STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: February 16, 2011
SUBJECT: Boston Water & Sewer Commission – CSO & Stormwater Project Update

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COMMITTEE: Wastewater Policy & Oversight

X INFORMATION
____ VOTE

Richard P. Trubiano
Deputy Chief Operating Officer

Michael J. Hornbrook
Chief Operating Officer

In early 2010, the Conservation Law Foundation (CLF) filed suit against the Boston Water & Sewer Commission (BWSC) alleging deficiencies in BWSC's operation of its municipal separate storm sewer system and compliance with its NPDES MS4 Stormwater Permit. On December 21, 2010, the Federal Court denied CLF's motion for partial summary judgment on several counts in the suit. On December 22, EPA joined the lawsuit against BWSC.

It is important at this time to note the commitment of BWSC and MWRA and the service area communities to the clean up of Boston Harbor and improvements to all aspects of BWSC and MWRA-owned sewer systems, and BWSC's stormwater collection system. The purpose of this staff summary is to review the extensive efforts BWSC and MWRA have made over the past almost two decades related to control of sewer and stormwater discharges in the Boston system.

Municipalities in the MWRA service area and throughout Massachusetts need to note with concern this recent action by EPA since NPDES stormwater permits are held by most communities in Massachusetts. In addition, EPA has significantly increased enforcement action against numerous MWRA communities regarding stormwater discharges.

The recent action by EPA to join the CLF lawsuit against BWSC has been denounced by the MWRA Advisory Board. An editorial in the Advisory Board's December monthly newsletter stated "Despite the huge environmental successes and financial commitment by Boston and the MWRA ratepayers, it is hard to understand why EPA chooses to take this action now."

RECOMMENDATION:

For information only

DISCUSSION:

BWSC is MWRA's largest customer and has contributed billions of dollars to MWRA's Boston Harbor Project, CSO and other capital programs and projects. Boston's CSO and stormwater-related pollution control projects are included, in part, in MWRA's CSO and Infiltration/Inflow Financial Assistance programs and are summarized below. In addition, BWSC has its own substantial capital program for improvements to Boston's sewer and drainage systems.

A recent example of the benefits of BWSC's and MWRA's collective efforts, was highlighted in a recent Boston Globe article published on January 7, 2011 ("**Triumph in the Malibu mud.")** The article focuses on the opening of shellfish areas in Malibu Beach in Dorchester for the first time "that anyone can remember." The opening of these shellfish areas is directly related to the increased water quality resulting from the extensive work performed by BWSC and MWRA harbor-wide.

Also, EPA has predicted that when the North Dorchester Bay Storage CSO Tunnel is completed next summer, the South Boston beaches will be among the cleanest urban beaches in the country. EPA has also given the Charles River a "B+" grade in its last six annual "report cards." This staff summary cites the significant additional benefits and examples of water quality improvements that have resulted from the successful completion of numerous projects.

Deer Island Treatment Plant Outfall/Long-Term CSO Control Program

The completion of the $3.8 billion federal court-ordered Boston Harbor clean-up, including the Deer Island Treatment Plant, 9.5-mile Outfall Tunnel and its associated pumping improvements, resulted in significant water quality improvements to the harbor due to reductions in wet-weather Sanitary Sewer Overflows in Boston and other MWRA communities and substantial reductions in Combined Sewer Overflows.

The goal of MWRA's CSO program, mandated under the same federal court order, is to bring CSO discharges in the metropolitan Boston area into compliance with the Federal Clean Water Act and Massachusetts Surface Water Quality Standards by eliminating CSO discharges to sensitive receiving waters (i.e., swimming and shell fishing areas) and greatly reducing CSO discharges or their impacts in less sensitive areas. The total cost of the CSO program, which includes 35 projects that comprise MWRA's Long-Term Control Plan and other projects to control CSOs (such as system optimization measures), is estimated to be $868 million in the Proposed FY12 CIP. Seventeen (17) of these projects, at an estimated cost of $684 million, involve improvements to the sewer systems in the City of Boston. Fifteen of the 17 projects in Boston are complete, and construction of the remaining two projects (North Dorchester Bay CSO Storage Tunnel and Reserved Channel Sewer Separation) is well underway. To date, BWSC and MWRA have spent approximately $620 million implementing the Long-Term CSO Control Plan projects in Boston. All projects are scheduled to be complete by 2015.

Boston is one of four MWRA member communities with CSOs and the estimated cost of the BWSC-managed portion of the Long-Term Control Plan is $298 million. Of this, BWSC spent approximately $230 million through December 2010 and completed nine of its eleven assigned CSO projects.

