

**WAC  
Notes  
May 10, 2019**

The Wastewater Advisory Committee to the MWRA toured the Cottage Farm Combined Sewer facility in Cambridge, MA

**Attendees/Contributors:**

**WAC:** Adrianna Cillo (BWSC), Craig Allen, George Atallah, Kannan Vembu, Karen Lachmayr (chair), Mary Adelstein, Philip Ashcroft, Stephen Greene,

**Guests:** Denise Ellis-Hibbett, Jim MacPherson, Charles Ryan (MWRA), Gabby Queenan (MA Rivers), John Dempsey (Brookline Solid Waste AC)

**Staff:** Andreae Downs

**FUTURE MEETING DATES/TOPICS**

**NEXT:** Friday, June 10. 10:30am, MAPC, 60 Temple Pl., Boston

**EXECUTIVE DIRECTOR'S REPORT:** Full report attached.

**TOUR:**

Deer Island can process 1.3 billion gallons/day (bdg)

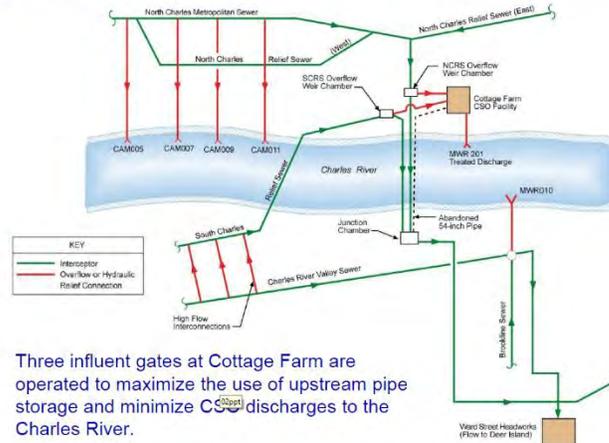
MWRA's CSO facilities can store 1 billion gallons

Cottage Farm (storage capacity 1.3 million gallons) is one of four CSO facilities:

- Prison Point (323 million gallons)
- Somerville Marginal (200+/- million gallons)
- Union Park 330 mgd
- BOS 19 (700,000 gallons)
- South Boston/Dorchester Tunnel (18 million gallons)

Both the North and South Charles River Relief Sewers drain to Cottage Farm when rainfall exceeds the capacity of the sewers.

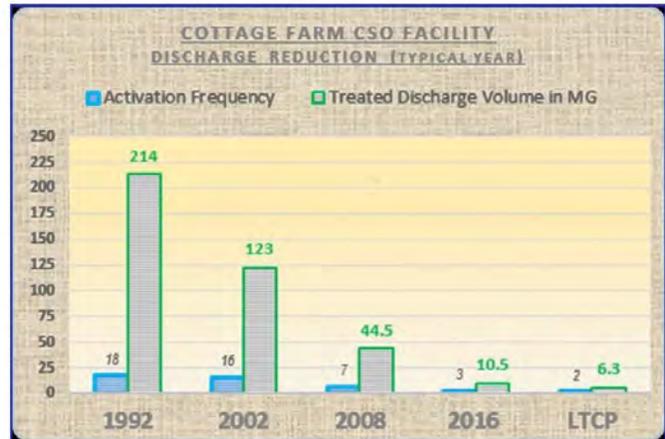
## Charles River Sewers and Cottage Farm Facility



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Usual procedure is to start filling the detention basins, watch the radar and the influent rates. If the storm is likely to end soon, Cottage Farm and other CSO facilities (Prison Point, Union Park, the tunnel) can hold flow so they don't have to activate the outfall into the river. In those cases, MWRA pumps the flow back to DI after the storm passes.

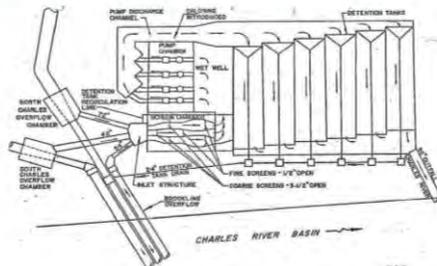
From Cottage Farm, detained and stored flows go through the [Ward Street Headworks](#) to Deer Island. Cottage Farm hasn't activated for 9 months, despite a wetter than average year. In a "typical" year, Cottage Farm should discharge twice a year.



