MASSACHUSETTS WATER RESOURCES AUTHORITY

Board of Directors Report

on

Key Indicators of MWRA Performance

Fourth Quarter FY2020

Q1	Q2	Q3	Q4

Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer
September 16, 2020

Board of Directors Report on Key Indicators of MWRA Performance
Fourth Quarter FY20

Table of Contents

Operations and Maintenance

DITP Operations-Energy 1
DITP Operations 2
Residuals Processing 4
DITP Maintenance
Proactive and Productivity Measures 5
- Preventive Maintenance
- Preventive Maintenance Kitting
- Operations Light Maintenance PMs
- Predictive Maintenance

Overall Maintenance Program Measures 6
- Maintenance Spending and FTEs
- Replacement Asset Value / Maintenance Technician
- Maintenance Cost / Replacement Asset Value
- Backlog and Availability

Overall Maintenance Program Measures (cont.) 7
- Overtime (excluding Storm Coverage) as a Percentage of Wages & Salaries
- Craft hours
- Craft Work Orders

Operations Division–Metering & Leak Detection 8
Water Distribution System–Valves 9
Wastewater Pipeline/Structures 10
FOD Metro Facility & Equipment Maintenance 11
Renewable Electricity Generation-1 12
Renewable Electricity Generation-2 13
Toxic Reduction and Control 14
Field Operations – Narrative Topics 15
Laboratory Services 17

Construction Programs

Projects in Construction 18
CSO Control Update 20
CIP Expenditures 21

Drinking Water Quality and Supply

Source Water – Microbial Results and UV Abs 22
Source Water – Turbidity 23
Treated Water– pH and Alkalinity 23
Treated Water– Disinfection Effectiveness 24
Source Water – Algae 25
Treated Water– Complaints 25

Drinking Water Quality and Supply (cont.)

Bacteria & Chlorine Residual Results - Communities 26
Treated Water- Disinfection By-Products, UV 254 27
Water Supply/Source & Management 28

Wastewater Quality

NPDES
Permit Compliance – Deer Island 29
Permit Compliance –Clinton 30

Community Flows and Programs

Total Water Use Core Communities 31
Community Wastewater Flows 32
Community Support Programs
- -Infiltration/Inflow Local Financial Assist. Progr. 33
- -Water-Local Pipeline & System Assist. Progr. 34
- -Lead Service Line Replacement Loan Progr. 35
- -Community Water System Leak Detection and Conservation Outreach 36

Business Services

Procurement 37
Materials Management 38
MIS Program 39
Legal Matters 40
Internal and Contract Audits 43

Other Management

Workforce Management 44
Workplace Safety Program 45
Job Group Representation 46
MBE/WBE Expenditures 47
CEB Expenses 48
Cost of Debt 49
Investment Income 50

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.

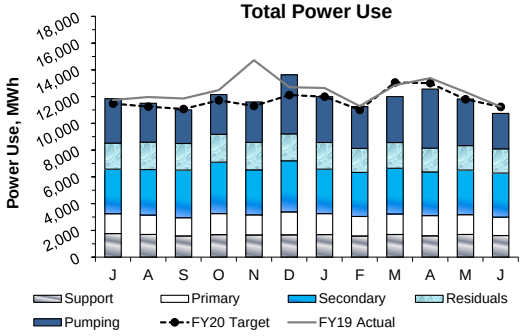
Frederick A. Laskey, Executive Director
David Coppes, Chief Operating Officer

September 16, 2020

OPERATIONS AND MAINTENANCE

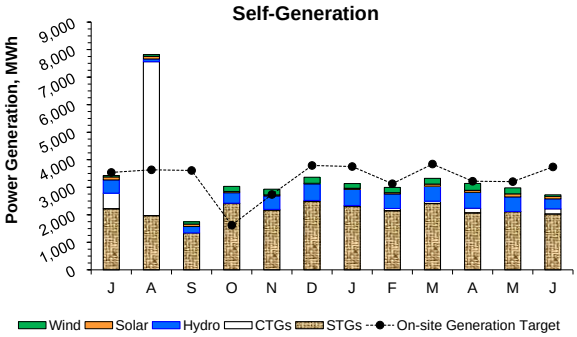
Deer Island Operations

4th Quarter - FY20

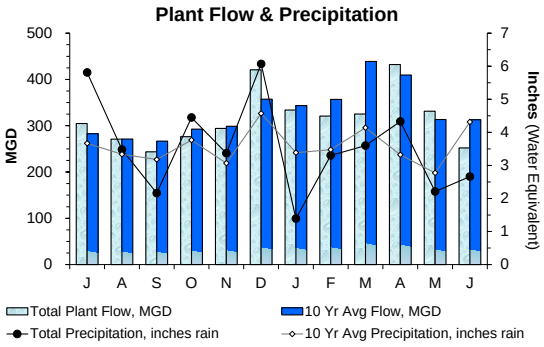


Total power usage in the 4th Quarter was 2.5% below target as the Total Plant Flow was 1.9% below target with the 4 year average plant flow. Power usage was similar to or below target in all process areas during the quarter. **Overall, total power usage in FY20 was on target (+0.8%) while total plant flow was 2.7% above the 4 year average plant flow target.**

Note: Power usage projections are based on 4 year averages.

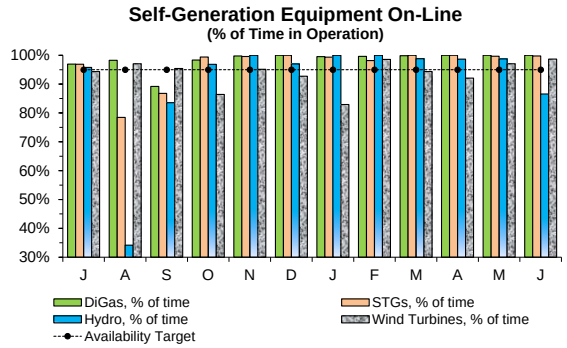


Power generated on-site during the 4th Quarter was 13.0% below target. CTGs generation fell below target by 30.7% as the FY20 budget estimate, based on generation data from FY15 to FY18, had included more CTG operation during storms, maintenance testing, and during extended utility cable maintenance outage periods, which did not occur to the same extent as expected this the quarter. STGs generation was 21.9% below target as digester gas production was lower than expected and due to reduced generation from not being able to operate the steam system in summer mode this quarter as a result of the CTG Auto Voltage Regulator (AVR) upgrade and an equipment issue with the BP-STG. Hydro Turbine generation was 47.5% above target. Generation from the Solar Panels was 2.1% below target, while Wind Turbine generation was 28.5% above target. **Overall, power generation was 2.0% above target for FY20.**

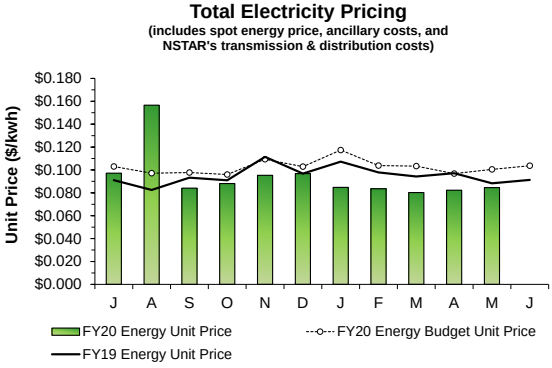


Total Plant Flow for the 4th Quarter was on target (-2.0%) with the budgeted 10 year average plant flow (338.5 MGD actual vs. 345.3 MGD expected) even though precipitation was 12.0% below target (9.20 inches actual vs. 10.41 inches expected). Total Plant Flow was 1.9% lower than the 4 year average plant flow used for energy budget projections. **Total Plant Flow in FY20 (10 year average) was 3.5% below target while precipitation was on target (-0.4%).**

Note: Plant Flow and precipitation projections are based on 10 year averages but are 4 year averages for the energy budget projections.

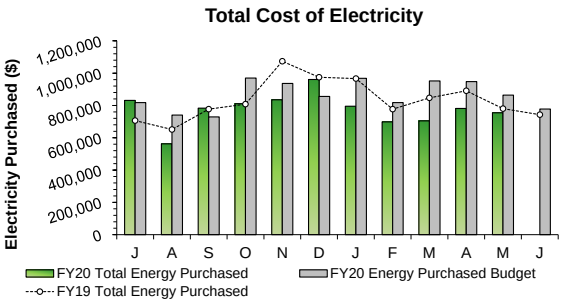


The DiGas system, STGs, Hydro Turbines, and Wind Turbines all met or exceeded the 95% availability target for the 4th Quarter.



