MASSACHUSETTS WATER RESOURCES AUTHORITY

Board of Directors Report

on

Key Indicators of MWRA Performance

Second Quarter FY2019

Q1	Q2	Q3	Q4
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Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer
February 20, 2019

Board of Directors Report on Key Indicators of MWRA Performance

2nd Quarter FY19

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This quarterly report is prepared by MWRA staff to track a variety of MWRA performance measures for routine review by MWRA's board of directors. The content and format of this report is expected to develop as time passes. Information is reported on a preliminary basis as appropriate and available for internal management use and is subject to correction and clarification.

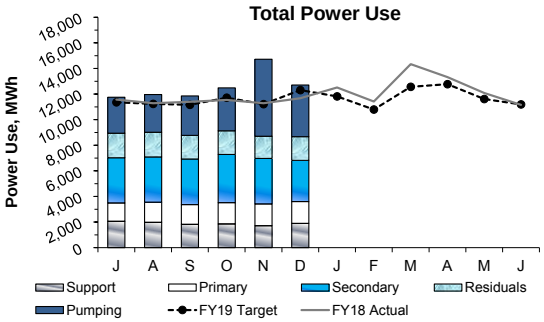
Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer

February 20, 2019

OPERATIONS AND MAINTENANCE

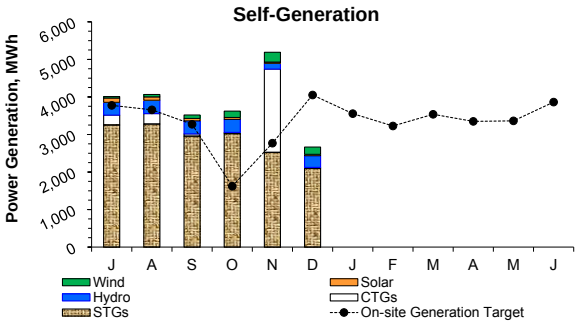
Deer Island Operations

2nd Quarter - FY19

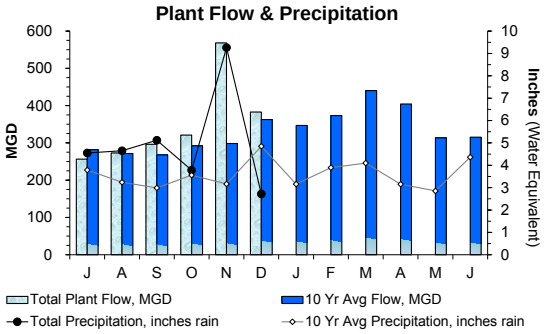


Total power usage in the 2nd Quarter was 13.2% above target as Total Plant Flow was 44.0% above target with the 3 year average plant flow. While power usage in the Residuals treatment process was below target, usage in a number of other processes were similar to or above target as a result of the higher plant flow, including power used for raw wastewater pumping which was 41.5% above target. Wastewater pumping for the North System was 30.4% higher and for the South System was 75.9% higher than target.

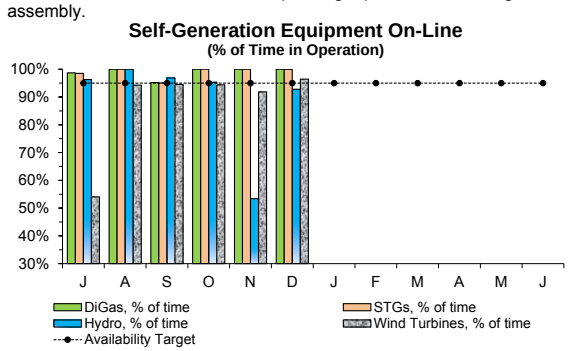
Note: Power usage projections are based on 3 year averages.



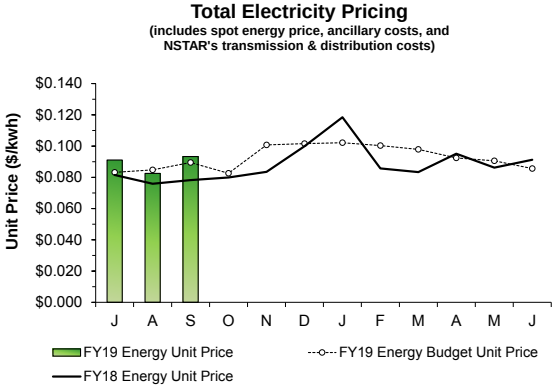
Power generated on-site during the 2nd Quarter was 35.9% above target. This was mainly due to the CTGs being operated on 11 days in November, for a total of 183 hours, as a precaution during the many rain events and extended periods of high plant flows. As a result, power generated by the CTGs was more than double the expected generation during Quarter 2. Power generated by the STGs and Wind Turbines also exceeded their target by 43.7% and 13.7%. Generation by the Solar Panels was 6.3% below target. Hydro Turbine generation was 38.4% below target due in part to extremely high plant flows events that prevented the turbine from operating at times, in addition to maintenance issues resulting in the turbine remaining offline for several days. Hydro Turbine #1 has been out of service pending repairs to the rotating assembly.



Total Plant Flow for the 2nd Quarter was 33.4% above target with the 10 year average plant flow (424.0 MGD actual vs. 317.8 MGD expected) as precipitation was 36.2% above target (15.76 inches actual vs. 11.57 inches expected). The near record breaking rainfall of 9.26 inches in November alone was nearly three (3) times higher than the 10 year average for the month.

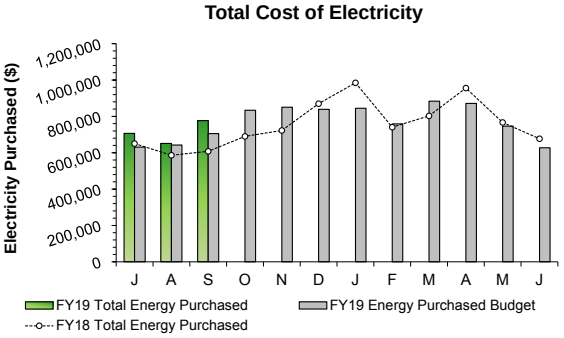


The DiGas system, STGs, and Wind Turbines met or exceeded the 95% availability target for the 2nd Quarter. The Hydro Turbine availability was14.5% lower than target due in part to extremely high plant flows during heavy rain events (in November), that prevented the turbine from operating at times, in addition to maintenance issues resulting in the turbine remaining offline for several days.



Under the current energy supply contract, a block portion of DI's energy is a fixed rate and the variable load above the block is purchased in real time. The actual Total Energy Unit Price in September (the most current invoice available) was 4.3% above target with budgetary estimates. The actual total energy unit prices in October, November, and December are not yet available as the complete invoices have not been received. The Total Energy Unit Price includes a fixed block price, spot energy price, transmission & distribution charges, and ancillary charges.

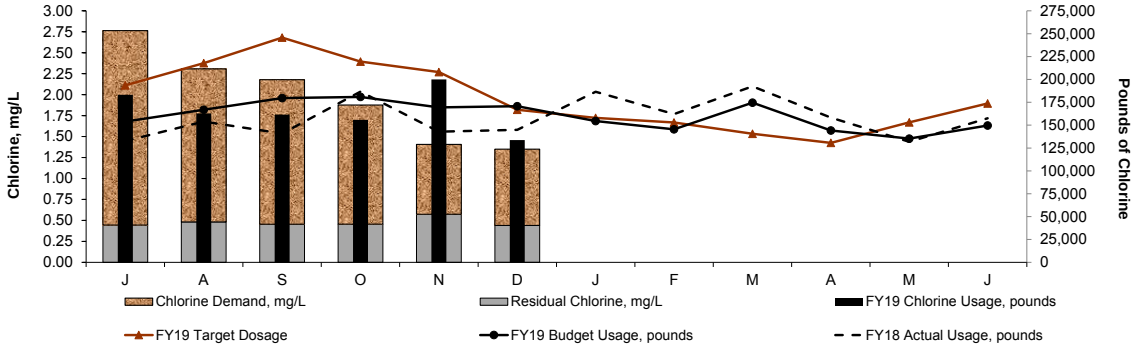
Note: Only the actual energy prices are reported. Therefore, the dataset lags by three (3) months due to the timing of invoice receipt and review.



The Electricity cost data for Electricity Purchased in October and November are not yet available. Year-to-date Total Cost of Electricity is $156,106 (7.9%) higher than budgeted through September as the Total Energy Unit Price is 3.7% higher than target and the Total Electricity Purchased is 4.1% higher than target through September.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by three (3) months due to the timing of invoice receipt and review.

Deer Island Sodium Hypochlorite Use



The disinfection dosing rate in the 2nd Quarter was 28.5% below target with budgetary estimates. Actual sodium hypochlorite usage in pounds of chlorine was also 6.1% lower than expected. The lower sodium hypochlorite dosage and usage is indicative of a lower chlorine demand in the wastewater due to higher flows and a more dilute wastewater. DITP maintained an average disinfection chlorine residual of 0.49 mg/L this month with an average dosing rate of 1.54 mg/L (as chlorine demand was 1.05 mg/L).

The overall disinfection dosing rate (target and actual) is dependent on plant flow, target effluent total chlorine residual levels, effluent quality and NPDES permit levels for fecal coliform.

Secondary Blending Events

Month	Count of Blending Events	Count of Blending Events Due to Rain	Count of Blending Events Due to Non-Rain-Related Events	Secondary, as a Percent of Total Plant Flow	Total Hours Blended During Month
J	1	1	0	99.5%	6.02
A	1	1	0	99.9%	2.96
S	2	2	0	99.4%	7.81
O	3	3	0	99.5%	9.58
N	12	12	0	96.2%	100.05
D	2	2	0	99.9%	9.68
J					
F					
M					
A					
M					
J					
Total	21	21	0	98.7%	136.10

98.2% of all flows were treated at full secondary during the 2nd Quarter. There were 17 secondary blending events this quarter, all due to high plant flow resulting from heavy rain. The Boston area received 292.6% more rain in November than expected resulting in a total of 12 secondary blending events for the month. Additionally, a number of high plant flow records for November were broken (see Deer Island Operations & Maintenance Report section below). Secondary blending for the 2nd Quarter resulted in a total of 114.02 hours of blending and 703.93 MGal of primary-only treated effluent with secondary effluent. The Maximum Secondary Capacity for the entire quarter was 700 MGD.

Secondary permit limits were met at all times during the 2nd Quarter.

Deer Island Operations & Maintenance Report

Environmental/Pumping:
The plant achieved an instantaneous peak flow rate of 1,208.1 MGD during the early morning of November 10. This peak flow occurred during a storm event that brought 1.65 inches of rain to the metropolitan Boston area. A number of high plant flow and rainfall records, dating back to plant startup in July 1998, were broken in November, as precipitation mostly in the form of rain in the Boston area, was 292.6% higher than expected. The daily average plant flow for the North System influent flow (351.06 MGD), South System influent flow (217.12 MGD), and Total Plant influent flow (568.19 MGD) all shattered the previous high flow records for the month of November (see table below).

Overall, Total Plant Flow in the 2nd Quarter was 33.4% above the 10 year average plant flow target for the quarter.

	Previous November Record (since plant startup July 1998)	New November Record (set 2018)
Total Plant Influent Flow	422.68 MGD (2006)	568.19 MGD
North System Influent Flow	281.74 MGD (2006)	351.06 MGD
South System Influent Flow	160.32 MGD (2011)	217.12 MGD
Precipitation	5.8 inches (2006)	9.26 inches

Cleaning of the North Main Pump Station riser shafts began during the week of November 19 and continued into December. The ten-foot diameter North Metropolitan Relief Tunnel riser shaft and the eleven-foot diameter Boston Main Drainage Tunnel riser shaft were cleaned out by the end of the month. The total amount of material removed will not be available until the completed invoice from the grit and screenings hauling contractor is received. The removal of this floating material reduces the risk of pumping system malfunctions during low flow and pump-down events at the North Main Pump Station. This cleaning occurs twice a year.

Deer Island Operations & Maintenance Report (continued)

Secondary Treatment:
Annual turnaround maintenance was performed on Train #1 in the Cryogenic Oxygen Facility in October. This turnaround maintenance is performed on roughly half of the components and systems in the Cryogenic Oxygen Facility and allows the remaining half of the facility to continue to operate and produce oxygen uninterrupted. During this turnaround maintenance, the contractor calibrated all the instrumentation on Cold Box unit #1 as well as, a number of other components of the oxygen plant. The same turnaround maintenance was completed on Train #2 in the spring (April).

DITP successfully received and offloaded a single 58,000 pound tanker delivery of liquid oxygen on November 21. The ability to receive liquid oxygen is important for DITP as a contingency in the event the cryogenic oxygen facility is out of service. Oxygen is needed for the biological process in secondary treatment to effectively treat the wastewater to a level that meets the effluent quality required in the discharge permit. As such, a minimum of one (1) liquid oxygen delivery is scheduled for offloading into the 1,000 ton liquid oxygen storage tank every five (5) years to ensure the deliveries can be successfully offloaded and allows staff to review the steps necessary to perform such an offload. DITP utilizes approximately 100 to 120 dry tons per day of pure oxygen to support the secondary biological process.

Residuals:
Contractors began work on a major Gravity Thickener Rehabilitation project in October. DITP has six (6) gravity thickeners used to concentrate sludge that is generated from the primary treatment process, and scum that is generated from all treatment processes. The sludge and scum thickening equipment and five (5) of the six (6) Fiberglass-Reinforced Plastic (FRP) domed covers have reached the end of their useful lives and are in need of replacement. This rehabilitation project will upgrade all six (6) gravity thickeners including complete replacement of each tank's sludge and scum thickening equipment as well as replacement of five (5) of the six (6) FRP dome covers (the FRP domed cover for Gravity Thickener #2 has already been replaced). Additionally, critical components which were previously fabricated from carbon steel, including the center columns and center cages, will now be fabricated from type 316 stainless steel in order to provide superior protection against hydrogen sulfide gas which is present in high concentrations in this highly corrosive environment. Gravity Thickener #1 was turned over to the contractors to begin work on October 12. The entire rehabilitation project is anticipated to take nearly three (3) years to complete.

Energy and Thermal Power Plant:
Overall, total power generated on-site accounted for 28.8% of Deer Island's total power use for the quarter. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 23.1% of Deer Island's total electrical power use for the quarter.

The required annual boiler inspections were successfully completed by a Department of Public Safety certified inspector on September 19 for Boiler 101 and on October 10 for Boiler 201. No issues were cited during these inspections.

The CTGs were operated on October 23 and on December 17 for ISO-New England electrical declared demand response audit events.

Contractors from Eversource began mobilizing on-site in early October to begin work in preparation for the installation the on-island of the new cross-harbor power cable. Currently, this work involves trenching from the Eversource building (Station 132) down the roadway inside the perimeter fence line ending at the northwestern section of parking lot #1. This new cross-harbor power cable will replace the existing cross-harbor power cable that serves as the primary means of transmitting electricity to Deer Island, and is expected to be available near the end of calendar year 2019.

The quarterly Continuous Emissions Monitoring System (CEMS) cylinder gas audits, along with the quarterly Continuous Opacity Monitoring System (COMS) audits for the two (2) boilers in the Thermal Power Plant were successfully completed by contractors on November 30. The CEMS measures the nitrogen oxides (NOx) emissions, the oxygen, carbon monoxide, and sulfur dioxide concentrations in the boiler flue gas. The cylinder gas audit measures each gas analyzer in the CEMS against known cylinder gas concentrations. The opacity audits measure the performance of the COMS through a number of required testing protocols specified in the regulations. DITP received passing results on all the audit tests that were performed and a final report will be submitted to the MaDEP.

Annual maintenance at the Thermal Power Plant began on December 10 and continued through December 26. Various maintenance activities on the Steam Turbine Generators (STGs) and the two (2) Zurn boilers included maintenance on various pumps, valves, and instruments throughout the power plant. The annual maintenance, which typically occurs during the late fall, includes maintenance on the common systems. However, the common systems maintenance was postponed to 2019 due to the later timing of this year's maintenance. Therefore, one (1) boiler and one (1) steam turbine generator remained in operation at all times during this minor plant outage.

DITP took delivery of nearly 343,000 gallons of #2 fuel oil without incident from December 10 through December 17. This fuel oil is used for CTG operation, for boiler startup operations, and for supplemental fuel for boiler operation during periods of low or unstable digester gas production.

Clinton AWWTP:
Drained, clean, and inspected #2 contact channel. Placed channel back in service.
Replaced broken throat flange and intermediate bearing #1 Influent Screw Pump.
Replaced coupling in #2 Belt Filter Press Sludge Supply Pump.
Drained, cleaned, and inspected #1 Final Clarifier.

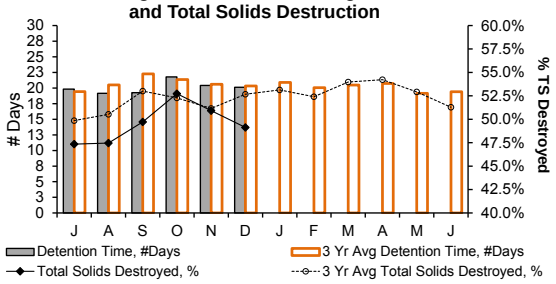
Phosphorus Reduction Facility:
Work completed or in progress during the Second Quarter:
Acid washed and inspected #1,2, &3 disk filters.
Laid up disk filters for off season maintenance.

Painting and Coatings contract:
Contractor has commenced work, bead blasting piping in the Chemical Building Basement.

Deer Island Operations and Residuals

2nd Quarter - FY19

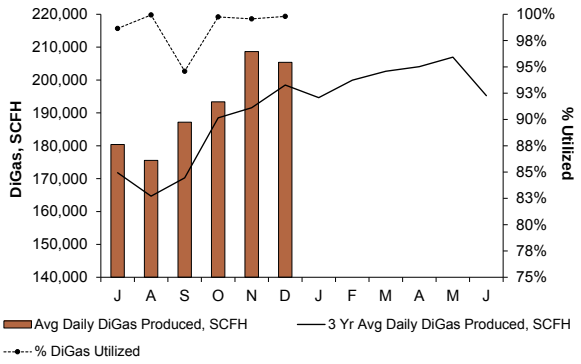
Sludge Detention Time in Digesters and Total Solids Destruction



Total solids (TS) destruction following anaerobic sludge digestion averaged 50.9% during the 2nd Quarter, 2.1% below the 3 year average of 52.0% even though the sludge detention time in the digesters was on target at 20.8 days. DI operated with an average of 8.0 digesters similar to the 3 year average.TS destruction was lower than expected due to a slightly higher percentage of secondary sludge going to digestion in December.

Total solids (TS) destruction is dependent on sludge detention time which is determined by primary and secondary solids production, plant flow, and the number of active digesters in operation. Solids destruction is also significanty impacted by changes in the number of digesters and the resulting shifting around of sludge.

Digester Gas Production and % Utilized

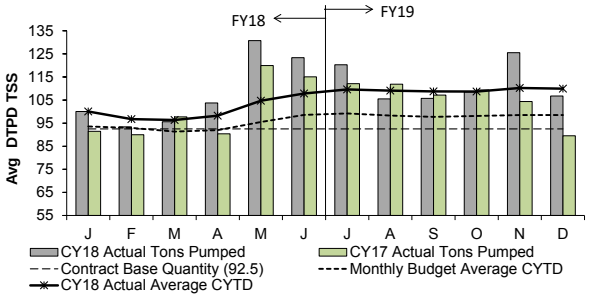


The Avg Daily DiGas Production in the 2nd Quarter was 5.0% above target with the 3 Year Avg Daily DiGas Production. On average, 99.7% of all the DiGas produced in the quarter was utilized at the Thermal Power Plant.

Residuals Pellet Plant

New England Fertilizer Company (NEFCO) operates the MWRA Biosolids Processing Facility (BPF) in Quincy under contract. MWRA pays a fixed monthly amount for the calendar year to process up to 92.5 DTPD/TSS as an annual average. The monthly invoice is based on 92.5 DTPD/TSS (Dry Tons Per Day/Total Suspended Solids) times 365 days divided by 12 months. At the end of the year, the actual totals are calculated and additional payments are made on any quantity above the base amount. On average, MWRA processes more than 92.5 DTPD/TSS each year (FY18's budget is 99.5 DTPD/TSS and FY19's budget is 98.9 DTPD/TSS).

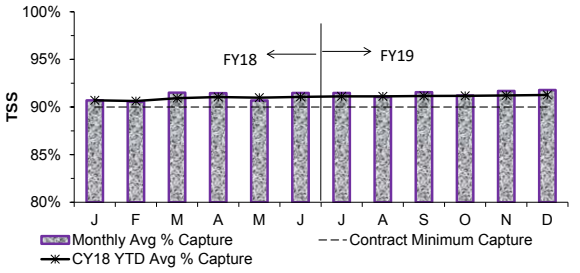
Sludge Pumped From Deer Island



The average quantity of sludge pumped to the Biosolids Processing Facility (BPF) in the 2nd Quarter was 113.6 DTPD - 12.7% above target with the FY19 budget of 100.8 DTPD for the same period. Sludge delivered to the BPF was higher than expected due in part to 10% higher than expected total sludge in November (caused by high influent loadings from the higher plant flows). Additionally, the quarterly target based on historical values from FY15 to FY17 was biased low as a result of less sludge being sent to the BPF while digester operation was transitioning from Module #3 to Module #1in December of FY15.

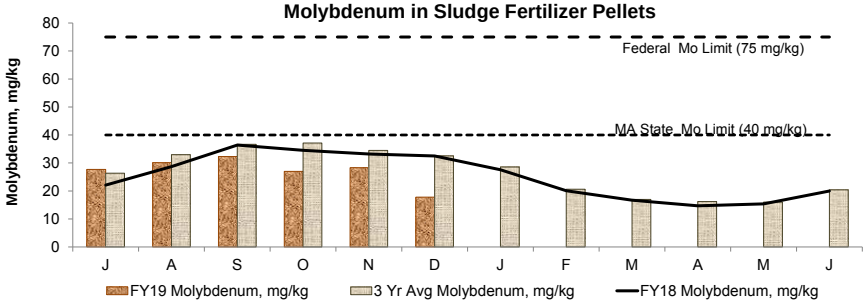
The CY18 average quantity of sludge pumped through December is 109.9 DTPD - 11.6% above target, compared with the CY18 average budget of 98.5 DTPD for the same time period.

Monthly Average % Capture of Processed Sludge



The contract requires NEFCO to capture at least 90.0% of the solids delivered to the Biosolids Processing Facility. The average capture for the 2nd Quarter was 91.6% and the CY18 to date average capture is 91.3%.

Molybdenum in Sludge Fertilizer Pellets



Copper, lead, and molybdenum (Mo) are metals of concern for MWRA as their concentrations in its biosolids have, at times, exceeded regulatory standards for unrestricted use as fertilizer. Molybdenum-based cooling tower water is a significant source of Mo in the sludge fertilizer pellets. The Federal standard for Mo is 75 mg/kg. In 2016, Massachusetts Type I biosolids standard for molybdenum was changed to 40 mg/kg from the previous standard of 25 mg/kg. This has allowed MWRA to sell its pellets in-state for land application whereas the previous limits forced several months' worth of pellets to be shipped out of state. This made it an impractical source of fertilizer for local Massachusetts farms since NEFCO does not distribute product that does not meet the suitability standards.

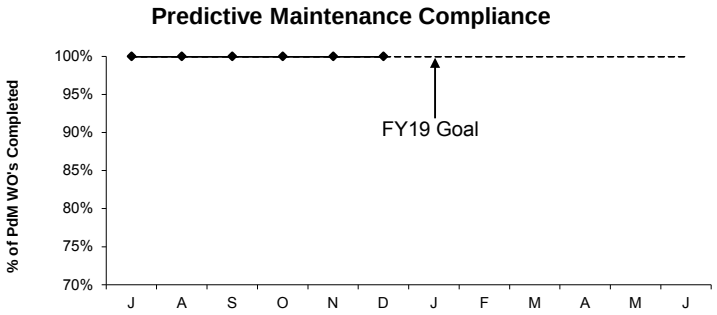
The levels have been below the DEP Type 1 limit for all three (3) metals. For Mo, levels in the MWRA sludge fertilizer pellets during the 2nd Quarter averaged 24.4 mg/kg, 30% below the 3 year average, 39% below the MA State Limit, and 68% below the Federal Limit.

Deer Island Maintenance

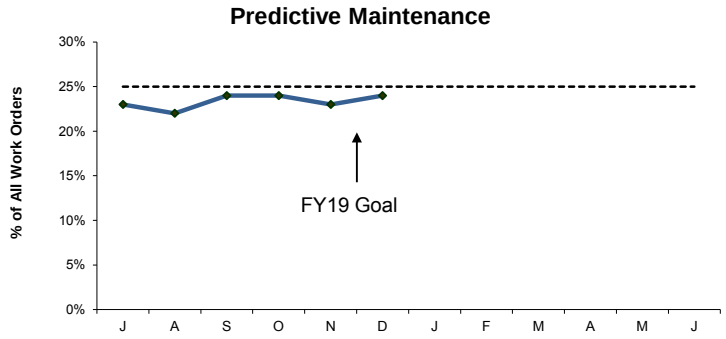
2nd Quarter - FY19

Productivity Initiatives

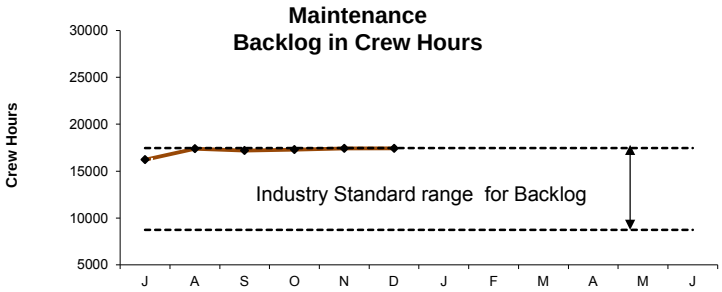
Productivity initiatives include increasing predictive maintenance compliance and increasing PdM work orders. Accomplishing these initiatives should result in a decrease in overall maintenance backlog.



Deer Island's FY19 predictive maintenance goal is 100%. DITP completed 100% of all PdM work orders this quarter. DITP is continuing with an aggressive predictive maintenance program.



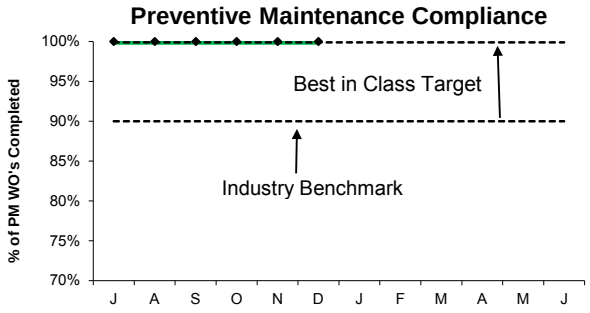
Deer Island's increased FY19 predictive maintenance goal is 25% of all work orders to be predictive. 24% of all work orders were predictive maintenance this quarter. The industry is moving toward increasing predictive maintenance work to reduce downtime and better predict when repairs are needed.



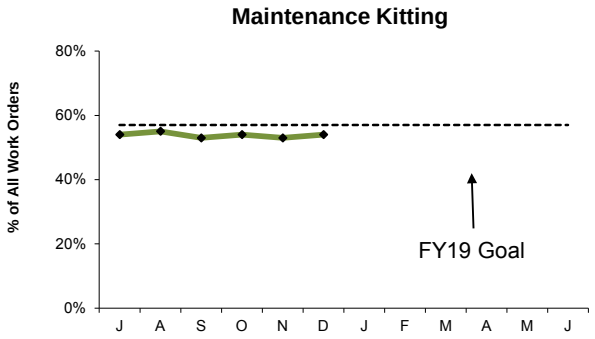
DITP's maintenance backlog at Deer Island is 17,298 hours this quarter. DITP is at the upper end of the industry average for backlog. The industry Standard for maintenance backlog with 97 staff (currently planned staffing levels) is between 8,730 hours and 17,460 hours. Backlog is affected by five vacancies; (1) HVAC Technician, (1) Plumber, (2) Electricians and (1) Instrument Technician. Management continues to monitor backlog and to ensure all critical systems and equipment are available.

Proactive Initiatives

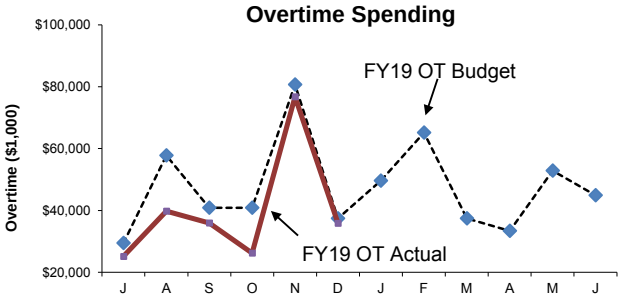
Proactive initiatives include completing 100% of all preventative maintenance tasks and increasing preventative maintenance kitting. These tasks should result in lower maintenance costs.