The CSO activates at about one inch of rain, but it depends on how quickly that rain falls, and on the saturation of the ground.

Built: 1971  
 Chemical Building added: 2000  
 Currently, new LED lights are being installed in the basins

## Cottage Farm CSO Treatment Facility



Flows enter the Cottage Farm wet well first, then flows are pumped to six detention basins. Prison Point CSO, which is about to be rehabilitated, has water enter the detention basins first, then it's pumped to the wet well.

Before flows enter the wet well, they are screened to remove large objects. Below is a shot of the huge screens:



Screenings and grit are returned to the flow going to Ward Street so that large dump trucks aren't coming & going near a DCR park (Magazine Beach is just next door)

Once flows enter the detention basins, they are disinfected. This picture shows the 10,000 gallon sodium hypochlorite tanks. →

These will be replaced when the facility is rehabilitated, as they corrode quickly.



Just before flows are discharged, they are dechlorinated.

← This picture shows the 2,000 gallon sodium bisulfate tanks



Electrical panels will also be updated.

Engine Room: these are diesel engines—the 14mw electric engine cannot handle rain storms. Each engine has a catalytic converter, added after the facility was built. Charlie Ryan in front of one of the engines →



Pump room:



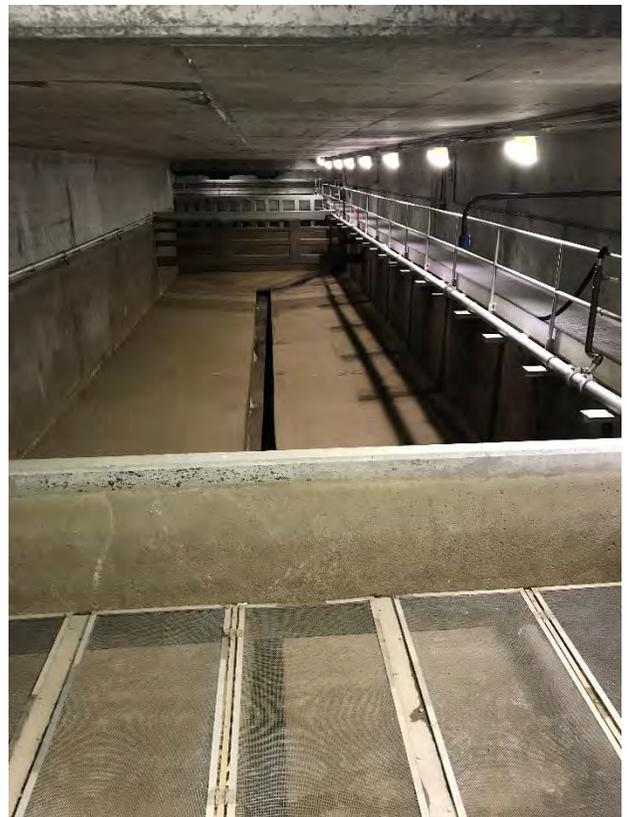
Lead paint peeling → that, PCBs and asbestos will all need to be remediated as part of the facility rehabilitation.

Also to be replaced are the pump rotator assembly. MWRA currently builds its own parts. In addition: chemical building, chemical pumps, gates, screens, controls, pumps and engines will all be replaced.



Six detention basins. They all rise together—the screens catch debris and floatables before the water reaches the weir—and eventually the outfall pipe →

Toxics Reduction and Control (TRAC) testing room and taps—TRAC tests for chlorination levels, fecal coliform (every half hour), Ph and Total Chlorine



Residuals (TCR).

During an activation, three staff are at Cottage Farm. Arrive hours before a storm to avoid getting stuck in traffic, and remain hours after a storm.

SCADA—showing how 3 gates can be opened at the station and remotely. Electricity at Cottage Farm is both supplied via wires, stored in batteries, and generated on site (diesel generator) to avoid power supply interruption.



MWRA notifies EPA and other stakeholders of an activation within 12 hours. Reports include the quantity (estimated using an outfall flow meter), time, chemical use, sampling and fecal coliform levels.

All staff actions at the facility are traceable. After each storm, actions are reviewed for improvement.

## April-May Director's Report

### OMSAP 4/24

Lynne Hamjian, EPA, deputy director, office of ecosystem protection—welcomes a fresh look at science in Boston harbor. Thinks OMSAP is a model—why does it work so well?