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 May (the most current invoice available) was 15.9% below target with budgetary estimates. The actual total energy unit price in June is 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.

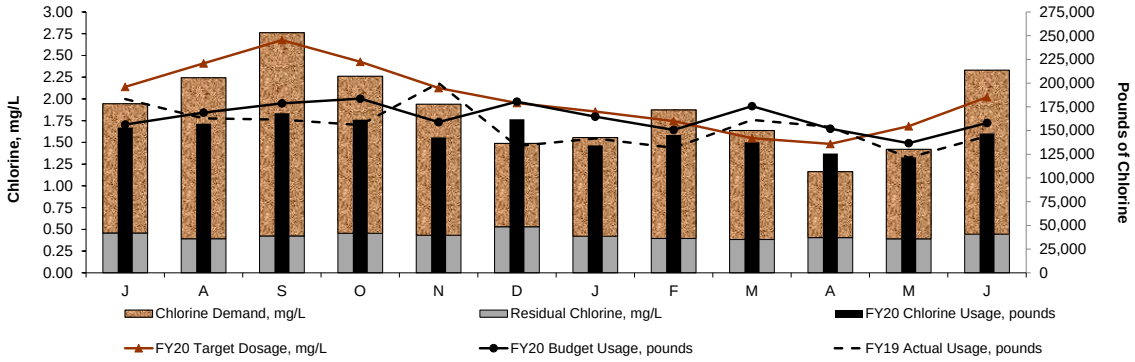
Note: Only the actual energy prices are reported. Therefore, the dataset lags by one (1) month due to the timing of invoice receipt and review.



The Electricity cost data for Electricity Purchased in June is not yet available. Year-to-date Total Cost of Electricity is $1,080,850 (11.3%) lower than budgeted through May. Even though the Total Electricity Purchased was on target (+0.6%) through May, the Total Energy Unit Price was 11.8% lower than target.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by one (1) month due to the timing of invoice receipt and review.

Deer Island Sodium Hypochlorite Use



The disinfection dosing rate in the 4th Quarter was 5.0% below target with budgetary estimates. Actual sodium hypochlorite usage in pounds of chlorine was also 11.7% lower than expected as the 4 year average plant flow used for estimating the hypochlorite usage target was 1.9% lower than expected. DITP maintained an average disinfection chlorine residual of 0.41 mg/L this quarter with an average dosing rate of 1.64 mg/L (as chlorine demand was 1.22 mg/L). **Overall in FY20, disinfection dosing was 6.0% below target and sodium hypochlorite usage in pounds of chlorine was 10.6% below target.**

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	4	4	0	99.6%	10.26
A	2	2	0	99.3%	7.64
S	1	1	0	99.8%	2.45
O	3	3	0	99.0%	11.13
N	1	1	0	99.6%	4.81
D	2	2	0	99.4%	17.99
J	0	0	0	100.0%	0.00
F	0	0	0	100.0%	0.00
M	1	1	0	99.4%	7.45
A	3	3	0	99.8%	7.64
M	2	2	0	99.9%	3.89
J	1	1	0	99.99%	1.12
Total	20	20	0	99.7%	74.38

99.9% of all flows were treated at full secondary during the 4th Quarter. There were six (6) secondary blending events due to high plant flows resulting from heavy rain. These blending events resulted in a total of 12.65 hours of blending and 37.26 MGal of primary-only treated effluent with secondary effluent. The Maximum Secondary Capacity for the entire quarter was 700 MGD.

Overall in FY20, 99.7% of all flows were treated at full secondary. There were a total of 20 separate secondary blending events in FY20; all due to high plant flows resulting from heavy rain, and on occasion in combination with significant snow melt during winter and early spring. These secondary blending events combined produced a total of 74.4 hours of blending and 409.3 MGal of flow blended with secondary effluent.

Secondary permit limits were met at all times during the 4th Quarter and during the entire FY20.

Deer Island Operations & Maintenance Report

Environmental/Pumping:

The plant achieved an instantaneous peak flow rate of 911.8 MGD during the morning of May 1. This peak flow occurred during a storm event that brought 0.80 inches of precipitation to the metropolitan Boston area. Overall, Total Plant Flow in the 4th Quarter was 2.0% below target with the 10 year average plant flow estimate for the quarter.

The MWRA has an on-going project to inspect, and eventually rehabilitate, the shafts that transport wastewater between the remote headworks facilities and the DITP. In order to support the inspections, the remote headworks facilities were temporarily shut down to perform physical and remote inspections. DITP worked closely with Wastewater Operations staff during the Chelsea Creek Headworks Facility shutdown on May 22. Flow at the facility was diverted to the Caruso Pump Station to the Winthrop Terminal Facility at the Deer Island Treatment Plant for approximately 4.5 hours from 3:00 AM to 7:30 AM, when the diurnal flows were at the lowest levels, to allow the contractor to inspect the Chelsea Creek Headworks Facility effluent channels and to remotely inspect the effluent shaft.

Work on the Winthrop Terminal Facility (WTF) VFD (Variable Frequency Drive) and Synchronous Motor Replacement project was started by the contractor in 2018 and entails the demolition of existing older obsolete equipment (electrical systems, motors and VFDs on each of the six (6) raw wastewater pumps). The pumps are currently powered by 600 volts service and will be changed to 4,160 volts, consistent with other major pumps in both the South System Pump Station (SSPS) and the NMPS. The upgrade for WTF Pump #4 began on May 18 and continued through the remainder of June. To date, work has been completed on three (3) of the six (6) pumps (#6, #2, and #5).

Staff and contractors performed testing on North Main Pump Station pump #9 on June 18 to evaluate whether the pump rebuild in December 2019 (which included a new epoxy coating of the pump casing) has resulted in improved performance. Pressure and power use readings were taken as the pump #9 flow rate was varied. Our preliminary operating data showed a 17-20% performance inprovement when normalized to kwh/MGD (pre- vs. post-repairs). The final report from the contractor is currently pending completion.

Deer Island Operations & Maintenance Report (continued)

Environmental/Pumping:
June's average daily North System influent plant flow of 164.84 MGD set a new low flow record for the month of June dating back to plant startup in July 1998. The previous low flow record for the month of June (167.30 MGD) was recorded in 2016.

Secondary Treatment:
Annual turnaround maintenance that is typically performed on Train #2 at the Cryogenic Oxygen Facility in April was postponed until July, as the contractor has suspended all non-essential work activities and travel due to the nation-wide shutdown response to the COVID-19 pandemic.

Odor Control:
The internal lining for carbon adsorber (CAD) unit #3 in the East Odor Control (EOC) Facility and for unit #6 in the West Odor Control (WOC) Facility were recoated in June. The CADs were refilled with new carbon media and the units were placed in operation. CAD unit #8 in the East Odor Control (EOC) Facility and unit #1 in the West Odor Control (WOC) Facility were taken offline on June 23 and emptied of carbon media. These CAD units will remain offline pending the completion of contractor maintenance (recoating).

Residuals Treatment:
The rehabilitation of Gravity Thickener #4 under the major Gravity Thickener Rehabilitation project was completed in mid-April. Gravity Thickener #3 was given to the contractor at the end of April to begin rehabilitation work. 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. The entire rehabilitation project is anticipated to take nearly three (3) years to complete in 2021. The rehabilitation of Gravity Thickeners #1, #2, and #4 has now been completed.

Energy and Thermal Power Plant:
Overall, total power generated on-site accounted for 25.2% of Deer Island's total power use for Quarter 4 and 28.6% for FY20. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 24.1% of Deer Island's total electrical power use for the quarter and 23.8% for FY20.

The 1.2 MW BP-STG had been out of service since May 22 due to a problem with a proprietary electrical component. The unit remained offline until June 29 after the failed component was able to be replaced. There was no impact on gas utilization and potentially a slight reduction in generation in late June as the main steam turbine generator was able to compensate for the BP-STG outage. The small BP-STG does provide additional generation from mid-June through September because it allows utilization of additional steam from the boiler when less heat is required over the summer.

The 100 kW solar panel array mounted on the rooftop of the Residuals Odor Control (ROC) Facility failed on May 31 due to an issue with the inverter unit which allows the electricity generated by the solar array to be transmitted to the DITP electrical grid. Operation of this solar panel array should be restored pending receipt and replacement of the failed inverter unit. Electricity generated by the ROC Facilitly solar array typically comprises 12% to 13% of the total solar generation. All other solar array units at the DITP were not impacted by this issue and are in operation.