Deer Island's FY19 preventative maintenance goal is 100% completion of all work orders from Operations and Maintenance. DITP completed 100% of all PM work orders this quarter.



Deer Island's increased FY19 maintenance kitting goal is 57% of all work orders to be kitted. 54% of all work orders were kitted this quarter. Kitting is staging of parts or material necessary to complete maintenance work. This has resulted in more wrench time and increased productivity.



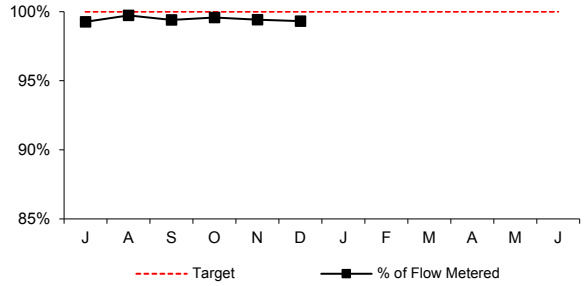
Maintenance overtime was under budget by $16K this quarter and $49k under for the year. Management continues to monitor backlog and to ensure all critical equipment and systems are available. This quarters overtime was predominately used for Storm Coverage/High Flows, Island Wide HVAC Winterization Preparation, Cryo Heating Coil #1 Replacement and Oxidizer Tank #2 Repair.

Operations Division Metering & Reliability

2nd Quarter - FY19

WATER METERS

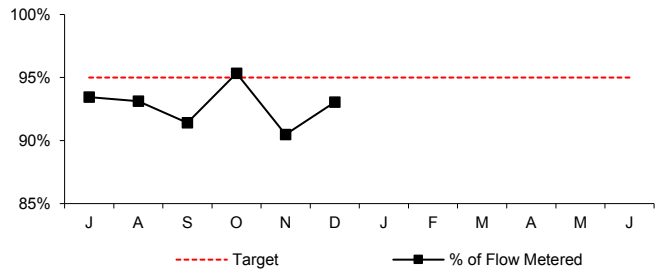
Percent of Total Revenue Water Deliveries Calculated Using Meters



The target for revenue water deliveries calculated using meters is 100%. Estimates are generated for meters that are out of service due to instrumentation problems or in-house and capital construction projects. During the 2nd Quarter of FY19, meter actuals accounted for 99.44% of flow; only 0.56% of total revenue water deliveries were estimated. The following is the breakdown of reasons for estimations:
In-house and Capital Construction Projects - 0.03%
Instrumentation Failure - 0.53%

WASTEWATER METERS

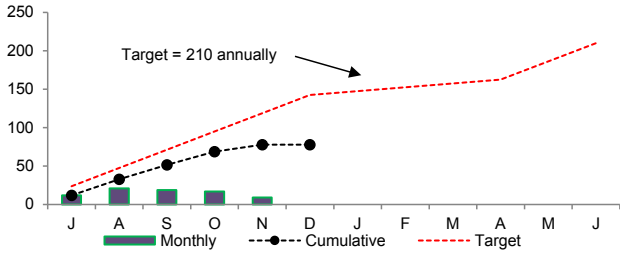
Percent of Total Wastewater Transport Calculated Using Meters



The target for revenue wastewater transport calculated using meters is 95%. Estimates are generated for meters missing data due to instrument failure and/or erratic meter behavior. Estimates are produced using data from previous time periods under similar flow conditions. During the 2nd Quarter of FY19, meter actuals accounted for 92.95 % of flow. Due to instrumentation failures, 7.05 % of wastewater transport flow was estimated.

WATER DISTRIBUTION SYSTEM PIPELINES

Miles Surveyed for Leaks



During the 2nd Quarter of FY19, 26.19 miles of water mains were inspected. The total inspected for the fiscal year to date is 77.88

Leak Backlog Summary

Month	J	A	S	O	N	D	J	F	M	A	M	J	Totals
Leaks Detected	1	4	4	1	0	1							11
Leaks Repaired	0	0	3	7	2	1							13
Backlog	10	14	15	9	7	7							n/a

During the 2nd Quarter of FY19, two new leaks were detected, ten leaks were repaired. Refer to FY19 Leak Report below for details. Also, community service ranging from individual leak location to hydrant surveys were conducted for: Arlington, Boston, Boston Water & Sewer, Canton, Deer Island, Ludlow, Lynn, Malden, Marlborough, Medford, Milton, Newton, Northboro, Reading, Saugus, Somerville, Stoneham, Wakefield, Watertown and Winthrop.

2nd Quarter - FY 19 Leak Report

Date Detected	Location of Leaks	Repaired
07/16/18	683 Boylston St., @ Lee St. Brookline	09/11/18
09/03/18	#2 Lynn Fells Pkwy., exit. Stoneham	09/05/18
09/07/18	Waverly Oaks Road. Waltham	09/15/18
11/20/17	Peabody St. @ Washington St., Newton	10/24/18
11/26/17	Nonantum Rd. @ Maple St., Newton	10/24/18
08/01/18	Morton St. @ Forest Hills Ave., W. Roxbury	10/25/18
08/08/18	Morton St. @ Forest Hills Cemetary, W. Roxbury	10/31/18
09/21/18	Felton St. @ Water St., Waltham	10/02/18
09/27/18	Morton St. @ Norfolk St., Dorchester	10/31/18
10/20/18	Morton St. @ Norfolk St. #2, Dorchester	10/23/18
08/26/18	West St. @ Neponset River, Hyde Park	11/15/18
08/28/18	Morton St. @ Harvard St. Mattapan	11/19/18
12/16/18	Hicks Ave. @ Mystic Ave., Medford	12/17/18

Date Detected	Location of Leaks/Unrepaired
06/08/15	Allandale Rd. @ Grove St., Brookline, Sect 78, located acoustically. Not surfacing. No redundancy.
06/17/15	Washington St. at East St., Dedham; Sect 77, located acoustically. Not surfacing. Need redundant SEH pipeline to enable isolation.
07/01/16	241 Forest St. Winchester, Sect 89, leaking blow of valve. Not surfacing. Need redundant NIH pipeline to enable isolation.
12/04/16	1025 W Roxbury Pkwy, Brookline, Sect 95, located acoustically. Not surfacing. Leaking blow off valve. No redundancy.
12/04/16	710 Ashland St/Summer St. Lynn, Sect 91. Not surfacing. Leaking emergency connection valve between MWRA and LWSC systems. LWSC has difficulty isolating 16" main.
07/20/17	Mystic Valley Parkway, Medford. Not surfacing.
04/20/18	#634 Mystic Ave. @ Mt. Vernon, Somerville. Not surfacing. Repair scheduled. Permit Issues.

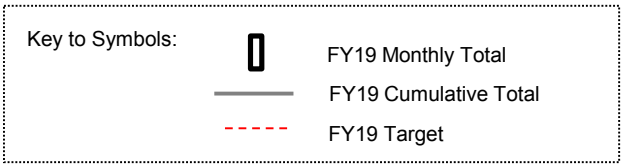
Water Distribution System Valves

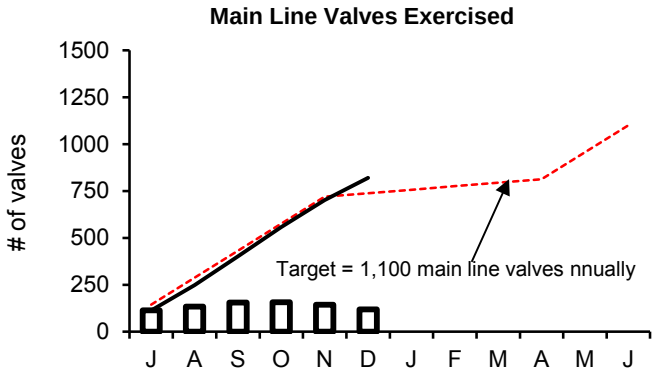
2nd Quarter - FY19

Background

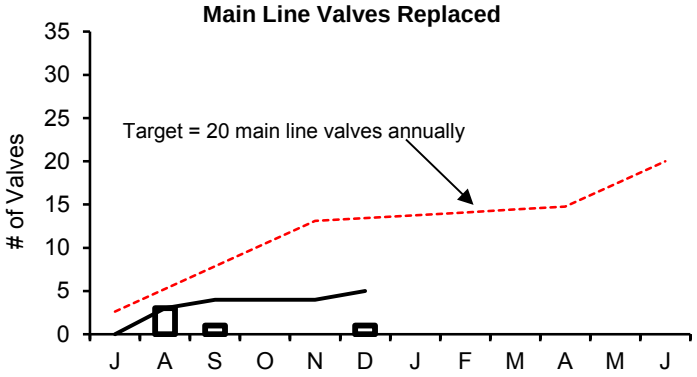
Valves are exercised, rehabilitated, or replaced in order to improve their operating condition. This work occurs year round. Valve replacements occur in roadway locations during the normal construction season, and in off-road locations during the winter season. Valve exercising can occur year round but is often displaced during the construction season. This is due to the fact that a large number of construction contracts involving rehabilitation, replacement, or new installation of water lines, requires valve staff to operate valves and assist with disinfection, dechlorination, pressure-testing, and final acceptance. Valve exercising can also be impacted due to limited redundancy in the water system; valve exercising cannot be performed in areas where there is only one source of water to the community meters or flow disruptions will occur.

Type of Valve	Inventory #	Operable Percentage	
		FY19 to Date	FY19 Targets
Main Line Valves	2,159	96.6%	95%
Blow-Off Valves	1,317	98.4%	95%
Air Release Valves	1,380	95.0%	95%
Control Valves	49	100.0%	95%

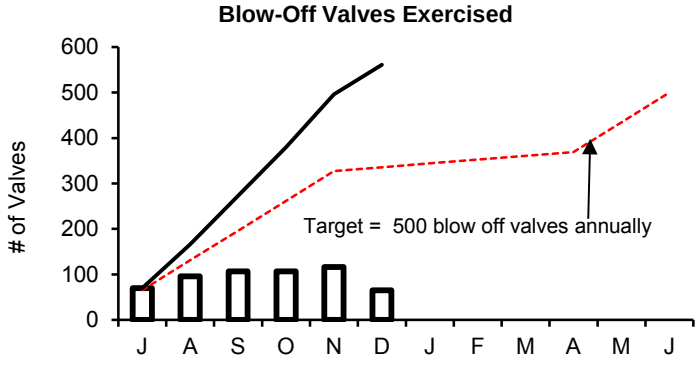




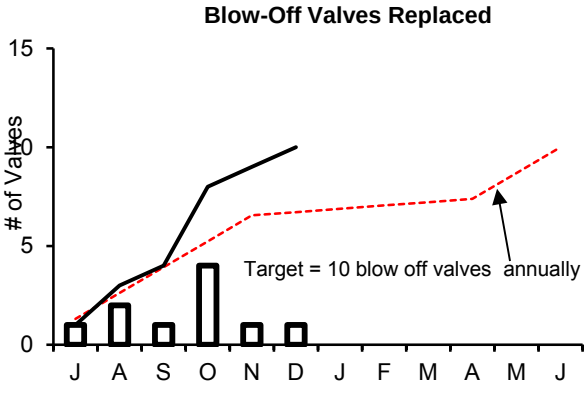
During the 2nd Quarter of FY19, 418 main line valves were exercised. The total exercised for the fiscal year to date is 820.



During the 2nd Quarter of FY19, there was one main line valve replaced. The total replaced for the fiscal year to date is five. Focus has been on Blow-Off valve replacements related to available pipeline isolations.



During the 2nd Quarter of FY19, 288 blow off valves were exercised. The total exercised for the fiscal year to date is 561. Valve exercising has increased due to full allocated staffing and CIP projects coming to completion.



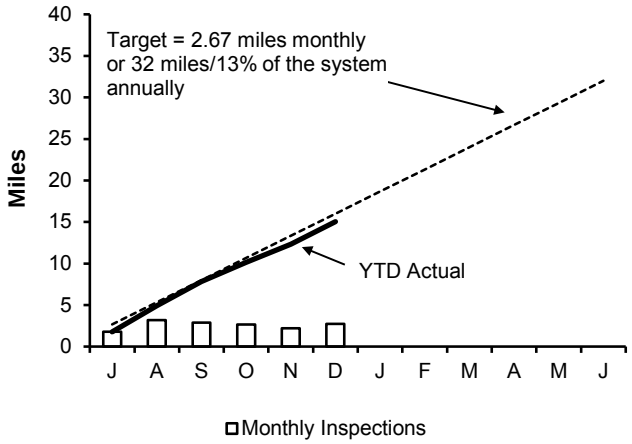
During the 2nd Quarter of FY19, there were six blow off valves replaced. The total replaced for the fiscal year to date is ten. Focus has been on Blow-Off valve replacements related to available pipeline isolations.

Wastewater Pipeline and Structure Inspections and Maintenance

2nd Quarter - FY19

Inspections

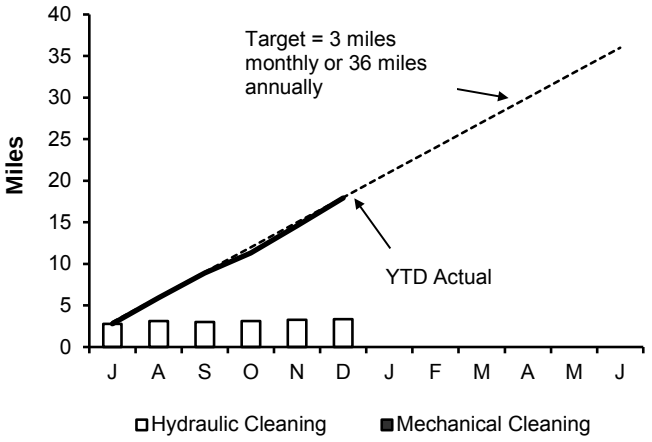
Pipeline Inspections



Staff internally inspected 7.59 miles of MWRA sewer pipeline during this quarter. The year to date total is 15.04 miles. No Community Assistance was provided quarter.

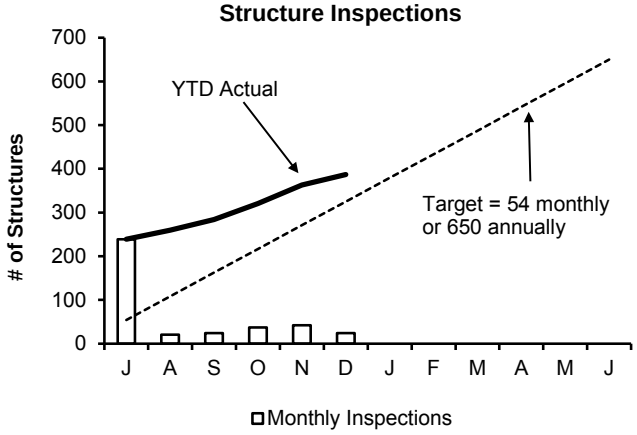
Maintenance

Pipeline Cleaning



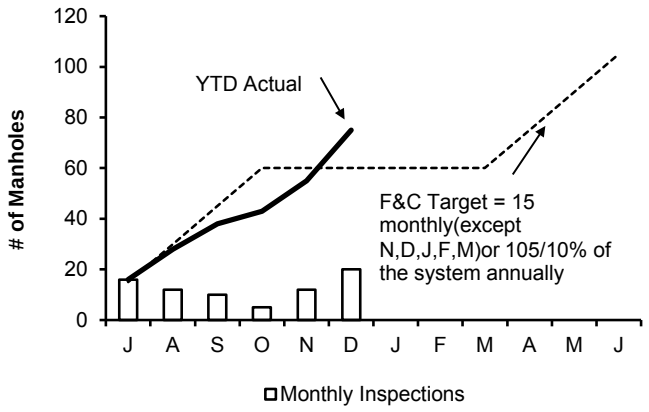
Staff cleaned 9.74 miles of MWRA's sewer system and removed 27 yards of grit and debris during this quarter. The year to date total is 17.93 miles. No Community Assistance was provided this quarter.

Structure Inspections



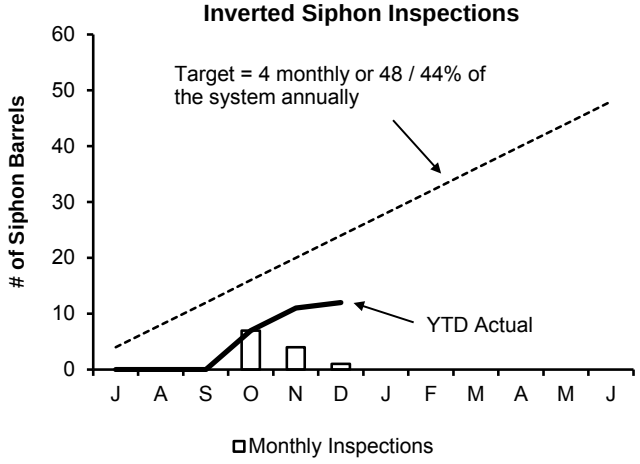
Staff inspected the 36 CSO structures and performed 103 additional manhole/structure inspections during this quarter. The year to date total is 387 inspections.

Manhole Rehabilitation



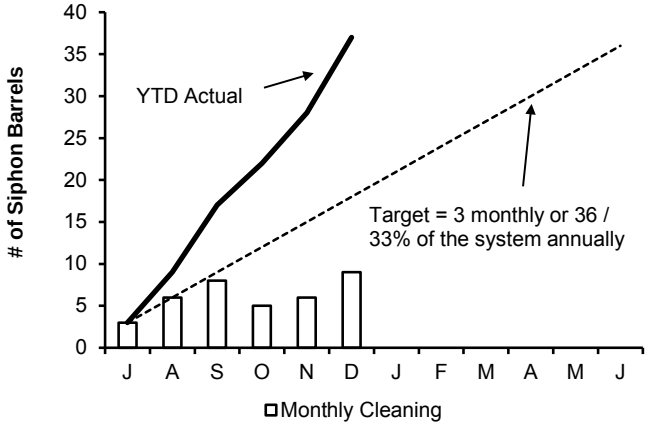
Staff replaced 37 frames & cover during this quarter.The year to date total is 75.

Inverted Siphon Inspections



Staff inspected 12 siphon barrels this quarter. Year to date total is 12 inspections.

Inverted Siphon Cleaning

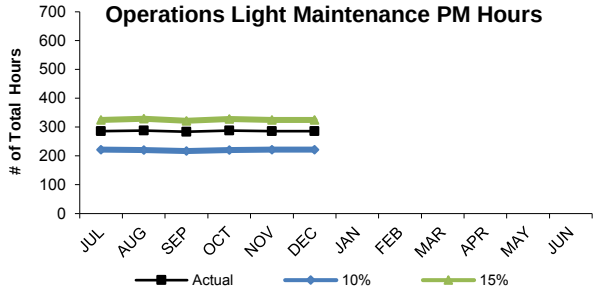


Staff cleaned 20 siphon barrels during this quarter. Year to date total is 37.

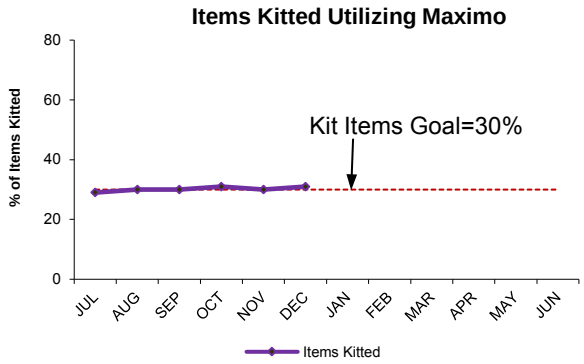
Field Operations' Metropolitan Equipment & Facility Maintenance

2nd Quarter - FY19

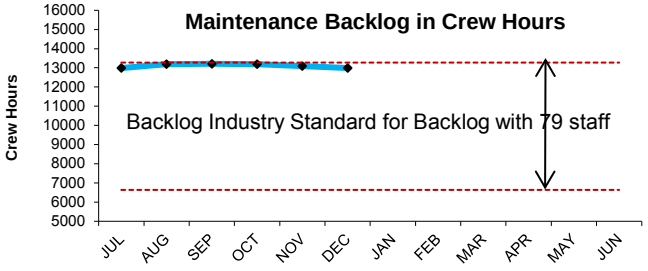
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus reducing maintenance spending. Backlog and overtime metrics monitor the success of these maintenance initiatives.



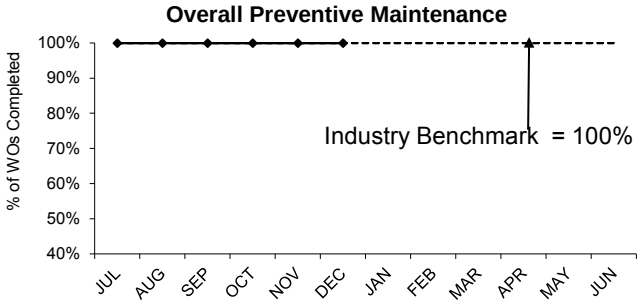
Operations staff averaged 287 hours of preventive maintenance during the 2nd Quarter, an average of 14% of the total PM hours for the 2nd Quarter, which is within the industry benchmark of 10% to 15%.



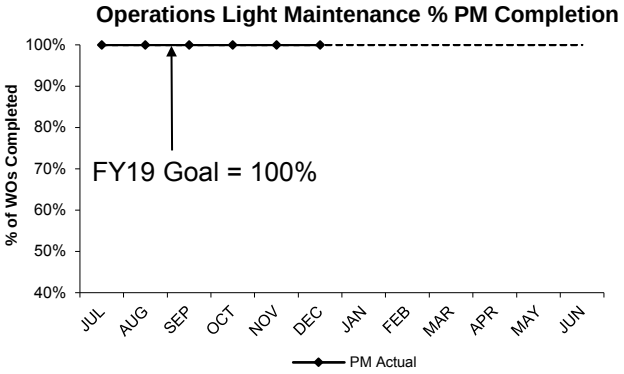
Operation's FY19 maintenance kitting goal has been set at 30% of all work orders to be kitted. Kitting is the staging of parts or material neccesary to complete maintenance work. In the 2nd Quarter, 30% of all applicable work orders were kitted. This resulted in more wrench time and increased productivity.



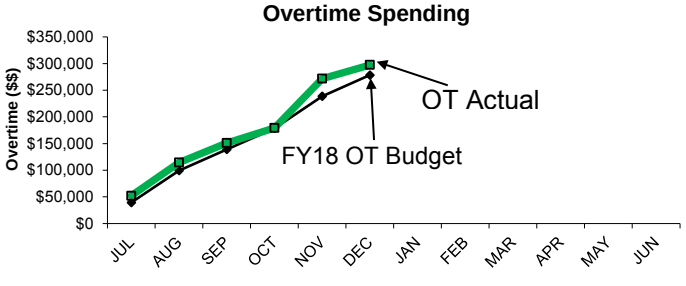
The 2nd Quarter backlog average is 13096 hours. Management's goal is to continue to control overtime and still stay within the industry benchmark of 6636 to 13275 hours.



The Field Operations Department (FOD) preventive maintenance goal for FY19 is 100% of all PM work orders. Staff completed an average of 100% of all PM work orders in the 2nd Quarter.



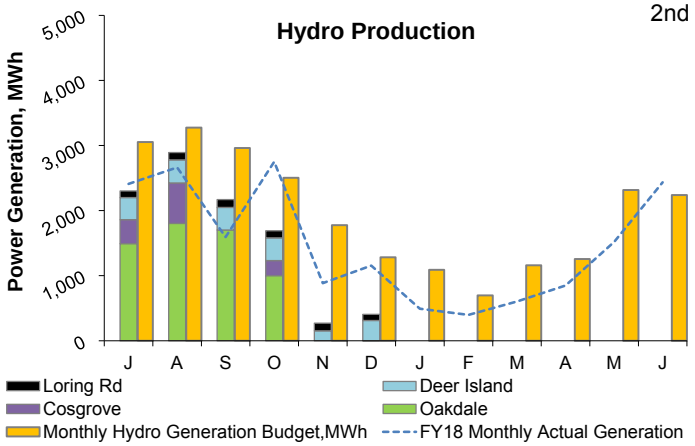
Wastewater Operators complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY19 PM goal is completion of 100% of all PM work orders assigned. Operations completed an average of 100% of PM work orders in the 2nd Quarter.



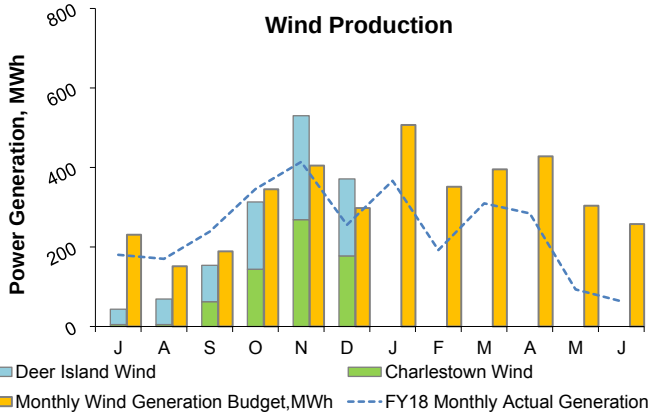
Maintenance overtime was $7k over budget for the 2nd Quarter. Overtime was used for critical maintenance repairs. Overtime for FY19 is $297k which is currently $19k over budget for the fiscal year.

Renewable Electricity Generation: Savings and Revenue

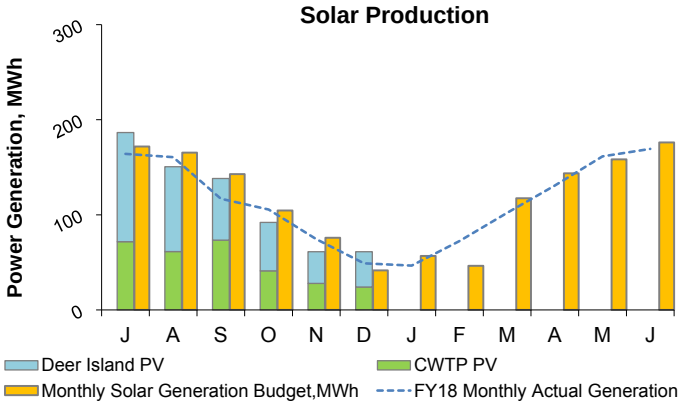
2nd Quarter - FY19



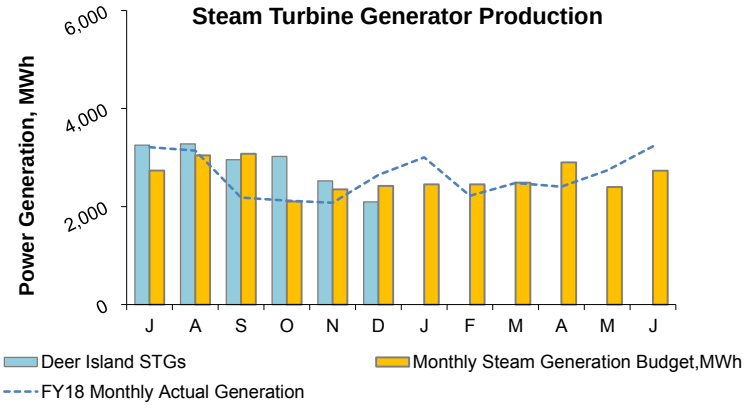
In the 2nd Quarter, the renewable energy produced from all hydro turbines totaled 2,369 MWh; 52% below budget[3] primarily due to Cosgrove generation values having been underestimated by the utility company and Oakdale being offline. The utility data for Cosgrove is typically corrected and reconciled in later months of the year. The total energy produced to date in FY19 is 9,732 MWh; 27% below budget[3]. The total savings and revenue[2] to date in FY19 (actuals through September[1]) is $340,009; 16% below budget[3], due to the reasons stated above. The savings and revenue value does not include RPS REC revenue (see next page).



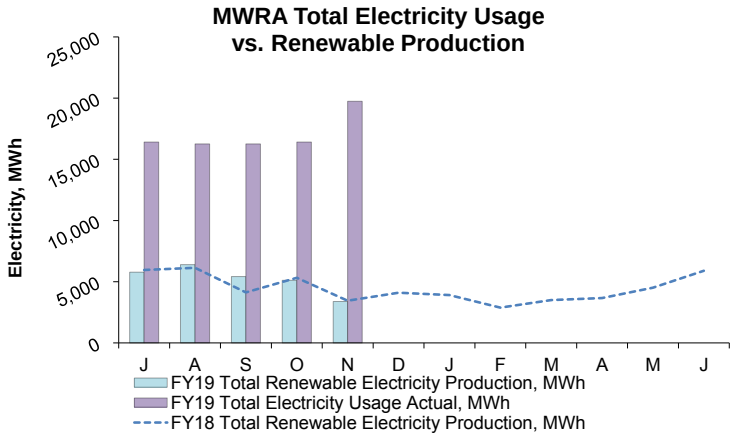
In the 2nd Quarter, the renewable energy produced from all wind turbines totaled 1,215 MWh; 14% above budget[3]. The total energy produced to date in FY19 is 1,482 MWh; 11% below budget[3], mostly due to Charlestown Wind generation values being underestimated by the utility company. The total savings and revenue[2] to date in FY19 (actuals through September[1]) is $33,842; 60% below budget[3], due to the reasons stated above. The savings and revenue value does not include RPS REC revenue (see next page).