The CSO Long-Term Control Plan includes projects managed by BWSC and projects managed by MWRA. In addition to major ongoing sewer separation work in the Reserved Channel and Fort Point Channel (South Bay) areas of Boston, some highlights of BWSC-managed projects include:

- Elimination of CSO discharges to Constitution Beach (public beach area) in East Boston;
- Elimination of CSO discharges at public beach areas in South Dorchester;
- Elimination of CSO discharges to the Neponset River;
- Reducing CSO overflows at more than 40 BWSC outfalls with system optimization measures;
- Elimination of more than a dozen CSO outfalls entirely (with additional closures as a result of other major CSO projects);
- Successful completion of sewer separation projects impacting 3,000 acres of urban land;
- Design and construction of more than 60 miles of new storm drain and sanitary sewers including:
    - 150,000 feet of storm drains and sanitary sewers in Dorchester, eliminating CSO discharges to South Dorchester Bay
    - 107,175 feet of storm drains and sanitary sewers in Jamaica Plain, Mission Hill and Roxbury, reducing CSO to Stony Brook by 99+%
    - 8,000 feet of new storm drains in the Neponset area of Dorchester, eliminating CSO to Neponset River
    - 14,000 feet of new storm drains in East Boston, eliminating CSO at Constitution Beach
    - 5,290 feet of storm drains and sanitary sewers in the Bulfinch Triangle area, reducing CSO volume at Prison Point facility and converting a local CSO outfall to a storm drain
    - 4,260 feet of new storm drains and 4,300 feet of sanitary sewers at Fort Point Channel, eliminating CSO at two outfalls in a typical rainfall year
    - 2,800 feet of 12-foot X 12-foot conduit and new stormwater outfall for Morrissey Boulevard, diverting stormwater from public beaches in South Boston
    - Ongoing work on 42,000 feet of storm drain in South Boston to reduce CSO volume to the Reserved Channel by 95%
- Rehabilitation or cleaning of several major storm outfalls; and
- Floatables control at outfalls that will remain active in a typical rainfall year in the long-term.

In addition to the BWSC projects that are part of MWRA's Long-Term Control Plan, BWSC has separately performed work over the past two decades to eliminate CSO discharges at other outfalls, especially benefiting the Charles River Basin and Boston Inner Harbor.

BWSC also eliminated 1,075 private illicit sewer connections to storm drains since 1986 and the BWSC Illicit Discharge Detection Protocol is responsible for the elimination of more than 500,000 gallons per day of sewer flow into receiving waters.

MWRA is managing implementation of eight projects that control CSO discharges related to Boston's collection system at a total cost estimate of $386 million. MWRA-managed CSO projects in the City of Boston include:

- CSO storage conduits in Charlestown;
- The CSO storage tunnel in South Boston (North Dorchester Bay) that will capture storm water and CSO to protect public beach areas;
- Storm drain improvements along Pleasure Bay Beach (eliminating stormwater discharges in that area);
- Relief sewers and relief connections in East Boston and Sullivan Square that reduce annual CSO volumes in these areas by more than 80%; and
- Upgrades to CSO treatment facilities with improved disinfection and dechlorination systems, and the addition of a detention and treatment facility at BWSC's Union Park Pumping Station in the South End.

Attachment 1 provides maps and photographs regarding several of the above projects.

Community Support Program

Through the Infiltration/Inflow (I/I) Local Financial Assistance Program, MWRA has issued grants and loans to its service area communities for sewer system improvements since 1993. Through 2010, BWSC has received grants and loans totaling more than $54 million for 71 different projects related to the planning, design and construction of sewer system improvements. These include 38 catch basin separation projects, 5 downspout disconnection projects, 11 sewer system rehabilitation projects and 17 sewer system evaluation surveys and planning studies. Projects range in cost from approximately $30,000 to more than $6 million.

Staff estimate that these projects have resulted in more than 20,500 feet of sewer separation and the disconnection of 450 catch basins and 5,050 downspouts. Under this financial assistance program, active I/I and sewer rehabilitation and separation planning, design and construction projects are currently ongoing in the Roxbury, West Roxbury, South Boston, Back Bay, East Boston and Hyde Park portions of the BWSC service area.

Other Capital Projects

MWRA's CIP includes completed and ongoing projects related to wastewater infrastructure serving the BWSC system. These include projects that mitigate the potential for sewer overflows.