During routine maintenance on Hydro Turbine #2 on June 17, the service contractor found an issue with the runner blade assembly. Further investigations into this issue are currently ongoing. This turbine will remain unavailable until the unit can be repaired. Hydro Turbine #2 was only being placed into operation intermittently as needed since October 2019 when Hydro Turbine #1 was returned to operation after being refurbished. There will be no reduction in hydro turbine generation due to the unavailability of this turbine as the operation of a single hydro turbine unit provides the same level of energy generation as would the operation of both turbine units during typical daily flow conditions.

Clinton Operations & Maintenance Report

Dewatering Building
Maintenance replaced a pulsation dampener on #3poylmer pump. Maintenance staff repaired suction valve on #1 gravity thickener. Operation staff dewatered and cleaned #1 gravity thickener. Staff also washed down #2 gravity thickener. Contractor replaced a leaking hot water pipe in belt filter press room.

Chemical Building
Maintenance installed 1-1/2'' make up water solenoid for the soda ash machine. Maintenance staff cleaned soda ash feed line. Maintenance staff fabricated a new sodium bisulfite line for bisulfite repair. Contractor performed official inspection and certification of the Penn Valley Pumps installed to pump soda ash slurry form the soda ash machine. Clinton staff and contractor successfully completed the dye test on the sodium bisulfite system. Contractor repaired skimmer arm assembly on #1 final clarifier.

Aeration Basins
Operations staff cleaned pH and DO probes. Maintenance staff changed oil and belts in all Aerzen compressors.

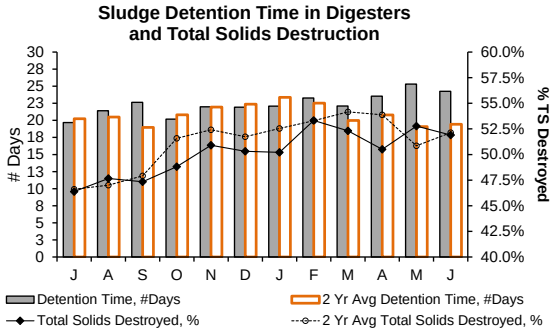
Phosphorus Building
Maintenance staff acid washed all three disk filters, cleaned troughs, and inspected all nozzles. Staff removed and replaced gaskets on five disk filter cartridges.

Headworks
Maintenance staff replaced coupling on # 2 grit bucket elevator motor. Maintenance checked, cleaned & lubricated all equipment in upper grit. They also cleaned and welded grit screw. Contractor replaced a leaking pipe section and plugged fittings on a head works 1" condensate line.

Digester Building
Maintenance staff they checked all equipment for proper operation. Contractor replaced hot water tubes and sludge tubes on # 2 digester sludge heater.

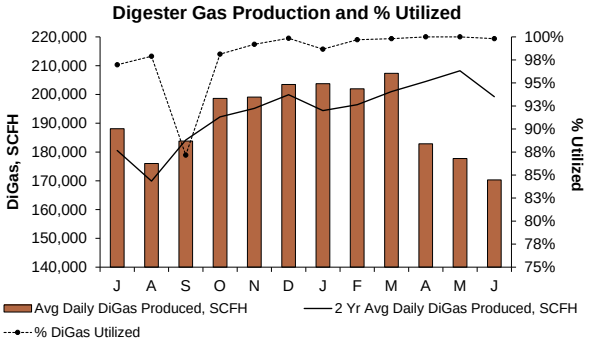
Deer Island Operations and Residuals

4th Quarter - FY20



Total solids (TS) destruction following anaerobic sludge digestion averaged 51.7% during the 4th Quarter, similar to the 2 year average of 52.3%. The lower destruction is attributed to higher-than-expected secondary waste sludge, which is more difficult to break down during sludge digestion. Sludge detention time in the digesters was 24.4 days as DI operated with an average of 8.0 digesters. **Overall in FY20, TS destruction averaged 50.2%, similar to the 2 year average of 51.2%. Sludge detention time was 22.4 days, 7.4% higher than the 2 year average of 20.8 days.**

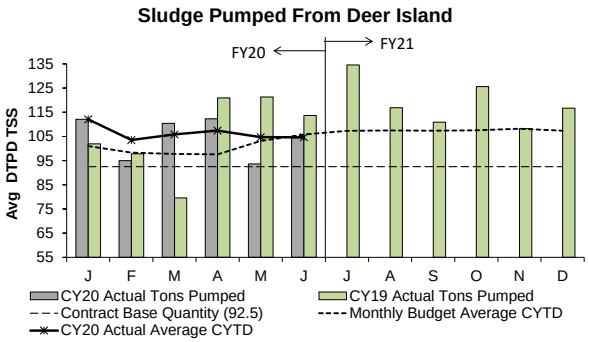
Total solids (TS) destruction is dependent on sludge detention time which is determined by primary and secondary solids production, plant flow, and the number of active digesters in operation. Solids destruction is also significantly impacted by changes in the number of digesters and the resulting shifting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



The Avg Daily DiGas Production in the 4th Quarter was 13.2% below target with the 2 Year Avg Daily DiGas Production due to much lower-than-expected primary sludge production which breaks down more readily during anaerobic sludge digestion. On average, 99.9% of all the DiGas produced in the quarter was utilized at the Thermal Power Plant (TPP). **Overall in FY20, the Avg Daily DiGas Production was 1.4% below target, with an average of 98.1% utilization of DiGas at the Thermal Power Plant.**

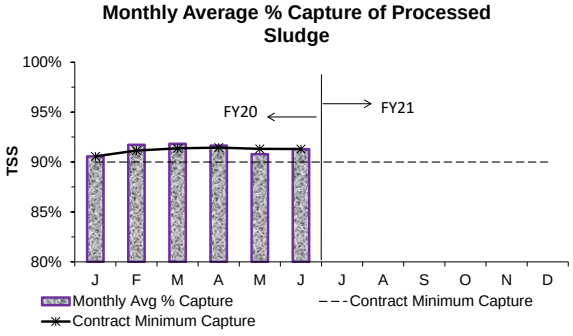
Residuals Pellet Plant

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 (FY20's budget is 107.4 DTPD/TSS and FY21's budget is 107.9 DTPD/TSS).

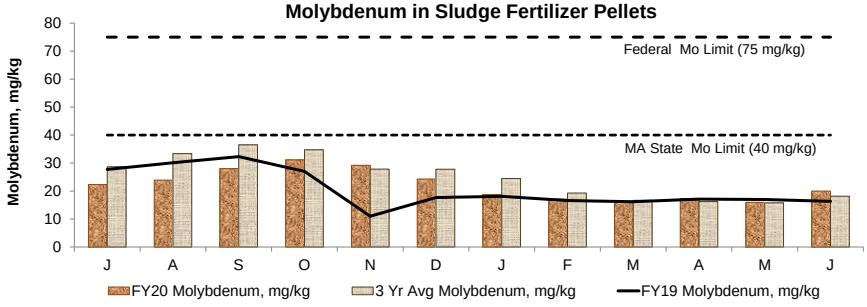


The average quantity of sludge pumped to the Biosolids Processing Facility (BPF) in the 4th Quarter was 103.5 TSS Dry Tons Per Day (DTPD) - 9.1% below target with the FY20 budget of 113.9 TSS DTPD for the same period. Sludge delivered to the BPF was lower than expected during the quarter mainly due to lower-than-expected overall sludge production in addition to inventory shifts in the digested sludge holding tanks on DITP.

The CY20 average quantity of sludge pumped through June is 104.6 DTPD - 1.1% below target compared with the CY20 average budget of 105.8 DTPD during the same time period.



The contract requires NEFCO to capture at least 90.0% of the solids delivered to the Biosolids Processing Facility. The average capture for the 4th Quarter was 91.2% and the CY20 to date average capture is 91.3%.



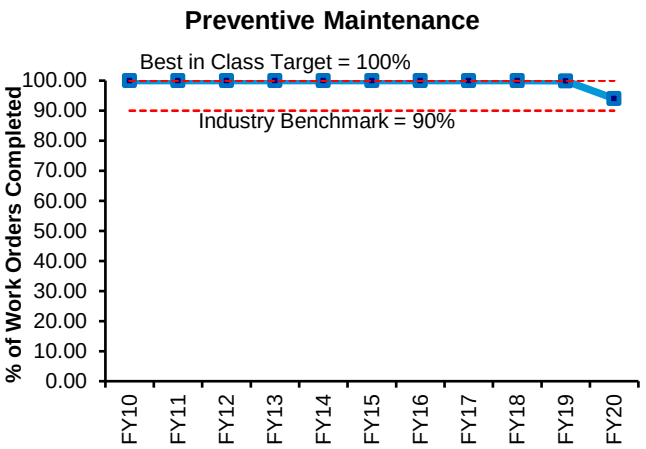
Copper, lead, and molybdenum (Mo) are metals of concern for MWRA as their concentrations in its biosolids have, at times, exceeded regulatory standards for unrestricted use as fertilizer. Molybdenum-based cooling tower water is a significant source of Mo in the sludge fertilizer pellets. The Federal 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, the level in the MWRA sludge fertilizer pellets during the 4th Quarter averaged 17.7 mg/kg, 6% above the 3 year average, 56% below the MA State Limit, and 76% below the Federal Limit.