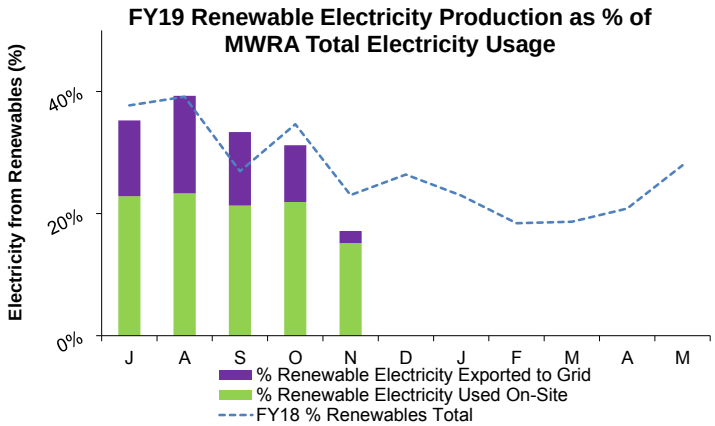


In the 2nd Quarter, the renewable energy produced from all solar PV systems totaled 214 MWh; 3 below budget[3]. The total energy produced to date in FY19 is 690 MWh; 2% below budget[3]. The total savings and revenue[2] to date in FY19 (actuals through September[1]) is $60,410; 5% above budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).



In the 2nd Quarter, the renewable energy produced from all steam turbine generators totaled 7,642 MWh; 44% above budget[3]. The total energy produced to date in FY19 is 17,129 MWh; 21% above budget[3]. The total savings and revenue[2] to date in FY19 (actuals through September[1]) is $842,589; 13% above budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).



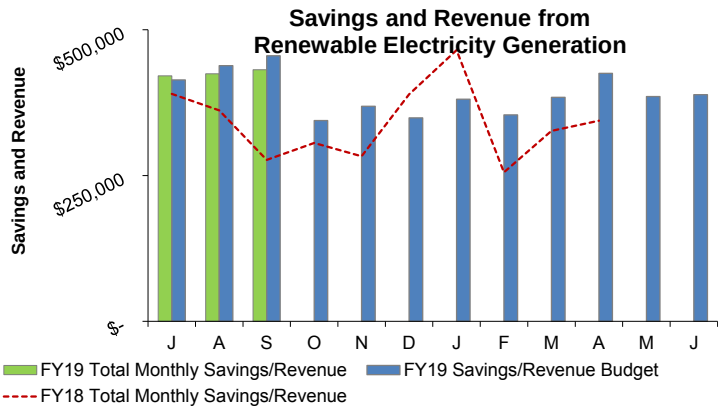


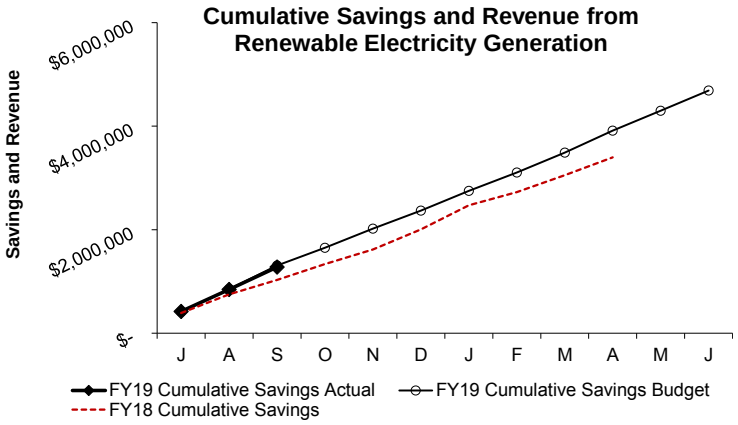
In the first 5 months of FY19, MWRA's electricity generation by renewable resources totaled 26,098 MWh. MWRA's total electricity usage was approximately 85,083 MWh. The MWRA total electricity usage is the sum of all electricity purchased for Deer Island and FOD plus electricity produced and used on-site at these facilities. Approximately 99% of FOD electrical accounts are accounted for by actual billing statements; minor accounts that are not tracked on a monthly basis such as meters and cathodic protection systems are estimated based on this year's budget.
In the first 5 months of FY19, green power generation represented approximately 31% of total electricity usage. All renewable electricity generated on DI is used on-site (this accounts for more than 50% of MWRA renewable generation). Almost all renewable electricity generated off-DI is exported to the grid.

Notes:
1. Only the actual energy prices are being reported. Therefore, some of the data lags up to 2 months due to timing of invoice receipt.
2. Savings and Revenue: Savings refers to any/all renewable energy produced that is used on-site therefore saving the cost of purchasing that electricity, and revenue refers to any value of renewable energy produced that is sold to the grid.
3. Budget values are based on historical averages for each facility and include operational impacts due to maintenance work.

Renewable Electricity Generation: Savings and Revenue

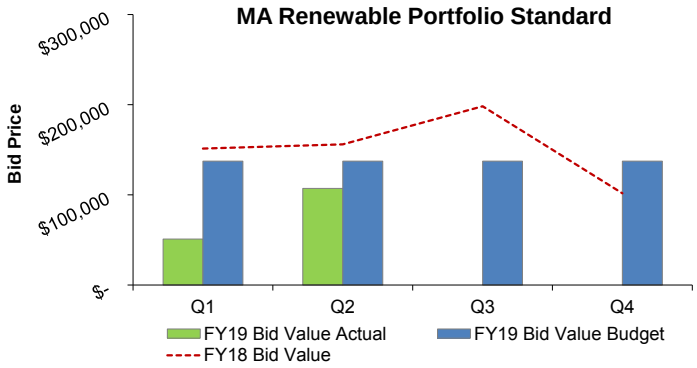
2nd Quarter - FY19

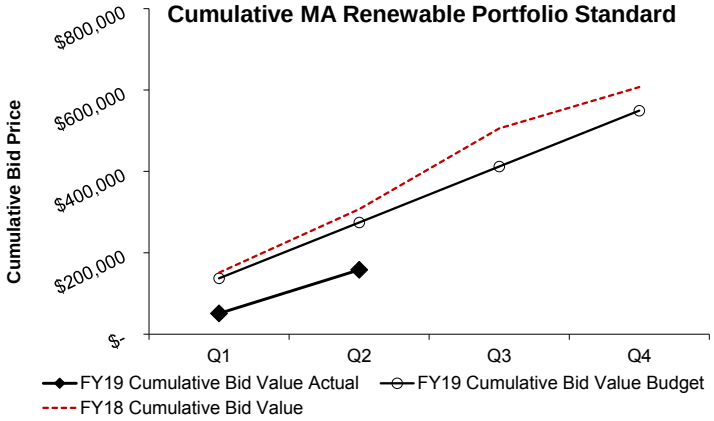




Savings and revenue from MWRA renewable electricity generation in the first 3 months of FY19 (actuals only through September[1]) is $1,276,850; which is 1% below the budget[3].

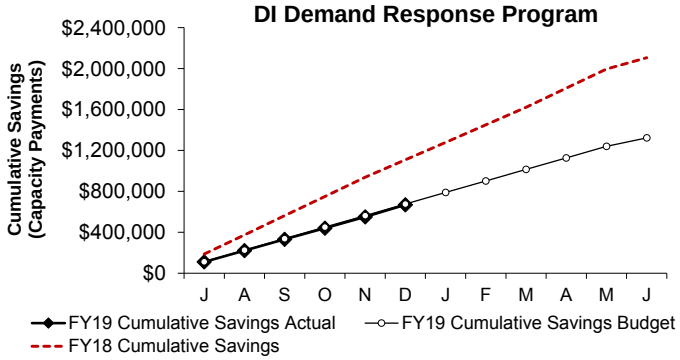
Savings and revenue[2] from all renewable energy sources include wind turbines, hydroelectric generators, solar panels, and steam turbines (DI). This includes savings and revenue due to electricity generation (does not include avoided fuel costs and RPS RECs).
The use of DITP digester gas as a fuel source provides the benefit of both electricity generation from the steam turbine generators, and provides thermal value for heating the plant, equivalent to approximately 5 million gallons of fuel oil per year (not included in charts above).

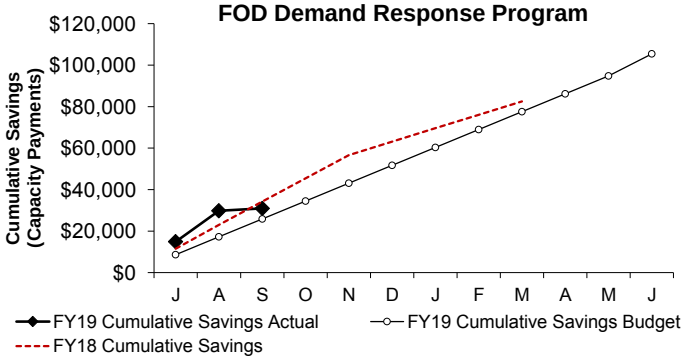




Bids were awarded during the 2nd Quarter[1] from MWRA's Class 1, Class 2, and Solar REC renewable energy assets; 6,672 Q2 CY2018 Class I Renewable Energy Certificates (RECs), 2,000 Q2 CY2018 Class 2 RECs, and 97 Q2 CY2018 Solar RECs (SRECs) were sold for a total value of $107,155 RPS revenue; which is 22% below budget[3] for the Quarter. This is mainly due to Class I market prices being 71% below budget for the Quarter.

REC values reflect the bid value on the date that bids are accepted. Cumulative bid values reflects the total value of bids received to date.



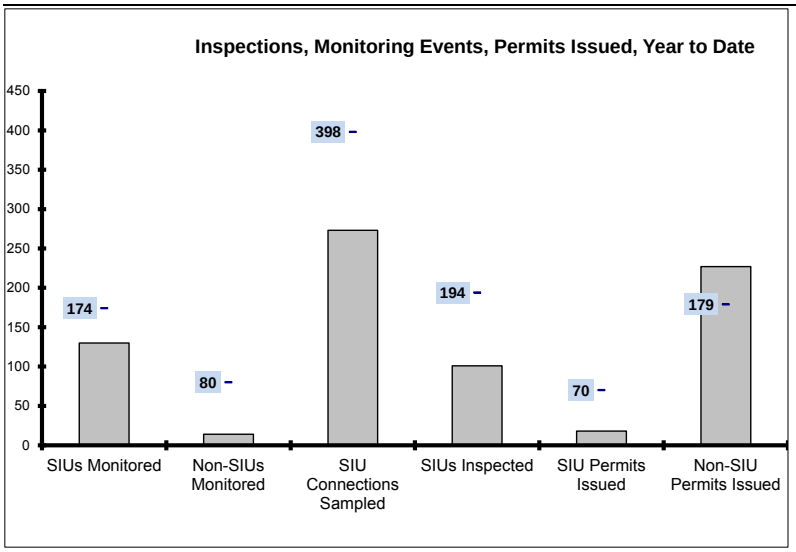


Currently Deer Island, JCWTP, and Loring Rd participate in the ISO-New England Demand Response Programs[4]. By agreeing to reduce demand and operate the facility generators to help reduce the ISO New England grid demand during periods of high energy demand, MWRA receives monthly Capacity Payments from ISO-NE. When MWRA operates the generators during an ISO-NE called event, MWRA also receives energy payments from ISO-NE.
FY19 Cumulative savings (Capacity Payments only) total $668,783 for Deer Island through December and $30,947 for FOD through September[1].

Notes:
1. Only the actual energy prices are being reported. Therefore, some of the data lags up to 2 months due to timing of invoice receipt.
2. Savings and Revenue: Savings refers to any/all renewable energy produced that is used on-site therefore saving the cost of purchasing that electricity, and revenue refers to any value of renewable energy produced that is sold to the grid.
3. Budget values are based on historical averages for each facility and include operational impacts due to maintenance work.
4. Chelsea Creek, Columbus Park, Ward St., and Nut Island participated in the ISO Demand Response Program through May 2016, until an emissions related EPA regulatory change resulted in the disqualification of these emergency generators, beginning June 2016. MWRA is investigating the cost-benefit of emissions upgrades for future possible participation.

Toxic Reduction and Control

2nd Quarter - FY19



EPA Required SIU Monitoring Events
for FY19: 174
YTD : **130**

Required Non-SIU Monitoring Events
for FY19: 80
YTD : **14**

SIU Connections to be Sampled
For FY19: 398
YTD: **273**

EPA Required SIU Inspections
for FY19: 194
YTD: **101**

SIU Permits due to Expire
In FY19: 70
YTD: **18**

Non-SIU Permits due to Expire
for FY19: 179
YTD: **227**

Significant Industrial Users (SIUs) are MWRA's highest priority industries due to their flow, type of industry, and/or their potential to violate limits. SIUs are defined by EPA and require a greater amount of oversight. EPA requires that all SIUs *with flow* be monitored at least once during the fiscal year. The "SIU Monitored" data above, reflects the number of industries monitored in the month. However, many of these industries have more than one sampling point and the "SIU Connections Sampled" data reflect samples taken from multiple sampling locations at these industries.

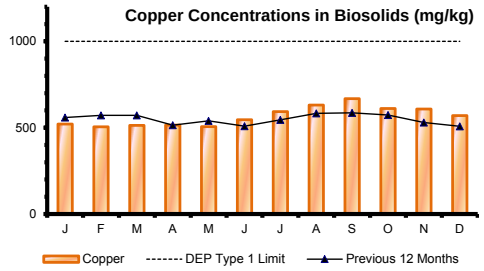
TRAC has completed over half of its EPA required SIU monitoring events and connections and SIU inspections halfway through FY19. Eighteen percent of the required non-SIU monitoring events have completed; it is anticipated that the remaining 76 events will be completed before the end of the fiscal year.

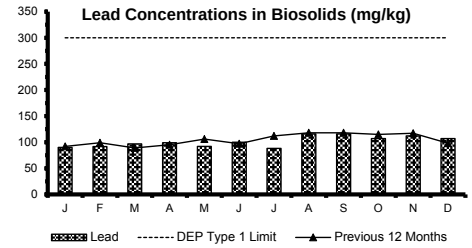
TRAC's annual monitoring and inspection goals are set at the beginning of each fiscal year but they can fluctuate due to the actual number of SIUs. Monitoring of SIUs and Non-SIUs is dynamic for several reasons including: newly permitted facilities, sample site changes within the year requiring a permit change, non-discharging industries, a partial sample event is counted as an event even though not enough sample was taken due to the discharge rate at the time, increased inspections leading to permit category changes requiring additional monitoring events.

TRAC also monitors one-third of the non-SIUs each year. SIU and Non-SIU permits are issued with durations of two to five years, depending on the category of industry, varying the number of permits that expire in a given year.

Number of Days to Issue a Permit

	0 to 120		121 to 180		181 or more		Permits Issued	
	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU
Jul	1	11	0	1	1	3	2	15
Aug	2	122	1	1	0	2	3	125
Sep	2	14	0	2	1	5	3	21
Oct	3	16	0	7	0	14	3	37
Nov	2	10	0	2	0	7	2	19
Dec	5	4	0	4	0	2	5	10
Jan								
Feb								
Mar								
Apr								
May								
Jun								
% YTD	83%	78%	6%	7%	11%	15%	18	227





In the 2nd Quarter of FY19, 76 permits were issued, 10 of which were SIUs. All ten of the SIU permits were issued within 120 days. EPA requires MWRA to issue or renew 90% of SIU permits within 120 days of receipt of the application or the permit expiration date - whichever is later. EPA also requires the remaining 10% of SIU permits to be issued within 180 days. TRAC anticipates that it will both meet its target for SIU permit issuance and that the remaining SIU permits issued will be ready for issuance with the 120 day timeframe.

During the second quarter, 53% of all permits were issued in the 120 day timeframe, 17% in the 120-180 days timeframe, and the remaining 30% in the 180 plus days timeframe. Personnel turnover, dating back to early FY18, continued to impact permit issuance into the second quarter of FY19. Those workflow issues have been addressed; any future permit issuances exceeding 180 days should be attributable to circumstances out of the control of TRAC, such as: waiting for data from an industry, approval from the municipality in which the industry was operating or intended to operate, or the late payment of a permit fee.

No SIU permits for the Clinton Sewerage Service area were issued during the second quarter of this fiscal year.

Although TRAC has only issued 18 SIU permits to date (26% of fiscal year goal), it is anticipated that TRAC will meet this goal. Timing of permit renewal issuance is dependent upon permit expiration dates which are not spaced evenly throughout the year.

Copper, lead, and molybdenum are metals of concern for MWRA as their concentrations in its biosolids have, at times, exceeded regulatory standards for unrestricted use as fertilizer.

Copper and lead levels remain relatively constant, below the DEP Type 1 Limit, and within the range of values over the past several years. A discussion of molybdenum concentrations in biosolids is included in the Deer Island Residuals Pellet discussion.

Field Operations Highlights
2nd Quarter – FY19

Western Water Operations and Maintenance

Carroll Water Treatment: Staff continued to support the Wachusett Aqueduct Pump Station. Operations Engineering and Environmental Quality staff provided assistance with the startup, checkout and commissioning of the control system, as well as water quality testing during pump testing. Worked with USGS to measure test flows discharged to Sudbury Reservoir. Pump Station testing is completed.

Grounds and Aqueducts Maintenance: Staff completed the annual cutting of the easements including the Mass Endangered Species Act zone areas that cannot be cleared until December.

Winsor Power Station: Staff coordinated with the power supplier to change the supply power from a nonstandard 2,200-volt service to a standard 2,400-volt service. This resulted in being able to remove the station transformer that will remove over 500 gallons of oil storage.

Metro Water Operations and Maintenance

Water Pipeline Program: Six blow off retrofit projects were completed and ten leaks were repaired during the quarter. Work also began on the repair of a leak on Deer Island at the Centrifuge Building.

Chestnut Hill Pump Station Operation: The Pump Station was successfully operated during October. Valves were realigned to supply the station from the reservoir and returned to normal position after station operation.

Operations Engineering

Staff continued support to major capital and in-house projects, reviewing contracts, submittals and detail and record drawings. Staff coordinated all necessary water main isolations and ensuring all communities were supplied with the flow and pressures they require. Staff ensured that Operation's needs are met by the contract design and construction.

Staff supported the isolations and activations including obtaining street opening permits, coordinating with the affected communities, and developing the isolation and activation operation plans. Four blow-offs retrofitted in Boston, Everett, and Malden; six leak repairs in Boston and Waltham; and three, 24-inch gate valves replaced in Malden and one, 20-inch gate valve replaced in Revere.

Community Emergency Response Training Program: Emergency response training is required by DEP, and is being provided by MWRA expert staff for staff from the communities and MWRA.

Community Water Quality Meetings: Staff from Op. Eng., Planning and Water Quality Assurance meet with community staff to discuss current DEP policies, water quality, hydraulics, lead and MWRA loan programs. This month's meeting was with Marblehead.

Wastewater Operations & Maintenance

Operations Staff attended a Wastewater Facility Set Point Review Meeting with SCADA Staff and Process Control Staff to review the operational and alarm set points at all wastewater facilities; continued to work with Process Control Staff to develop "simple" SOPs for Wastewater Operators; and met with Permitting Staff and the Training Consultant (Geosphere) to review and provide feedback for the next round of required Spill Prevention, Control, and Countermeasure (SPCC) Training this Spring.

Metro Equipment and Facility Maintenance

- MWRA Electricians provided electrical support to an outside vendor replacing the Newton Street Pump Station boiler fuel tank; working with an outside contractor, conducted infrared testing at Houghs Neck, Gillis Pump Station and Spot Pond Pump Station; working with a Manufacturer's Technician and MWRA Mechanics replaced the Variable Frequency Drive for IPS Pump #3; upgraded Shaft 9A with a new electrical service; and installed switchgear to receive emergency power as needed and the replaced explosion proof heaters Houghs Neck pump station. MWRA HVAC Technicians replaced the split A/C Unit for the MIS Training Center. MWRA Mechanics conducted equipment vibration monitoring at the Quincy Pump Station, Nut Island Headworks and IPS. MWRA Plumbers completed backflow testing at Chelsea Headworks, Chelsea Screen House, Cottage Farm CSO, North Dorchester Bay, Newton Street Pump Station and Spring Street Pump Station; winterized the dog fountains at Hingham Pump Station, Nut Island and Columbus Park. MWRA Electricians and Plumbers installed emergency over-pressurization switches on three pumps at the Brattle Court Pump Station.
-
- **Metering**

Notified the BWSC, Newton, Swampscott, Winthrop, Watertown and Somerville of increased water use potentially from leaks, and provided assistance to Malden, Chelsea and Clinton on water loss issues.

Staff continue to work with the contractor on the wastewater meter replacement contract. Staff worked with Verizon and MIS on the wireless 4G Connectivity Project.

TRAC

Compliance and Enforcement

- TRAC issued 9 Notices of Noncompliance, 53 Notices of Violation, 1 Return to Permit Letters, 2 Rulings on Request for Reconsideration and 1 Extension Letter.

Twin Rivers Technologies Corporation (TRT) moved to voluntarily dismiss and withdraw its Claim for an Adjudicatory Proceeding, in withdrawing the claim, TRT agreed to perform the required actions specified in the Notice/Order and pay the $5,000 penalty specified in the 2014 Demand Letter to TRT from MWRA. The penalty was paid in full. TRT will install a pretreatment system to address ongoing acrolein violations at its facility.

TRAC hosted two meetings for SIUs to discuss certified operator requirements, compliance, and FY19 priorities at MWRA's Chelsea facility, with 90 attendees representing more than 57 industries.

Inspections and Permitting

TRAC issued a total of 54 MWRA 8(m) Permits allowing companies to work within an easement or other property interest held by the Authority. The total number includes 37 permits issued for work within water infrastructure easements and 17 permits issued for work within sewer infrastructure easements. Permits issued this quarter were issued in an average of 86 days from the date the application for 8(m) permit was received by the MWRA.

Staff conducted 67 Annual SIU Inspections, 2 Industrial Surveys, and 274 other inspections. Other inspections include inspections for enforcement, permit renewal, NonSIU, follow-up, temporary construction dewatering sites, group/combined permit audits, out-of-business facility, and survey.

TRAC monitored the septage receiving sites a total of 33 times. Staff conducted 119 inspections of existing gasoline/oil separators, 28 new construction gasoline/oil separators and 2 septage hauler permit related inspections.

76 MWRA Sewer Use Discharge Permits (Permits) were issued and/or renewed to its sewer users.

Monitoring

TRAC completed 315-SIU monitoring events, 16-NSIU monitoring events and 480 other events including Local Limits Sampling, Clinton NPDES Sampling, Municipal Sulfide and Sulfide Project Sampling, Cosgrove and Oakdale NPDES Sampling, Carroll Water Treatment Plant Half Plant Maintenance Sampling, Carrol Water Treatment Plant Compliance Sampling for discharge to Marlborough, CSO Hypochlorite Tank Chemical Testing, CSO Sampling, and Sudbury Aqueduct Monitoring and Emergency Response Sampling.

Other

TRAC's annual bills to sewer use discharge permit holders were issued on November 15, 2018. The amount invoiced totaled $1,999,222.

On September 28, 2018, EPA published a notice regarding its intent to approve MWRA's proposed modifications to the Clinton Local Limits. These modifications were approved on November 6, 2018. The modifications included the integration of chemicals previously regulated on a facility-by-facility basis into the Total Toxic Organics (TTO) List. A limit of 9 mg/L was established for formaldehyde, and the limit for fats, oils, and grease (FOG) was increased from 100 mg/L to 300 mg/L. The formaldehyde and FOG limits are now consistent across the entire Authority Sewerage Service Area. These changes will be incorporated into MWRA's Sewer Use Regulations in Calendar Year 2019.

Environmental Quality-Water

Regulatory and Non-Regulatory Sampling Programs:

- Staff collected Unregulated Contaminant Monitoring Rule (UCMR4) Samples. This EPA program collects data for contaminants suspected to be present in drinking water, but do not have a health-based standard. Staff provided community training on sample collection, laboratory coordination, sample storage and shipping requirements as well as data reporting for those communities required to do their own sampling under this rule.

  Contaminant Monitoring System: Staff participated in an EPA Forum panel for drinking water utilities on December 5th to discuss MWRA's experience in establishing CMS alarm thresholds.
- Staff installed a UV Reactor at UMass Amherst for a research project on mitigating potential chemical spills.

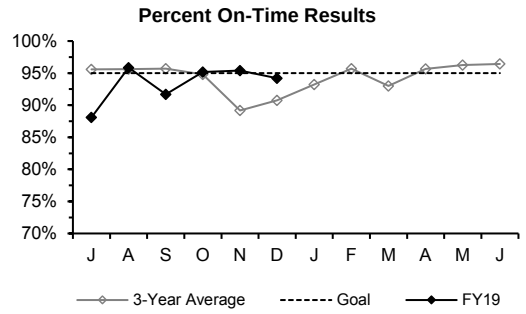
  Chemical Contract Management: Staff completed annual Water Treatment Chemical Purity Sampling, collecting a random tank truck sample from the chemical suppliers that deliver product to CWTP and BWTF.

Environmental Quality-Wastewater

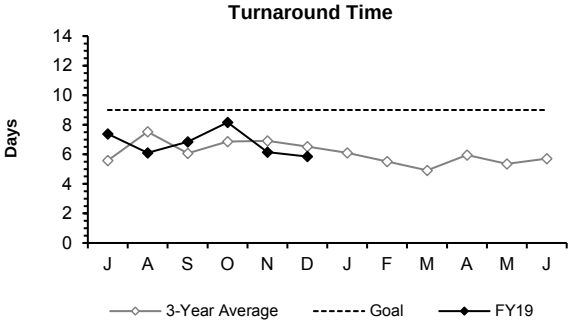
- Ambient Monitoring:
- Staff presented at an Outfall Monitoring Science Advisory Panel Workshop on in November. The meeting generated a good deal of public interest and led to a *Boston Globe* editorial and Board presentation of the role of MWRA in monitoring pharmaceuticals and personal care products in wastewater. The 2017 Outfall Monitoring Overview Report was presented to the Board and submitted to regulators. A scientific journal article detailing the recovery of flounder in Boston Harbor, was published in November resulting in substantial positive press in local and national media

- Cooperation with Other agencies: Made a presentation to the MWRA Advisory Board about the Outfall Ambient Monitoring Program. Hosted a brown bag presentation by the Charles River Conservancy and Northeastern University, and a scientific workshop for local watershed associations. Provided data to researchers at several area universities, to Save the Harbor/Save the Bay, and the Stellwagen Bank National Marine Sanctuary. Staff attended a meeting of the Boston Harbor Ecosystem Network and a NEWEA Conference on combined sewer overflows. Submitted comments on the Springfield revised draft NPDES Permit.

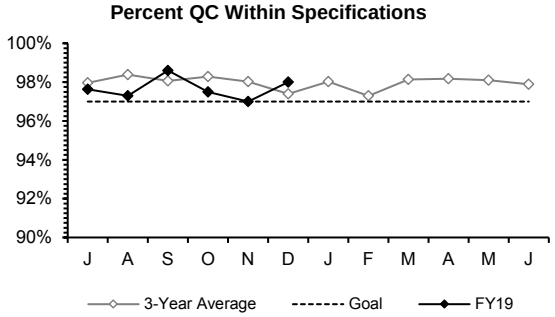
Laboratory Services
2nd Quarter - FY19



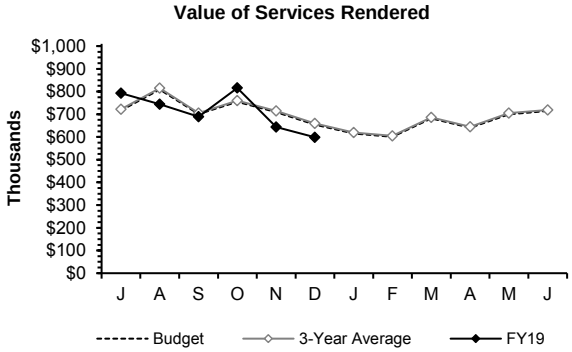
The Percent On-Time measurement was at or near the 95% goal.



Turnaround Time was faster than the 9-day goal.



Percent of QC tests meeting specifications met the 97% in-house goal.



Value of Services Rendered was below the seasonally adjusted budget projection due to staffing vacancies.

Highlights:

CSO Assessment: We continued to perform weekend CSO receiving water sampling in the Charles and Mystic Rivers during/after significant wet weather events. This is intended to give additional data for the CSO Assessment to document the recovery of the rivers after it rains.