Judy Pederson—interim OMSAP chair, MIT Sea grant.

Betsy Reilly: billions spent on harbor cleanup (shows video of right whale breaching by the plant). Trends over time of blending, sludge, metals. Nitrogen levels increasing (population growth). Indicator, and in 2016 came close to caution threshold, but less than predicted. Monitoring still showing no adverse outfall impact. Minor red tide bloom in 2017, but science shows it is blown in from Gulf of Maine, not outfall related. Ammonium is higher near outfall, but not indicated 10 km from outfall. Phytoplankton blooms—April and October. Sediments show no increase of pubs near outfall. In fact, contaminants lower in nearfield than in bay generally. Oxygenation of sediments increasing over time, deeper into sediments. Diverse community of organisms in sediments near outfall. Fish and seafood contaminant levels also down. Significant decrease in liver tumors in flounder. Last liver tumor (at DI flats) was in 2004. same with lobster and mussel tissues—reductions in all locations, in part because pesticide concentrations are going down in the state. Monitoring shows no adverse impact to the outfall. Changes are regional not outfall related. Open to looking at changes to the monitoring plan. Know there are new concerns from the public, and want to take into consideration. Balance between better monitoring program and providing value for the ratepayers.

Ken Keay: evolution of MWRA's ambient monitoring plan. Original plan developed in 1990s with 33 questions, 76 parameters with trigger thresholds. Baseline monitoring 1992-sept. 2000.

Components: effluent, water quality, sediment, fish & shellfish. Special studies of plume tracking, productivity, usgs modeling, sediment metabolism (2000-03, benthic nitrogen and other nutrients), contaminant special study—including pesticides and pubs, nutrient special study.

Water quality monitoring was substantially greater than today. 21 nearfield stations, 17 surveys/year. Reduced over time. By 2000, 8 farfield stations. Rocky sea floor, outfall riser videos. Fish & shellfish annually.

Monitoring review in 2003-4, planned over multiple OMSAP meetings in 2002. Changes approved and implemented 2003-4. Planned by MWRA and evaluated, presented to OMSAP and EPA. Monitor fewer stations and get continuity of data. Additional efficiencies 2009-2010. All monitoring questions answered, but not all monitoring suspended. Again, data preserved, but gathered in a more efficient method.

Monthly Buoy sampling of chlorophyll and ph./ alkalinity, dissolved inorganic carbon—the latter for MIT Sea grant.

Annual sediment surveys. Hard bottom surveys every 3 years. Consensus in 2018 that ambient monitoring questions had been answered. Technical report coming. If adding requests, MWRA wants OMSAP guidance on level of evaluation and documentation.

Judy Pederson: saying all questions answered is a bit of a stretch. Keay: all the questions the monitoring was designed to address have been answered.

Monitoring questions—including. “Natural/living resources being protected” mostly to do with endangered species, particularly marine mammals.

PIAC job to ensure panel, MWRA and regulators are aware of the public’s concerns.

Does age of plant affect water quality? Betsy—extensive maintenance & management and expect to last 100+ years. There will always be some monitoring, particularly of the effluent.

PIAC: Berman: MWRA has kept environmental commitment, but also managed rates—significant commitment to the ratepayers.

Expected MWRA to present specific recommendations today. Not going to happen today. Preliminary draft consensus document—upwelling, emerging contaminants, microplastics. Collaborative structure to pull together research done by others. Joe—environmentally sound and ratepayer equitable.

Bruce: expects specific changes to monitoring—proposed by MWRA and OMSAP. Draft/letter sign on or separate from Bruce’s draft. Not the first or the last opportunity to comment on that.

Joe—sudden appearance this week, meant he reacted dramatically. Know things evolve. Workshop created ideas, but premature to weigh in on any specifics. First thing—assumption that MWRA will pay for all of it. There are 36 discharges. But only MWRA & USGS participated. MWRA contribution \$71 million so far. If program evolves, then has to come with a whole new approach. Not just MWRA doing this. Thousands of emerging contaminants, and they continue to emerge. Want leadership from EPA, DEP, OMSAP. All others should be included. MWRA is not the convener of a task force—it should be the regulators. Doesn’t want MWRA to be the only one paying for this project going forward.