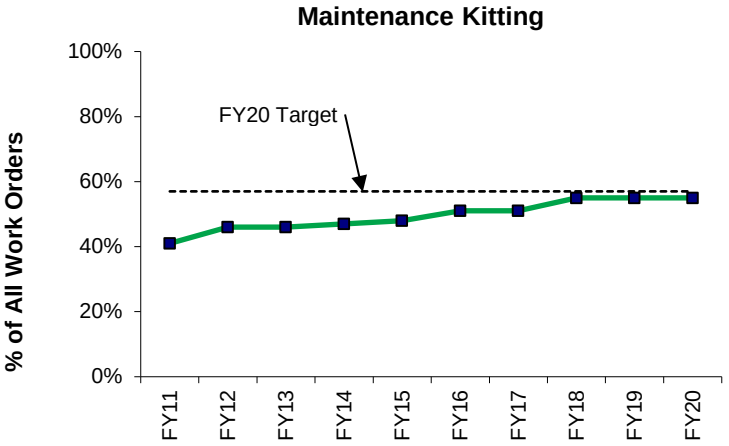
Deer Island Yearly Maintenance Metrics

4th Quarter - FY20

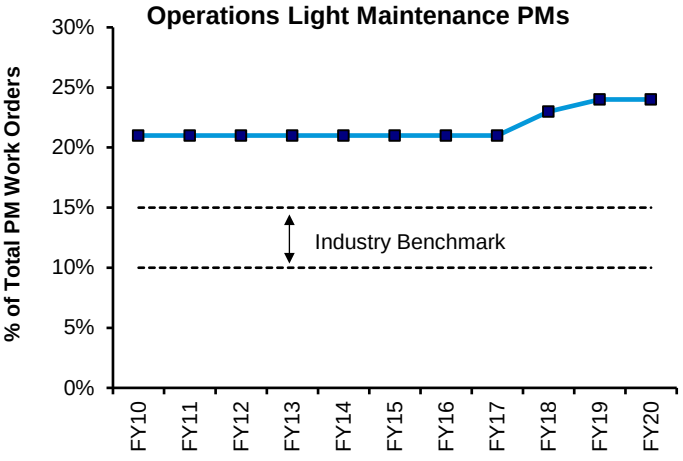
Proactive and Productivity Measures



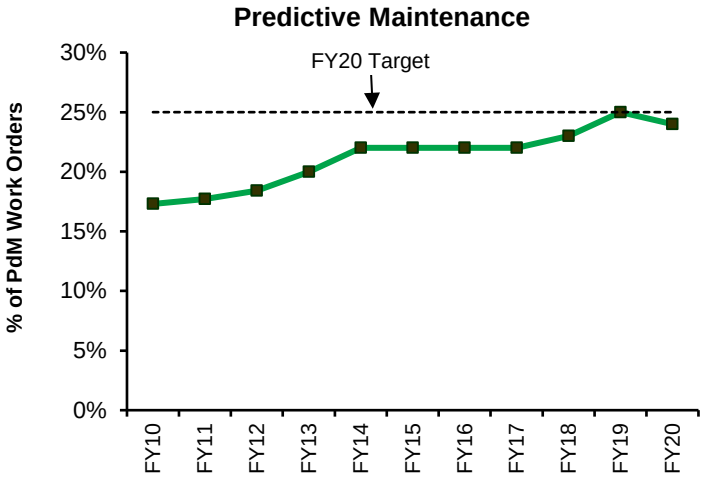
The industry benchmark is 90% for Preventive Maintenance (PM) completion. Upon reaching the 90% goal in FY05, the target goal was increased to the "Best in Class" Target of 100% PM completion. Reliability-Centered Maintenance (RCM) and PM optimization efforts have continued since FY01. PM completion rate was 94% in FY20. This year's decrease is because of limited staff onsite after March 13, 2020, due to COVID-19.



Preventive Maintenance (PM) inventory items were loaded into Maximo to assign spare parts for equipment to PM work orders. DITP reached the PM kitting goal of 100%. In FY11 a new graph (above) was developed to track kitting of all maintenance work orders in an effort to increase wrench time. Staff continues to fine-tune the process to "kit" all maintenance work orders. Kitting is considered a best practice by maintenance and reliability professionals. It entails staging parts necessary to complete maintenance work. Kitting allows maintenance staff to spend more time "turning the wrench" and less time waiting for parts at the stockroom window. Kitting for FY20 was 55%, below DITP's goal of 57%. Kits were prepared, but because of limited staff due to COVID-19, work was delayed.



The percentage of preventive maintenance work order hours completed by Operations staff (non maintenance staff) increased from less than 1% in January 2002 to the current level of 24% in FY20. DITP reached the industry benchmark range of 10-15% in April 2003 and has exceeded the goal through FY20. Operations completes approximately 625 PM work orders per month. Operations work percentage stayed on track as operations was fully staffed and not limited by COVID-19.

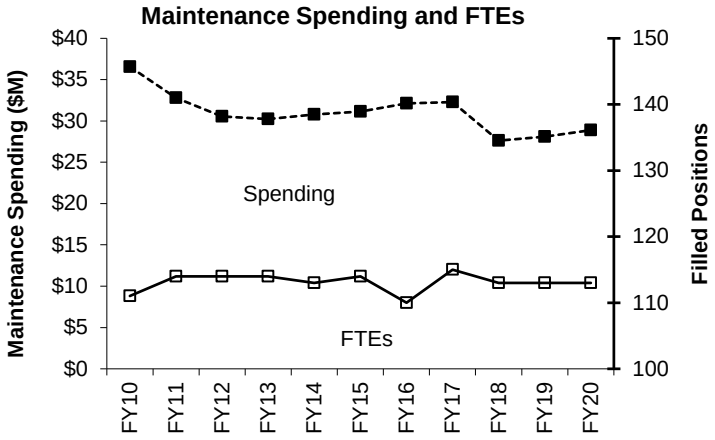


Predictive maintenance has steadily increased from 2% in FY03 to 24% in FY20, DITP's was below FY20 goal of 25%. This percentage in predictive maintenance was achieved through the expanded use of lubrication, vibration, thermography, and acoustic ultrasonic testing techniques. The Condition Monitoring Group continually reviews and investigates new opportunities and initiatives to expand condition monitoring testing and analysis. This year's decrease is because of limited staff onsite after March 13, 2020, due to COVID-19.

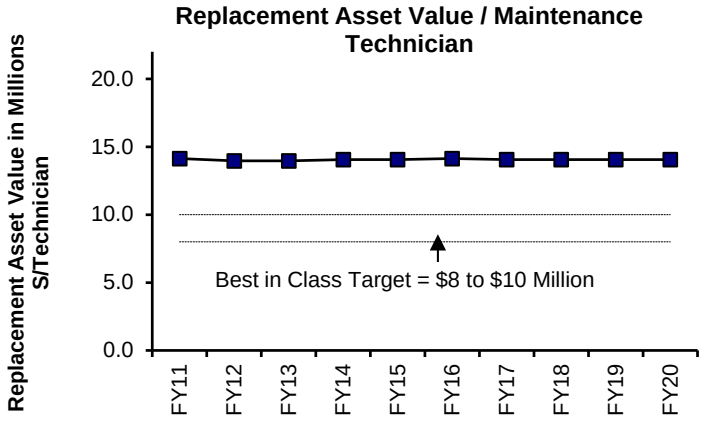
Deer Island Yearly Maintenance Metrics

4th Quarter - FY20

Overall Maintenance Program Measures

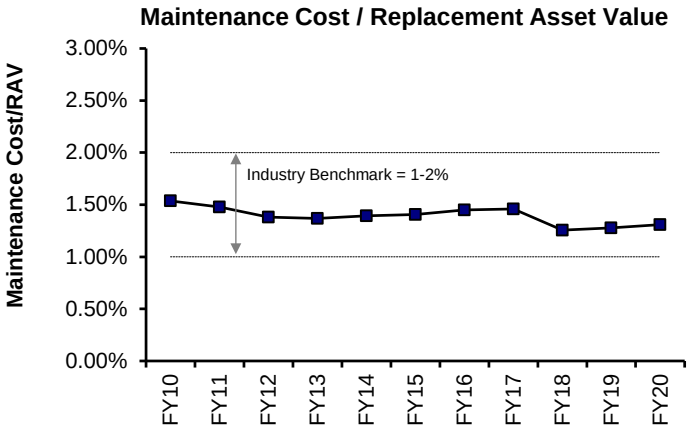


DITP's Maintenance staff is currently at 113 FTE's. Maintenance has been successful in meeting its goals through implementation of numerous maintenance efficiencies including: Operations staff performing light maintenance, cross-functional training and flexibility, and Reliability-Centered Maintenance.