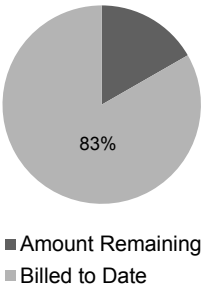
Lead Testing: Completed the annual system wide compliance sampling round.

QA: Succesfully completed the biennial MA DEP microbiology audit of the Central Laboratory with no reported deficiencies. The Central Laboratory was also audited for certification under the National Environmental Laboratory Accreditation Program. This is one part of a process required to allow our fecal coliform results for fertilizer pellets to be accepted by the state of Pennsylvania.

CONSTRUCTION PROGRAMS

Projects In Construction
2nd Quarter– FY19

Money



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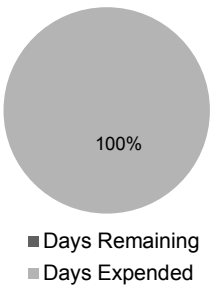


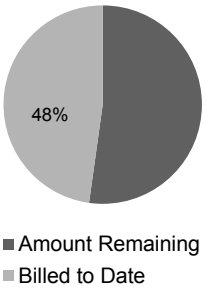
Reading Extension Sewer Rehabilitation

Project Summary: This project involves the rehabilitation of 10,820-linear feet of the Reading Extension Sewer and 2,280-linear feet of the Metropolitan Sewer and 62 associated manholes/structures.

Notice to Proceed: 10-Aug-2017 *Contract Completion:* 10-Dec-2018

Status and Issues: As of December, the Contractor installed a cured-in-place spot repair over a hole created during the liner installation. They then completed CCTV inspections of the remaining CIPPL repairs and found no additional defects. In addition, they completed all of the remaining manhole rehabilitation punchlist items.

Money



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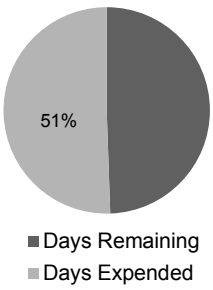


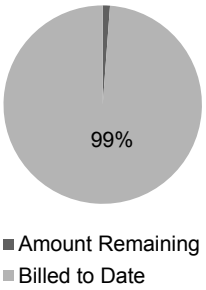
Chelsea Creek Headworks Upgrade

Project Summary: This project involves a major upgrade to the entire facility including: automation of screening collection & solids conveyance, replacement of the odor control, HVAC and electrical systems.

Notice to Proceed: 22-Nov-2016 *Contract Completion:* 21-Nov-2020

Status and Issues: As of December, the Contractor excavated and placed the concrete for the duct banks, and stripped the odor control fan foundation cantilever portion of the top slab. In addition, they cored a hole in the flat top of the butterfly valve manhole for the gate box and extension stem.

Money



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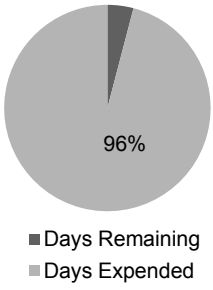


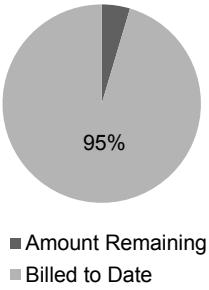
Wachusett Aqueduct Pumping Station

Project Summary: This project involves the construction of a 240 MGD pump station to supply water from the Wachusett Aqueduct to the Carroll Water Treatment Plant.

Notice to Proceed: 1-Mar-2016 *Contract Completion:* 14-Feb-2019

Status and Issues: As of December, the Contractor performed punch list work in the pump room including: sealing the floor, waterproofing the construction joints and cleaning and laminating of the windows. They also painted and labeled the plumbing pipes and performed the integrated security monitoring final testing.

Money



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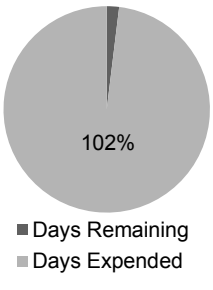


Alewife Brook Pump Station Improvements

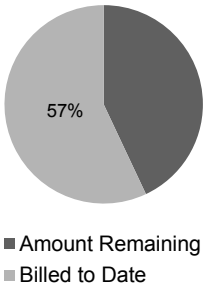
Project Summary: This project involves the replacement of wet-weather pumps, motors, gear drives, VFD's, MCC, screens, sluice gates, standby generator, roof, PLC's and HVAC. Also, the remediation of PCB's and asbestos and the installation of a flow meter on the 66-inch downstream Alewife Brook Conduit.

Notice to Proceed: 29-Jan-2016 *Contract Completion:* 14-Dec-2018

Status and Issues: As of December, the Contractor continued checkout, testing and start-up of the equipment and devices throughout the station including instrumentation. They also performed additional vibration testing on the three wastewater pumps and motors.

Projects In Construction
2nd Quarter– FY19

Money



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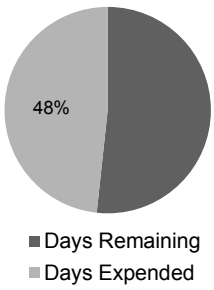


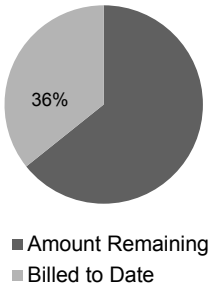
NIH Section 110 - Stoneham

Project Summary: This project consists of the replacement of 14,000 linear feet of 48-inch diameter transmission main in the Town of Stoneham.

Notice to Proceed: 5-Sep-2017 *Contract Completion:* 1-Jun-2020

Status and Issues: As of December, the Contractor installed 430-LF of 48" DIP water main along Pond Street (DCR), Main Street and Warren Street; they removed 475-CY of ledge along Pond Street (DCR), and Main Street.

Money



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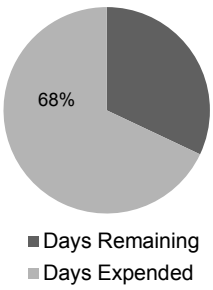


Winthrop Terminal VFD and Motor

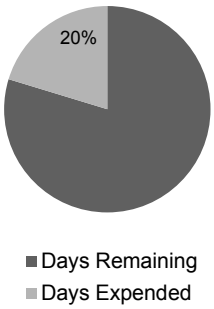
Project Summary: This project involves the replacement of 6, 600-HP motors, VFDs and associated electrical components in the Winthrop Terminal Facility.

Notice to Proceed: 16-Jun-2016 *Contract Completion:* 12-Mar-2020

Status and Issues: VFD/Motor No. 2 installation is on-going.

Money

Time



Gravity Thickener Rehabilitation

Project Summary: This project involves the upgrade of all six gravity thickeners, including the complete replacement of each tank's sludge and scum thickening equipment and 5 of the 6 FRP dome covers.

Notice to Proceed: 11-May-2018 *Contract Completion:* 4-Feb-2021

Status and Issues: As of December, the Contractor resurfaced and coated GT #1's tank walls and launders. They shop tested the control panel and drive, as well as the thickener mechanism.

CSO CONTROL PROGRAM

2nd Quarter – FY19

All 35 projects in the Long-Term CSO Control Plan are complete, in compliance with Schedule Seven. Of the $910.1 million budget in the FY19 CIP for the CSO Control Program, approximately $7 million remain to be spent through 2021.

Project/Item	Status as of December 31, 2018
BWSC Dorchester Interceptor Inflow Removal	MWRA's CIP and the MOU/FAA with BWSC included $5.4 million for additional inflow removal from the BWSC Dorchester Interceptor system in the South Dorchester Bay Sewer Separation area, of which $1.7 million was transferred to the BWSC MOU/FAA CSO account and $1.6 million of that was withdrawn by BWSC to fund related design and construction work. On May 17, 2017, MWRA's Board of Directors authorized removing the remaining $3.8 million from the BWSC MOU/FAA (which ended on June 30, 2017) and including this funding amount in a separate, 4-year financial assistance agreement with BWSC effective July 1, 2017. The new agreement limits MWRA financial assistance to reimbursement of the eligible costs of BWSC construction work reviewed and approved by MWRA, up to $3.8 million. BWSC continues to perform sewer system evaluations that will support its construction project recommendations.
City of Cambridge Memorandum of Understanding and Financial Assistance Agreement	The City of Cambridge attained substantial completion of its last project, CAM004 Sewer Separation, in December 2015 in compliance with Schedule Seven, and attained substantial completion of related surface restoration work by the end of 2017. MWRA made a final transfer of funds to the Cambridge CSO account in December 2017, in the amount of $1,254,551, to cover eligible costs through June 30, 2018, when the 22 year-old, $100.2 million MOU/FAA ended. Cambridge continues to support ongoing MWRA final eligibility reviews and final reconciliation of the MOU/FAA costs scheduled for completion in Q3FY19.
MWRA CSO Performance Assessment	MWRA issued the Notice to Proceed with the contract for CSO Post-Construction Monitoring and Performance Assessment to AECOM Technical Services, Inc., in November 2017. The contract includes CSO inspections, overflow metering, hydraulic modeling, system performance assessments and water quality compliance assessments culminating in the submission of a report verifying attainment of court-ordered levels of CSO control to EPA and DEP in December 2020, in compliance with the last milestone in Schedule Seven. MWRA issued the first of five planned progress reports on November 30, 2018. It covers the analysis of rainfall and CSO meter data collected in the period April 15 through June 30, 2018. The remaining progress reports will cover subsequent six-month data collection periods, as well as describe hydraulic model related activities. AECOM has begun the recalibration and verification of MWRA's hydraulic model using the recent CSO and sewer system data. Model recalibration and verification will bring the meter results and model predictions closer together to gain assurance of the accuracy of the model in predicting CSO discharges and verifying attainment of the Long Term Control Plan's typical year levels of CSO control. MWRA staff and AECOM are also conducting investigations at several outfalls where metered CSO discharges differ from historical model predictions. MWRA staff also continue to collect water quality data in CSO affected waters for eventual analysis by AECOM relative to compliance with water quality standards.

CIP Expenditures
2nd Quarter – FY19

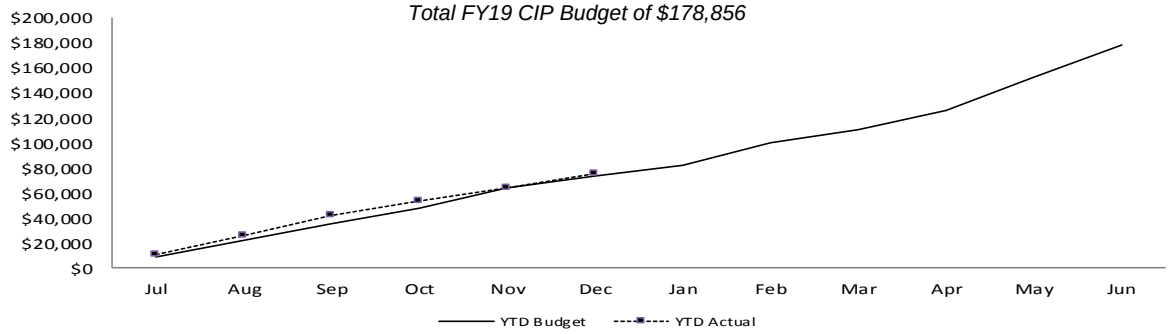
FY19 Capital Improvement Program Expenditure Variances through December by Program ($ in thousands)				
Program	FY19 Budget Through December	FY19 Actual Through December	Variance Amount	Variance Percent
Wastewater	39,506	33,139	(6,367)	-16%
Waterworks	32,121	40,969	8,848	28%
Business and Operations Support	2,418	1,416	(1,001)	-41%
Total	$74,045	$75,524	$1,479	2%

Project underspending within Wastewater was due to delays in Channel 1 work and odor control equipment delivery for the Chelsea Creek Headworks Upgrade Construction, delay in city of Somerville construction award for the Somerville Marginal In-System Storage, motor commission testing problem for the Winthrop Terminal Facility Variable Frequency Drives Replacements, timing of final work for the Alewife Brook Pump Station, delay in the notice to proceed for the Clinton Roofing Rehab, and delay in completion of design documents for the NI Odor Control & HVAC Design/ESDC/REI contract. This was partially offset by greater than anticipated community requests for grants and loans, progress on Deer Island Gravity Thickener Rehabilitation, and FY18 work completed in FY19 for the Reading Extension Sewer and Prison Point Piping Rehabilitation contracts. Project overspending in Waterworks was due to greater than anticipated requests for community loans, progress for the Northern Intermediate High Section 89 & 29 construction Phases 2 and 1C, Section 89 & 29 Replacement Design, Southern Extra High Section 111 Construction 2, Wachusett Aqueduct Pump Station, timing of Watershed Land purchases, and scheduled FY18 work invoiced in FY19 for the Rosemary Brook Building Repair. This was partially offset by SEH Section 111 Construction 3 delay in notice-to-proceed, Bellevue 2 and Turkey Hill Painting/Improvements contract being awarded less than budget and behind schedule due to additional structural repairs, schedule delay for the Maintenance Building/Garage Washbay/Storage Building contract, delay in CP3 Sections 23, 24, 47 Design/CA/RI due to utility relocations, and delay in test pit work for WASM 3 MEPA Design.

Budget vs. Actual CIP Expenditures

($ in thousands)

Total FY19 CIP Budget of $178,856



Construction Fund Management

All payments to support the capital program are made from the Construction Fund. Sources of fund in-flows include bond proceeds, commercial paper, SRF reimbursements, loan repayments by municipalities, and current revenue. Accurate estimates of cash withdrawals and grant payments (both of which are derived from CIP spending projections) facilitate planning for future borrowings and maintaining an appropriate construction fund balance.

Cash Balance as of 12/29/2018	$48.2 million
Unused capacity under the debt cap:	$1.52 billion
Estimated date for exhausting construction fund without new borrowing:	MAY-19
Estimated date for debt cap increase to support new borrowing:	Not anticipated at this time
Commercial paper/Revolving loan outstanding: Commercial paper capacity / Revolving Loan	$128 million $350 million
Budgeted FY19 capital spending*:	$188 million

* Cash based spending is discounted for construction retainage.

DRINKING WATER QUALITY AND SUPPLY

Source Water – Microbial Results and UV Absorbance

2nd Quarter – FY19

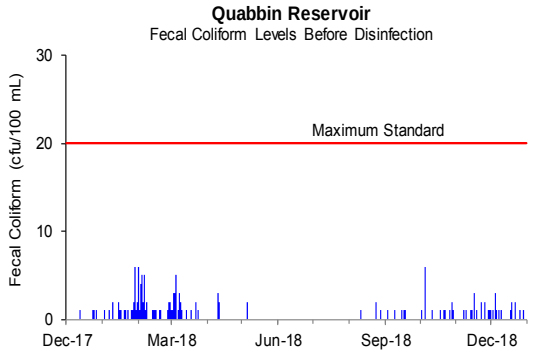
Source Water – Microbial Results

Total coliform bacteria are monitored in both source and treated water to provide an indication of overall bacteriological activity. Most coliforms are harmless. However, fecal coliform, a subclass of the coliform group, are identified by their growth at temperatures comparable to those in the intestinal tract of mammals. They act as indicators of possible fecal contamination. The Surface Water Treatment Rule for unfiltered water supplies allows for no more than 10% of source water samples prior to disinfection over any six-month period to have more than 20 fecal coliforms per 100mL.

Sample Site: Quabbin Reservoir

Quabbin Reservoir water is sampled at the William A. Brutsch Water Treatment Facility raw water tap before being treated and entering the CVA system.

All samples collected during the 2nd Quarter were below 20 cfu/100ml. **For the current six-month period, 0.0% of the samples have exceeded a count of 20 cfu/100mL.**

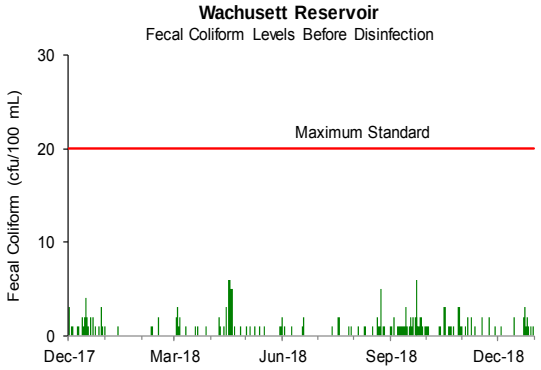


Sample Site: Wachusett Reservoir

Wachusett Reservoir water is sampled at the CWTP raw water tap in Marlborough before being treated and entering the MetroWest/Metropolitan Boston systems.

In the wintertime when smaller water bodies near Wachusett Reservoir freeze up, many waterfowl will roost in the main body of the reservoir - which freezes later. This increased bird activity tends to increase fecal coliform counts. DCR has an active bird harassment program to move the birds away from the intake area.

All samples collected during the 2nd Quarter were below 20 cfu/100ml. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL.**

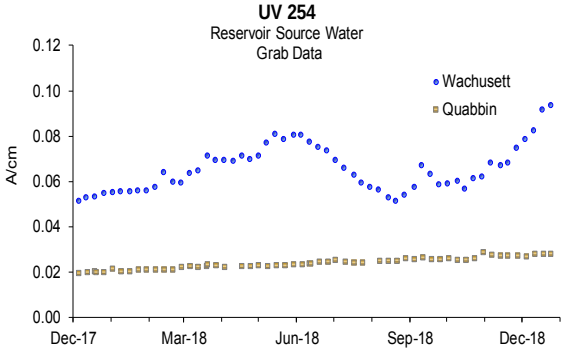


Source Water – UV Absorbance

UV Absorbance at 254nm wavelength (UV-254), is a measure of the amount and reactivity of natural organic material in source water. Higher UV-254 levels cause increased ozone and chlorine demand resulting in the need for higher ozone and chlorine doses, and can increase the level of disinfection by-products. UV-254 is impacted by tributary flows, water age, sunlight and other factors.

Quabbin Reservoir UV-254 levels are currently around 0.028 A/cm.

Wachusett Reservoir UV-254 levels are currently around 0.094 A/cm.



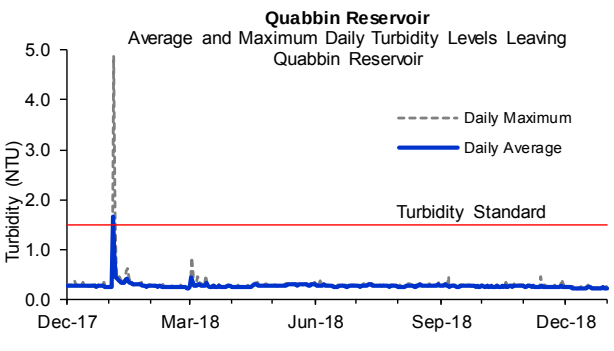
Source Water – Turbidity

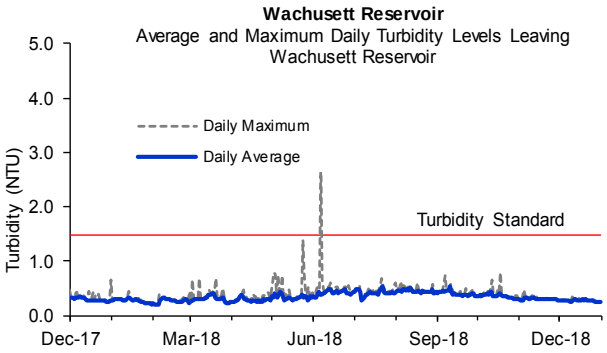
2nd Quarter – FY19

Turbidity is a measure of suspended and colloidal particles including clay, silt, organic and inorganic matter, algae and microorganisms. The effects of turbidity depend on the nature of the matter that causes the turbidity. High levels of particulate matter may have a higher disinfectant demand or may protect bacteria from disinfection effects, thereby interfering with the disinfectant residual throughout the distribution system.

There are two standards for turbidity: all water must be below five NTU (Nephelometric Turbidity Units), and water only can be above one NTU if it does not interfere with effective disinfection.

Turbidity of Quabbin Reservoir water is monitored continuously at the Brutsch Water Treatment Facility (BWTF) before UV and chlorine disinfection. Turbidity of Wachusett Reservoir is monitored continuously at the Carroll Water Treatment Plant (CWTP) before ozonation and UV disinfection. Maximum turbidity results at Quabbin and Wachusett were within DEP standards for the quarter.



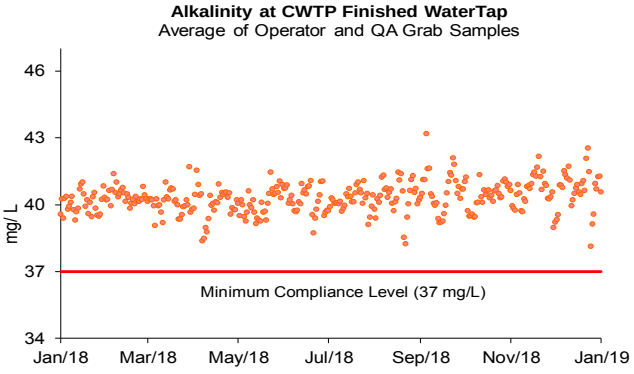


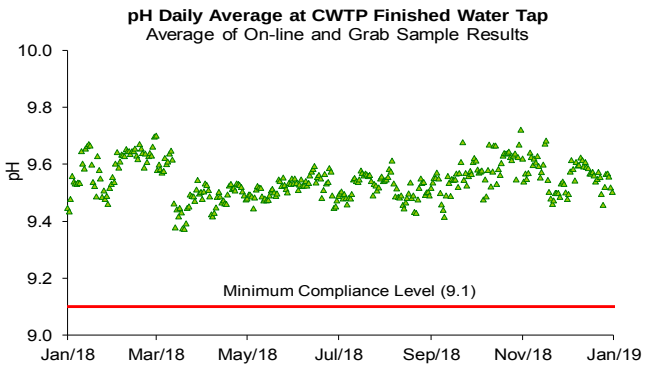
Treated Water – pH and Alkalinity Compliance

MWRA adjusts the alkalinity and pH of Wachusett water at CWTP to reduce its corrosivity, which minimizes the leaching of lead and copper from service lines and home plumbing systems into the water. MWRA tests finished water pH and alkalinity daily at the CWTP's Fin B sampling tap. MWRA's target for distribution system pH is 9.3; the target for alkalinity is 40 mg/l. Per DEP requirements, CWTP finished water samples have a minimum compliance level of 9.1 for pH and 37 mg/L for alkalinity. Samples from 27 distribution system locations have a minimum compliance level of 9.0 for pH and 37 mg/L for alkalinity. Results must not be below these levels for more than nine days in a six month period. Distribution system samples are collected in March, June, September, and December.

Each CVA community provides its own corrosion control treatment. See the CVA report: www.mwra.com/water/html/awqr.htm.

Distribution system samples were collected on December 12 and 13, 2018. Distribution system sample pH ranged from 9.3 to 9.7 and alkalinity ranged from 39 to 43 mg/L. No sample results were below DEP limits for this quarter.





Treated Water – Disinfection Effectiveness

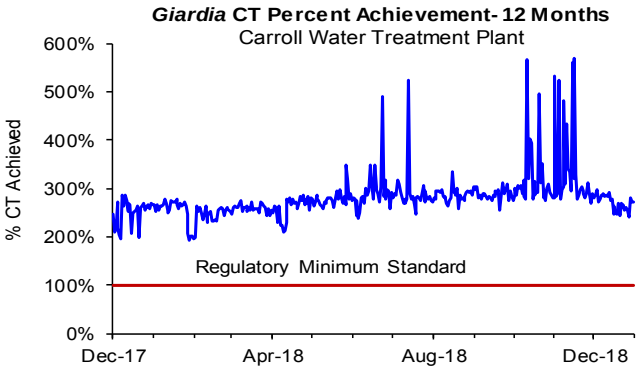
2nd Quarter – FY19

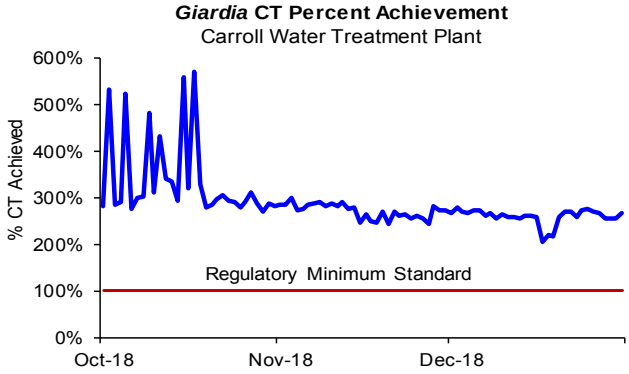
At the Carroll Water Treatment Plant (CWTP), MWRA meets the required 99.9% (3-log) inactivation of *Giardia* using ozone (reported as CT: concentration of disinfectant x contact time) and the required 99% (2-log) inactivation of *Cryptosporidium* using UV (reported as IT: intensity of UV x time). MWRA calculates inactivation rates hourly and reports *Giardia* inactivation at maximum flow and *Cryptosporidium* inactivation at minimum UV dose. MWRA must meet 100% of required CT and IT.

CT achievement for *Giardia* assures CT achievement for viruses, which have a lower CT requirement. For *Cryptosporidium*, there is also an "off-spec" requirement. Off-spec water is water that has not reached the full required UV dose or if the UV reactor is operated outside its validated ranges. No more than 5% off-spec water is allowed in a month.

Wachusett Reservoir – MetroWest/Metro Boston Supply:

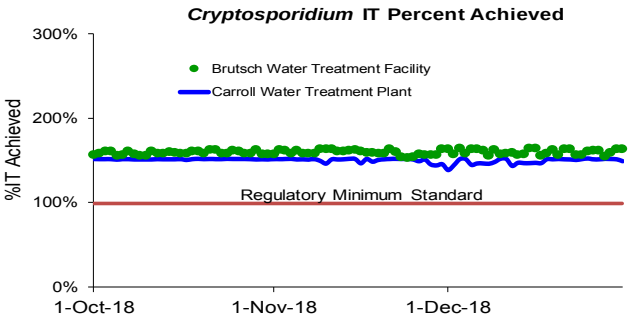
- Ozone dose at the CWTP varied between 1.8 to 2.7 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system this quarter, as well as every day for the last fiscal year.
- *Cryptosporidium* IT was maintained above 100% during the month. Off-spec water was less than 5%.
- The Wachusett Aqueduct Pump Station (WAPS) will improve redundancy in the MWRA water system. WAPS testing was performed from June through October. Prior to and during WAPS testing, CWTP proactively increase the ozone dose and "CT achievement". This is visible in the two top graphs.

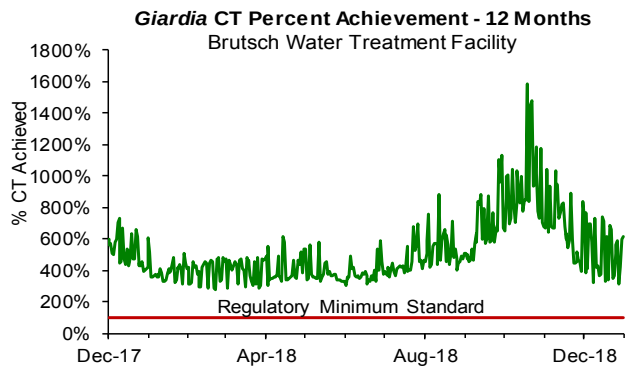


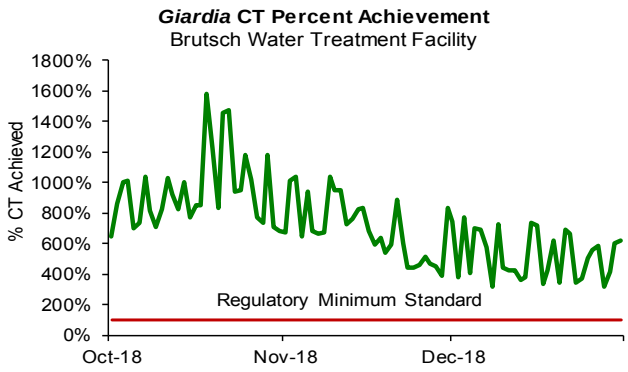


Quabbin Reservoir (CVA Supply) at: Brutsch Water Treatment Facility

- The chlorine dose at BWTF is adjusted in order to achieve MWRA's seasonal target of >0.75 mg/L (November 01 – May 31) and >1.0 mg/L (June 1– October 31) at Ludlow Monitoring Station.
- The chlorine dose at BWTF varied between 1.6 to 1.9 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system for the quarter.
- *Cryptosporidium* IT was maintained above 100% during the month. Off-spec water was less than 5%.