The Upper Neponset Valley Sewer System was rehabilitated at a cost of $54 million. With the construction of relief sewers, sewer surcharges and overflows were eliminated or reduced for various size storms. Visual inspections of the West Roxbury Tunnel indicated that severe corrosion due to hydrogen sulfide had occurred in portions of the sewer. A structural failure of the tunnel would affect the tributary communities and could result in the discharge of 53 to 128 million gallons per day of raw sewage into the Charles River until emergency repairs could be completed, back-up of sewage into local residences and businesses, and the interruption of

service to as many as 125,000 people. The design contract to rehabilitate the tunnel was awarded in February 2009 with construction, at an estimated cost of $75 million, scheduled to start in September 2012.

The South System Relief Project consisted of several distinct components to protect public health and property from sanitary system overflows and back-ups into homes and businesses during extreme wet weather events. Boston components included construction of the Archdale Road diversion structure and repairs to the High Level Sewer. This work was completed in 1999. Remaining work to structurally modify Outfall 023 in Boston to increase access points and diversion capability in order to enhance cleaning is scheduled in FY17.

A number of other CIP projects designed to ensure the long-term protection of wastewater system assets will include project components within Boston. These projects include:

- Siphon Structure Rehabilitation - $2.6 million ($1.7 remaining to be spent); design is expected to commence in July 2012 and construction is scheduled to begin in October 2014;
- Wastewater Process Optimization - $10.3 million; key project components remaining include Manhole Structure flood Protection Design and Construction and a Hydraulic Flood Engineering analysis of the North system; and
- Interception and Pumping Facility Asset Protection - This program currently includes identified interceptor renewal projects in Charlestown, Dorchester and Brighton.

Water Quality Benefits

The cumulative effect of these projects by BWSC and MWRA, other community projects and the Boston Harbor Project has been a dramatic improvement in the bacterial water quality of the harbor and its tributary rivers, as shown in Figures 1, 2 and 3 on the following pages.