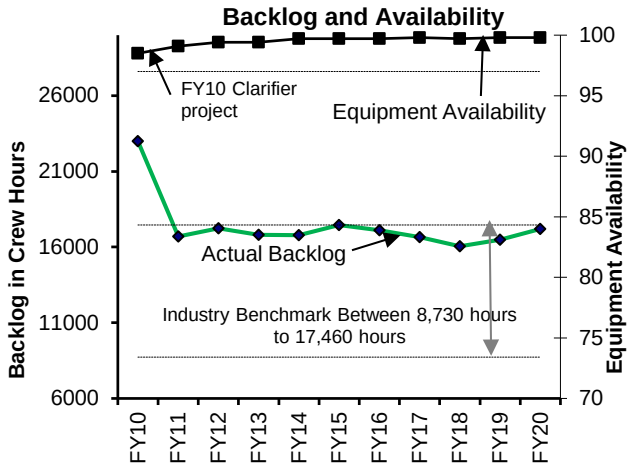


DITP adopted a "best in class" target of $8-$10 Million/Technician for maintenance staffing. DITP remains above this Best in Class target range. However, as the plant ages and additional equipment replacements are expected, DITP management will reassess staffing as needed.

The Maintenance Spending graph shows actual annual maintenance spending and significant CIP asset replacements (equipment costs only). Maintenance budgeting continues to evaluate plant assets and requirements for replacement of obsolete equipment to ensure the plant operates at maximum efficiency. In FY20, overall spending increased slightly from FY19 due to some large Maintenance Projects; Winthrop Terminal Facility VFD/Motor Replacements (2), Gravity Thickener Rebuilds (3), MCC Switchgear Replacements, Exterior Door Contract and PICS Upgrades.



The industry benchmark for annual maintenance spending is between 1% to 2% of replacement asset value, currently DITP is at 1.32%. The plant's replacement asset value is calculated at approximately $2.4 billion dollars. DITP's current maintenance spending is within the industry benchmark. As the plant ages and equipment replacement is required, spending is expected to increase. DITP Maintenance CEB spending is $22.4 million coupled with CIP spending of $6.5 million, totaling $28.9 million.



Industry benchmark for Equipment Availability is 97%. Deer Island has exceeded this benchmark over for the last ten years. In FY20 the availability was 99.8%. The high percentage in Equipment Availability during FY20 is due to redundancy of equipment and effective/efficient maintenance practices.

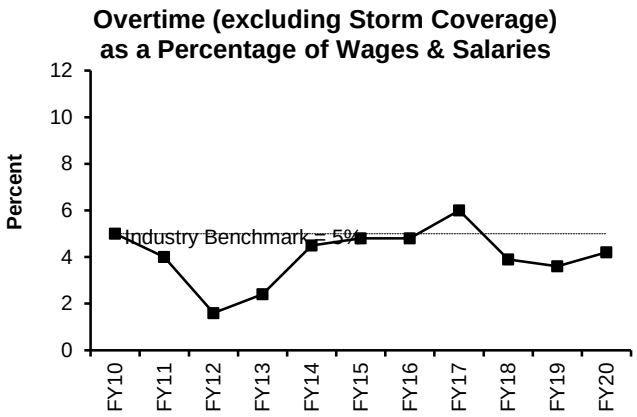
Industry Benchmark for Backlog is between 8,730 to 17,460 hours for maintenance based on current staffing, the total average backlog for FY20 was 17,194 hours, which is within the industry benchmark.

Although we are in acceptable Backlog range, we did increase from last year. Maintenance was above the industry benchmark for the last three months of FY20, due to limited staff onsite after March 13, 2020 due to COVID-19.

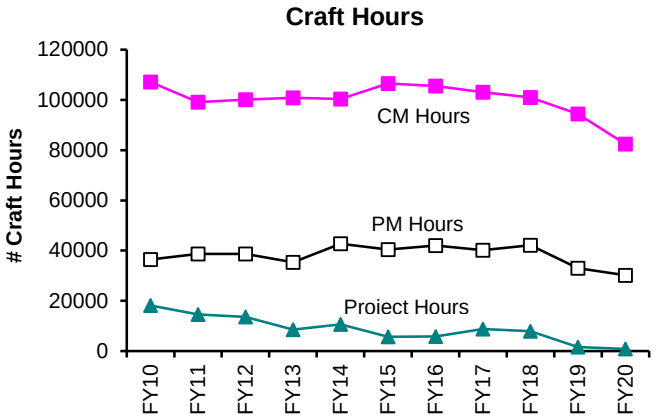
Deer Island Yearly Maintenance Metrics

4th Quarter - FY20

Overall Maintenance Program Measures (cont.)



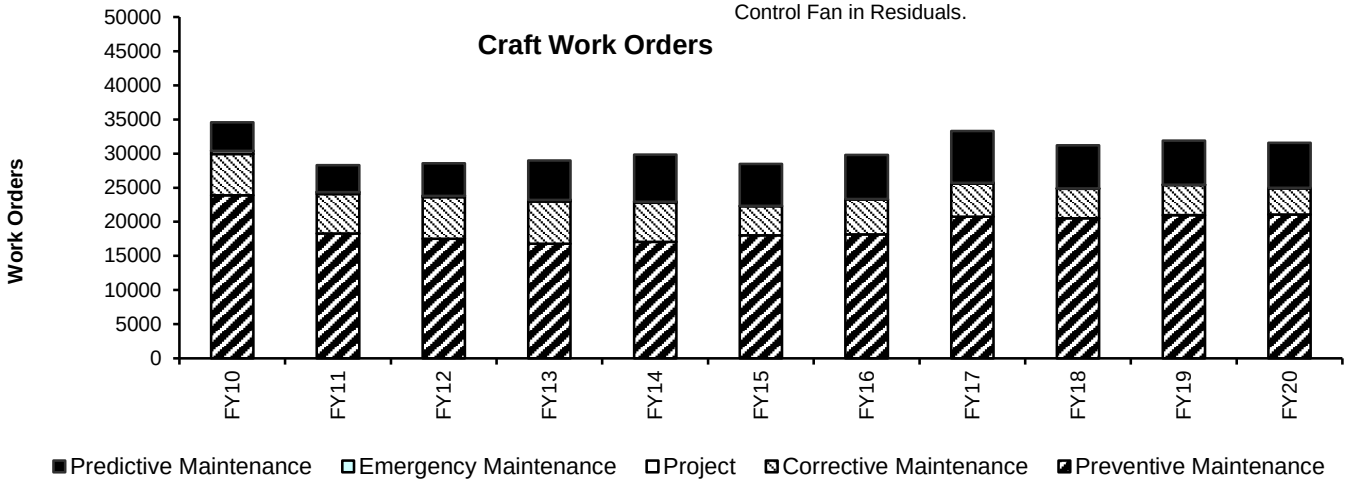
Management continues its effort to keep overtime below the industry benchmark. DITP maintenance overtime was 4.2% for FY20. Management has taken steps to reduce overtime spending by limiting overtime to repair critical equipment and systems only. DITP has been on or under Industry Benchmark every year except FY17, due to the increase in overtime for the Eversource Cable Outage.



Continued optimization of the Preventive Maintenance (PM) program through the transfer of some light maintenance tasks from Maintenance to Operations staff (24% of PM work orders in FY20), elimination of duplicate work orders, combining some PM's, increasing PM frequency due to equipment history and performance along with limited staff onsite due to COVID-19 has resulted in a decrease in PM hours in FY20.

This years decrease in CM and Project hours is because of limited staff onsite after March 13, 2020 due to COVID-19.