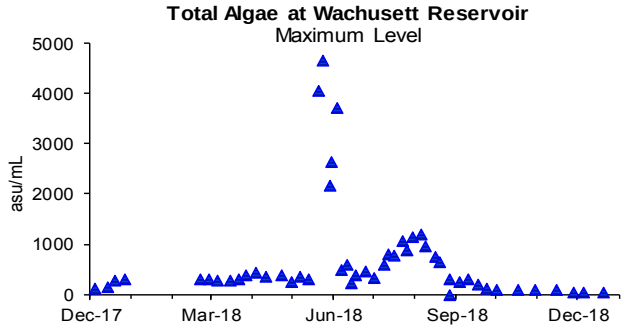
Source Water - Algae

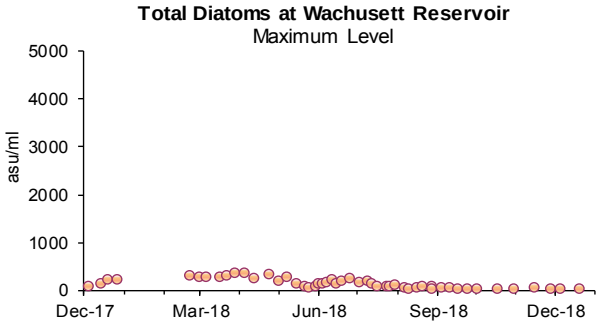
2nd Quarter – FY19

Algae levels in Wachusett Reservoir are monitored by DCR and MWRA. These results, along with taste and odor complaints, are used to make decisions on source water treatment for algae control.

Taste and odor complaints at the tap may be due to algae, which originate in source reservoirs, typically in trace amounts. Occasionally, a particular species grows rapidly, increasing its concentration in water. When *Synura*, *Anabaena*, or other nuisance algae bloom, MWRA may treat the reservoir with copper sulfate, an algaecide. During the winter and spring, diatom numbers may increase. While not a taste and odor concern, consumers that use filters may notice a more frequent need to change their filters.

In the 2nd Quarter, no complaints which may be related to algae were reported from the local water departments.



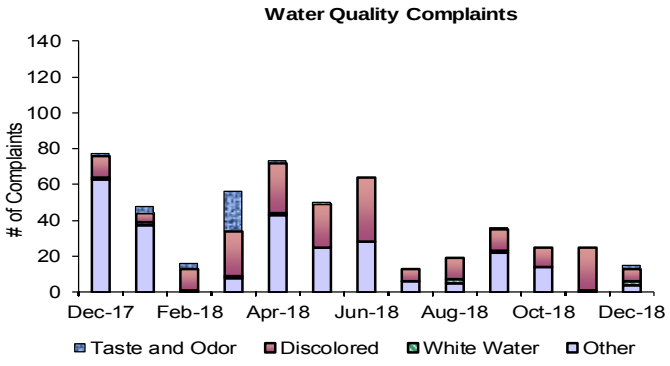


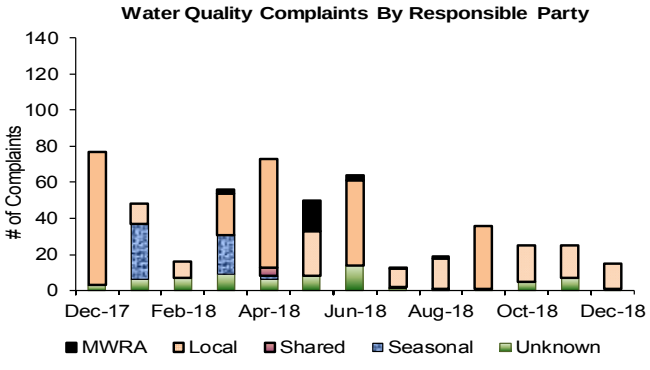
Drinking Water Quality Customer Complaints: Taste, Odor, or Appearance

MWRA collects information on water quality complaints that typically fall into four categories: 1.) discoloration due to MWRA or local pipeline work; 2.) taste and odor due to algae blooms in reservoirs or chlorine in the water; 3.) white water caused by changes in pressure or temperature that traps air bubbles in the water; or 4.) "other" complaints including no water, clogged filters or other issues.

MWRA routinely contacts communities to classify and tabulate water complaints from customers. This count, reflecting only telephone calls to towns, probably captures only a fraction of the total number of customer complaints. Field Operations staff have improved data collection and reporting by keeping track of more kinds of complaints, tracking complaints to street addresses and circulating results internally on a daily basis.

Communities reported 65 complaints during the quarter compared to 140 complaints from 2nd Quarter of FY18. Of these complaints, 42 were for "discolored water", 2 were for "taste and odor", 2 were for "white water", and 19 were for "other". Of these complaints, 52 were local community issues and 13 were unknown in origin.





Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program

2nd Quarter – FY19

While all communities collect bacteria samples and chlorine residual data for the Total Coliform Rule (TCR), data from the 44 systems that use MWRA's Laboratory are reported below.

The MWRA TCR program has 141 sampling locations. These locations include sites along MWRA's transmission system, water storage tanks and pumping stations, as well as a subset of the community TCR locations.

Samples are tested for total coliform and Escherichia coli. *E.coli* is a specific coliform species whose presence likely indicates potential contamination of fecal origin.

If *E.coli* are detected in a drinking water sample, this is considered evidence of a potential public health concern. Public notification is required if repeat tests confirm the presence of E.coli or total coliform.

Total coliform provide a general indication of the sanitary condition of a water supply. If total coliform are detected in more than 5% of samples in a month (or if more than one sample is positive when less than 40 samples are collected), the water system is required to investigate the possible source/cause with a Level 1 or 2 Assessment, and fix any identified problems.

A disinfectant residual is intended to maintain the sanitary integrity of the water; MWRA considers a residual of 0.2 mg/L a minimum target level at all points in the distribution system.

Highlights

In the 2nd Quarter, 41 of the 6,286 community samples (0.65% system-wide) submitted to MWRA labs for analysis tested positive for total coliform (Boston, Everett, Lexington, Milton, Somerville, Watertown, Bedford, Needham - October; Lexington, Malden, Stoneham, Bedford, Hanscom AFB – November; Everett, Newton, Bedford, Peabody – December). 3 of the 1,921 Shared community/MWRA samples (0.16%) tested positive for total coliform. No samples tested positive for *E.coli*. Bedford had more than one positive total coliform sample each month and was required to conduct Level 2 Assessments for each month of the quarter. In November, Hanscom AFB had more than one positive coliform sample and was required to conduct a Level 1 Assessment. Only 1.0% of the Fully Served community samples had chlorine residuals lower than 0.2 mg/L.

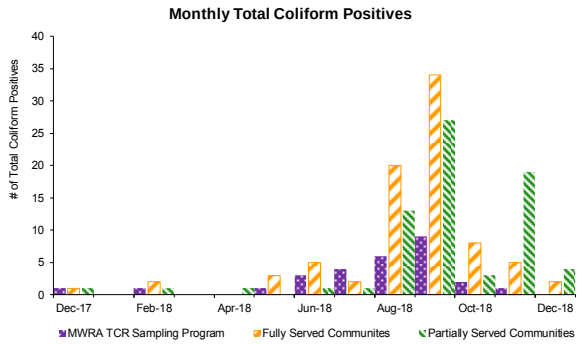
NOTES:

a) MWRA total coliform and chlorine residual results include data from community locations. In most cases these community results are indicative of MWRA water as it enters the community system; however, some are strongly influenced by local pipe conditions. Residuals in the MWRA system are typically between 1.0 and 2.8 mg/L.

b) The number of samples collected depends on the population served and the number of repeat samples required.

c) These communities are partially supplied, and may mix their chlorinated supply with MWRA chloraminated supply.

d) Part of the Chicopee Valley Aqueduct System. Free chlorine system.



			Total Coliform # Samples (b)	Total Coliform # (%) Positive	E.coli # Positive	Assessment Required
MWRA	a	MWRA Locations	333	0 (0%)	0	
	a	Shared Community/MWRA sites	1588	3 (0.19%)	0	
		Total: MWRA	1921	3 (0.16%)	0	No
Fully Served		ARLINGTON	167	0 (0%)	0	
		BELMONT	104	0 (0%)	0	
		BOSTON	796	1 (0.13%)	0	No
		BROOKLINE	223	0 (0%)	0	
		CHELSEA	169	0 (0%)	0	
		DEER ISLAND	52	0 (0%)	0	
		EVERETT	178	3 (1.69%)	0	No
		FRAMINGHAM	239	0 (0%)	0	
		LEXINGTON	128	4 (3.13%)	0	No
		LYNNFIELD	18	0 (0%)	0	
		MALDEN	258	2 (0.78%)	0	No
		MARBLEHEAD	72	0 (0%)	0	
		MEDFORD	204	0 (0%)	0	
		MELROSE	117	0 (0%)	0	
		MILTON	105	1 (0.95%)	0	No
		NAHANT	30	0 (0%)	0	
		NEWTON	279	1 (0.36%)	0	No
		NORTHBOROUGH	48	0 (0%)	0	
		NORWOOD	99	0 (0%)	0	
		QUINCY	299	0 (0%)	0	
		READING	130	0 (0%)	0	
		REVERE	180	0 (0%)	0	
		SAUGUS	104	0 (0%)	0	
		SOMERVILLE	276	1 (0.36%)	0	No
		SOUTHBOROUGH	30	0 (0%)	0	
		STONEHAM	94	1 (1.06%)	0	No
		SWAMPSCOTT	54	0 (0%)	0	
		WALTHAM	216	0 (0%)	0	
		WATERTOWN	133	1 (0.75%)	0	No
		WESTON	45	0 (0%)	0	
		WINTHROP	72	0 (0%)	0	
		Total: Fully Served	4919	15 (0.30%)		
Partially Served	c	BEDFORD	78	13 (16.67%)	0	Yes
	c	CANTON	87	0 (0%)	0	
	c	HANSCOM AFB	47	10 (21.28%)	0	Yes
	c	MARLBOROUGH	126	0 (0%)	0	
	c	NEEDHAM	126	1 (0.79%)	0	No
	c	PEABODY	214	2 (0.93%)	0	No
	c	WAKEFIELD	145	0 (0%)	0	
	c	WELLESLEY	113	0 (0%)	0	
	c	WILMINGTON	85	0 (0%)	0	
	c	WINCHESTER	91	0 (0%)	0	
	c	WOBURN	195	0 (0%)	0	
CVA	d	SOUTH HADLEY FD1	60	0 (0%)	0	
		Total: CVA & Partially Served	1367	26 (1.90%)		
		Total: Community Samples	6286	41 (0.65%)		

Chlorine Residuals in Fully Served Communities

	2017	2018											
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% <0.1	0.5	0.2	0.1	0.1	0.0	0.2	0.0	0.3	0.7	0.5	0.7	0.7	0.2
% <0.2	1.1	0.5	0.2	0.2	0.3	0.2	0.4	0.5	1.0	1.5	1.9	1.6	1.0
% <0.5	3.1	1.4	0.5	0.8	0.7	0.4	0.7	1.5	3.4	4.6	5.8	3.8	2.3
% <1.0	6.0	3.2	2.2	1.4	1.5	1.3	1.6	3.2	8.9	11.9	11.2	8.3	5.2
% ≥1.0	94.0	96.8	97.9	98.6	98.5	98.7	98.4	96.8	91.1	88.2	88.8	91.7	94.8

Treated Water Quality: Disinfection By-Product (DBP) Levels in Communities

2nd Quarter – FY19

Total Trihalomethanes (TTHMs) and Haloacetic Acids (HAA5s) are by-products of disinfection treatment with chlorine. TTHMs and HAA5s are of concern due to their potential adverse health effects at high levels. EPA's locational running annual average (LRAA) standard is 80 µg/L for TTHMs and 60 µg/L for HAA5s.

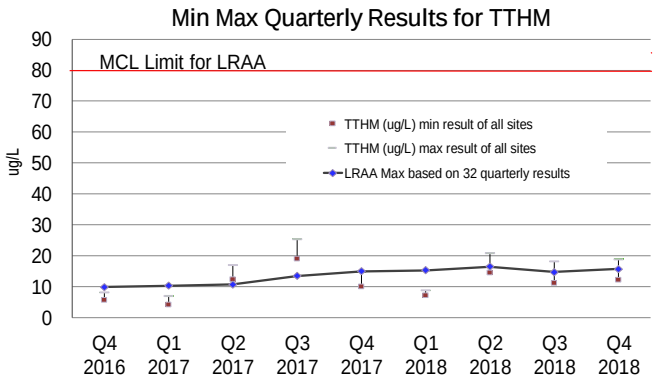
The locational running annual average at each individual sampling location must be below the standard. The charts below show the highest and lowest single values for all sites, and the LRAA of the highest location each quarter.

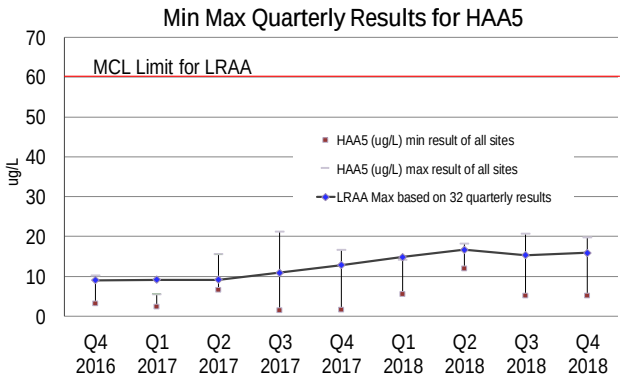
Partially served and CVA communities are responsible for their own compliance monitoring and reporting, and must be contacted directly for their individual results. The chart below combines all three CVA communities data (Chicopee, Wilbraham and South Hadley FD1).

Bromate is tested monthly per DEP requirements for water systems that treat with ozone. Bromide in the raw water may be converted into bromate following ozonation. EPA's RAA MCL standard for bromate is 10 ug/L.

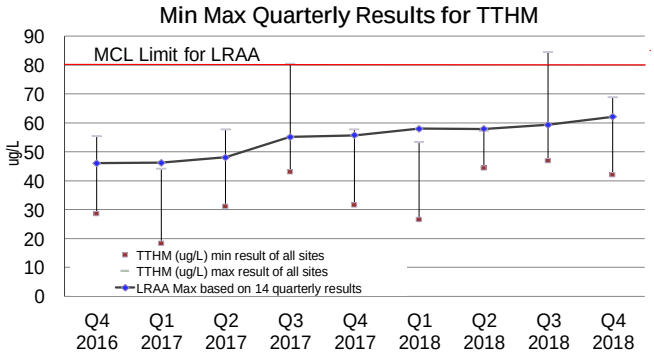
The LRAA for TTHMs and HAA5s for MWRA's Compliance Program (represented as the line in the top two graphs below) remain below current standards. The Max LRAA in the quarter for TTHMs = 15.7 ug/L; HAA5s = 15.9 ug/L. The current RAA for Bromate = 0.0 ug/L. CVA's DBP levels continue to be below current standards.

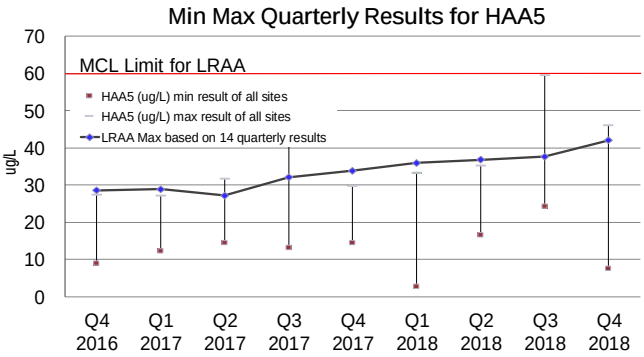
MetroBoston Disinfection By-Products





CVA Disinfection By-Products (Combined Results)





Water Supply and Source Water Management

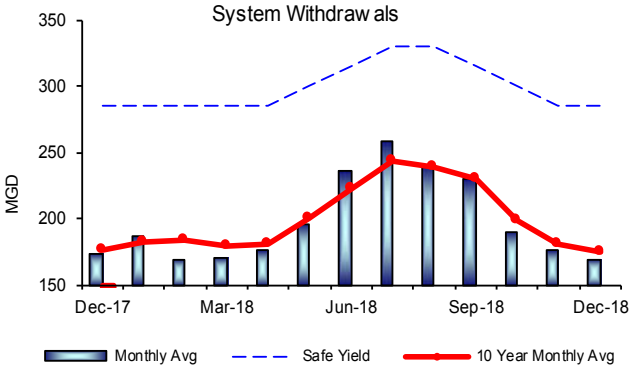
2nd Quarter – FY19

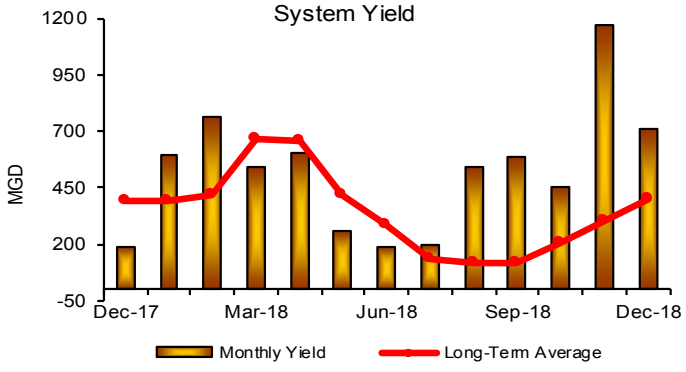
Background

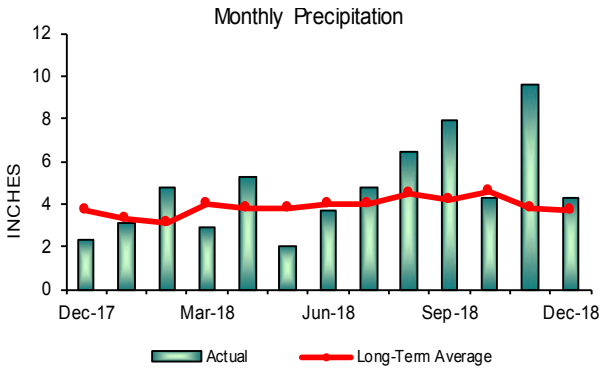
A reliable supply of water in MWRA's reservoirs depends on adequate precipitation during the year and seasonal hydrologic inputs from watersheds that surround the reservoirs. Demand for water typically increases with higher summer temperatures and then decreases as temperatures decline. Quabbin Reservoir was designed to effectively supply water to the service areas under a range of climatic conditions and has the ability to endure a range of fluctuations. Wachusett Reservoir serves as a terminal reservoir to meet the daily demands of the Greater Boston area. A key component to this reservoir's operation is the seasonal transfer of Quabbin Reservoir water to enhance water quality during high demand periods. On an annual basis, Quabbin Reservoir accounts for nearly 50% of the water supplied to Greater Boston. The water quality of both reservoirs (as well as the Ware River, which is also part of the System Safe Yield) depend upon implementation of DCR's DEP-approved Watershed Protection Plans. System Yield is defined as the water produced by its sources, and is reported as the net change in water available for water supply and operating requirements.

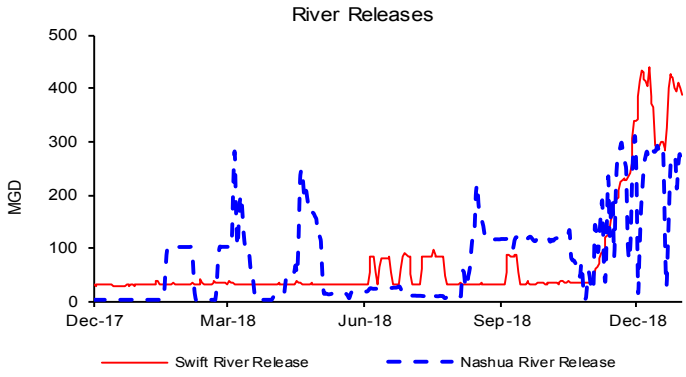
Outcome

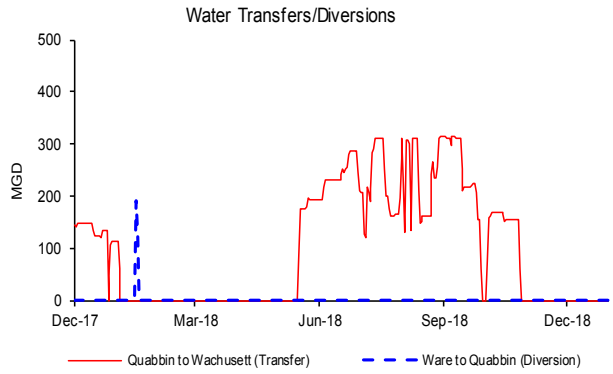
The volume of the Quabbin Reservoir was at 100.5% as of December 31, 2018; a 4.9% increase for the quarter, which represents a gain of more than 19.8 billion gallons of storage and an increase in elevation of 2.54' for the quarter. Quabbin level is in "normal" operating range. Precipitation and yield for the quarter were above their respective long term averages. System withdrawal for the quarter was below the 10 year monthly average.

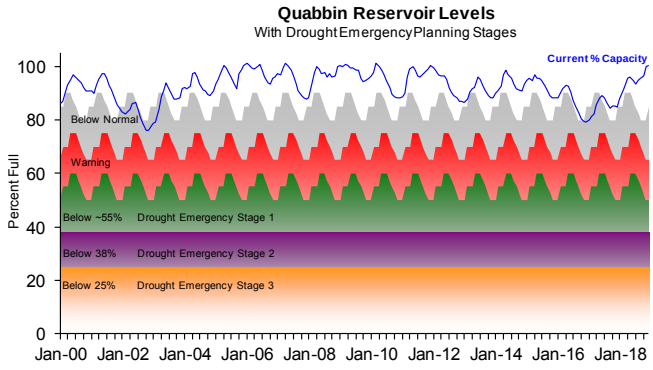












WASTEWATER QUALITY

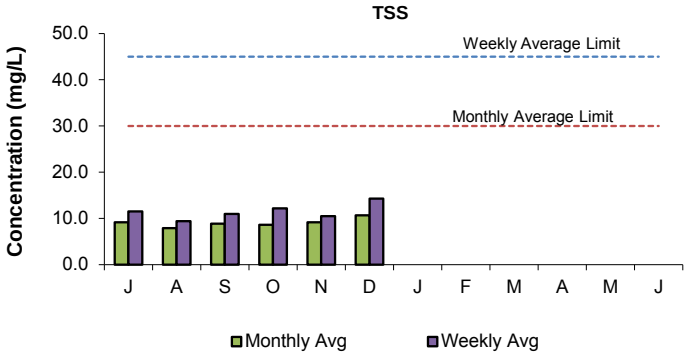
NPDES Permit Compliance: Deer Island Treatment Plant

2nd Quarter - FY19

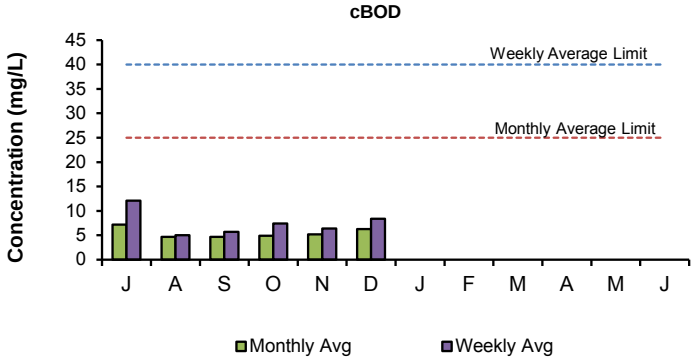
NPDES Permit Limits

Effluent Characteristics		*Units*	*Limits*	*October*	*November*	*December*	*2nd Quarter Violations*	*FY19 YTD Violations*
Dry Day Flow (365 Day Average):		mgd	436	284.2	296.0	307.9	0	0
cBOD:	Monthly Average	mg/L	25	4.9	5.2	6.3	0	0
	Weekly Average	mg/L	40	7.4	6.4	8.4	0	0
TSS:	Monthly Average	mg/L	30	8.6	9.2	10.7	0	0
	Weekly Average	mg/L	45	12.2	10.5	14.3	0	0
TCR:	Monthly Average	ug/L	456	0	0	0	0	0
	Daily Maximum	ug/L	631	0	0	0	0	0
Fecal Coliform:	Daily Geometric Mean	col/100mL	14000	7	16	12	0	0
	Weekly Geometric Mean	col/100mL	14000	43	63	70	0	0
	% of Samples >14000	%	10	0	0	0	0	0
	Consecutive Samples >14000	#	3	0	0	0	0	0
pH:		SU	6.0-9.0	6.5-7.0	6.5-7.0	6.4-7.2	0	0
PCB, Aroclors:	Monthly Average	ug/L	0.000045	UNDETECTED			0	0
Acute Toxicity:	Mysid Shrimp	%	≥50	>100	>100	>100	0	0
	Inland Silverside	%	≥50	>100	>100	>100	0	0
Chronic Toxicity:	Sea Urchin	%	≥1.5	100	100	100	0	0
	Inland Silverside	%	≥1.5	100	100	100	0	0

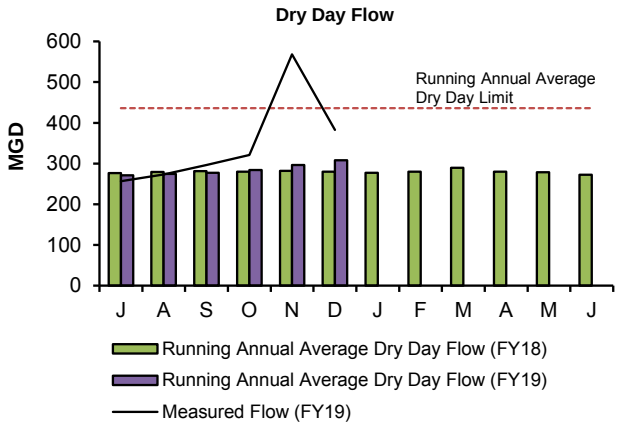
There have been no permit violations in FY19 to date at the Deer Island Treatment Plant (DITP).



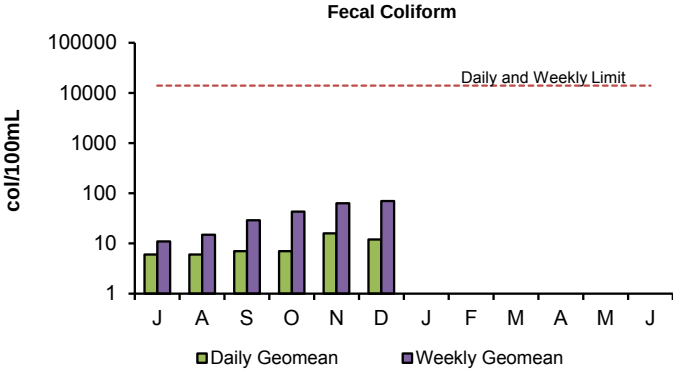
Total Suspended Solids (TSS) in the effluent is a measure of the amount of solids that remain suspended after treatment. All TSS measurements for the 2nd Quarter were within permit limits.



Carbonaceous Biochemical Oxygen Demand (cBOD) is a measure of the amount of dissolved oxygen required for the decomposition of organic materials in the environment. All cBOD measurements for the 2nd Quarter were within permit limits.



Running Annual Average Dry Day Flow is the average of all dry weather influent flows over the previous 365 days. The Dry Day Flow for the 2nd Quarter was well below the permit limit of 436 MGD.



Fecal Coliform is an indicator for the possible presence of pathogens. The levels of these bacteria after disinfection show how effectively the plant is inactivating many forms of disease-causing microorganisms. In the 2nd Quarter, all permit conditions for fecal coliform were met.

NPDES Permit Compliance: Clinton Wastewater Treatment Plant

2nd Quarter - FY19

NPDES Permit Limits

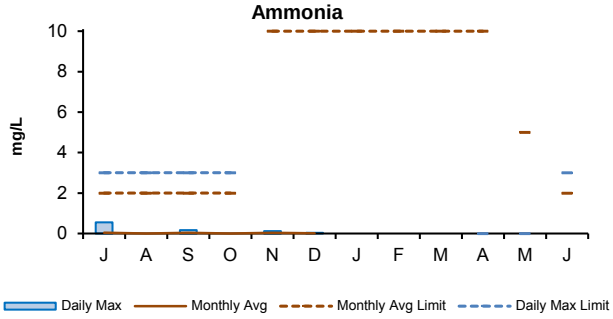
Effluent Characteristics		*Units*	*Limits*	*October*	*November*	*December*	*2nd Quarter Violations*	*FY19 YTD Violations*
Flow:	12-month Rolling Average:	mgd	3.01	2.84	3.09	3.26	2 [1]	2
BOD:	Monthly Average:	mg/L	20	1.8	1.3	3.3	0	0
	Weekly Average:	mg/L	20	1.7	2.3	4.6	0	0
TSS:	Monthly Average:	mg/L	20	7.7	7.5	4.4	0	0
	Weekly Average:	mg/L	20	10.0	12.3	5.2	1 [2]	1
pH:		SU	6.5-8.3	7.2-7.9	6.8-7.7	7.0-7.8	0	0
Dissolved Oxygen:	Daily Average Minimum:	mg/L	6	8.3	9.4	9.5	0	0
E. Coli:	Monthly Geometric Mean:	cfu/100mL	126	12.7	6.7	5.5	0	0
	Daily Geometric Mean:	cfu/100mL	409	113.1	43.7	8.8	0	0
TCR:	Monthly Average:	ug/L	17.6	0.0	0.0	0.0	0	0
	Daily Maximum:	ug/L	30.4	0.0	0.0	0.0	0	0
Copper:	Monthly Average:	ug/L	11.6	6.2	6.6	3.2	0	0
	Daily Maximum:	ug/L	14.0	6.2	6.6	3.4	0	0
Total Ammonia Nitrogen: November 1st - March 31st	Monthly Average:	mg/L	2.0 / 10.0	0.17	0.03	0.01	0	0
	Daily Maximum:	mg/L	3.0 / 35.2	0.00	0.12	0.04	0	0
Total Phosphorus: November 1st - March 31st	Monthly Average:	mg/L	1.0 / RPT*	0.28	0.04	0.09	0	0
	Daily Maximum:	mg/L	RPT*	0.14	0.07	0.12	0	0
Acute Toxicity+:	Daily Minimum:	%	≥100	N/A	N/A	>100	0	0
Chronic Toxicity+:	Daily Minimum:	%	≥62.5	N/A	N/A	100	0	0

There have been three permit violations in FY19 at the Clinton Treatment Plant.
1st Quarter: There were no permit violations in the first quarter.
2nd Quarter: There were three permit violations in the second quarter.

