



Massachusetts Water Resources Authority

CSO Post-Construction Monitoring and Performance Assessment

Presentation to the

Wastewater Advisory Committee

December 6, 2019



CSO Performance Assessment Scope

- Rainfall data collection and analyses
- Sewer system meter data and CSO meter data collection and analyses
- Metered and modeled CSO discharge estimates
- Site-specific performance assessments relative to the LTCP levels of control
- Water quality assessments of the Lower Charles River and Alewife Brook/Upper Mystic River



Scope and Schedule Changes

- Water quality assessments of the Lower Charles River and Alewife Brook/Upper Mystic River will use:
 - Updated receiving water quality models
 - Updated CSO/stormwater data inputs

- On July 19, 2019, the Federal Court approved a 1-year extension, for submission of the final report – to December 2021 - to provide time necessary for receiving water quality modeling.

- On August 30, 2019, DEP issued 5-year CSO variances for the Lower Charles River and the Alewife Brook/Upper Mystic River, effective through August 2024.



Work Progress – Rainfall Analyses

- 20 rainfall gauges
- Rainfall data quality assurance/quality control
 - Weekly inspection/maintenance of MWRA gauges
 - Review of data for irregularities
 - Comparison of data with nearby gauges
 - Replacement of suspect or missing data
- Rainfall analyses
 - Intensity-Duration-Frequency (IDF) analyses to characterize each storm (3-mo.?, 1-yr.?) and compare to Typical Year storms
- Characteristics of 2018 and 2019 rainfall compared to the Typical Year
 - 2018: very wet year – lots of storms; short duration, high peak intensities
 - 2019 thru June: more in-line with Typical Year



Work Progress – CSO Metering

- Temporary meter coverage Apr 2018 thru Feb 2019:
57 CSO regulators

- Temporary meter coverage Mar 2019 thru Jun 2020
36 CSO regulators
 - Charles River, Alewife Brook and Mystic River outfalls
 - All MWRA outfalls
 - Outfalls subject to further investigation of overflow activity

- Monthly quantification of CSO discharges from meter data
165 storms April 15, 2018 through June 30, 2019

- MWRA also utilizes data from dozens of system and facility meters.



Work Progress – Hydraulic Model Updates and Calibration

- Model updates from new information in 2018
 - Incorporation of CSO inspection information
 - Maintenance weir/sediment in South Boston Interceptor

- Model calibration and verification using 2018 meter data
 - Data from 106 depth and velocity sensors, 20 level sensors, 16 tide gate inclinometers, 32 interceptor meters, 25 CSO community meters
 - Facility operation records

- Model calibration recently completed; under review

- The 2018 calibrated model was also updated to current (2019) system conditions.
 - Hydraulic relief at Outfall SOM001A (Alewife Brook)
 - Hydraulic relief at Outfall CAM002
 - Upgraded operations at Alewife Brook Pumping Station



Hydraulic Model Runs Underway

For Supplement to 2018 CSO Discharge Report (April 30, 2019):

- 2018 storms: meter vs. model comparison
- Typical Year, current system conditions vs. LTCP levels of control

Also:

- 2019 storms and beyond: meter vs. model comparisons



Preliminary Findings from Inspections and Metering

Of the 84 CSO outfalls addressed in MWRA's Long-term Control Plan:

- Inspections have confirmed that 35 outfalls are closed (CSO is eliminated).
- Technical evaluations of South Boston tunnel performance since May 2011 confirm CSO control up to the 25-year storm at the remaining 5 outfalls to the South Boston beaches.
- Of the 44 active outfalls, approximately half are the subject of ongoing site-specific investigations based on meter results.



Work Progress – Site Specific Investigations

Site-specific investigations are underway where overflow activity is questionable or may not meet LTCP level of control.