Maintenance did complete some significant maintenance work in the first 3 quarters of FY20: Exterior Door Contract, Overhaul of Norwalk Compressor #3, Installation of new Wash Press Screw, Installation of High Pressure W3 Strainers, Installation of Rebuilt RWW Pump #9 in North Main Pump Station and the Installation of the 52,000 CFM Odor Control Fan in Residuals.



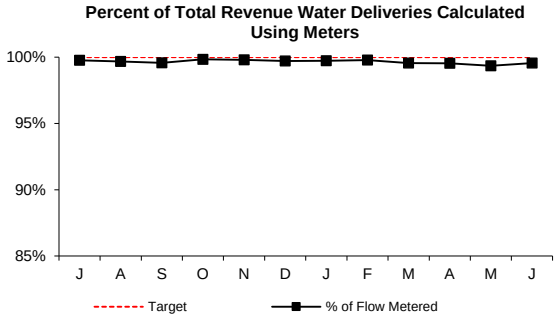
During FY20, the overall number of work orders decreased by 300 from the previous year. The decrease in work orders was due to COVID-19 and the Planning Department increasing frequency time between PM's/Pdm's based on trending of real time data and previous failure rates.

The Planning department is continuously modifying PM, PdM, and CM Job Plans to ensure maintenance is being performed efficiently and effectively, while ensuring reliability and availability of DITP's Assets.

Operations Division Metering & Reliability

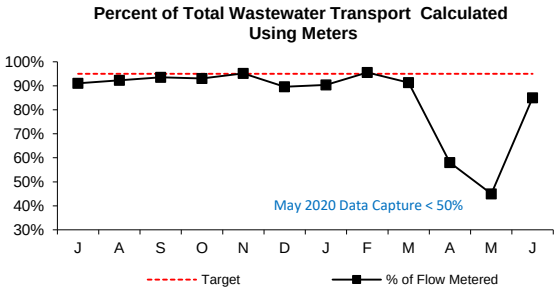
4th Quarter - FY20

WATER 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 Q4 of 2020, 0.52% of the billed water flow was estimated. 99.48% was based on meter actuals. The entirety of this value was from instrumentation failure.

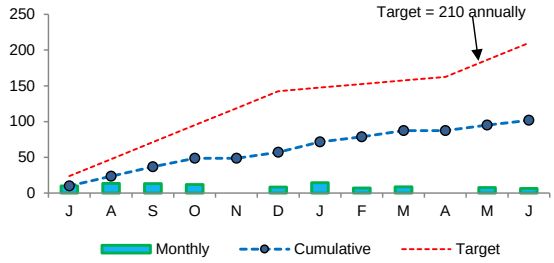
WASTEWATER METERS



During to the COVID staffing limitations in the month of April and May, all preventative maintenance confined space entries were postponed. Because of this the data capture rate in April was approximately 57% and in May was <50%. The MWRA Advisory Board approved the use of historical average data billing in April and May 2020. The data capture rate improved steadily during the month of June as meter crews were able to catch up on maintenance and replace batteries, and was up to >90% by the end of the month for an average monthly data capture rate up approximately 85%.

WATER DISTRIBUTION SYSTEM PIPELINES

Miles Surveyed for Leaks



During Q4 14.35 miles of water mains were inspected. The total inspected for the fiscal year to date is 101.71. Below target due to staffing shortage and community support work during FY20.

Leak Backlog Summary

Month	J	A	S	O	N	D	J	F	M	A	M	J	Totals
Leaks Detected	5	1	1	6	0	3	3	2	2	0	1	0	24
Leaks Repaired	2	3	2	3	2	0	7	1	2	1	0	1	24
Backlog	9	7	6	9	7	10	6	7	7	6	7	6	n/a

During the 4th Quarter, one new leak was detected, and two were repaired. Refer to FY20 Leak Report below for details. Also, community service ranging from individual leak location to hydrant surveys were conducted for: Cambridge, Malden, Medfod, Newton, Revere and Stoneham and Swampscott.

4th Quarter - FY20 Leak Report

Date Detected	Location of Leaks	Repaired
07/19/19	Ocean Ave., @ Revere St., Revere	07/31/19
07/29/19	Wadsworth Rd., Dow St., Arlington	07/31/19
07/16/19	Watham St. @ Concord Ave., Lexington	08/14/19
07/24/19	#1098 Waltham St., Lexington	08/14/19
08/11/19	South Street Court, Medford	08/12/19
09/04/19	Pearl St. @ Center St. Malden	09/04/19
07/08/19	River St. Bridge @ Memorial Dr., Cambridge	09/05/19
10/09/19	Essex St. @ Highland St., Chelsea	10/09/19
10/14/19	Mass Ave. @ Appleton Pl., Arlington	10/24/19
10/15/19	Alewife Brook Sewer P.S. Somerville	10/16/19
10/30/19	Felton St. @ Water St., Waltham	11/05/19
10/16/19	Stone Zoo, Pond St., Stoneham	11/06/19
12/16/19	Linden St. @ Waverly Oaks Rd., Waltham	01/07/20
12/16/19	#271 Waverly Oaks Rd., Waltham	01/08/20
12/16/19	#1010 Pleasant St., Belmont	01/14/20
01/05/20	#429 Pleasant St., Belmont	01/16/20
01/06/20	Madison St. @ Main St., Malden	01/06/20
01/15/20	Comm. Ave. @ Lexington St., Newton	01/16/20
10/23/19	Concord Ave. @ April Lane, Lexington	01/29/20
02/02/20	Lynnway @ Harding St., Lynn	02/02/20
02/26/20	Diminios Sub Shop, Winthrop Ave., Revere	03/02/20
03/01/20	#685 Revere Beach Reservation, Revere	03/09/20
03/17/20	B.C. Train Stop Commonwealth Ave., Newton	04/06/20
05/27/20	#129 Medford St., @ Canal St., Malden	06/15/20

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 off 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.

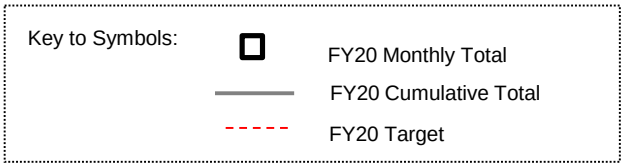
Water Distribution System Valves

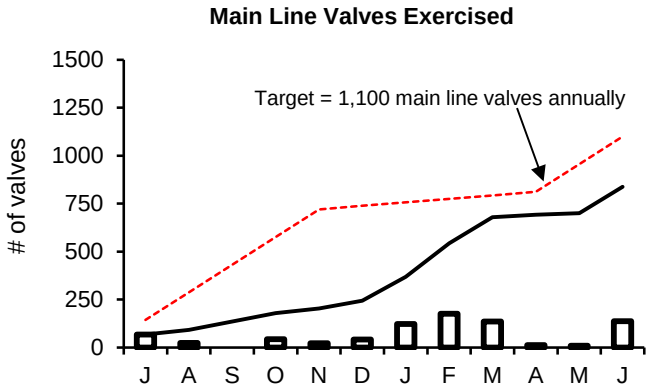
4th Quarter - FY20

Background

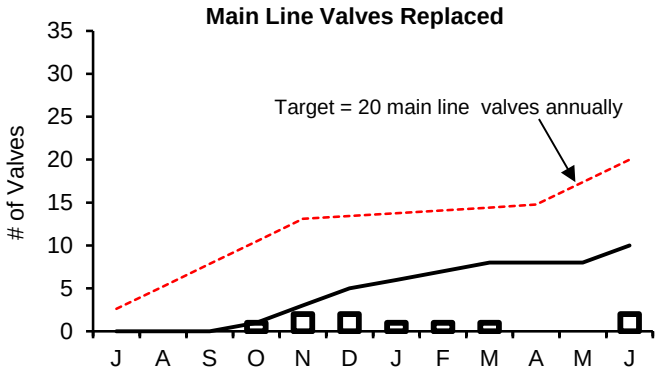
Valves are exercised, rehabilitated, or replaced in order to improve their operating condition. This work occurs year round. Valve replacements occur in roadway locations during the normal construction season, and in off-road locations during the winter season. Valve exercising can occur year round but 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	
		FY20 to Date	FY20 Targets
Main Line Valves	2,159	96.5%	95%
Blow-Off Valves	1,317	98.6%	95%
Air Release Valves	1,380	95.0%	95%
Control Valves	49	100.0%	95%