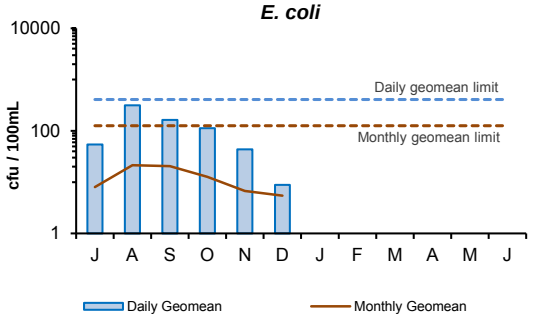
[1]The 12-month rolling average flow exceeded the limit of 3.01 MGD in November and December, due to excessive rains in the region.

[2]The TSS weekly average loading exceeded the limit of 500 lbs/day in November, as a result of elevated TSS concentrations and highly elevated plant flows due to rain. The weekly average loading 11/18 - 11/24 was 592 lbs/day.

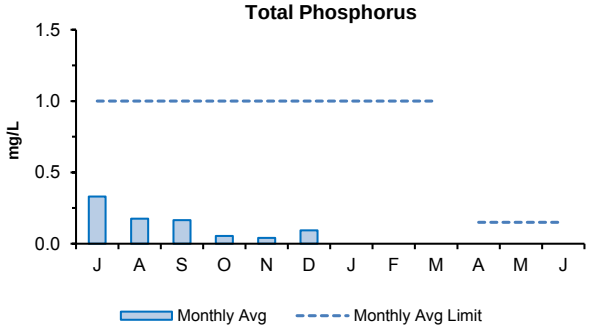
* The winter period (November 1st - March 31st) monthly average phosphorus limit of 1.0 mg/L goes into effect November 1st, 2019
+Toxicity testing at the Clinton Treatment Plant is conducted on a quarterly basis.



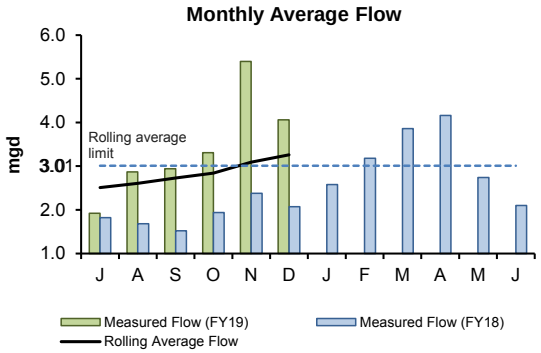
The 2nd Quarter's monthly average and daily maximum concentrations of ammonia were below the permit limits. The monthly average and daily maximum limits for the 2nd Quarter are variable, moving from 2 and 3 mg/L to 10 and 35.2 mg/L respectively. The permit limits are most stringent from June to October when warm weather conditions are most conducive to potential eutrophication.



E. coli is an indicator for the possible presence of pathogens. There were no violations of permit limits in the 2nd Quarter.The monthly and daily limits are 126 cfu/100 mL and 409 cfu/100 mL respectively.



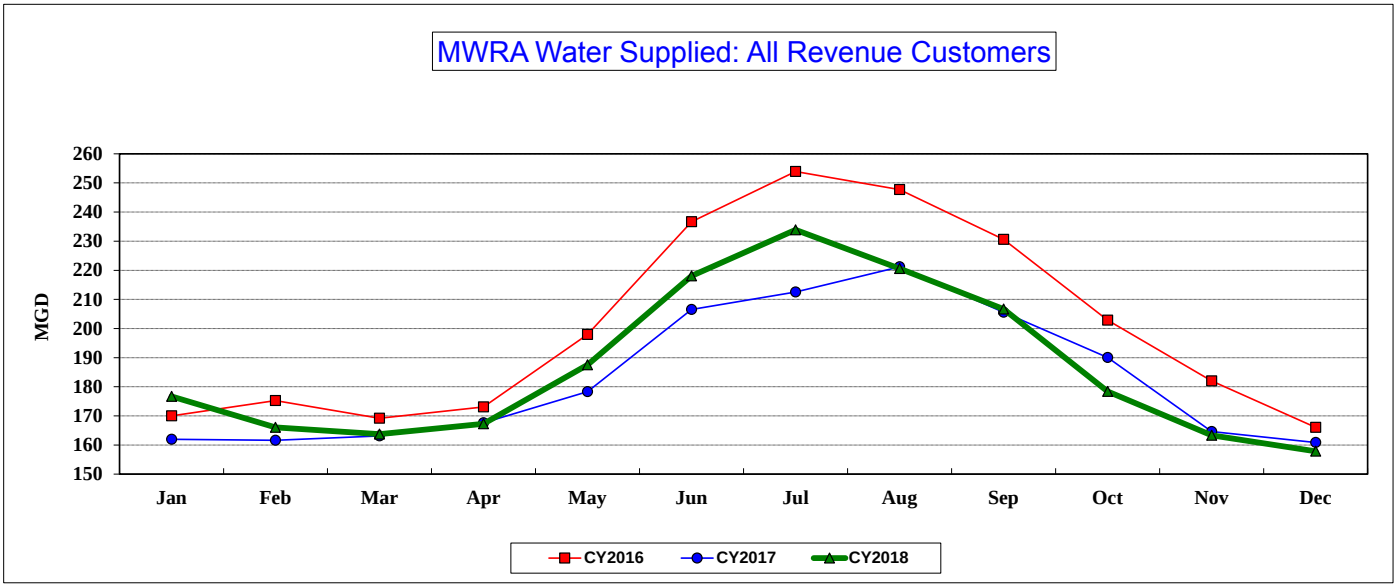
The 2nd Quarter's monthly average concentrations for total phosphorus were below permit limits. An interim permit limit of 1.0 mg/L is in effect from April through October, until April 1st, 2019, when the new permit limit of 0.15 mg/L goes into effect for April - October. The new permit limit of 1.0 mg/L from November through March goes into effect. November 1st, 2019.



The graph depicts the rolling annual average monthly flow, measured in million gallons per day, exiting the plant. The average monthly flows during the 2nd quarter exceeded the limit of 3.01 in November and December due to excessive rains in the region.

COMMUNITY FLOWS AND PROGRAMS

Total Water Use
2nd Quarter - FY19



MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Average	Annual Average
CY2016	169.989	175.229	169.161	173.080	197.940	236.644	253.923	247.681	230.631	202.827	182.020	166.059	200.513	200.513
CY2017	161.941	161.609	163.129	167.613	178.331	206.541	212.533	221.175	205.579	190.053	164.610	160.853	182.969	182.969
CY2018	176.713	166.065	163.701	167.282	187.553	218.076	233.894	220.562	206.693	178.419	163.315	157.832	186.821	186.821

MG	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Total	Annual Total
CY2016	5,269.650	5,081.631	5,244.002	5,192.412	6,136.128	7,099.331	7,871.618	7,678.123	6,918.941	6,287.652	5,460.602	5,147.831	73,387.922	73,387.922
CY2017	5,020.179	4,525.063	5,056.997	5,028.390	5,528.255	6,196.217	6,588.510	6,856.435	6,167.355	5,891.640	4,938.301	4,986.434	66,783.777	66,783.777
CY2018	5,478.106	4,649.821	5,074.728	5,018.447	5,814.128	6,542.278	7,250.719	6,837.418	6,200.796	5,530.986	4,899.450	4,892.783	68,189.659	68,189.659

Calendar year 2018 water use will be used to allocate the FY20 water utility rate revenue requirement to MWRA water communities. Each community's annual water use relative to the system as a whole is the primary factor in allocating the annual water rate revenue requirement.

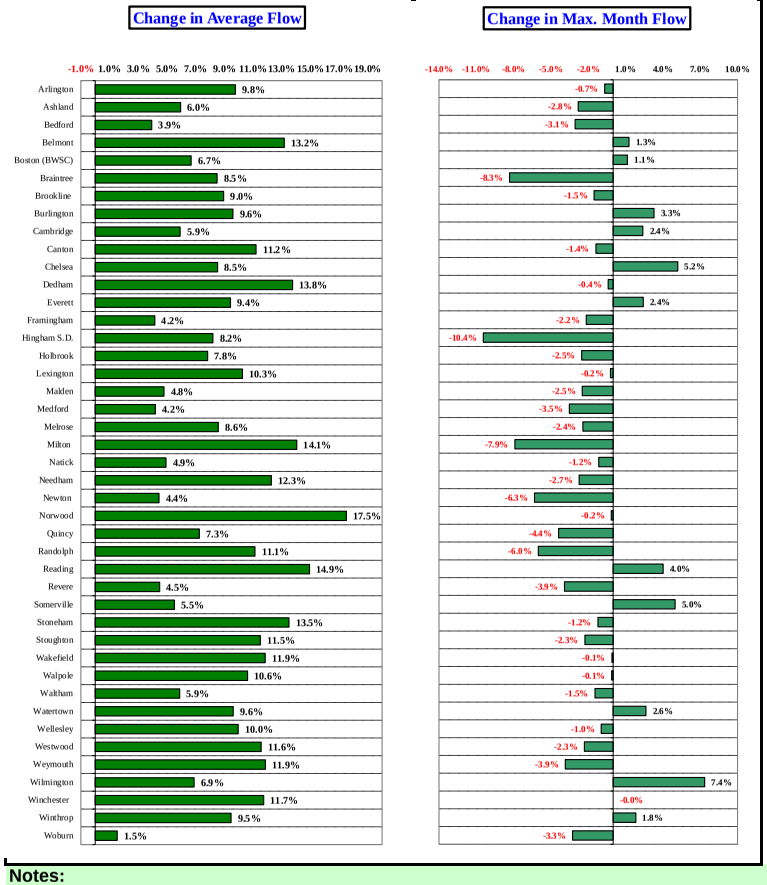
December 2018 water supplied of 157.8 mgd for revenue generating users is down 3.0 mgd or 1.9% compared to December 2017, and represents the lowest monthly water use by MWRA customers since the inception of the MWRA. December's total reservoir withdrawal of 168.2 mgd also represents a new monthly low for the MWRA.

While December water use represented new lows for the MWRA, overall CY18 annual water use for revenue generating users totaled 186.8 mgd, and is 3.9 mgd or 2.1% higher than CY17.

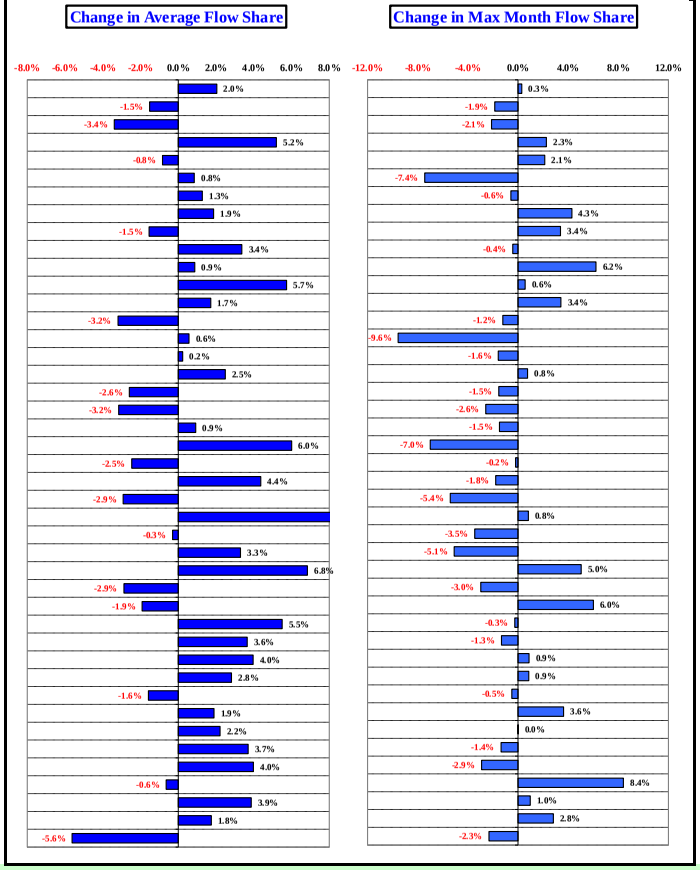
Community Wastewater Flows
2nd Quarter - FY19

How Projected CY2018 Community Wastewater Flows Could Effect FY2020 Sewer Assessments [1,2,3]

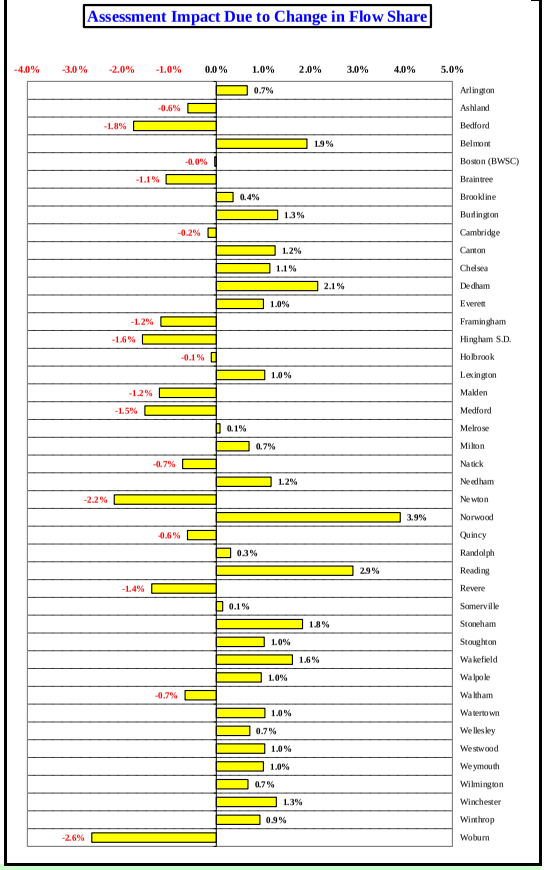
The flow components of FY2020 sewer assessments will be calculated using a 3-year average of CY2016 to CY2018 wastewater flows compared to FY2019 assessments that used a 3-year average of CY2015 to CY2017 wastewater flows.



But as MWRA's sewer assessments are a ZERO-SUM calculation, a community's assessment is strongly influenced by the RELATIVE change in CY2016 to CY2018 flow share compared to CY2015 to CY2017 flow share, compared to all other communities in the system.



The chart below illustrates the change in the TOTAL BASE assessment due to FLOW SHARE CHANGES. [4]



Notes:

[1] MWRA uses a 3-year flow average to calculate sewer assessments. Three-year averaging smoothes the impact of year-to-year changes in community flow share, but does not eliminate the long-term impact of changes in each community's relative contribution to the total flow.

[2] Based on CY2015 to CY2018 a**verage wastewater flows as of 01/30/19.** Flow data is preliminary and subject to change pending additional MWRA and community review.

[3] CY2015 to CY2018 wastewater flows based on actual meter data.

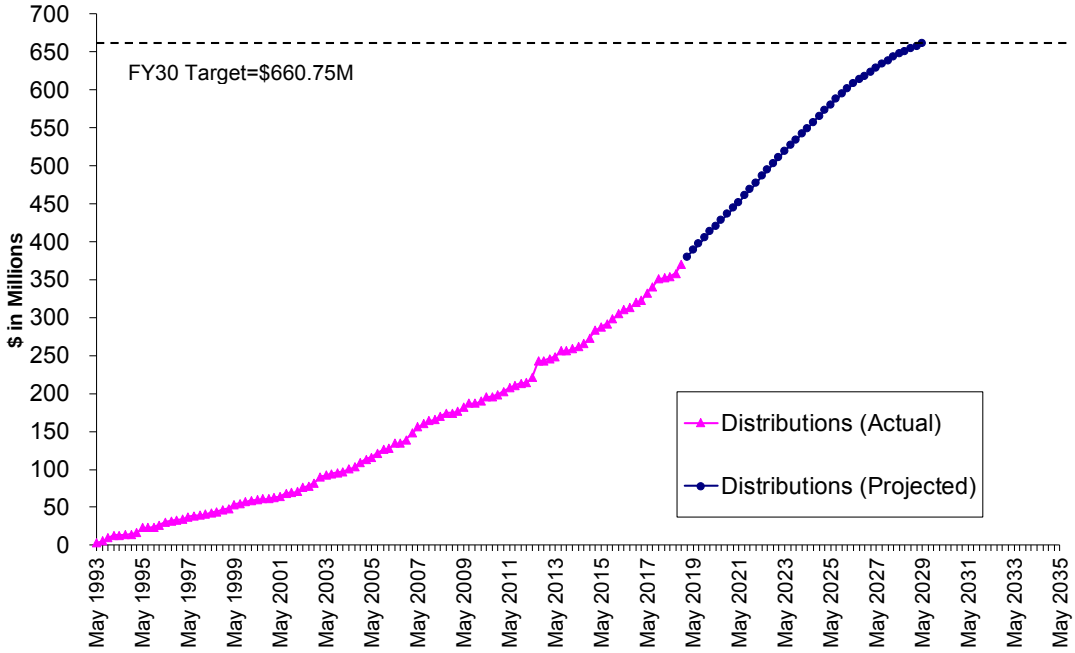
[4] Represents ONLY the impact on the total BASE assessment resulting from the changes in average and maximum wastewater FLOW SHARES.

Community Support Programs
2nd Quarter – FY19

Infiltration/Inflow Local Financial Assistance Program

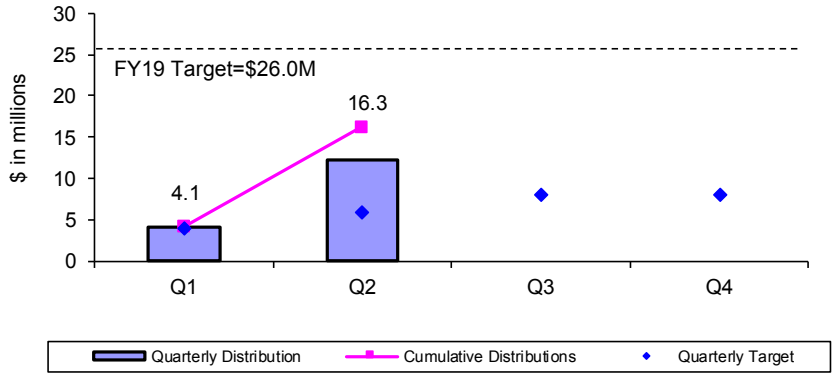
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides $660.75 million in grants and interest-free loans (average of about $18 million per year from FY93 through FY30) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Eligible project costs include: sewer rehabilitation construction, pipeline replacement, removal of public and private inflow sources, I/I reduction planning, engineering design, engineering services during construction, etc. I/I Local Financial Assistance Program funds are allocated to member sewer communities based on their percent share of MWRA's wholesale sewer charge. Phase 1-8 funds (total $300.75 million) were distributed as 45% grants and 55% loans with interest-free loans repaid to MWRA over a five-year period. Phase 9 through 12 funds (total $360 million) are distributed as 75% grants and 25% loans with interest-free loans repaid to MWRA over a ten-year period. An additional future Phase 13 providing $100 million in loan only funds is not yet included in this report.

I/I Local Financial Assistance Program Distribution FY93-FY30



During the 2nd Quarter of FY19, $12.2 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Hingham, Lexington, Malden, Newton, Quincy, Stoughton and Wakefield. Total grant/loan distribution for FY19 is $16.3 million. From FY93 through the 2nd Quarter of FY19, all 43 member sewer communities have participated in the program and more than $370 million has been distributed to fund 556 local I/I reduction and sewer system rehabilitation projects. Distribution of the remaining funds has been approved through FY30 and community loan repayments will be made through FY40. All scheduled community loan repayments have been made.

FY19 Quarterly Distributions of Sewer Grant/Loans

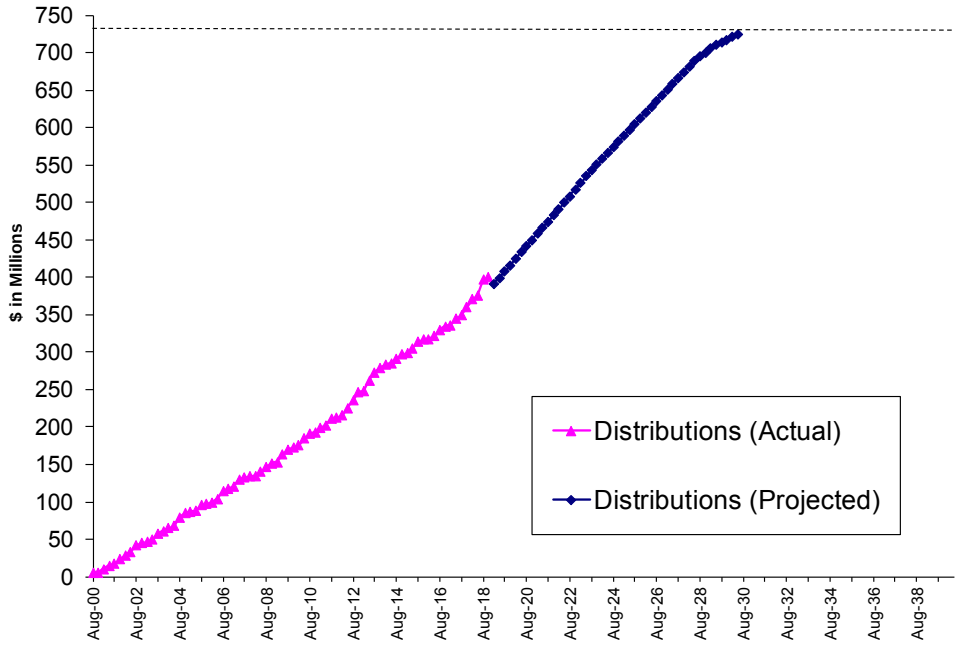


Community Support Programs
2nd Quarter – FY19

Local Water System Assistance Program

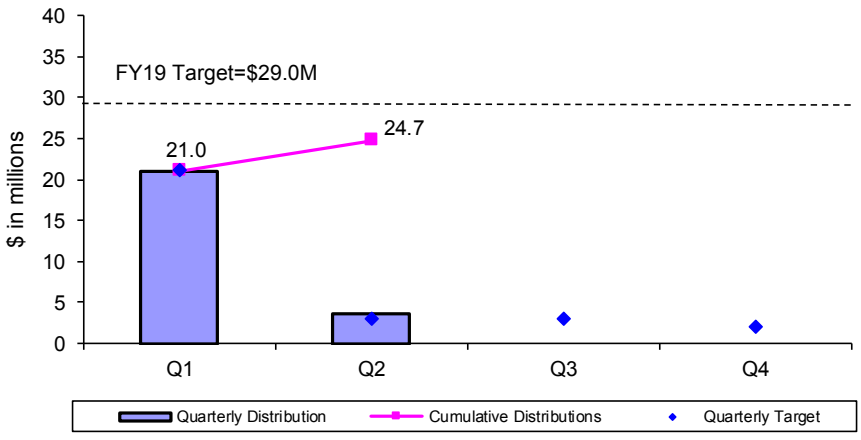
MWRA's Local Water System Assistance Programs (LWSAP) provides $724 million in interest-free loans (an average of about $24 million per year from FY01 through FY30) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. There have been 3 phases: Phase 1 at $222 Million, Phase 2 at $210 Million, and Phase 3 at $292 Million. Eligible project costs include: water main cleaning/lining, replacement of unlined water mains, lead service replacements, valve, hydrant, water meter, tank work, engineering design, engineering services during construction, etc. MWRA partially-supplied communities receive pro-rated funding allocations based on their percentage use of MWRA water. Interest-free loans are repaid to MWRA over a ten-year period beginning one year after distribution of the funds. The Phase 1 water loan program concluded in FY13 with $222 million in loan distributions. The Phase 2 - LWSAP continues distributions through FY23. The Phase 3 Water Loan Program is authorized for distributions FY18 through FY30.

Local Water System Assistance Program Distribution FY01-FY30



During the 2nd Quarter of FY19, $3.7 million in interest-free loans was distributed to fund local water projects in Newton, Swampscott and Waltham. Total loan distribution for FY19 is $24.7 million. From FY01 through the 2nd Quarter of FY19, more than $400 million has been distributed to fund 421 local water system rehabilitation projects in 42 MWRA member water communities. Distribution of the remaining funds has been approved through FY30 and community loan repayments will be made through FY40. All scheduled community loan repayments have been made.

FY19 Quarterly Distributions of Water Loans



Community Support Programs
2nd Quarter – FY19

Lead Service Line Replacement Loan Program

By its vote on March 16, 2016, the Board approved an enhancement to the Local Water System Assistance Program to provide up to $100 million in 10-year zero-interest loans to communities solely for efforts to fully replace lead service lines. The Lead Service Line Replacement Loan Program is also referenced as the Lead Loan Program or LLP. Each community can develop its own program, tailored to their local circumstances. MWRA's goal in providing financial assistance to member communities is to improve local water systems so that the high quality water MWRA delivers can make it all the way to the consumer's tap. The presence of a lead service line connecting a home to the main in the street can lead to elevated lead levels in tap water, especially if that water sits stagnant for an extended period. MWRA's stable water quality and effective corrosion control treatment reduce the risk that a lead service line will cause elevated lead levels, and measured lead levels in high risk homes have decreased by 90 percent since corrosion control was brought on-line in 1996. However, the risk of elevated levels remains as long as lead service lines are in use.

FY17 was the first year of the Lead Service Line Replacement Loan Program. During FY17, MWRA made three Lead Loan Program distributions as noted in the Table below.

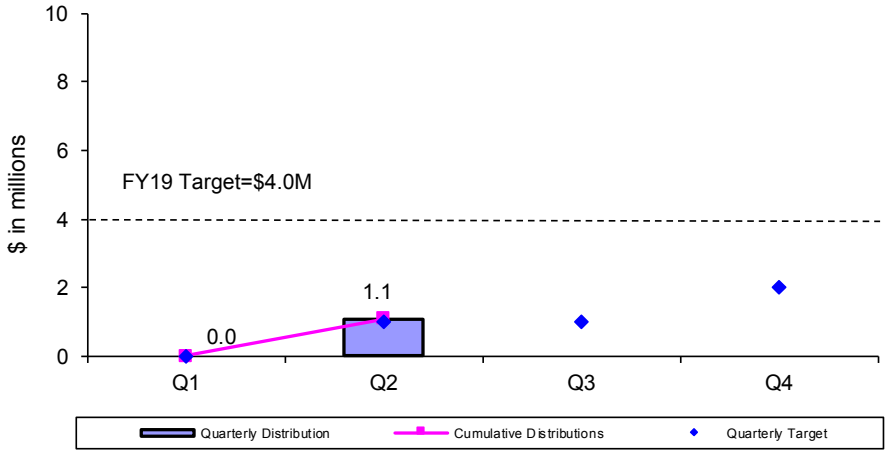
FY18 was the second year of the Lead Loan Program. During FY18, MWRA made five Lead Loan Program distributions as noted in the table below.

FY19 is the third year of the Lead Loan Program. Two Lead Loans were made during the second quarter of FY19: $100,000 to Chelsea and $1.0 Million to Everett.

