwater flows from area sewers, and close CSO regulators, eliminating CSO discharges at the two remaining CSO outfalls to the Neponset River.</p>	<p>CSO Control</p>
	<p>Water Quality Benefit: Eliminated CSO discharges to Neponset River to comply with Class B water quality standards and protect South Dorchester Bay beaches (Tenean Beach).</p> <p>CSO Outfalls: BOS093, BOS095</p> <p>Frequency of Discharge (typical year): Before project: 17 With project: Eliminated</p> <p>Annual Discharge Volume (typical year): Before project: 5.8 million gallons With project: Eliminated</p> <p>CSO Reduction by Volume: 100%</p>	

6. CHELSEA TRUNK SEWER REPLACEMENT 7. CHELSEA BRANCH SEWER RELIEF 8. CHE008 OUTFALL REPAIRS		
	<p>Receiving Water: Mystic River/Chelsea Creek Confluence Chelsea Creek</p> <p>Completed: 2000-2001</p> <p>Capital Cost: \$29,778,000</p> <p>Description: 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>CSO Control</p>
	<p>Water Quality Benefit: Minimized CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).</p> <p>CSO Outfalls: CHE002, CHE003, CHE004, CHE008</p> <p>Frequency of Discharge (typical year): Before project: 8 With project: 4</p> <p>Annual Discharge Volume (typical year): Before project: 9.0 million gallons With project: 0.6 million gallons</p> <p>CSO Reduction by Volume: 93%</p>	

Completed CSO Projects (continued)


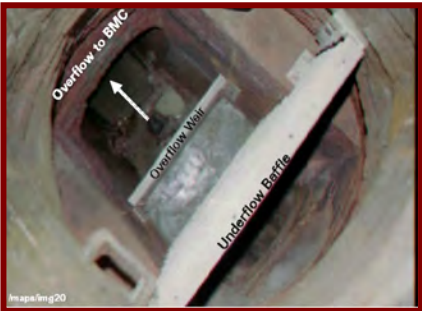
<p>9. UPGRADE COTTAGE FARM CSO FACILITY 10. UPGRADE PRISON POINT CSO FACILITY 11. UPGRADE SOMERVILLE MARGINAL CSO FACILITY 12. UPGRADE FOX POINT CSO FACILITY 13. UPGRADE COMMERCIAL POINT CSO FACILITY</p>		
	<p>Receiving Water: Lower Charles River Basin Upper Inner Harbor Upper Mystic River Mystic River/Chelsea Creek Confluence South Dorchester Bay</p> <p>Completed: 2001</p> <p>Capital Cost: \$22,261,000</p> <p>Description: Upgraded chlorine disinfection systems, added dechlorination systems, process control and safety improvements.</p>	<p>CSO Control</p> <p>Water Quality Benefit: Upgrade treatment to meet Class B water quality criteria, including residual chlorine limits.</p> <p>CSO Outfalls: MWR201 (Cottage Farm Facility) MWR203 (Prison Point Facility) MWR205, MWR205A(SOM007A) (Somerville Marginal Facility) MWR209(BOS088/BOS089) (Fox Point Facility) MWR211(BOS090) (Commercial Point Facility)</p> <p>These projects improved treatment performance, with no effect on discharge frequency or volume.</p>

<p>14. PLEASURE BAY STORM DRAIN IMPROVEMENTS</p>		
	<p>Receiving Water: North Dorchester Bay</p> <p>Completed: 2006</p> <p>Capital Cost: \$3,200,000</p> <p>Description (cont): Constructed a new storm drain system to relocate stormwater dischargers from Pleasure Bay to Reserved Channel.</p>	<p>CSO Control</p> <p>Water Quality Benefit: Eliminated storm water discharges to Pleasure Bay Beach.</p>


Completed CSO Projects (continued)