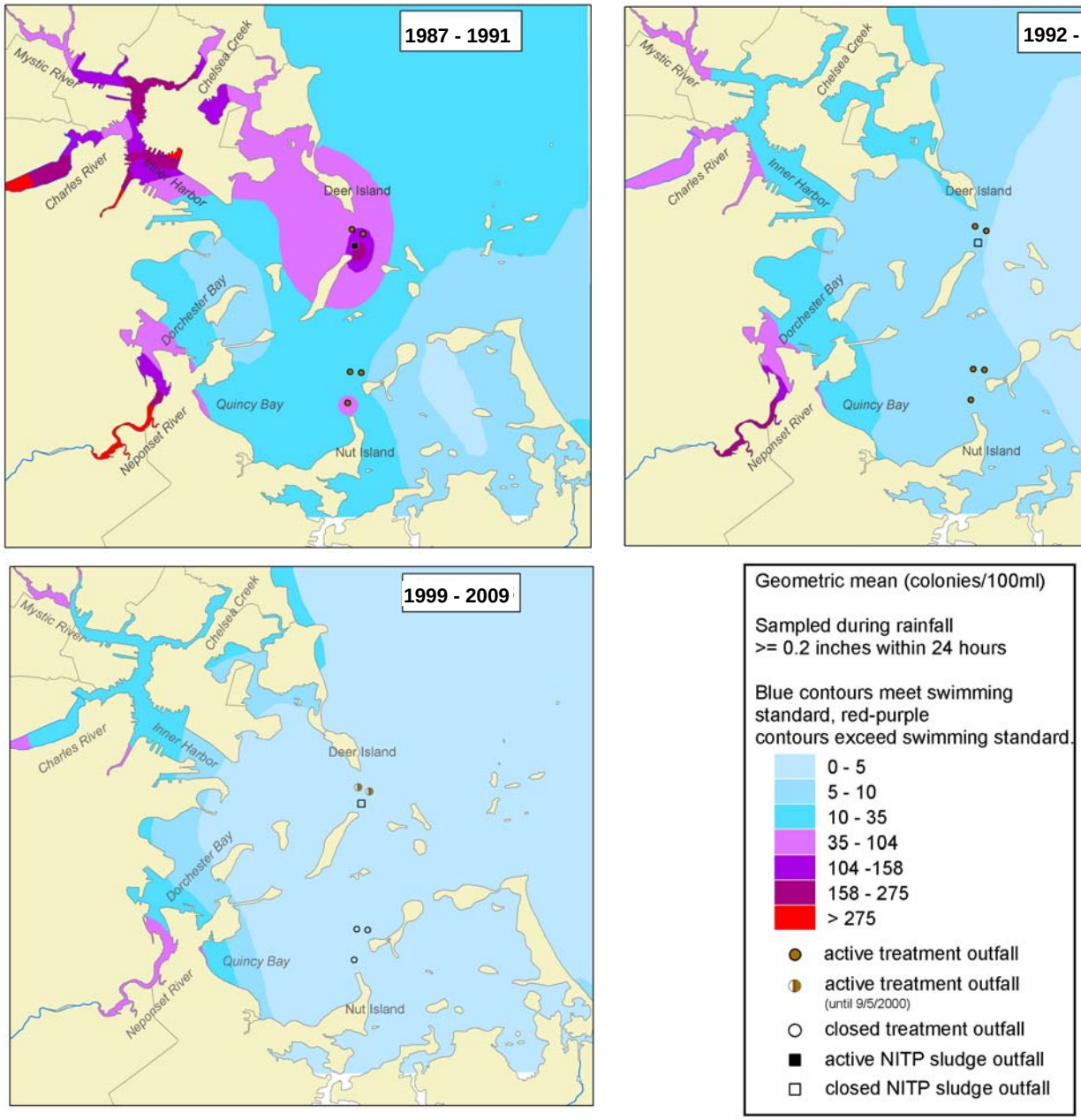
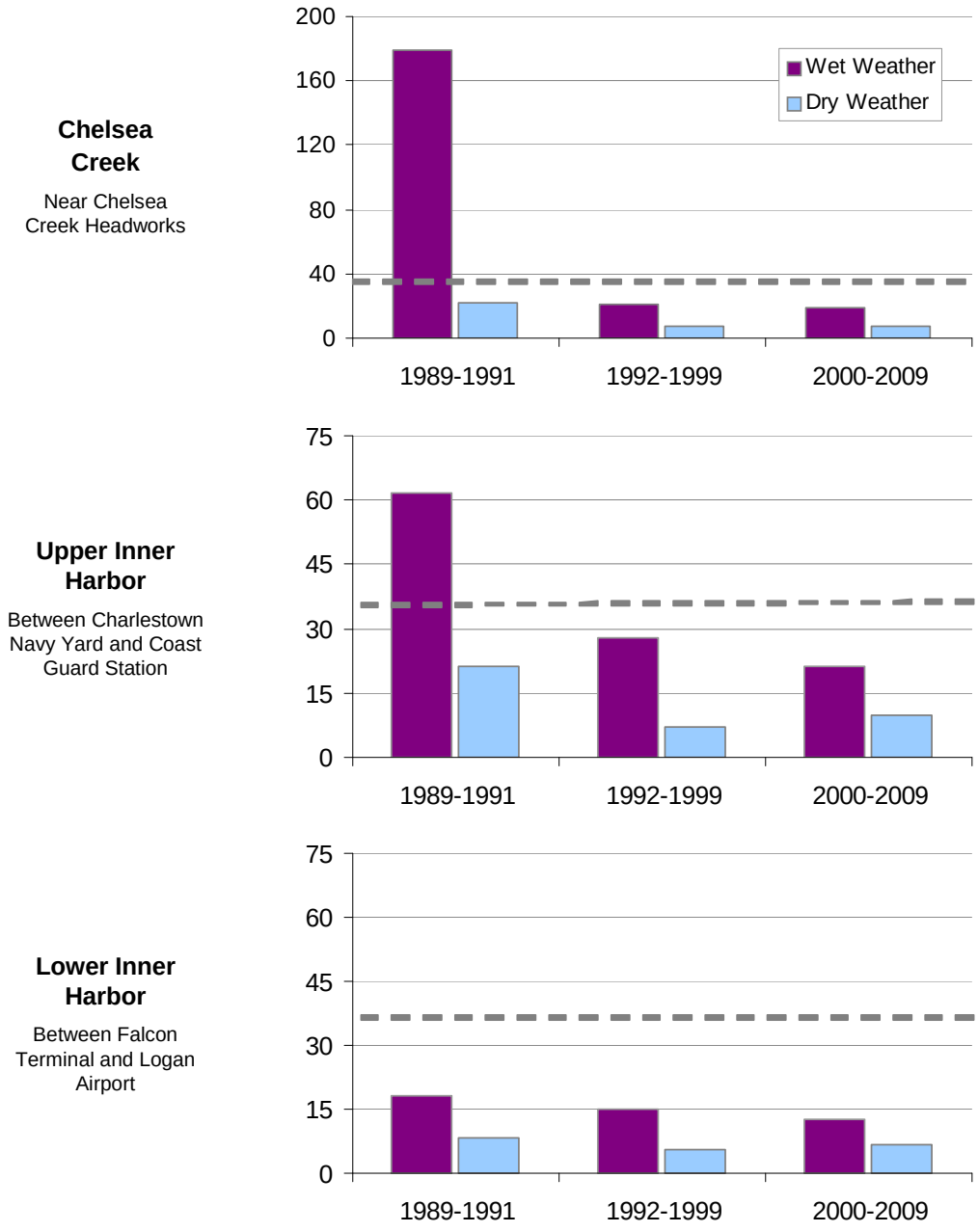