- Validate and understand the measured overflow activity
- Evaluate measures to reduce discharges

BWSC outfalls

- East Boston: hydraulic restrictions; BWSC sewer separation plans
- BOS017 and BOS057: tidal inflow
- Fort Point Channel: CA/T pumping; Union Park facility operations

Cambridge outfalls

- Confirm system conditions and overflow elevations
- Evaluate upgrading dry weather connection capacity at certain locations



Work Progress – Site Specific Investigations

Chelsea outfalls

- Chelsea Creek outfalls CHE004 and CHE008
 - Evaluate upgrading dry weather connection capacity

Somerville outfalls

- Alewife Brook SOM001A
 - Investigate flow sources - City is conducting upstream investigations
 - Evaluate feasibility of raising the overflow weir and other regulator improvements



Semiannual Progress Reports

Semiannual reports are posted to MWRA's website, at:

<http://www.mwra.com/cso/pcmapa.html>

Report #	Data Collection Period	Schedule
1	April 15, 2018 through June 30, 2018 (2.5 months)	November 30, 2018
2	July 1, 2018 through December 31, 2018 (6 months)	May 3, 2019
3	January 1, 2019 through June 30, 2019 (6 months)	October 31, 2019
4	July 1, 2019 through December 31, 2019 (6 months)	April 30, 2020
5	January 1, 2020 through June 30, 2020 (6 months)	October 31, 2020
6	July 1, 2020 through December 31, 2020 (6 months)	April 30, 2021
7	January 1, 2021 through June 30, 2021 (6 months)	October 31, 2021



CSO Variances – Lower Charles River/Charles Basin and Alewife Brook/Upper Mystic River

- On August 30, 2019, DEP issued 5-year variances to Water Quality Standards for CSO discharges (through Aug 2024)
- The variances include conditions on MWRA, Cambridge and Somerville intended to minimize CSO discharges and their impacts.
 - Progress with the CSO performance assessment, semiannual reporting and annual public briefings
 - Compliance with CSO Nine Minimum Controls
 - Inspection/maintenance of outfalls, CSO regulators and tide gates
 - Outfall signs
 - Annual press releases on public health risks and CSO controls
 - **AS WELL AS THE FOLLOWING**



CSO Variances: Projects to Minimize CSO Discharges

- Alewife Brook Pumping Station optimization evaluation
 - NTP: Apr 2020
 - Evaluate pumping operation

- Somerville-Marginal optimization evaluation
 - NTP: Dec 2020
 - Evaluate dry weather connection to reduce activations and treated discharges at MWRA's Somerville-Marginal facility
 - Evaluate feasibility of redirecting separate stormwater flows

- CSO system optimization
 - NTP: Dec 2020
 - Optimize hydraulic conditions at all CSO regulators tributary to Charles River and Alewife Brook/Upper Mystic River outfalls



CSO Variances: Public Notification of CSO Discharges

The variances require MWRA, Cambridge and Somerville to implement CSO discharge notification systems for their respective outfalls.

- Overflow metering
- Notification within **4 hours** of an activation: location, time/date of onset; time overflow ceased; waters and lands affected; measures to avoid health risks; link to website
- Updated notification within **5 business days**: updated information; duration and volume estimates; rainfall data
- Subscriber-based notification system
- Implementation by December 2020



CSO Variances: Updated CSO Control Plans

The variances require MWRA, Cambridge and Somerville to prepare updated CSO control plans for their respective outfalls.

- Scopes and schedules due April 1, 2022
- Evaluation of costs, performance and WQ improvement of additional controls up to and including CSO elimination
- Affordability analyses
- Public participation process
- MEPA review
- Draft Recommended Plans due June 30, 2023



CSO Variances: Assessment of Water Quality Impacts

Consultant Services (Receiving Water Modeling)

- Update and calibrate receiving water quality models
- Assess updated water quality conditions, including remaining CSO impacts
- Run model simulations of CSO control scenarios