15. STONY BROOK SEWER SEPARATION		
	<p>Receiving Water: Lower Charles River Basin</p> <p>Completed: 2006</p> <p>Capital Cost: \$44,332,000</p> <p>Description: Installed a total of 107,175 linear feet of storm drain and sanitary sewer to remove stormwater 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 style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Minimizes CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).</p> <p>CSO Outfalls: MWR023 (Stony Brook Conduit)</p> <p>Frequency of Discharge (typical year): Before project: 22 With project: 2</p> <p>Annual Discharge Volume (typical year): Before project: 44.5 million gallons With project: 0.13 million gallons</p> <p>CSO Reduction by Volume: 99.7%</p>
16. SOUTH DORCHESTER BAY SEWER SEPARATION		
	<p>Receiving Water: South Dorchester Bay</p> <p>Completed: 2007</p> <p>Capital Cost: \$118,723,000</p> <p>Description: Installed a total of 150,000 linear feet of storm drain and sanitary sewer to remove stormwater from local sewers serving a 1,750-acre area in Dorchester. Closed all CSO regulators, allowing MWRA to decommission its Fox Point and Commercial Point CSO facilities.</p>	<p style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Eliminated CSO discharges to Savin Hill, Malibu and Tenean beaches, in compliance with Class B water quality standards.</p> <p>CSO Outfalls: MWR209 (BOS088/BOS089) MWR211 (BOS090)</p> <p>Frequency of Discharge (typical year): Before project: 20 (treated) With project: Eliminated</p> <p>Annual Discharge Volume (typical year): Before project: 30 million gallons With project: Eliminated</p> <p>CSO Reduction by Volume: 100%</p>

Completed CSO Projects (continued)


17. FORT POINT CHANNEL SEWER SEPARATION		
	<p>Receiving Water: Fort Point Channel</p> <p>Completed: 2007</p> <p>Capital Cost: \$12,047,000</p> <p>Description: Installed 4,260 feet of storm drain and 4,300 feet of sanitary sewer to remove stormwater from local sewers serving 55 acres in the Fort Point Channel area. Raised overflow weirs at outfalls BOS072 and BOS073. Replaced tide gates and installed underflow baffles for floatables control at both outfalls.</p>	<p style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Minimizes CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).</p> <p>CSO Outfalls: BOS072, BOS073</p> <p>Frequency of Discharge (typical year): Before project: 9 With project: 0</p> <p>Annual Discharge Volume (typical year): Before project: 3.0 million gallons With project: 0.0</p> <p>CSO Reduction by Volume: 100%</p>
18. REGIONWIDE FLOATABLES CONTROL 19. MWRA FLOATABLES CONTROL AND OUTFALL CLOSING PROJECTS		
	<p>Receiving Water: Region-wide</p> <p>Completed: 2007</p> <p>Capital Cost: \$1,216,000</p> <p>Description: Installed underflow baffles for floatables controls and closed several regulators and outfalls.</p> <p>In March 2000, MWRA closed Outfalls MWR021 and MWR022 to CSO discharges.</p>	<p style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Complies with EPA Policy Nine Minimum Controls requirement to control solid and floatable material. Eliminated CSO discharges at certain outfalls.</p> <p>CSO Outfalls: Various outfalls system-wide.</p> <p>CSO Control: The floatables controls do not affect CSO discharge frequency or volume.</p>


Completed CSO Projects (continued)

20. UNION PARK DETENTION/TREATMENT FACILITY		
	<p>Receiving Water: Fort Point Channel</p> <p>Completed: 2007</p> <p>Capital Cost: \$49,584,000</p> <p>Description: 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 style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Provides treatment of Union Park pumping station discharges to Fort Point Channel to meet Class B water quality criteria, including residual chlorine limits, and lowers discharge frequency and volume with on-site detention basins.</p> <p>CSO Outfall: BOS 070</p> <p>Frequency of Discharge (typical year): Before project: 25 (untreated) With project: 17 (treated)</p> <p>Annual Discharge Volume (typical year): Before project: 132.0 million gallons With project: 71.4 million gallons/year</p> <p>CSO Reduction by Volume: 46%</p>


21. BOS019 CSO STORAGE CONDUIT		
	<p>Receiving Water: Upper Inner Harbor (Little Mystic Channel)</p> <p>Completed: 2007</p> <p>Capital Cost: \$14,288,000</p> <p>Description: 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 style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Minimizes CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).</p> <p>CSO Outfall: BOS019</p> <p>Frequency of Discharge (typical year): Before project: 13 With project: 2</p> <p>Annual Discharge Volume (typical year): Before project: 4.4 million gallons With project: 0.6 million gallons</p> <p>CSO Reduction by Volume: 86%</p>


Completed CSO Projects (continued)