Figure 1 Contours show the geometric means of Enterococcus data collected when more than 0.2 inches of rain fell in the previous 24 hours. Blue areas meet the EPA geometric mean standard and red-purple areas exceed the standard.

Change in Inner Harbor Water Quality Over Time

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



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

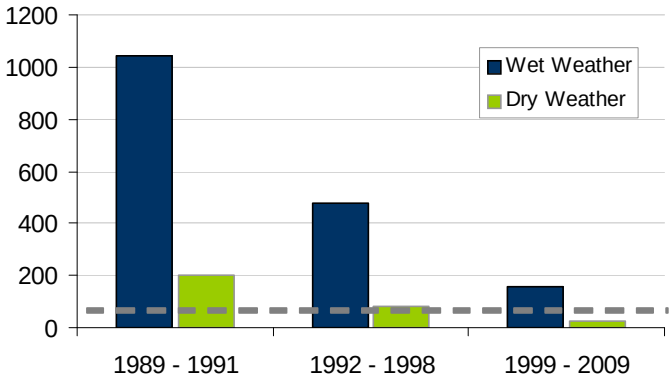
Figure 2 Concentrations of the sewage indicator bacterium Enterococcus have dramatically decreased in the inner harbor, both in dry weather and wet weather as a result of projects funded by MWRA and the communities.

Change in Lower Charles River Water Quality Over Time

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

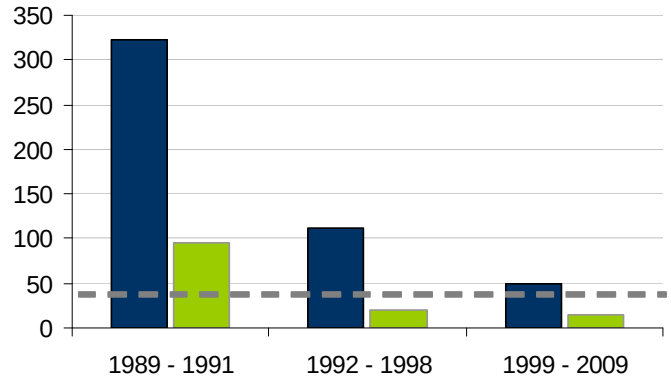
Upper Basin

(Watertown Dam to upstream of Cottage Farm, *note different scale*)



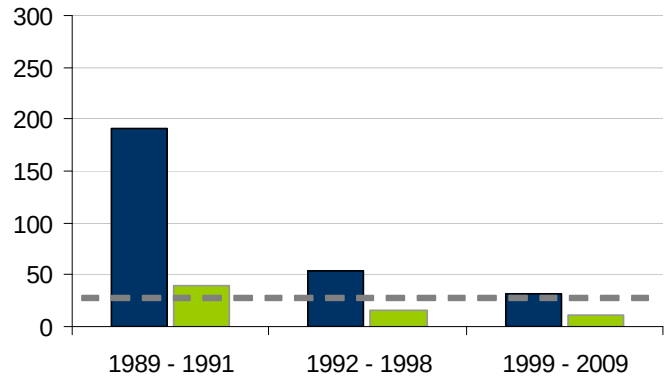
Mid-Basin

(Cottage Farm to Science Museum)



Downstream of Basin

(Science Museum to New Charles Dam)



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 3. Levels of bacteria in the Charles River have decreased because of MWRA and community projects.