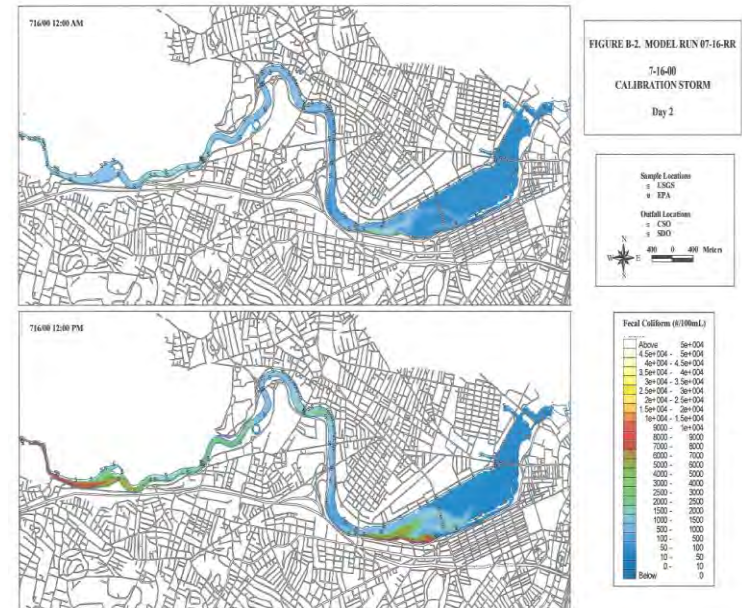
MWRA In-House Activities (WQ Data Collection)

- Continue in-stream sampling, with emphasis in Charles and Alewife/Upper Mystic
- Conduct updated CSO and stormwater sampling
- Coordinate data collection with communities



Receiving Water Modeling

- Update prior models to more current platforms
- Update with current information on stormwater and CSO sources and loads.
- Calibrate with current in-stream WQ data (a calibration report will be provided)
- Perform model simulations
- Provide WQ Assessment Report (Dec 2021)



The model will allow for the assessment of remaining CSO (vs non-CSO) impacts on water quality in the variance areas.



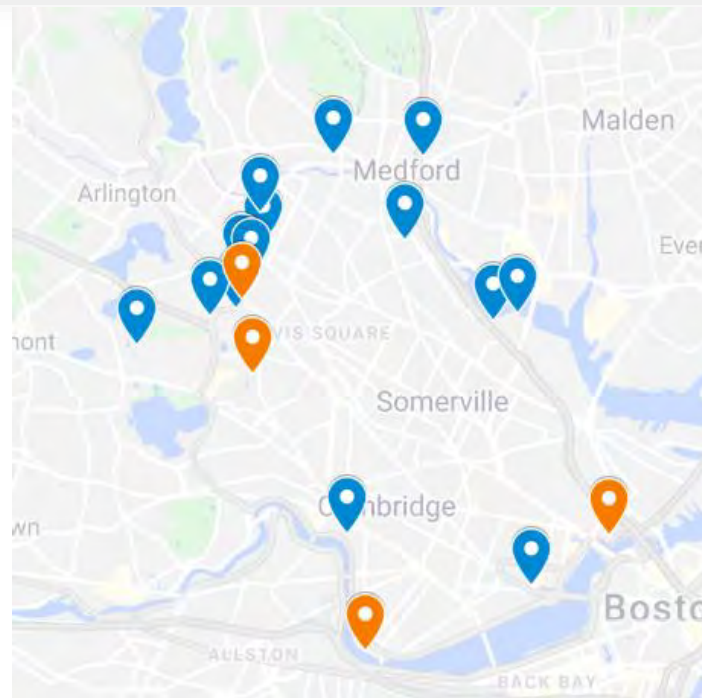
Stormwater and CSO Sampling Plan

MWRA, Cambridge and Somerville are collecting stormwater samples to provide updated estimates of stormwater quality inputs to the model:

- MWRA is collecting SW samples from 3 sites in Medford and 2 sites in Arlington
- Cambridge is collecting SW samples from 2 sites on Alewife, 2 on Charles.
- Somerville will collect SW samples from 5 sites.
- Summer 2019 - Summer 2020

MWRA also is collecting samples of untreated CSO:

- Two locations in Alewife Brook
- Influent samples from 2 CSO treatment facilities in Charles have been collected since 2017



Stormwater sampling locations



Untreated CSO (or CSO facility influent) sampling locations



QUESTIONS