Bruce: MWRA obligation comes from the NPDES permit, other 36 not governed by it. The document is a draft. Not a public document yet. Still stands by the recommendations. November’s meeting will be important. Asks that PIAC asks questions, share thoughts, and after it’s over, share thoughts in writing, together as a group. J

Kathy: other discharges along the coast—NPDES permits being renewed. Should include monitoring and the opportunity is in commenting before those permits are final.

Bruce: also, other stakeholders should be encouraged to participate. Two organizations have come through: MIT Sea Grant & SHSB. MWRA team made point that if they are the only folks looking for something like PFAS, then the risk is that they own it. Suggests if other dischargers can’t monitor, they should give \$\$ toward MWRA monitoring. Discharge includes stormwater. But MWRA’s pipe is the largest in MassBay. But it has also transformed the health of the bay & harbor.

Carolyn: ratepayers and impact is well taken. MWRA interested in changes to monitoring plan. Studies MWRA done show 90% of nitrogen comes from Gulf of Maine. One piece of the puzzle. Important to find a way to collaborate.

Bruce: uptick in mammal mortality regionally—not outfall related, but how better share information? Also share information to PIAC before November. Will distribute all our emails. Looking for a few more organizations to join PIAC, not necessarily the usual suspects.

Judy Pederson: OMSAP monitoring highlights—outfall not adversely affect Mass. Bay. Growing concerns—emerging contaminants. Climate change—teasing out the effects from the outfall vs. climate is challenging. effective in identifying sources and contaminants of concern. Collaboration.

Still concern for endangered species. How can use technology to lower the intensity of monitoring & costs, models & their role, lessons learned from other WWTP

#WWTP outfalls to the Bay.

Delaney: IPCC report this summer just focused on oceans. Don't lose focus on climate.

Berman: PIAC—agreed with OMSAP perspective on potential changes to monitoring and possible switch to emerging threats and collaboration.

Suggest:

1. Reduce number of monitoring stations, keep continuity of data sets
2. Reduce flounder monitoring frequency
3. Discontinue lobster, flounder mussel bioaccumulation studies, but continue monitoring effluent contaminants
4. Reduce benthic monitoring frequency from annually to once every 3-5 years.

Request

- Nutrient upwelling study
- Test for emerging contaminants—just DEP identified—in effluent and mixing zone
- Monitor potential effects of outfall around climate change changes
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Says agrees MWRA that if just test MWRA outfall, then they will be blamed for the pollutants. All future NPDES permits to area should involve monitoring contribution of some sort.

Regional stakeholders and dischargers should support and develop ring plan collaboratively.

Bill Kiley, BWSC—other outfalls have no monitoring?

Berman: Lynn monitors their effluent, but have no ambient monitoring. Not at the scale of MWRA monitoring.

Kathy V—DEP —all have effluent monitoring. As permits renewed, can ask in comments that they participate in regional monitoring efforts.

OMSAP member—comprehensive research is never cost effective

Examples cited of collaborative and cost-effective research.

Judy Pederson: straightforward process to develop monitoring program. State the problem, summarize what is known, design to answer the questions, implement, obtain results, analyze, review outcome to see if goals were met, redesign as needed—but the basic rule in monitoring is not to change the program.

Low hanging fruit—changing the frequency of monitoring and special studies listed in permit. Because permit has expired, changing it is not possible. But can change monitoring plan.

Emerging issues—contaminant sources for PFAS, Microplastics, PPCPs. No standards, sources unknown, danger of them unknown

OMSAP Q should MWRA outfall be looked at since don't know if these contaminants are in the effluent?

MWRA: these are everywhere in the environment. So, they are in the effluent also. Question is are they harmful there and at what levels are harmful. You will find them if you look at a low enough level.

OMSAP Q: so real question here is whether the outfall is contributing a higher concentration than is already in the background.

Kathy V: DEP has a draft for PFAS in ground cleanup of 20ppb. Working on drinking water standard.

OQ: NH already has for finished drinking water

OQ: need the ambient numbers to determine if outfall is a source.

Berman: these contaminants may be binding to pellets instead of being in the effluent.

Climate change: Bruce—strong argument to continue datasets. Temperature of bay gone up ½ degree per decade.

OQ: focus monitoring on those possible negative impacts that would be exacerbated by climate change and keep it limited to those.

Berman: algae blooms may increase as part of temperature increase. And it would be good to know they aren't from the outfall.

OQ: when we add resources to an ecosystem, you expect effects. Maybe we are just below the trigger point.