22. PRISON POINT CSO FACILITY OPTIMIZATION		
	<p>Receiving Water: Upper Inner Harbor</p> <p>Completed: 2008</p> <p>Capital Cost: \$50,000</p> <p>Description: Minimizes 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>CSO Control</p> <p>Water Quality Benefit: Reduces treated CSO discharges to Upper Inner Harbor.</p> <p>CSO Outfall: MWR203 (Prison Point Facility)</p> <p>Frequency of Discharge (typical year): Before project: 30 (treated) With project: 17 (treated)</p> <p>Annual Discharge Volume (typical year): Before project: 335 million gallons With project: 243 million gallons</p> <p>CSO Reduction by Volume: 27% (with Bulfinch Triangle Sewer Separation)</p>



23. COTTAGE FARM BROOKLINE CONNECTION AND INFLOW CONTROLS		
	<p>Receiving Water: Lower Charles River Basin</p> <p>Completed: 2009</p> <p>Capital Cost: \$3,186,000</p> <p>Description: Optimizes 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; increases this conveyance capacity by bringing into service a parallel, previously unutilized 54-inch diameter sewer (the "Brookline Connection").</p>	<p>CSO Control</p> <p>Water Quality Benefit: Minimizes treated CSO discharges from the Cottage Farm CSO Facility to the Lower Charles River Basin.</p> <p>CSO Outfall: MWR201 (Cottage Farm Facility)</p> <p>Frequency of discharges (typical year): Before project: 7 (treated) With project: 7 (treated)</p> <p>Annual Discharge Volume (typical year): Before project: 44.5 million gallons With project: 24.0 million gallons</p> <p>CSO Reduction by Volume: 46%</p>

Completed CSO Projects (continued)

24. MORRISSEY BOULEVARD STORM DRAIN		
	<p>Receiving Water: North Dorchester Bay</p> <p>Completed: 2009</p> <p>Capital Cost: \$36,173,000</p> <p>Description: Installed 2,800 linear feet of 12-foot by 12-foot and 8-foot by 8-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>CSO Control</p>
		<p>Water Quality Benefit: Maximizes level of stormwater control along the South Boston beaches by redirecting some stormwater to Savin Hill Cove in large storms.</p>

25. EAST BOSTON BRANCH SEWER RELIEF		
	<p>Receiving Water: Boston Harbor and Chelsea Creek</p> <p>Completed: 2010</p> <p>Capital Cost: \$87,124,000</p> <p>Description: Upgraded MWRA's 115-year-old interceptor system serving most of East Boston, using a combination of construction methods: microtunneling, pipe-bursting, open-cut excavation and pipe relining.</p>	<p>CSO Control</p>
		<p>Water Quality Benefit: Minimizes CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).</p> <p>CSO Outfalls: BOS003, BOS004, BOS005, BOS009, BOS010, BOS012, BOS013, BOS014 (BOS006 and BOS007 closed by BWSC)</p> <p>Frequency of discharges (typical year): Before project: 31 With project: 6</p> <p>Annual Discharge Volume (typical year): Before project: 41.0 million gallons With project: 8.6 million gallons</p> <p>CSO Reduction by Volume: 79%</p>

Completed CSO Projects (continued)