BUDGET/FISCAL IMPACT:

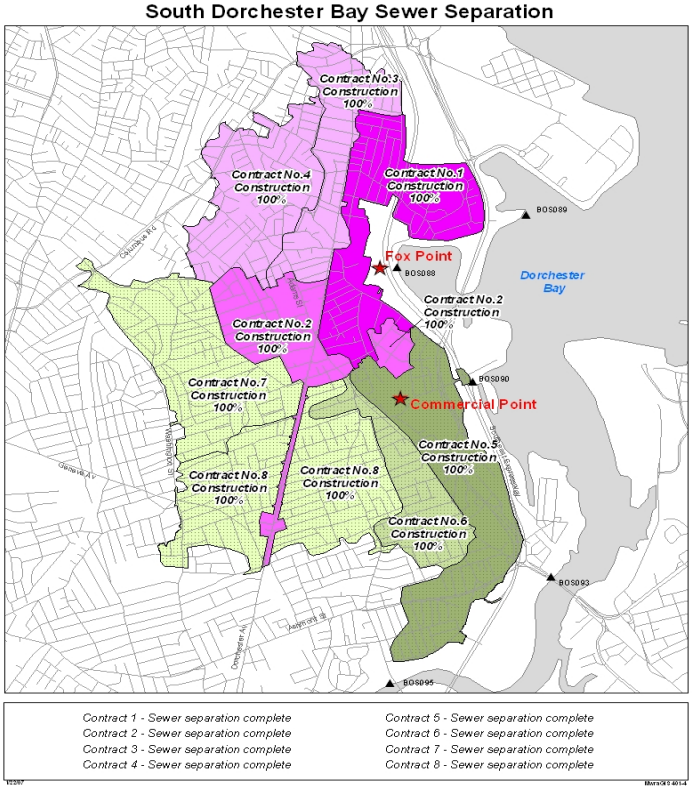
Budget impacts are uncertain at this time pending the outcome of the law suit and any potential ordered relief.

ATTACHMENT:

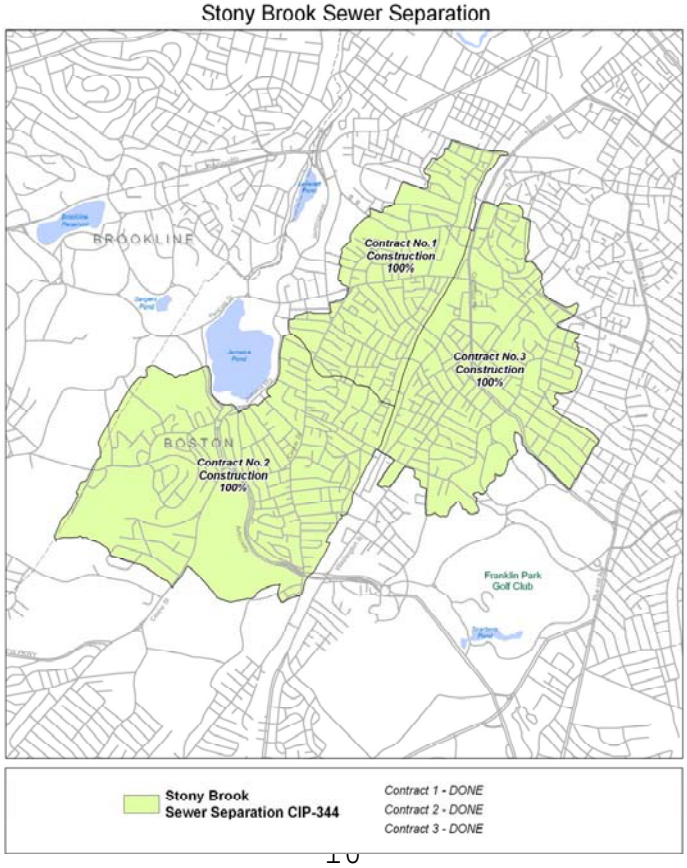
1. CSO-Related Water Pollution Control Efforts in the City of Boston