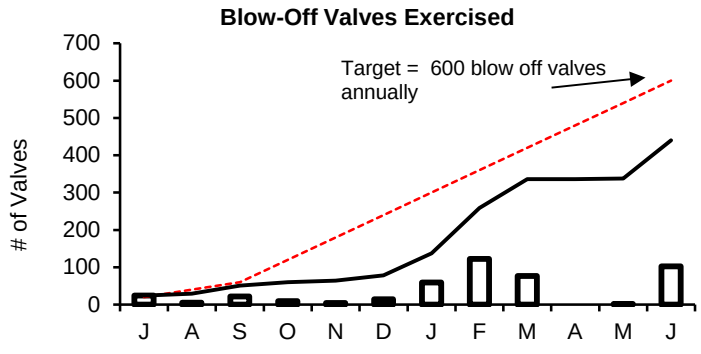




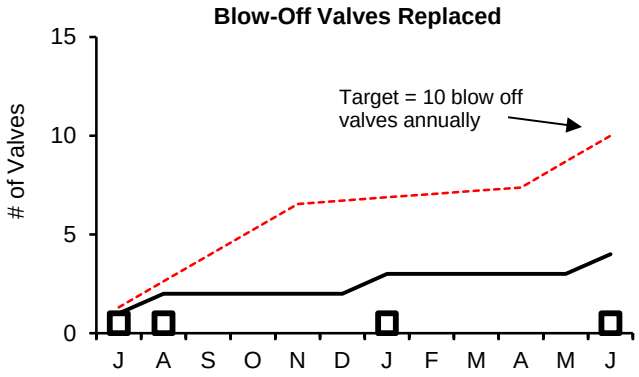
During the 4th Quarter of FY20, 158 main line valves were exercised. The total exercised for the fiscal year to date is 838. Below YTD target due to high priority CIP project (WASM 1) and Covid 19.



During the 4th Quarter of FY20, there were two main line valves replaced. The total replaced for the fiscal year to date is ten. Below YTD target due to isolation & permit issues, and Covid 19.



During the 4th Quarter of FY20, 104 blow off valves were exercised. The total exercised for the fiscal year to date is 440. Below YTD target due to high priority CIP project (WASM 1) and Covid 19.



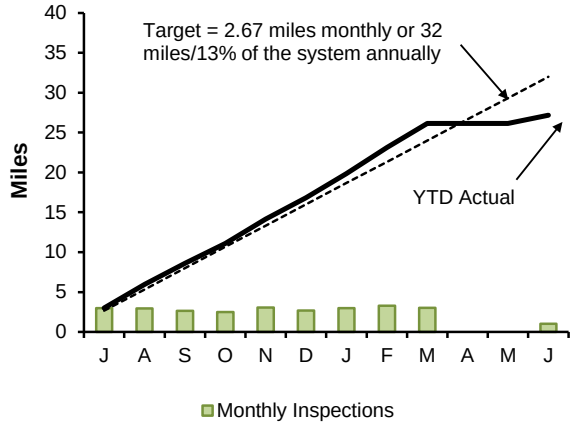
During the 4th Quarter of FY20, there was one blow off valve replaced. The total replaced for the fiscal year to date is four. Below YTD target due to isolation & permit issues, and Covid 19.

Wastewater Pipeline and Structure Inspections and Maintenance

4th Quarter - FY20

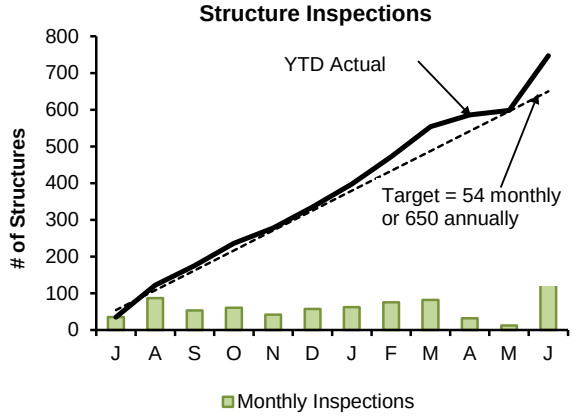
Inspections

Pipeline Inspections



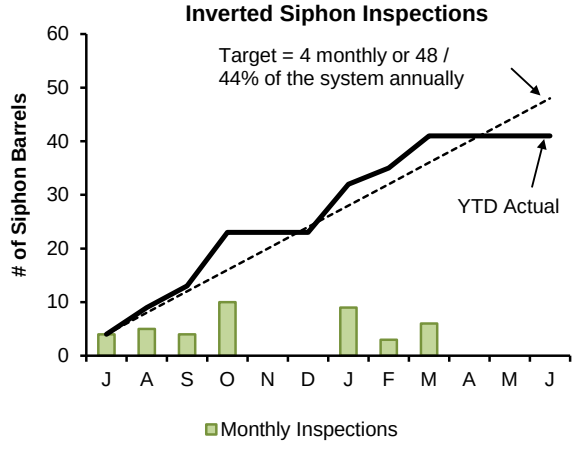
Due to the Covid 19 Virus, staff were limited to working only during the month of June. This resulted in reducted inspection numbers for this quarter. Staff internally inspected 1.04 miles of pipe. The year to date total is 27.18 miles. No Community Assistance was provided.

Structure Inspections



Staff inspected the 36 CSO structures and performed 157 other additional manhole/structure inspections during this quarter. The year to date total is 747 inspections.

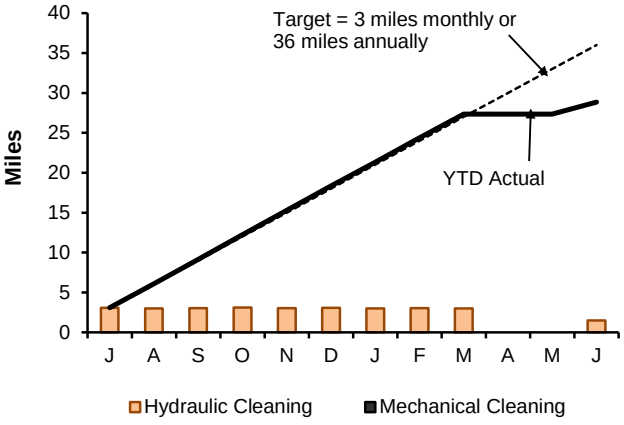
Inverted Siphon Inspections



Staff did not perform any siphon inspections this quarter. The year to date total is 41.

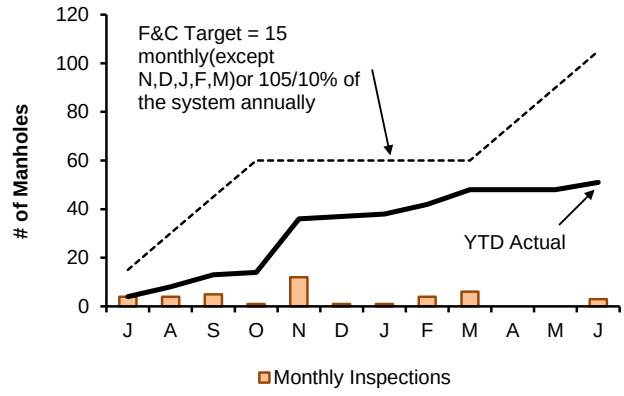
Maintenance

Pipeline Cleaning



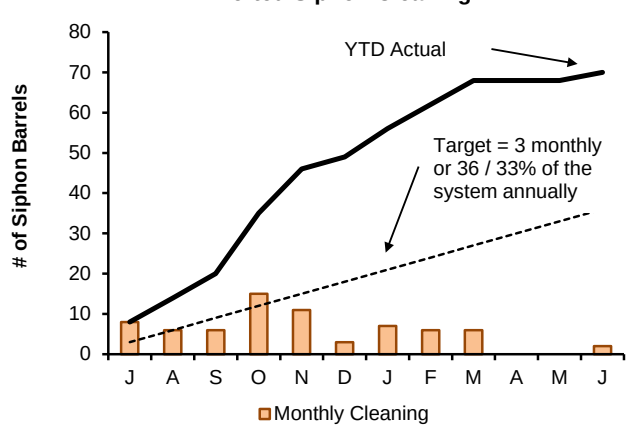
Due to the Covid 19 Virus, staff were limited to working only during the month of June. This resulted in reducted cleaning numbers for the quarter. Staff cleaned 1.5 miles of pipe, and removed 1 yard of grit. The year to date total is 28.85 miles. No Community Assistance was provided.

Manhole Rehabilitation



Staff conducted 3 frame and cover replacements this quarter. The year to date total is 51.