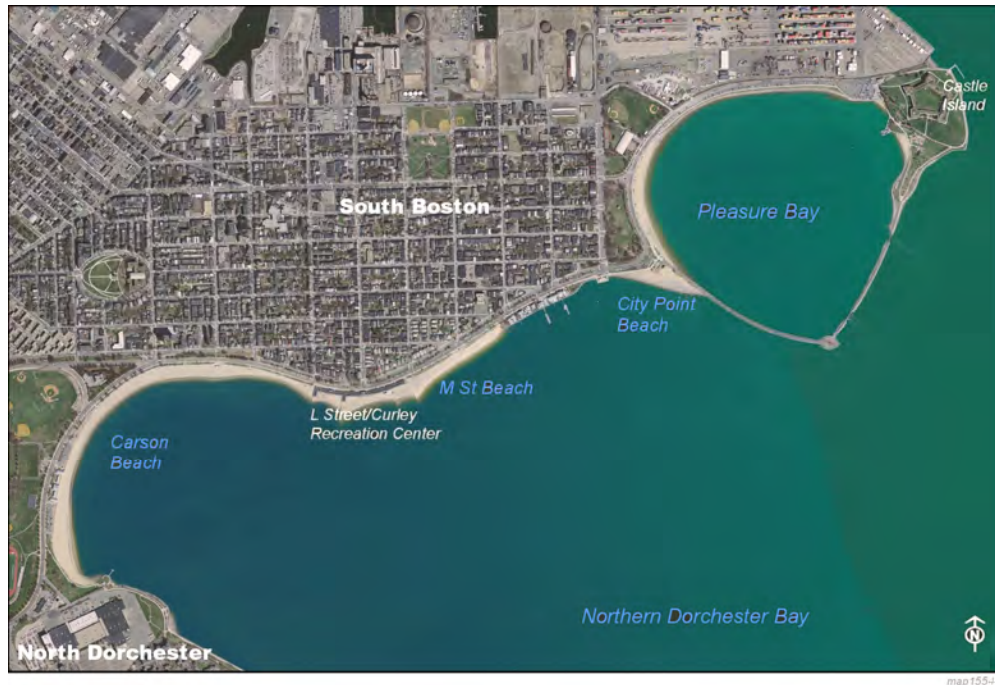
26. BULFINCH TRIANGLE SEWER SEPARATION		
	<p>Receiving Water: Boston Inner Harbor and Lower Charles River Basin</p> <p>Completed: 2010</p> <p>Capital Cost: \$9,986,000</p> <p>Description: Installed a total of 5,290 feet of storm drain and sanitary sewer to remove stormwater from local sewers in a 14-acre area of Bulfinch Triangle/North Station, allowing already-separated storm drains serving an additional 47-acre area of Government Center to be removed from the sewer system, as well. Closed Outfall BOS049 to CSO discharges.</p>	<p style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Reduces treated CSO discharges from the Prison Point CSO Facility to Boston Upper Inner Harbor. Eliminated CSO discharges at Outfall BOS049 to Lower Charles River Basin.</p> <p>CSO Outfalls: MWR203 (Prison Point Facility) and BOS049</p> <p>Frequency of discharges (typical year): Before project: 18 (treated) With project: 17 (treated)</p> <p>Annual Discharge Volume (typical year): Before project: 281.5 million gallons With project: 243.0 million gallons</p> <p>CSO Reduction by Volume: 14%</p>
27. INTERCEPTOR CONNECTION RELIEF AND FLOATABLES CONTROL AT CAM002 AND CAM401B AND FLOATABLES CONTROL AT CAM001		
 <p>CAM 002A & B inlet structure-baffle is visible in front of CAM 002A outlet with a steel plate (temporary condition) bolted on the left hand wall on the CAM 002B outlet.</p>	<p>Receiving Water: Alewife Brook</p> <p>Completed: 2010</p> <p>Capital Cost: \$1,207,900</p> <p>Description: Upgraded the hydraulic capacities of City of Cambridge connections to MWRA interceptors and installed underflow baffles for floatables control.</p>	<p style="text-align: center;">CSO Control</p> <p>Water Quality Benefit: Together with other Alewife Brook CSO projects (not yet complete), minimizes CSO discharges and their impacts to meet 98% compliance with Class B water quality standards.</p> <p>CSO Outfalls: CAM002, CAM401B, CAM001</p>

7. PLANNED CSO CONTROL EFFORTS IN 2011 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 a BWSC contract for the Morrissey Boulevard storm drain. MWRA attained substantial completion of the construction contracts for the Pleasure Bay storm drain improvements and the CSO storage tunnel in March 2006 and November 2009, respectively. BWSC attained substantial completion of the construction contract for 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. BWSC's 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 integrated service to capture CSO and stormwater flows that presently discharge to the South Boston beaches. The projects are intended to eliminate CSO discharges up to the 25-year design storm and control separate stormwater up to the 5-year design storm, with the goal of making beach closings rare events. Once the storage tunnel and related facilities are brought on-line in May 2011, MWRA plans to conduct extensive start-up testing and performance evaluations on the tunnel operation with the goal of attaining an optimized operational plan that will provide assurance of attainment of the long-term levels of CSO and stormwater control.