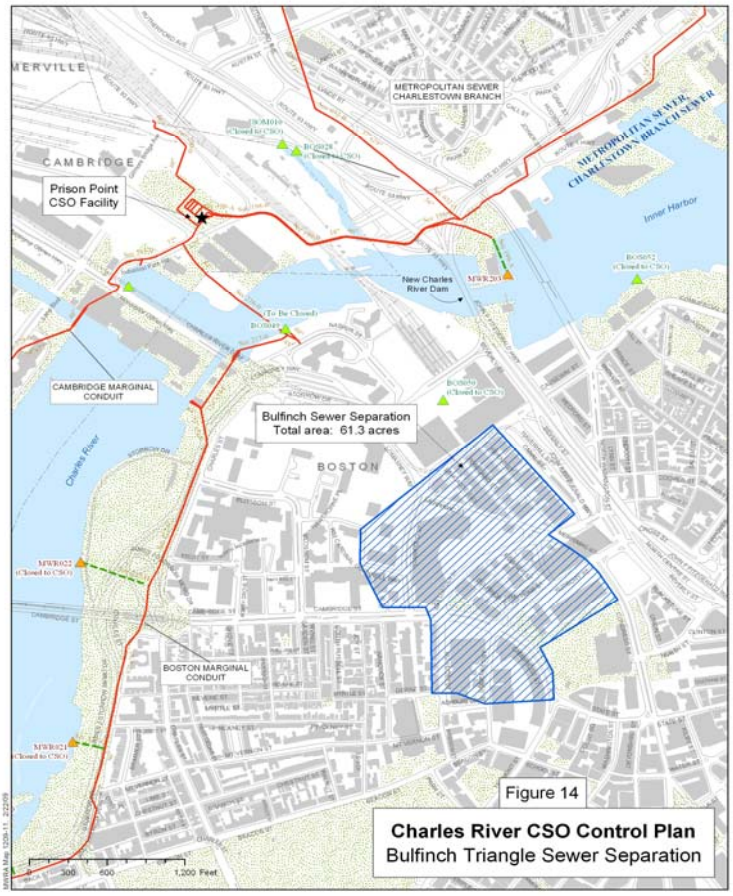
ATTACHMENT 1 - CSO-RELATED WATER POLLUTION CONTROL EFFORTS IN THE CITY OF BOSTON