Keay: can see discharge signatures. But only within 2 km of outfall. Doesn't surprise me that we are not seeing degradation.

Other issues: contingency plan—leave untouched. Technology changes—needs time, models need data, other WWTP—special study to inform MWRA & OMSAP.

Process: MWRA proposes changes & data

OMSAP reviews & responds

- May take time
- Outside reviewers,
- Pass along decisions to regulators
- Regulators determine whether to approve changes

Special studies—focus groups on ad hoc basis

Betsy. How to streamline?

OQ. Cull documents down to each question with MWRA recommendations. Then OMSAP can indicate support

Judy thinks all on same page with monitoring reductions

Betsy. All have ideas, but want to be careful with special studies and cost going forward needs better idea of that before continuing

Study of PFAS in mass bay—Anna Robuck

2018 workshop—highlighted need for a background study. Polyfluorinated substances PFAS, break down, bioaccumulate, stay dissolved, found in all sorts of products. Have been documented in effluent around country. In regional fauna—same levels in mass bay as in Narragansett bay.

Found in the mass bay waters—higher concentrations closer to Boston. Also in LI Sound, with concentrations decreasing as move east (away from WWTP). Can also trace effluent markers with sucralose. Also corresponds nicely with prescription drug concentrations in the water. 5,000 different kinds of PFAS. Looking at 24 + 15 drugs and Sucralose.

Collaborated with MWRA—effluent sampling and comparison to other WWTPs. Control sites at Merrimack and Maine coastal rivers. Not doing sediment sampling. Measuring at 2 ends of Stellwagen bank & into or out of the bay.

Should have numbers for OMSAP to consider. May be able to figure out how quickly they diffuse. Also evaluating wastewater tracer elements. Guidance for future monitoring design. Basic environmental risk assessment. Could rule out the outfall as a source of PFAS.

August and September out on bay collecting samples.

## **Advisory Board Operations Committee 5/7**

- Wastewater system overview:
- What are its limits
- Impacts of CSOs and CSO flows
- Stormwater & the MWRA system

Joe—with the MS4, discussion on MWRA and its capability to handle additional stormwater. Discussion today just to bring everyone up to speed

Brian McLaughlin—assistant director of wastewater at the MWRA.

How it works—25 miles east-west, north-south. 2.5m people. Ashland sewer takes up to 13 hours to get to DI. 330mgd 10-year average flow. Design capacity average 361mgd.

Treatment and storage: system can treat or store up to 2.3 billion gallons/24 hours. 1.27mgd at DI, 1,006mgd in CSO facilities, CSO Tunnels—can also store.

Treatment capacity about 1.3bgd—adding all the pump stations together. To control flow getting to the island, have to choke the headworks—means closing input gates.

North vs. South: South all separate systems. Typical—flows impacted by long wet weather periods or high ground water. Not immediately after a rain. Pumps at Framingham and other outer burbs activate during wet weather. Every storm is different. MWRA produces storm reports after every major rain. Nut Island sees peak flows about 24 hours after heaviest precipitation. Once they climb, they stay high for 3-4 days.

North system gets flows quicker and also subsides more quickly. Why? Inflow vs. infiltration (groundwater into the pipes). North has combined systems—stormwater comes immediately into the system.

CSO facilities store rain/sewage first, then start to discharge, keeping the flows more even to DI. Prison Point activates about 20x/year.

Cottage Farm receives from Cambridge, Watertown, Brookline.

CSO flows are a high percentage of flow from the North System. Made substantial reductions in flow over time by separating systems, improving pumping capacity at Deer Island.

30-year CSO plan—over \$1b to eliminate or reduce CSO discharges. 3.3 billion gallons->.38

CSO semi-annual monitoring report will be at next AB meeting.

Questions on what impacts overall volume of flow—I/I work keeps things lower, but it's what MWRA expects is the issue in the South System. Question about how much other communities subsidize the 4 communities with combined sewers (no answer).

Chelsea Creek lags Ward and Columbus because less Combined Sewers upstream.

Is the sewer system maxed out? We do have storms that exceed the plant and storage system capacity. For anyone joining the system, would depend on where & how much flow expected.

There are communities interested in MWRA taking the first flush of stormwater (most phosphorus and other pollutants). Would that be the most difficult to take? —Not clear. Need the hydraulic models.