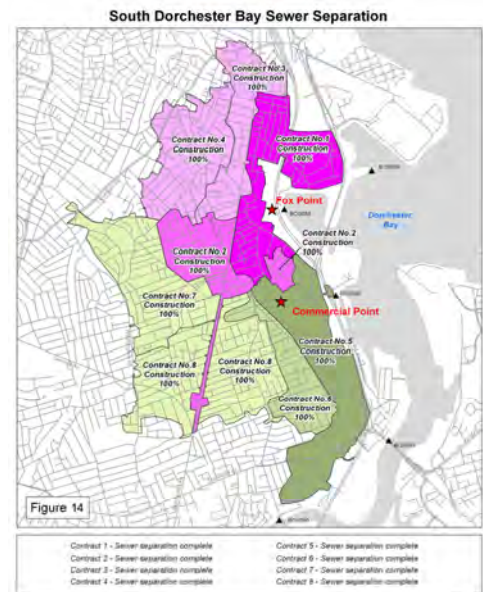
Reserved Channel

BWSC attained substantial completion of the first of nine construction contracts for this project in December 2010, and recently awarded four additional construction contracts. BWSC continues to make final design progress and plans to award the remaining four construction contracts sequentially, in the period 2011 through 2013. With completion of the nine contracts by December 2015, average annual activations of CSO overflow to the Reserved Channel are predicted to be reduced from 37 to 3 times per year, bringing them into compliance with the Class B(cso) water quality standards for this receiving water, and meeting Class B water quality standards more than 98% of the time.



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 awarded a design contract in 2010 that includes the preparation of plans for additional inflow removal and expects to continue implementation of these plans until the performance criteria for BWSC’s Dorchester Interceptor are met and system flooding risks are mitigated. While this work and related MWR funding continue, CSO discharges to South Dorchester Bay are eliminated.



Inner Harbor and Fort Point Channel

With completion of the East Boston Branch Sewer Relief project by MWRA in 2010, CSO discharges to the Inner Harbor and Chelsea Creek from the East Boston outfalls are reduced in compliance with the Class B(cso) water quality standard. BWSC completed construction of the Bulfinch Triangle sewer separation project in July 2010, significantly lowering treated CSO discharges to MWRA's Prison Point CSO treatment facility, which discharges to the Inner Harbor, immediately downstream of the Charles River Dam. Removal of stormwater from the sewer system in the Bulfinch Triangle area also relieved CSO conditions at other outfalls that discharge to the Inner Harbor and the Charles River Basin, and allowed BWSC to close Outfall BOS049.

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. In November 2010, BWSC commenced construction for CSO regulator relocation and related sewer separation in the South Bay area (Lower Dorchester Brook Sewer) which, together with the projects already completed, is intended to attain the long-term levels of CSO control for the Fort Point Channel. BWSC expects to attain substantial completion of the Lower Dorchester Brook Sewer contract in July 2011. With this project, CSO discharges are predicted to meet the Class B(cso) water quality standards for this receiving water and meet Class B standards more than 98% of the time.



Charles River Basin

The Town of Brookline recently awarded the second and last construction contract for the Brookline sewer separation project and plans to complete all work by July 2013, in compliance with Schedule Seven. In a related effort, MWRA is currently developing plans to rehabilitate 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, which will bring CSO discharges into compliance with Class B water quality standards more than 98% of the time.



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 expects to commence the two-year construction contract for the CAM004 stormwater outfall and wetland basin in 2011. Cambridge resumed design work in 2010 for sewer

separation in large neighborhood areas upstream of Outfall CAM004 that will allow Cambridge to eliminate CSO discharges at this outfall. The Alewife Brook projects are predicted to reduce average annual CSO discharge volume to Alewife Brook by 85% and allow attainment of Class B water quality standards more than 98% of the time, pending the control of other pollution sources.



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 2010 to EPA and DEP by April 30, 2011, 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.

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7.3 Compliance with Schedule Seven Milestones Through 2020

Schedule Seven in the Federal Court Order includes three CSO milestones in 2011 and 12 CSO milestones in the years 2012 and beyond. Several of these milestones and certain earlier milestones not met are related to the Alewife Brook CSO control plan and are the subject of negotiations with the Court parties to revise these milestones in accordance with updated or anticipated project schedules, as discussed in Chapter 5. Past milestones not met related to the Charles River Valley Sewer/South Charles River Relief Sewer Gate Controls (January 2010 and January 2011) are proposed by MWRA to be deleted.

The last CSO milestone date in the Federal Court Order is December 2020, and the last project construction completion milestone is December 2015. Table 5 identifies the remaining milestones, past Alewife Brook milestones not met, and MWRA's plans for compliance.