South Dorchester Bay Sewer Separation



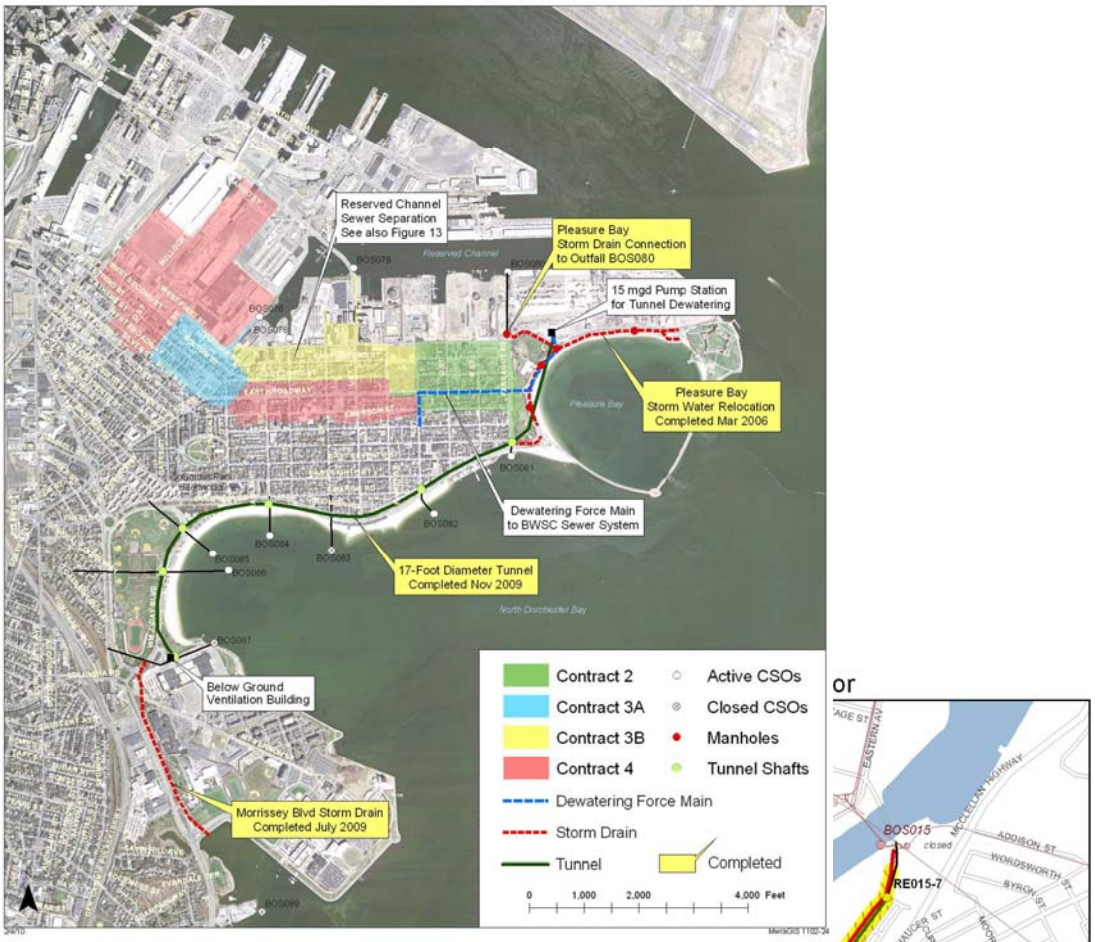
Stony Brook Sewer Separation



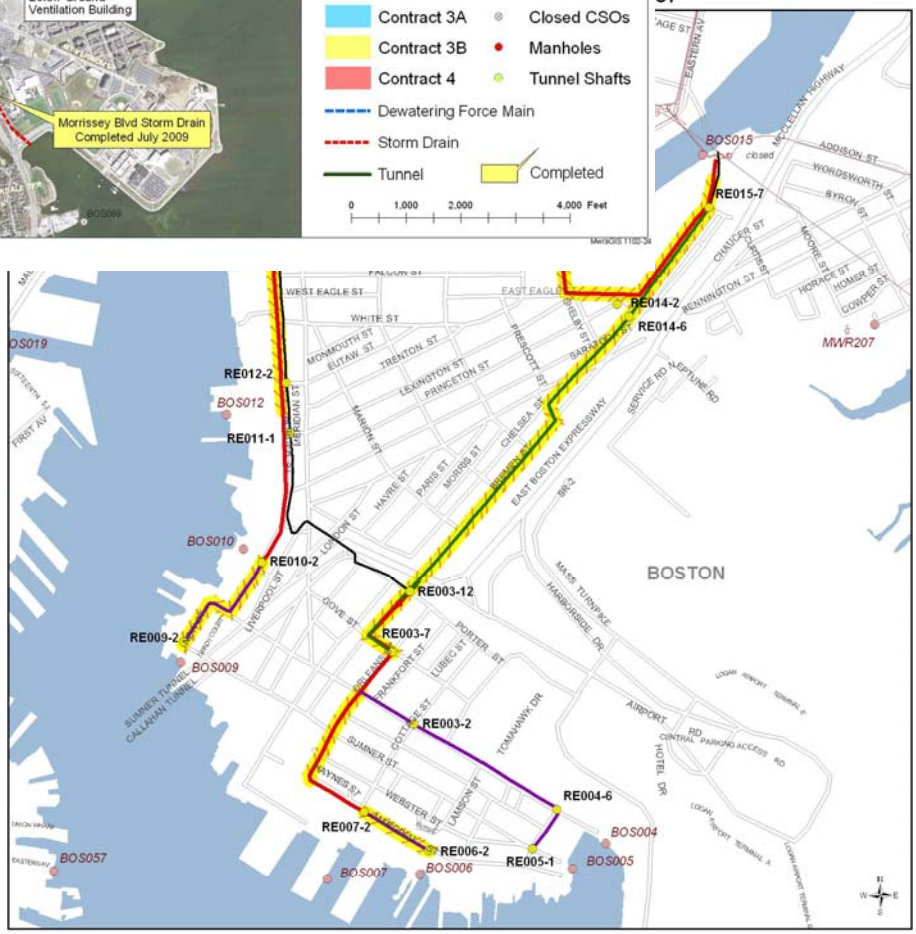


Installation of storm drain on Causeway Street

North Dorchester Bay and Reserved Channel
Recommended CSO Control Plans



or



Construction Progress through March 2010
New Sewer by Microtunneling (MWRA Contract 6257)
Pipe Burst Existing Sewer (MWRA Contract 6841)
Existing East Boston Branch Sewer Rehabilitation by CIPP
Abandon Existing Sewer
Liner Process (MWRA Contract 6840, completed 2004)

CSO Regulators
CSO Outfalls
Sewer Interceptors

map1102-26

MWRA decommissioned its Constitution Beach CSO Facility after CSO flows were eliminated by BWSC sewer separation.

When ready contact Flora Sanders at 4363

STAFF SUMMARY ROUTING SHEET

☐ For the signature of the Executive Director, under his Delegated Authority

☒ For presentation to Committee/Board of Directors at the 1/12/11 Board Meeting

FROM: R. Trubiano x4929
E. Murray x5762

SUBJECT: **BWSC** CSO & Stormwater Project Update

	LOG-IN DATE	*SIGNATURE*	*LOG-OUT DATE*
***TO: PROCUREMENT**	_____	_____	
BUDGET	_____	_____	
AFFIRM. ACTION	_____	_____	
LAW	_____	_____	
EXEC. OFFICE	_____	_____	

STAFF COMMENTS:

***IF YOUR REVIEW OF THIS SUMMARY WILL TAKE MORE THAN 2 WORKING DAYS, PLEASE INFORM THE PREPARER.**