Summary of Lead Loans:

Chelsea in FY19	$0.1 Million
Everett in FY19	$1.0 Million
Needham in FY18	$1.0 Million
Winchester in FY18	$0.5 Million
Revere in FY18	$0.2 Million
Winthrop in FY18	$0.3 Million
Marlborough in FY18	$1.0 Million
Newton in FY17	$4.0 Million
Quincy in FY17	$1.5 Million
Winchester in FY17	$0.5 Million
TOTAL	$10.1 Million

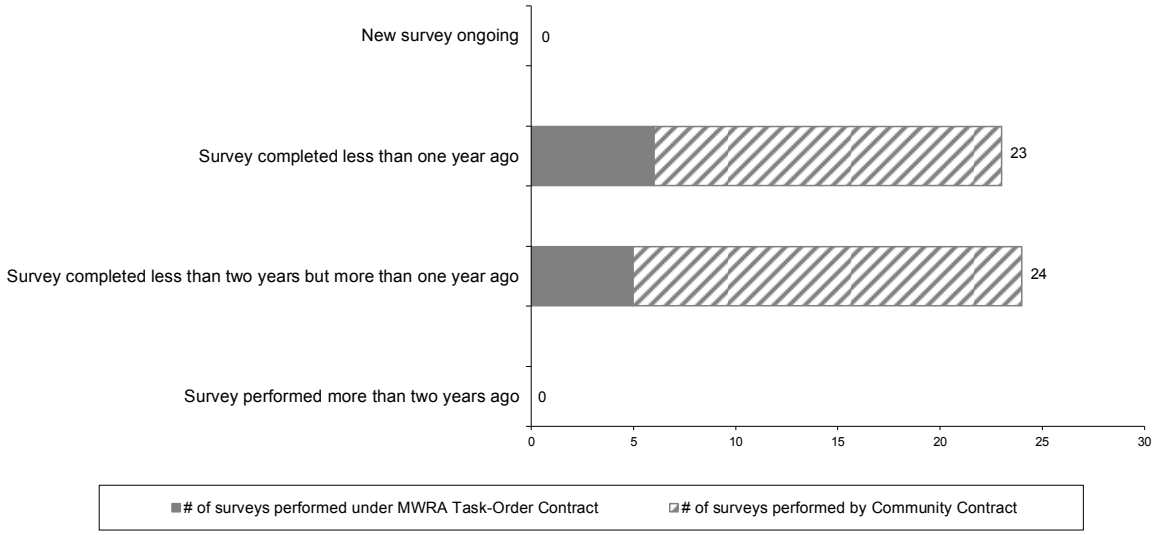
FY19 Quarterly Distributions of Lead Service Line Replacement Loans



Community Support Programs
2nd Quarter – FY19

Community Water System Leak Detection

To ensure member water communities identify and repair leaks in locally-owned distribution systems, MWRA developed leak detection regulations that went into effect in July 1991. Communities purchasing water from MWRA are required to complete a leak detection survey of their entire distribution system at least once every two years. Communities can accomplish the survey using their own contractors or municipal crews; or alternatively, using MWRA's task order leak detection contract. MWRA's task order contract provides leak detection services at a reasonable cost that has been competitively procured (3-year, low-bid contract) taking advantage of the large volume of work anticipated throughout the regional system. Leak detection services performed under the task order contract are paid for by MWRA and the costs are billed to the community the following year. During the 2nd Quarter of FY19, all member water communities were in compliance with MWRA's Leak Detection Regulation.



Community Water Conservation Outreach

MWRA's Community Water Conservation Program helps to maintain average water demand below the regional water system's safe yield of 300 mgd. Current 5-year average water demand is less than 205 mgd. The local Water Conservation Program includes distribution of water conservation education brochures (indoor and outdoor bill-stuffers) and low-flow water fixtures and related materials (shower heads, faucet aerators, toilet leak detection dye tabs, and instructions), all at no cost to member communities or individual customers. The Program's annual budget is $25,000 for printing and purchase of materials. Annual distribution targets and totals are provided in the table below. Distributions of water conservation materials are made based on requests from member communities and individual customers.

	Annual Target	Q1	Q2	Q3	Q4	Annual Total
Educational Brochures	100,000	690	10,753			11,443
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	1,738	1,635			3,373
Toilet Leak Detection Dye Tablets	------	15,202	352			15,554

BUSINESS SERVICES

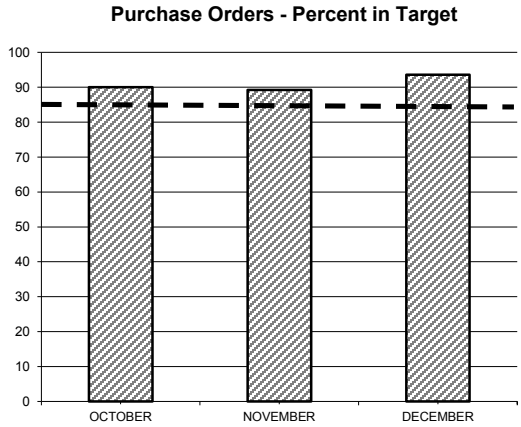
Procurement: Purchasing and Contracts

2nd Quarter - FY19

Background: Goal is to process 85% of Purchase Orders and 80% of Contracts within Target timeframes.

Outcome: Processed 91% of purchase orders within target; Average Processing Time was 5.23 days vs. 4.77 days in Qtr 2 of FY18. Processed 58% (7 of 12) of contracts within target timeframes; Average Processing Time was 192 days vs. 153 days in Qtr 2 of FY18.

Purchasing



	No.	TARGET	PERCENT IN TARGET
$0 - $500	595	3 DAYS	85.8%
$500 - $2K	693	7 DAYS	94.0%
$2K - $5K	457	10 DAYS	95.6%
$5K - $10K	64	25 DAYS	82.8%
$10K - $25K	58	30 DAYS	89.6%
$25K - $50K	17	60 DAYS	70.5%
Over $50K	29	90 DAYS	93.3%

The Purchasing Unit processed 1913 purchase orders, 64 less than the 1977 processed in Qtr 2 of FY18 for a total value of $24,523,913 versus a dollar value of $8,548,562 in Qtr 2 of FY18.

The purchase order processing target was not met for the $5K - $10K category due to end user evaluations and the $25K-$50K category due to end user evaluations and staff summary requirements.

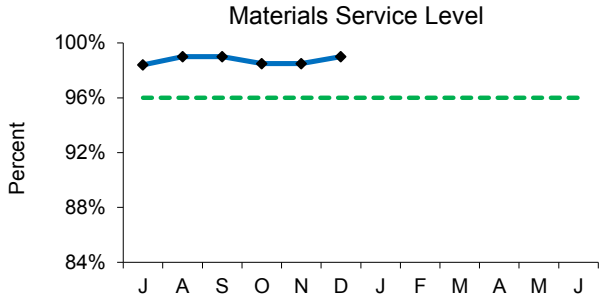
Contracts, Change Orders and Amendments

Five contracts were not processed within the target timeframes. Two contracts were delayed due to additional procurement requirements necessary for insurance services. Insurance for all categories of coverage was obtained timely and according to schedule. One contract was delayed due to delays in the receipt of a parental guaranty. Another contract was not processed within the target timeframe due to delays in verifying references. The final contract required Boston Water and Sewer Commission Board of Director's approval (Union Park Pump Station Fuel Storage Upgrade).

Procurement processed seventeen contracts with a value of $14,413,635 and six amendments with a value of $893,641. Thirty two change orders were executed during the period. The dollar value of all non-credit change orders during Q2 FY18 was $1,448,601 and the value of credit change orders was ($428,945.43).

Materials Management

2nd Quarter - FY19



The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 7,593 (99.0%) of the 7,696 items requested in Q2 from the inventory locations for a total dollar value of $1,390,801.

Inventory Value - All Sites

Inventory goals focus on:

- Maintaining optimum levels of consumables and spare parts inventory
- Adding new items to inventory to meet changing business needs
- Reviewing consumables and spare parts for obsolescence
- Managing and controlling valuable equipment and tools via the Property Pass Program

The FY18 goal is to reduce consumable inventory from the July '18 base level ($8.4 million) by 2.0% (approximately $168,025), to $8.2 million by June 30, 2019 (see chart below).

Items added to inventory this quarter include:

- Deer Island – paint rollers and paint primer for Facilities; fan kit, fan filter, couplings, bushings and door enclosure kit for Electric Shop; position transmitter, potentiometer, terminal strips, wire labels, transducers, and electronic timer for I&C; pump and flare fitting for Liquid Train; elbows, coupling and brass connectors for HVAC; hubs, unions and expansion joints for Power and Pump.
- Chelsea – class 3 safety vests for Safety; switch selectors, motor and heater unit for Work Coordination; brake rotors, brake pads, ball joints, oil filters, plow link, plow harness and headlight bulbs for Fleet Services.
- Southboro – fuel filters, oil filters, air filters and wiper blades for Fleet Services; sanding discs for Equipment Maintenance; paint brushes for Facilities Maintenance.

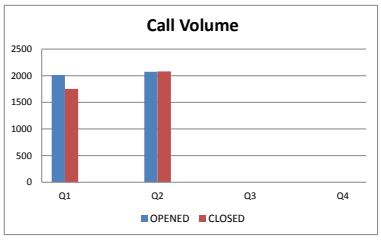
Property Pass Program:

- Five audits were conducted during Q2.
- Scrap revenue received for Q2 amounted to $9,457. Year to date revenue received amounted to $20,296.
- Revenue received from online auctions held during Q2 amounted to $181,356. Year to date revenue received amounted to $314,124.

Items	Base Value July-18	Current Value w/o Cumulative New Adds	Reduction / Increase To Base
Consumable Inventory Value	8,401,259	8,291,625	-109,634
Spare Parts Inventory Value	8,884,367	8,934,503	50,136
Total Inventory Value	17,285,626	17,226,128	-59,498

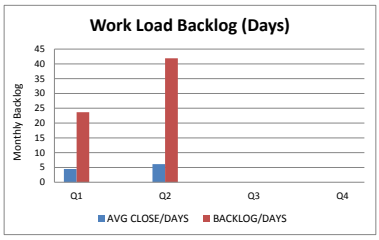
Note: New adds are items added at an inventory location for the first time for the purpose of servicing a group/department to meet their business needs/objectives.

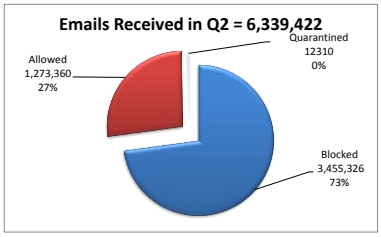
MIS Program
2nd Quarter FY19



Performance & Backlog for Q1

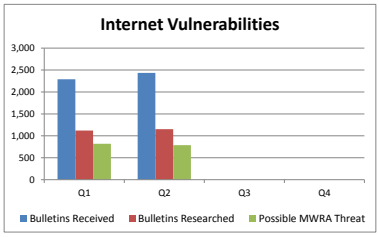
- 87% of open calls were closed.
- Call closure averaged 4.5 days.
- Priority 1 & 2 Service Level Agreements (SLA) were not met because of priorities and delayed closure. Workarounds provided.





Information Security for Q2

- In Q2, pushed security fixes/updates to desktops/servers protecting against 512 vulnerabilities.
- McAfee quarantined 8 distinct viruses from 116 PCs. PCs are current with antivirus signatures for known malware.



Infrastructure:

Desktop Refresh: Bid awarded to Hub Technical Services LLC. Software compatibility still being tested and reviewed.

Managed Security Services Contract: Amendment for contract 7499 approved by Board of Directors.

Audio/Visual Upgrades: A/V Equipment in conference and meeting rooms, operations centers, etc. is old and needs to be upgraded. New equipment was identified and the first installation is scheduled for January.

External Facing Server Hardware Replacement: Testing communications over private wireless.

DITP Circuit Upgrade: New data network circuit installed.

Multi-Functional Devices (MFD): Completed.

Network Switch Upgrades: Completed CNY core switch, and edge switch upgrades. The remaining 10 buildings will be scheduled through February.

IPhone Upgrades: Completed 34% of iPhone 8 upgrades.

Applications/Library & Records Center/Training:

Enterprise Content Management (ECM)/e-Construction: Continued working on business process workflows and/or use case documentation of existing E&C Department processes. Continued working on a Management Dashboard design. Discussed evaluation approaches of ECM products with Gartner IT Consultants.

Canto Cumulus Upgrade: Upgraded the Digital Asset Management Software used for managing MWRA photos/images, from version 9 to 11 to maintain vendor support and to be Windows 10 compatible. End users and IT staff were trained on new features.

GIS: The TV Inspection Truck software, GraniteXP and was updated to the latest version called GraniteNet. This upgrade keeps the Authority current with the latest technology, provides an easier user interface for entering inspection observations and Windows 10 compliant.

ELN: The Electronic Lab Notebook (ELN) Improvements Project was completed in December adding new functionality of the phase one Water Quality (WQ) implementation completed in Q3 of 2017. The major enhancements were to allow grouped workbooks to be accessed independently and to implement incremental row locking of data already reviewed by supervisors allowing staff continued use of other log entries within the same workbook.

PIMS: Version 12.0.0 with 9 bug fixes was installed in PIMS production environment.

PIMS CROMERR: Web Self-Monitoring Reporting tool (WebSMR) was configured in production for outside lab submissions that are compliant with EPA's Cross-Media Electronic Reporting Rule (CROMERR) . Outside Laboratory have successfully submitted Sample results for their respective industries.

Oracle Discoverer: The Oracle Discoverer query building tool was upgraded to 11g. User documentation for new Oracle Discoverer was completed.

Learning Management System (LMS): The LMS which internally hosts and manages on-line training for MWRA staff such as the Conflict of Interest Law Training, Active Shooter Video Training, etc., was upgraded from ver. 3.1 to 3.5 to maintain software support and add new functionality and software fixes.

Library & Records Center: Library: Fulfilled 21 research requests, acquired 7 new, loaned 35 books and reports, and provided 21 articles and 28 standards. The MWRA Library Portal supported 2780 end user searches. Research topics included: Metal deicing, MWRA tunnel geology, 1848 Cochituate Water Celebration, and cured-in-place pipes. Record Center: Added 127 new boxes and handled 201 total boxes, fulfilled 22 rush requests (< 24hrs), scanned/emailed 455 pages, received 24 soil and 20 rock core samples and attended 1 Records Conservation Board meeting.

IT Training: For the quarter, 37 staff attended 9 classes. Windows10 Job-aids were developed for Mapping a Network Drive job aid and using Outlook PST files.

Legal Matters
2nd Quarter - FY19

PROJECT ASSISTANCE

Real Estate, Contract, Environmental and Other Support:

- **8(m) Permits**: Reviewed sixty-eight (68) 8(m) permits. Drafted an amendment to an 8(m) permit for Wellesley Country Club for the use of certain Sudbury Aqueduct land (amendment addresses new location of alternate public access trail provided by Permittee).

- **Real Property**: Recorded Certificate of Compliance for Order of Conditions 270-0674 for work which was part of MWRA Contract 7478 in Stoneham. Drafted Second Amended Memorandum of Understanding related to the fishing pier at Deer Island. Reviewed MWRA's property rights and potential land acquisitions related to the Dorchester Interceptor Sewer rehabilitation – MWRA Contract 7279. Extended term of license with J. F. White for the use of an MWRA parcel of land located at 12 Cleverly Court, Quincy, Massachusetts. Reviewed lease amendment #5 for MWRA's records retention space at 34 St. Martin Drive, Marlborough. Recorded Order of Conditions 270-0674 for work which was part of MWRA Contract 7478. Reviewed MWRA's property rights at Shaft 8 in Barre, MA, at 233 Clinton Road in Brookline, MA, and for Section 44 at MBTA's Wedgemere Station in Winchester, MA.

- **Direct Connect Permits:** Revised Direct Connect Permit 18-08-179DC to connect a 6-inch PVC sanitary sewer from the proposed building at 130 Eastern Avenue in Chelsea to Section 61 of MWRA's Chelsea Branch Sewer at manhole station 20+80. Reviewed Direct Connect Permit 18-04-177DC to connect a 10-inch PVC gravity sanitary sewer line from the proposed Harvard Engineering and Science Complex at 130-140 Western Avenue in Boston to Section 163 of MWRA's Charles River Valley Sewer at manhole station 12+78.

- **MOA**: Drafted a memorandum of agreement between the City of Newton and MWRA relative to cost sharing for work being performed by MWRA for the City of Newton in the City of Newton as part of MWRA Contract 6392 – Rehabilitation of Sections 23, 24, and 47 Water Mains.

- **Boston Harbor Case**: Reviewed and filed Semi-Annual Compliance and Progress Report. Reviewed first semiannual progress report on the three-year CSO performance assessment.

- **Watershed Acquisitions**: Reviewed Wachusett Watershed Preservation Restriction, W-001195 located on Cottonwood Place in Boylston, MA. Reviewed Wachusett Watershed Acquisition, W-001207 located on Highland and Wachusett Streets in Holden, MA.

- **NPDES**: Reviewed annual DITP outfall monitoring overview.

- **Legislation**: Drafted legislation authorizing MWRA to release easements upon certain real property in Stoneham, MA, which is adjacent to MWRA's Spot Pond Facility.

- **Fore River Railroad Corporation (FRRC)**: Filed Certificate of Change of Directors or Officers of the FRRC with the Secretary of the Commonwealth.

- **Deer Island New Cross Harbor Cable:** Drafted and negotiated the terms of a letter agreement with the Harbor Electric Energy Co., concerning pre-payment of certain construction interest charges associated with the new cross harbor electric cable to Deer Island. The pre-payments help reduce total project costs.

- **Prison Point CSO Facility:** Assisted engineering in successfully securing a variance from the Division of Professional Licensure, Board of State Examiners of Plumbers and Gas Fitters, for relief from the applicable provisions of 248 CMR 3.00 through 10.00, which would otherwise require restroom facilities at the chemical building for the Prison Point CSO facility. The variance helps reduce project design and construction costs.

- **Deer Island – Harbor Electric Energy Company:** Prepared and filed written comments with the Department of Public Utilities concerning HEEC's proposed 2019 Capacity and Support Charge for Deer Island. The comments questioned HEEC's treatment

of the impact of the 2017 Federal Tax Cuts & Jobs Act on the 2019 Capacity and Support Charge. The Department agreed and removed a portion of the 2019 Capacity and Support Charge, pending further investigation by the Department in 2019.

- **Public Records Requests:** During the second quarter of FY 2019, one hundred and thirty-five (135) public records requests were received and one hundred and thirty-three (133) public records request were closed.

LABOR, EMPLOYMENT AND ADMINISTRATIVE

New Matters

A Charge was filed at the Massachusetts Commission Against Discrimination alleging that the MWRA discriminated against an employee on the basis of age.

Two demands for arbitration were filed.

Matters Concluded

Received an arbitrator's decision in favor of MWRA finding that employees were not working out of classification when assigned certain tasks and therefore the MWRA did not violate a collective bargaining agreement.

Received a Department of Unemployment Assistance decision in favor of MWRA denying claimant unemployment benefits.

SUMMARY OF PENDING LITIGATION MATTERS

TYPE OF CASE/MATTER	As of Dec 2018	As of Sept 2018	As of June 2018
Construction/Contract/Bid Protest (other than BHP)	3	2	2
Tort/Labor/Employment	4	5	3
Environmental/Regulatory/Other	2	2	2
Eminent Domain/Real Estate	0	0	0
Total	**9**	**9**	**7**
Other Litigation matters (restraining orders, etc.)	1	2	2
Total – all pending lawsuits	**10**	**11**	**9**
Claims not in suit:	1	2	1
Bankruptcy	0	0	2
Wage Garnishment	4	4	4
TRAC/Adjudicatory Appeals	0	1	1
Subpoenas	0	1	1
TOTAL – ALL LITIGATION MATTERS	**15**	**18**	**18**

LITIGATION/CLAIMS

New lawsuits/claims: Isabelle Quinn v. MWRA, et al., C.A. No. 2018 CV 3544 E: Plaintiff filed a personal injury action in Suffolk Superior Court alleging negligence on the part of MWRA in connection with an automobile accident between an MWRA vehicle operated by an MWRA employee and plaintiff's vehicle which occurred in the town of Weston on May 31, 2016, and which caused plaintiff to sustain a fractured right arm. The plaintiff claims medical and other expenses totaling $104,846.

New lawsuits/claims: (cont.)

BHD/BEC JV2015 v. MWRA: Plaintiff BHD/BEC JV2015 is a joint venture between Barletta Heavy Division, Inc. and Barletta Engineering Corporation for the purpose of bidding and performing MWRA Contract No. 7157, also known as Wachusett Aqueduct Pumping Station. The contractor seeks to recover claimed increased costs of $311,000 allegedly arising out of differing site conditions. This action challenges the Engineer's Final Decision denying the contractor's claims under G.L. c. 30 §39J.

Significant Developments

DaPrato v. MWRA, C.A. No. 2015 CV 3687 D: On November 1, 2018, MWRA filed an application to the Supreme Judicial Court (SJC) for direct appellate review of its appeal from judgment in the underlying action. MWRA also filed a brief in support of its appeal with the Appeals Court on November 19, 2018. On December 13, 2018, the SJC accepted MWRA's application for direct appellate review and MWRA filed an amended brief for the SJC's consideration. The SJC also solicited amicus briefs to address to two specific questions concerning the court's instructions to the jury during the trial.

Closed Cases/Claims:

Julie Ischia v. MWRA, DCR, Stoneham DPW, Albanese: Malden District Court Small Claims Session. Ms. Ischia claimed damage to her car, totaling approximately $1,200, allegedly when she went over something in the road (Ravine Road, Stoneham) on the night of April 4, 2018. The matter was dismissed by a magistrate on October 12, 2018, after Ms. Ischia failed to appear at the call of the list on the day of trial, and because Malden District Court does not have jurisdiction over the case.

(Former employee) v. MWRA, C.A. No. 2018 CV 1070 D: Plaintiff filed a lawsuit alleging handicap discrimination and retaliation under G. L. c. 151B. The case settled for $77,500.00 and the lawsuit was dismissed with prejudice.

Subpoenas

During the Second Quarter of FY 2019, no subpoenas were received and no subpoenas were pending at the end of the Second Quarter FY 2019.

Wage Garnishments

There are currently 14 Trustee Process matters, four of which are considered active and are monitored by Law Division.

TRAC/MISC.

New Appeals:

No new TRAC Appeals.

Settlement by Agreement of Parties

No Settlement by Agreement of Parties.

Stipulation of Dismissal

No Joint Stipulation of Dismissals filed.

Notice of Dismissal Fine paid in full

One TRAC case: Notice of Dismissal, Fine paid in full.

Twin Rivers Technology Manufacturing Corporation;
MWRA Docket No. 17-05.

Tentative Decision

There are no Tentative Decisions issued in the 2nd Quarter FY 2019.

Final Decisions

There are no Final Decisions issued in the 2nd Quarter FY 2019.

INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES
2nd Quarter FY19

Highlights

During the 2nd quarter FY19, IA completed a review of fuel usage and mileage tracking to determine the reasonableness and accuracy of the base year data that is required to be reported to MassDEP on emission limits of passenger vehicles. Recommendations included supporting the replacement of the Gas Boy fuel system software, ensuring all applicable vehicles are included in the reporting and creating a field in Maximo for identifying passenger and non-passenger vehicles.

Other completed assignments included an audit of the City of Cambridge's force account costs charged to MWRA related to the CSO financial assistance agreement, unemployment compensation review and a preliminary consultant and a contractor review. Work continues on reviewing costs on the new HEEC electrical cable to Deer Island, and the first 2 progress payments from MWRA have been made that will result in substantial future savings. Various management advisory services were also completed this quarter.

Status of Recommendations

During FY19, 7 recommendations were closed of which 5 are from prior fiscal years' audits.

IA follows-up on open recommendations on a continuous basis. All open recommendations have target dates for implementation. When a recommendation has not been implemented within 48 months, the appropriateness of the recommendation is re-evaluated.

All Open Recommendations Pending Implementation – Aging Between 0 and 48 Months

Report Title (issue date)	Audit Recommendations		
	Open	Closed	Total
MIS Mobile Equipment Asset Tracking (9/26/16)	1	11	12
Wright Express (WEX) Credit Card Fuel Purchases (11/16/16)	1	12	13
Purchase Card Activity on Deer Island (3/31/17)	2	13	15
Review of Uniform Debit Card Program (3/30/18)	3	3	6
Review of MWRA Procedures on Payments for Police Details (5/23/18)	1	0	1
Overtime & Timesheet Review (6/30/18)	2	14	16
Fleet Services Process Review (6/30/18)	4	1	5
Fuel Use & Mileage Tracking (12/31/18)	7	1	8
Total Recommendations	***21***	***55***	***76***

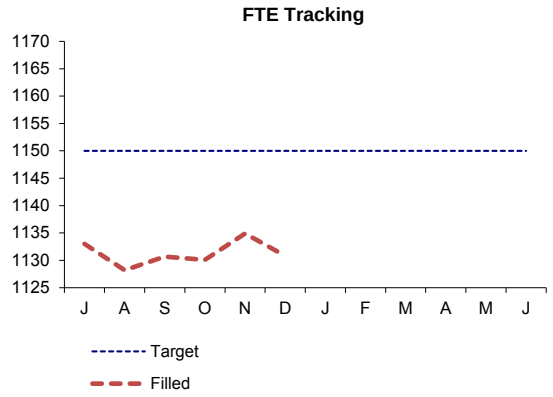
Cost Savings

IA's target is to achieve at least $1,000,000 in cost savings each year. Cost savings vary each year based upon many factors. In some cases, cost savings for one year may be the result of prior years' audits.

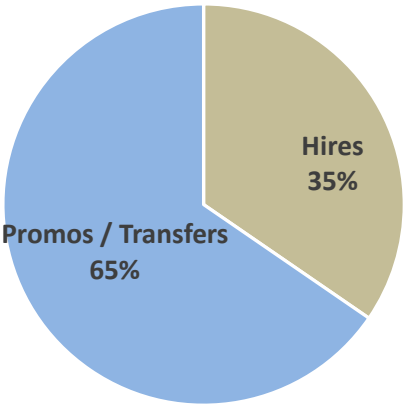
Cost Savings	FY15	FY16	FY17	FY18	FY19 Q2	TOTAL
Consultants	$87,605	$88,312	$272,431	$118,782	$52,784	$619,914
Contractors & Vendors	$1,146,742	$1,772,422	$3,037,712	$1,323,156	$2,631,543	$9,911,575
Internal Audits	$543,471	$220,929	$224,178	$203,702	$101,151	$1,293,931
Total	**$1,777,818**	**$2,081,663**	**$3,534,321**	**$1,645,640**	**$2,785,478**	**$11,825,420**

OTHER MANAGEMENT

Workforce Management
2nd Quarter FY19



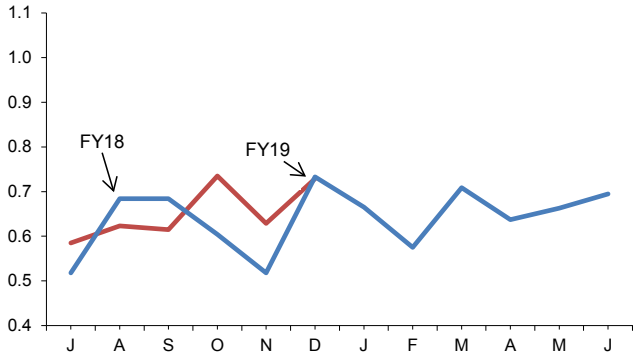
FY19 Target for FTE's = 1150
FTE's as of DEC 2018 = 1130.8
Tunnel Redunancy as of DEC 2018 = 3.8



Position Filled by Hires/Promos & Transfer for YTD FY19

	Pr/Trns	Hires	Total
FY17	155 (68%)	72 (32%)	227
FY18	118 (61%)	74 (39%)	192
FY19	70 (65%)	37 (35%)	107

Average Monthly Sick Leave Usage
Per Employee

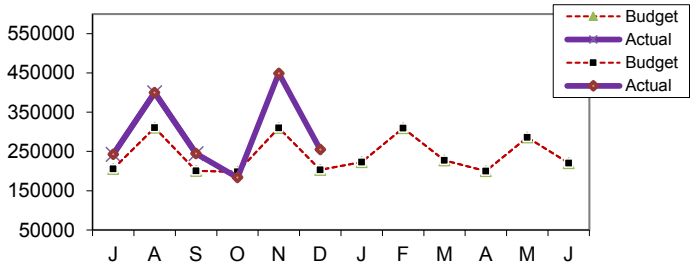


Average monthly sick leave for the 2nd Quarter of FY19 increased as compared to the 2nd Quarter of FY18 (7.482 to 7.832 days)

	Number of Employees	YTD	Annualized Total	Annual FMLA %	FY18
Admin	130	4.18	8.35	17.5%	6.6
Aff. Action	5	3.01	6.02	0.0%	7.1
Executive	4	2.50	2.47	0.0%	3.3
Finance	33	3.68	7.36	0.0%	6.1
Int. Audit	6	1.39	2.79	0.0%	4.9
Law	14	3.87	7.73	6.6%	6.9
OEP	8	2.48	4.97	74.0%	3.6
Operations	934	3.93	7.87	14.6%	7.7
Tunnel Red	4	4.62	9.23	47.2%	0
Pub. Affs.	11	2.23	4.47	23.9%	10.4
MWRA Avg	**1149**	**1.31**	**7.83**	**14.8%**	**7.7**

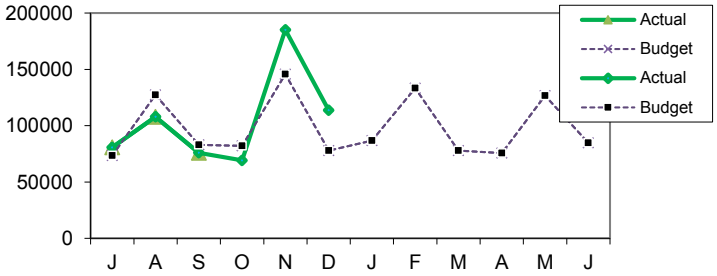
Percent of sick leave usage for FY19, attributable to Family and Medical Leave Act (FMLA) is 14.8% .