Table 5: Remaining Schedule Seven Milestones and Corresponding Compliance Plans

Milestone Date	Milestone Description	Project Schedule
Past Alewife Brook and Charles River Milestones		
Jul 2007 Mar 2011*	<i>MWRA, in cooperation with Cambridge, to commence construction of CAM004 stormwater outfall and detention basin.</i>	The City of Cambridge plans to issue the Notice to Proceed with the construction contract for CAM004 stormwater outfall and wetland basin ("Contract 12") upon securing remaining easements and obtaining authorization to award from DEP.
Jul 2008 Mar 2011*	<i>MWRA, in cooperation with Cambridge, to complete construction of CAM400 manhole separation.</i>	Contract 4/13, which the City of Cambridge commenced in January 2010, includes a completion date for the CAM400 manhole separation work of March 31, 2011.
Apr 2009 Apr 2012*	<i>MWRA to commence design of control gate/floatables control at outfall MWR003 and MWRA Rindge Avenue Siphon relief.</i>	Dependent upon construction of Cambridge's Contract 12. MWRA plans to establish a new project schedule once Cambridge has issued Notice to Proceed for CAM004 stormwater outfall and wetland basin (Contract 12).
Jul 2009 Mar 2013*	<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 of the CAM004 stormwater outfall and wetland basin two years after Notice to Proceed.
Jul 2009 Jul 2012*	<i>MWRA, in cooperation with Cambridge, to commence construction of CAM004 sewer separation.</i>	Contract 8A will start on time. The City of Cambridge plans to commence remaining construction of the CAM004 sewer separation project by July 2012.
Jan 2010	<i>MWRA to commence construction of Charles River Valley Sewer/South Charles River Relief Sewer gate controls.</i>	MWRA has recommended deletion of the project and milestone from Schedule Seven.
Nov 2010 Jun 2014*	<i>MWRA to commence construction of control gate/floatables control at outfall MWR003 and MWRA Rindge Avenue Siphon relief.</i>	Dependent upon construction of Cambridge's Contract 12. MWRA plans to update the project schedule once Cambridge has issued Notice to Proceed for CAM004 stormwater outfall and wetland basin (Contract 12).

* Current MWRA and Cambridge schedule for Alewife Brook projects.

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Milestone Date	Milestone Description	Project Schedule
Schedule Seven Milestones in 2011		
Jan 2011	<i>MWRA to complete construction of Charles River Valley Sewer/South Charles River Relief Sewer gate controls.</i>	MWRA has recommended deletion of the project and milestone from Schedule Seven.
Mar 2011 (and every March thru Mar 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 2010 on March 15, 2011. MWRA plans to submit annual reports through March 2016.
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.
Schedule Seven Milestones in 2012 and Beyond		
Jan 2012 Aug 2015*	<i>MWRA to complete construction of control gate/floatables control at outfall MWR003 and MWRA Rindge Avenue Siphon Relief</i>	Dependent upon construction of Cambridge's Contract 12. MWRA plans to establish a new project schedule once Cambridge has issued Notice to Proceed for CAM004 stormwater outfall and wetland basin (Contract 12).
Mar 2012	Submission of Annual Report	See Mar 2011
Jan 2013 Dec 2015*	<i>MWRA, in cooperation with Cambridge, to complete construction of CAM004 sewer separation.</i>	Dependent upon Construction of Cambridge's Contract 12, MWRA and Cambridge plan to complete construction of CAM004 sewer separation by Dec 2015, as proposed in 2009
Mar 2013	Submission of Annual Report	See Mar 2011
Jul 2013	<i>MWRA, in cooperation with BWSC, to complete construction of Bulfinch Triangle sewer separation.</i>	BWSC completed construction of the Bulfinch Triangle sewer separation project in July 2010.
Jul 2013	<i>MWRA, in cooperation with Brookline, to complete construction of Brookline sewer separation.</i>	The Town of Brookline issued the Notice to Proceed with the last contract for Brookline Sewer Separation on January 19, 2011, and plans to complete the project before July 2013.
Mar 2014	Submission of Annual Report	See Mar 2011
Mar 2015	Submission of Annual Report	See Mar 2011
Dec 2015	<i>MWRA, in cooperation with BWSC, to complete construction of Reserved Channel Sewer Separation</i>	BWSC plans to complete the last of nine construction contracts for this project by December 2015. Five contracts are awarded at this time.
Mar 2016	Submission of Annual Report	See Mar 2011

* Current MWRA and Cambridge schedule for Alewife Brook projects.

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Milestone Date	Milestone Description	Project Schedule
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