Field Operations
Current Month Overtime $



Total Overtime for Field Operations for the second quarter of FY 2019 was $887,546 which is $176k over budget. Emergency overtime was $461k, which was $81k over budget. Rain events totaled $335k, CSO Activation was $33k, emergency maintenance was $44k, emergency operations was $43k. Coverage overtime was $177k, which was $40k over budget, reflecting the month's shift coverage requirements. Planned overtime was $249k or $55k over budget. The month's spending includes planned operations at $53k, maintenance off-hours work at $75k, and half plant operations at $39k. YTD, FOD has spent $1,775,005 on overtime which is $346k over budget.

Deer Island Treatment Plant
Current Month Overtime $

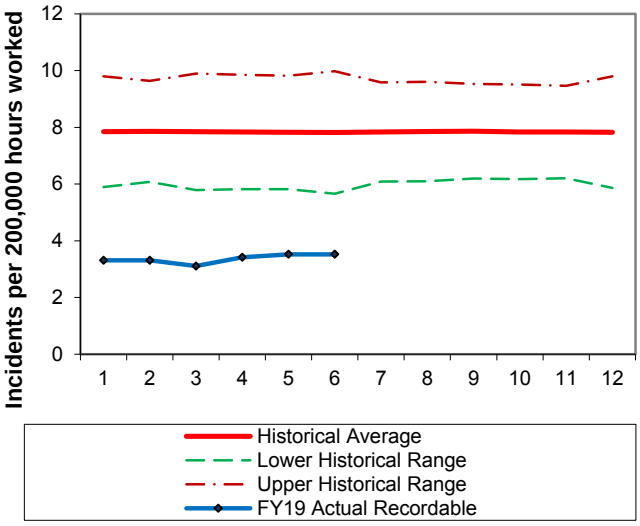


Total Overtime for Deer Island for the second quarter of FY2019 was $368,081, which is $62,533 over budget. The over spending in the second quarter was for storm coverage of $52k and shift coverage requirements of $20k. This is offset by lower spending for Planned/Unplanned overtime of ($10k). YTD, Deer Island has spent $632,528 on overtime, which is $43K over budget mostly due to storm coverage in November and December due to high rains and flows.

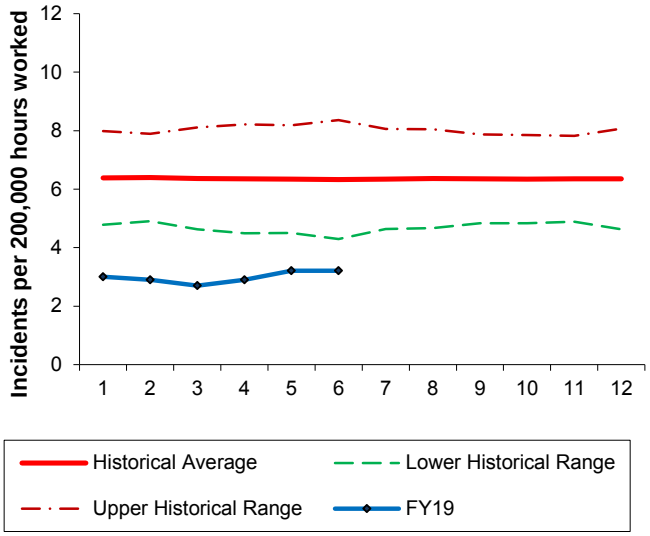
Workplace Safety

2nd Quarter - FY19

Recordable Injury & Illness Rates



Lost Time Injury & Illness Rates



1 “Recordable" incidents are all work-related injuries and illnesses which result in death, loss of consciousness, restriction of work or motion, transfer to another job, or require medical treatment beyond first aid.

2 "Lost-time" incidents, a subset of the recordable incidents, are only those incidents resulting in any days away from work, days of restricted work activity or both - beyond the first day of injury or onset of illness.

3 The “Historical Average” is computed using the actual MWRA monthly incident rates for FY99 through FY18. The “Upper” and “Lower Historical Ranges” are computed using these same data – adding and subtracting two standard deviations respectively.

WORKERS COMPENSATION HIGHLIGHTS

	2nd Quarter Information		
	New	Closed	Open Claims
Lost Time	8	19	56
Medical Only	13	24	16
Report Only	12	22	
	QYTD		FYTD
Regular Duty Returns	5		15
Light Duty Returns	0		0

COMMENTS:

Regular Duty Returns

OCT 2 Employee returned to full duty/no restrictions
NOV 1 Employees returned to full duty/no restrictions
DEC 2 Employee returned to full duty/no restrictions

Light Duty Returns

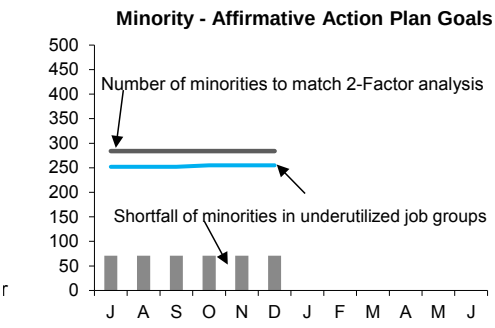
OCT N/A
NOV N/A
DEC N/A

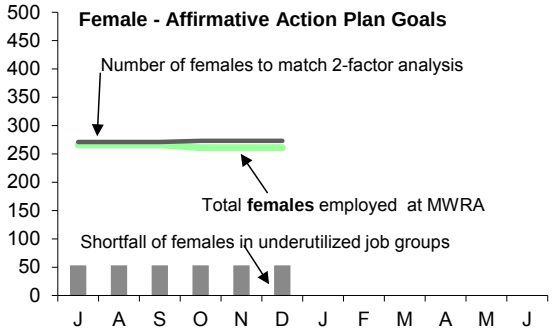
Note: Claims may initially be counted in one category and changed to another category at a later date. Examples include a medical treatment only claim (no lost time from work) but the employee may require surgery at a later date resulting in the claim becoming a lost time claim. At that time we would only count the claim as opened but not as a new claim.

*Report only claims are closed the month they are filed.

MWRA Job Group Representation

2nd Quarter - FY19





Highlights:

At the end of Q2 FY19, 7 job groups or a total of 71 positions are underutilized by minorities as compared to 7 job groups for a total of 44 positions at the end of Q2 FY18; for females 8 job groups or a total of 53 positions are underutilized females as compared to 10 job groups or a total of 62 positions at the end of Q2 FY18. During Q2, 8 minorities and 2 females were hired. During this same period no minorities and no females were terminated.

Underutilized Job Groups - Workforce Representation

Job Group	Employees as of 12/31/2018	Minorities as of 12/31/2018	Achievement Level	Minority Over or Under Underutilized	Females As of 12/31/2018	Achievement Level	Female Over or Under Underutilized
Administrator A	22	1	3	-2	8	7	1
Administrator B	21	1	4	-3	6	3	3
Clerical A	29	11	6	5	25	20	5
Clerical B	26	9	7	2	8	10	-2
Engineer A	80	29	17	12	16	16	0
Engineer B	61	16	12	4	13	7	6
Craft A	116	19	42	-23	0	4	-4
Craft B	145	22	43	-21	2	4	-2
Laborer	68	19	14	5	3	3	0
Management A	98	17	24	-7	33	38	-5
Management B	42	7	7	0	9	4	5
Operator A	65	3	13	-10	1	5	-4
Operator B	69	18	16	2	4	22	-18
Professional A	31	5	8	-3	19	15	4
Professional B	155	42	37	5	76	56	20
Para Professional	59	19	19	0	30	46	-16
Technical A	54	14	11	3	7	12	-5
Technical B	8	3	1	2	1	1	0
Total	**1149**	**255**	**284**	**38/-71**	**261**	**273**	**42/-53**

AACU Candidate Referrals for Underutilized Positions

Job Group	Title	# of Vac	Requisition Int. / Ext.	Promotions/Transfers	AACU Ref. External	Position Status
Administrative A	Chief Engineer	1	Int	1	0	Promo =WM
Administrative B	Assistant Director, Engineering	1	Int	1	0	Promo =WF
Craft A	WSS Foreman	1	Int	1	0	Promo =HM
Craft A	Metal Fabricator/Welder	1	Ext	1	0	Promo =WM
Craft A	M&O Specialist	1	Int/Ext	0	1	NH =WM
Craft B	Junior Instrument Technician	2	Ext	0	0	NH =(BM) (WM)
Craft B	Facilities Specialist I	2	Int/Ext	2	0	Promo =2(WM)
Clerical B	Warehouse Material Handler	3	Int	3	0	Trans =2(WM) Promo WM
Laborer	Building and Grounds Worker	1	Ext	0	0	NH = WM
Management A	Manager, Finance & Administration	1	Int/Ext	1	0	Promo =AM
Management A	Budget Manager	1	Int/Ext	0	0	NH = WM
Management A	Manager, Design	1	Int/Ext	0	0	NH =WF
Management A	Manager, Geotechnical and Tunneling	1	Int/Ext	0	0	NH =AF
Management A	Deputy Contracts Manager	1	Int	1	0	Promo =WM
Operator B	Operator	4	Int	4	0	Promo =3(WM) (HM)
ParaProfessional	Human Resources Coordinator	1	Int	1	0	Trans =HM
ParaProfessional	Planning Scheduling Coordinator	2	Int	2	0	Promo =(WM) (BM)
Technical A	Business Systems Analyst III	1	Int	1	0	Promo =AM
Technical A	Systems Analyst Programmer	1	Int/Ext	0	0	NH =AM

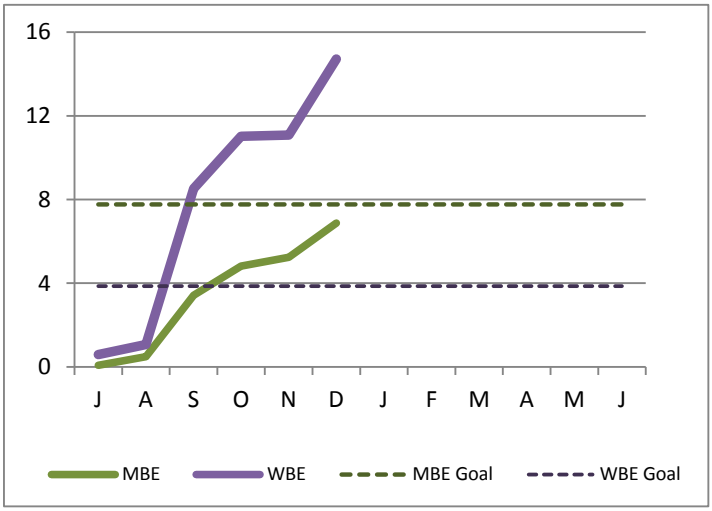
MBE/WBE Expenditures

2nd Quarter - FY19

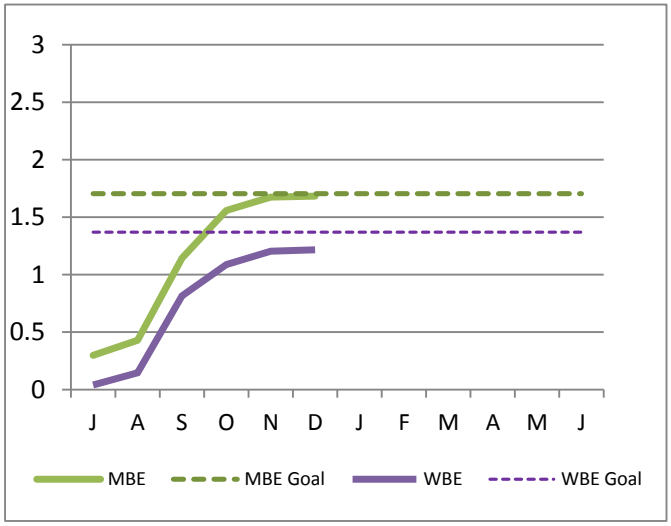
MBE/WBE targets are determined based on annual MWRA expenditure forecasts in the procurement categories noted below. The goals for FY19 are based on 85% of the total construction and 75% of the total professional projected spending for the year. Certain projects have been excluded from the goals as they have no MBE/WBE spending goals.

MBE/WBE percentages are the results from a 2002 Availability Analysis, and MassDEP's Availability Analysis. As a result of the Availability Analyses, the category of Non-Professional Services is included in Goods/Services. Consistent with contractor reporting requirements, MBE/WBE expenditure data is available through December.

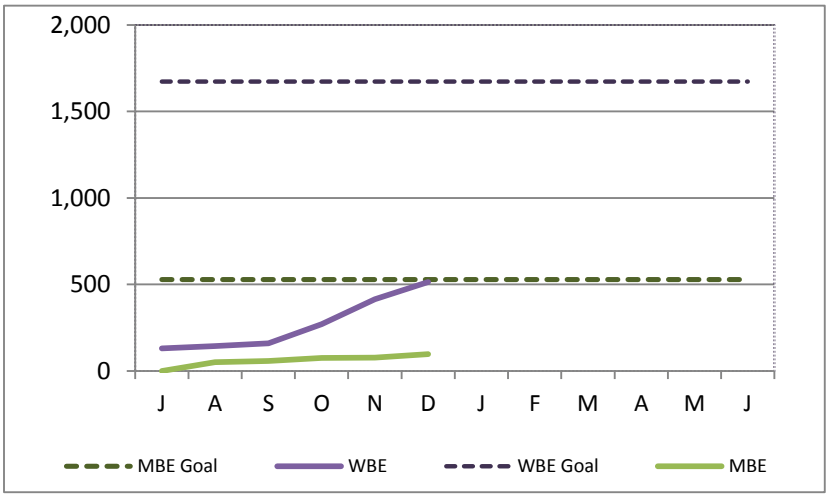
Construction (millions $)



Professional Services (millions $)



Goods/Services (Thousands $)



FY19 spending and percentage of goals achieved, as well as FY18 performance are as follows:

MBE					WBE			
FY19 YTD		FY18			FY19 YTD		FY18	
Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent
6,874,450	88.5%	12,337,140	169.4%	Construction	14,715,260	381.0%	15,875,719	438.4%
1,682,915	98.7%	1,680,583	89.2%	Prof Svcs	1,216,209	88.8%	1,196,643	79.0%
97,612	18.5%	183,744	39.8%	Goods/Svcs	514,342	30.7%	786,485	78.9%
8,654,977	89.9%	14,201,467	298.4%	**Totals**	16,445,811	268.2%	17,858,847	596.3%

FY19 MBE/WBE dollar totals do not include MBE and WBE payments to prime contractors and consultants.

MWRA FY19 CEB Expenses through December 2018

As of December 2018, total expenses are $366.0 million, $8.0 million or 2.1% lower than budget, and total revenue is $386.1 million, $1.4 million or 0.4% over budget, for a net variance of $9.5 million.

Expenses –

Direct Expenses are $113.7 million, $3.7 million or 3.1% under budget.

- **Wages & Salaries** are under budget by $2.4 million or 4.6%. Regular pay is $2.4 million under budget, due to lower head count, and timing of backfilling positions. At the end of December, the average Full Time Equivalent (FTE) positions was 1,134, twenty-one fewer than the 1,155 FTE's budgeted.
- **Ongoing Maintenance** expense $1.2 million under budget or 7.3%, reflecting the timing of projects.
- **Professional Services** expense $904k under budget or 23.6%, primarily due to under spending for Engineering and Other Professional Service of $289k and $280k, respectively. Additionally, Legal expenses were $120k under budget.
- **Utilities** expenses are $711k or 6.5% over budget due to overspending of $616k on electricity primarily at Deer Island and overspending on diesel fuel by $126K due to the timing of deliveries at Deer Island and in Wastewater Operations.
- **Other Materials** expenses are $671k or 24.2% under budget reflecting delayed spending on computer hardware of $522k and lower spending on equipment & furniture of $148k. Computer hardware purchases have been delayed.
- **Other Services** expenses are $533k or 4.5% over budget reflecting higher processing volume at palletization plant of $744k.
- **Overtime** expenses are $480k or 21.8% over budget due to wet weather events.
- **Fringe Benefits** expenses are $478k or 4.6% under budget reflecting lower health insurance cost of $457k again due to lower head count.

Indirect Expenses are $23.3 million, $357k or 1.5% under budget reflecting lower than budgeted Watershed Reimbursement of $154k and lower HEEC related charge due to delay of the low voltage switchgear upgrade project of $307k partially offset by increased HEEC Capacity charges of $67k.

Debt Service Expenses totaled $228.9 million, $4.0 million under budget due to lower than budgeted variable interest rates.

Revenue and Income –

Total Revenue and Income is $386.1 million, $1.4 million higher than budget, primarily due to greater than budgeted investment income reflecting higher returns of $1.0 million and Disposal of Equipment $288k, partially offset by lower energy revenue of $196k, due to lower Demand Response payments and Renewable Portfolio credits.

	December 2018 Year-to-Date			
	Period 6 YTD Budget	Period6 YTD Actual	Period 6 YTD Variance	%
EXPENSES				
WAGES AND SALARIES	$ 52,094,007	$ 49,716,949	$ (2,377,058)	-4.6%
OVERTIME	2,205,845	2,685,806	479,961	21.8%
FRINGE BENEFITS	10,369,901	9,892,084	(477,817)	-4.6%
WORKERS' COMPENSATION	1,211,304	1,254,969	43,665	3.6%
CHEMICALS	5,816,694	5,983,550	166,856	2.9%
ENERGY AND UTILITIES	10,874,230	11,584,790	710,560	6.5%
MAINTENANCE	16,265,719	15,084,605	(1,181,114)	-7.3%
TRAINING AND MEETINGS	241,438	223,068	(18,370)	-7.6%
PROFESSIONAL SERVICES	3,828,674	2,924,626	(904,048)	-23.6%
OTHER MATERIALS	2,778,570	2,107,325	(671,245)	-24.2%
OTHER SERVICES	11,734,508	12,267,812	533,304	4.5%
TOTAL DIRECT EXPENSES	**$ 117,420,890**	**$ 113,725,584**	**$ (3,695,307)**	**-3.1%**
INSURANCE	$ 1,049,529	$ 1,086,413	$ 36,884	3.5%
WATERSHED/PILOT	13,203,213	13,049,242	(153,971)	-1.2%
HEEC PAYMENT	693,412	453,175	(240,237)	-34.6%
MITIGATION	807,131	807,131	-	0.0%
ADDITIONS TO RESERVES	940,901	940,901	-	0.0%
RETIREMENT FUND	7,000,000	7,000,000	-	0.0%
POST EMPLOYEE BENEFITS	-	-	-	---
TOTAL INDIRECT EXPENSES	**$ 23,694,186**	**$ 23,336,862**	**$ (357,326)**	**-1.5%**
STATE REVOLVING FUND	$ 42,093,788	$ 41,754,371	$ (339,417)	-0.8%
SENIOR DEBT	134,566,990	134,566,990	-	0.0%
DEBT SERVICE ASSISTANCE	(944,726)	(944,726)	-	0.0%
CURRENT REVENUE/CAPITAL	7,099,996	7,099,996	-	0.0%
SUBORDINATE MWRA DEBT	46,087,268	46,087,268	-	0.0%
LOCAL WATER PIPELINE CP	2,375,198	2,375,198	-	0.0%
CAPITAL LEASE	1,608,530	1,608,530	-	0.0%
DEBT PREPAYMENT	-	-	-	---
VARIABLE DEBT	-	(3,647,734)	(3,647,734)	---
DEFEASANCE ACCOUNT	-	-	-	---
TOTAL DEBT SERVICE	**$ 232,887,044**	**$ 228,899,893**	**$ (3,987,151)**	**-1.7%**
TOTAL EXPENSES	**$ 374,002,120**	**$ 365,962,339**	**$ (8,039,784)**	**-2.1%**
REVENUE & INCOME				
RATE REVENUE	$ 369,521,100	$ 369,521,100	$ -	0.0%
OTHER USER CHARGES	4,441,475	4,504,813	63,338	1.4%
OTHER REVENUE	4,135,752	4,464,637	328,885	8.0%
RATE STABILIZATION	-	-	-	---
INVESTMENT INCOME	6,608,255	7,638,341	1,030,086	15.6%
TOTAL REVENUE & INCOME	**$ 384,706,582**	**$ 386,128,891**	**$ 1,422,309**	**0.4%**

Cost of Debt
2nd Quarter – FY19

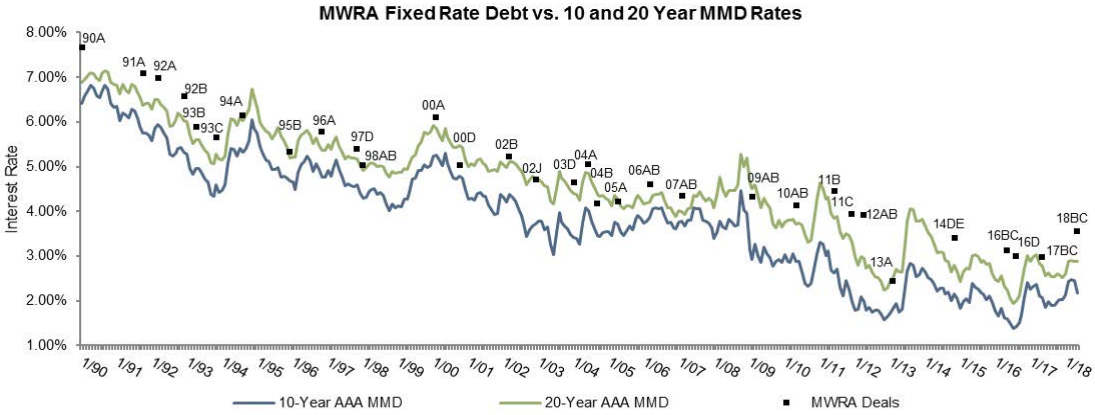
MWRA borrowing costs are a function of the fixed and variable tax exempt interest rate environment, the level of MWRA's variable interest rate exposure and the perceived creditworthiness of MWRA. Each of these factors has contributed to decreased MWRA borrowing costs since 1990.

Average Cost of MWRA Debt FYTD

Fixed Debt ($3,40 billion)	3.77%
Variable Debt ($418.9 million)	2.04%
SRF Debt ($935.7 million)	1.48%
Weighted Average Debt Cost ($4,755 billion)	3.17%

Most Recent Senior Fixed Debt Issue
May 2018

2018 Series B &C ($129.5 million) 3.56%

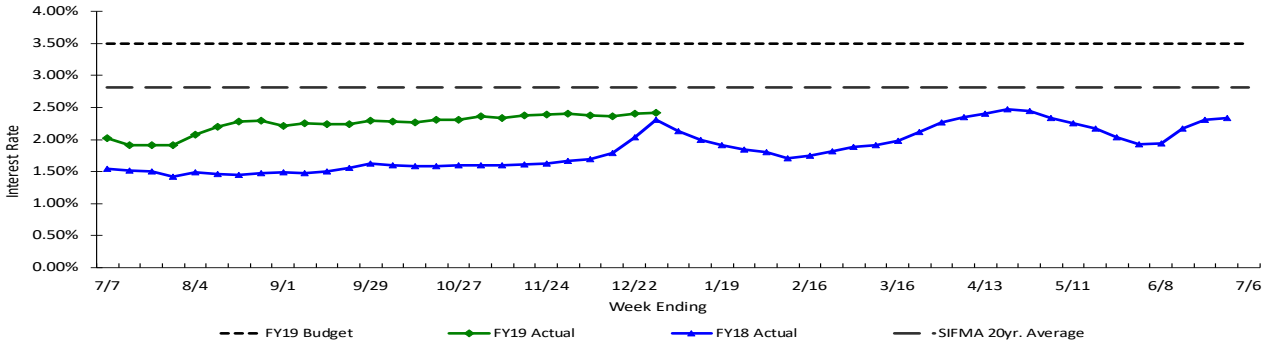


Bond Deal	1993B	1993C	1994A	1995B	1996A	1997D	1998AB	2000A	2000D	2002B	2002J	2003D	2004A	2004B
Rate	5.89%	5.66%	6.15%	5.34%	5.78%	5.40%	5.04%	6.11%	5.03%	5.23%	4.71%	4.64%	5.05%	4.17%
Avg Life	19.8 yrs	19.1 yrs	19.5 yrs	20.5 yrs	19.5 yrs	21.6 yrs	24.4 yrs	26.3 yrs	9.8 yrs	19.9 yrs	19.6 yrs	18.4 yrs	19.6 yrs	13.5 yrs

Bond Deal	2005A	2006AB	2007AB	2009AB	2010AB	2011B	2011C	2012AB	2013A	2014DEF	2016BC	2016D	2017BC	2018BC
Rate	4.22%	4.61%	4.34%	4.32%	4.14%	4.45%	3.95%	3.93%	2.45%	3.41%	3.12%	2.99%	2.98%	3.56%
Avg Life	18.4 yrs	25.9 yrs	24.4 yrs	15.4 yrs	16.4 yrs	18.8 yrs	16.5 yrs	17.9 yrs	9.9 yrs	15.1 yrs	17.4 yrs	18.8yrs	11.2 yrs	11.7yrs

Weekly Average Variable Interest Rates vs. Budget

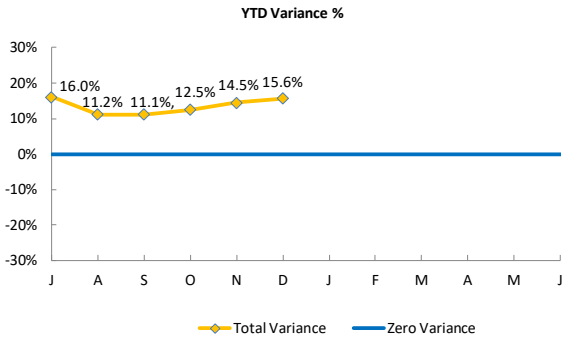
MWRA currently has eleven variable rate debt issues with $808.2 million outstanding, excluding commercial paper. Of the eleven outstanding series, five have portions which have been swapped to fixed rate. Variable rate debt has been less expensive than fixed rate debt in recent years as short-term rates have remained lower than long-term rates on MWRA debt issues. In December, SIFMA rates ranged from a high of 1.71% to a low of 1.64% for the month. MWRA's issuance of variable rate debt, although consistently less expensive in recent years, results in exposure to additional interest rate risk as compared to fixed rate debt.



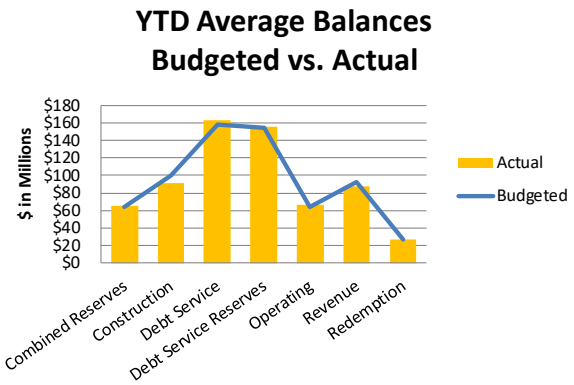
Investment Income

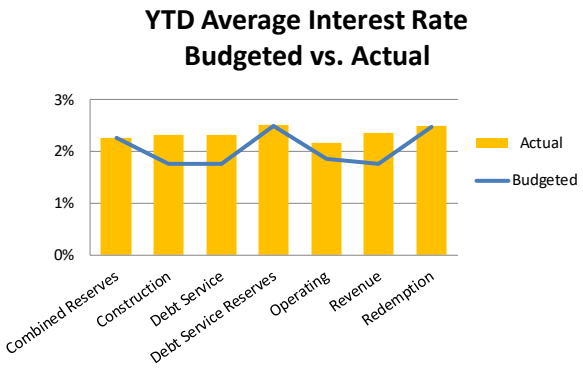
2nd Quarter – FY19

Year To Date



	YTD BUDGET VARIANCE ($000)			
	BALANCES IMPACT	RATES IMPACT	TOTAL	%
Combined Reserves	$10	($2)	9	1.2%
Construction	($75)	$254	178	20.5%
Debt Service	$40	$460	500	36.2%
Debt Service Reserves	$2	$23	25	1.3%
Operating	$28	$65	93	15.7%
Revenue	($40)	$264	224	27.9%
Redemption	$0	$1	1	0.3%
Total Variance	($35)	$1,066	$1,030	15.6%





Monthly