Inverted Siphon Cleaning

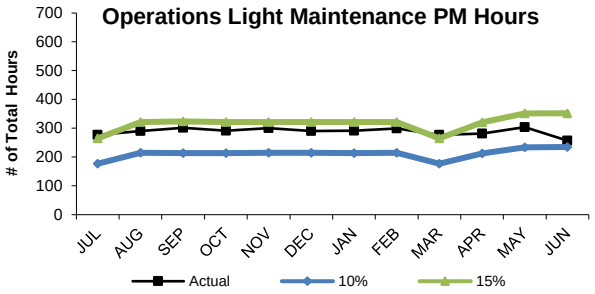


Staff cleaned 2 siphon barrels this quarter. Year to date total is 70.

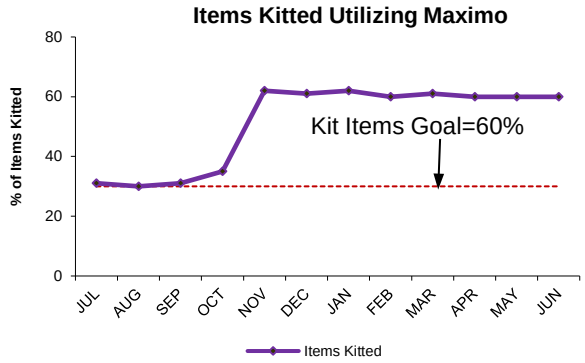
Field Operations' Metropolitan Equipment & Facility Maintenance

4th Quarter - FY20

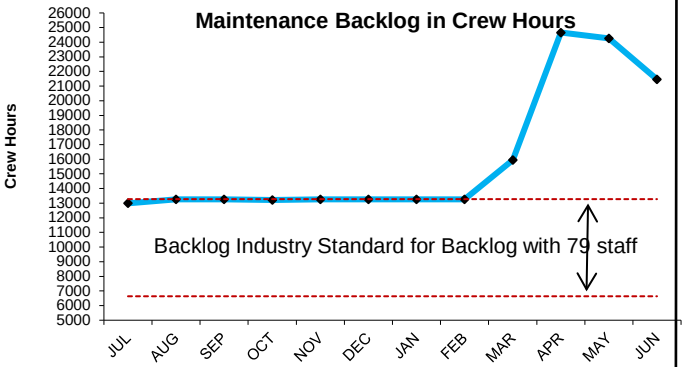
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus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



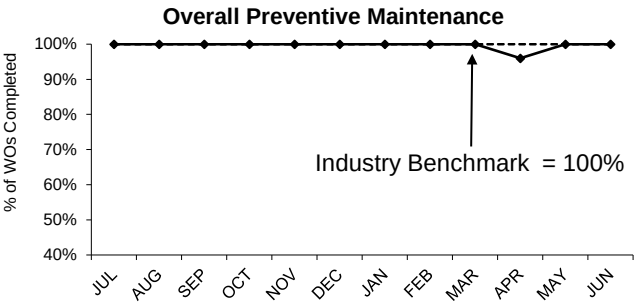
Operations staff averaged 281 hours of preventive maintenance during the 4th Quarter, an average of 12% of the total PM hours for the 4th Quarter, which is within the industry benchmark of 10% to 15%.



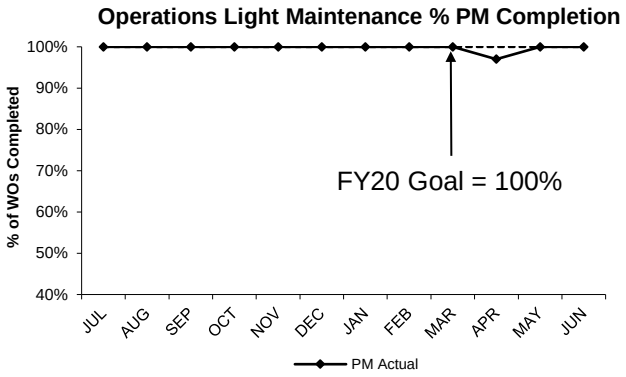
Operations' FY20 maintenance kitting goal has been set at 60% of all work orders to be kitted. Kitting is the staging of parts or material neccesary to complete maintenance work. In the 4th Quarter, 60% of all applicable work orders were kitted. This resulted in more wrench time and increased productivity.



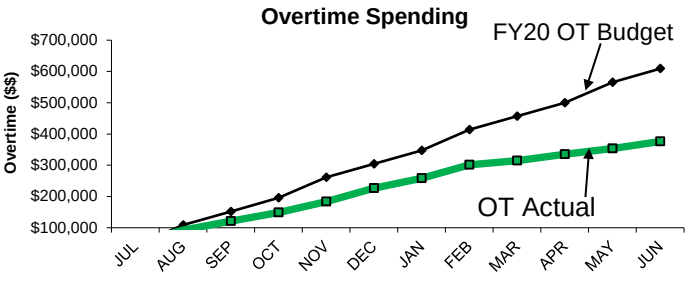
The 4th Quarter backlog average is 23,463 hours. Management's goal is to continue to control overtime and still stay within the industry benchmark of 6,636 to 13,275 hours. The slight increase is due to reduced staffing levels due to COVID19



The Field Operations Department (FOD) preventive maintenance goal for FY20 is 100% of all PM work orders. Staff completed an average of 99% of all PM work orders in the 4th Quarter. The slight decrease is due to reduced staffing levels due to COVID19



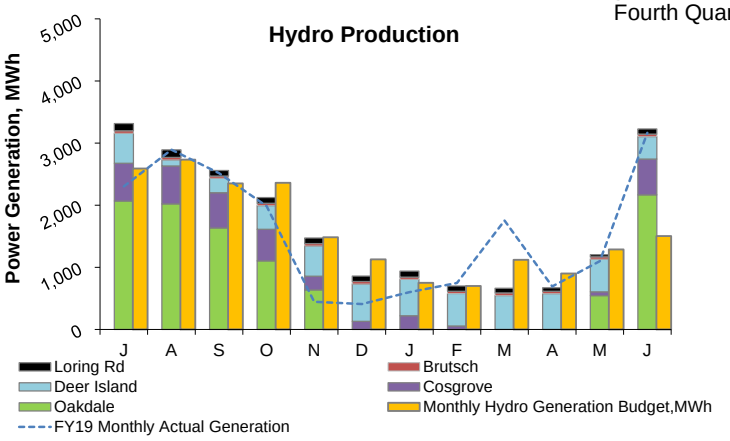
Wastewater Operations complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY20 PM goal is completion of 100% of all PM work orders assigned. Operations completed an average of 99% of PM work orders in the 4th Quarter. The slight decrease is due to reduced staffing levels due to COVID19



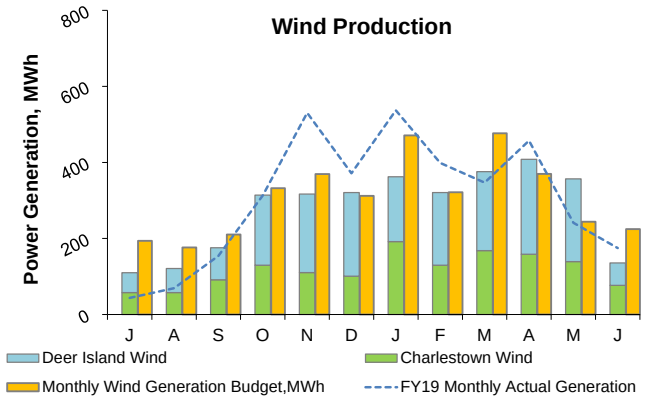
Maintenance overtime was $30k under budget for the 4th Quarter. Overtime was used for critical maintenance repairs and wet weather events. The overtime budget for FY20 is $609k and is $233k under budget for the fiscal year.

Renewable Electricity Generation: Savings and Revenue

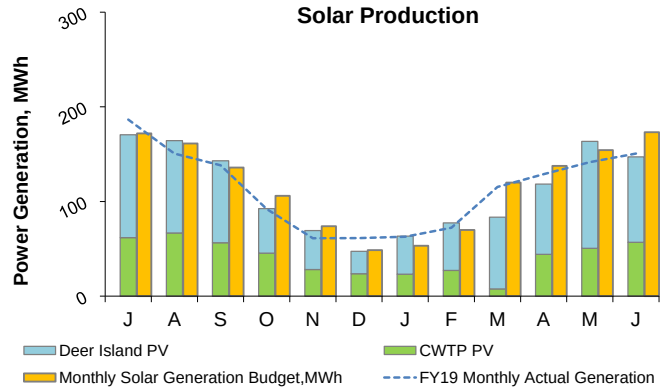
Fourth Quarter - FY20



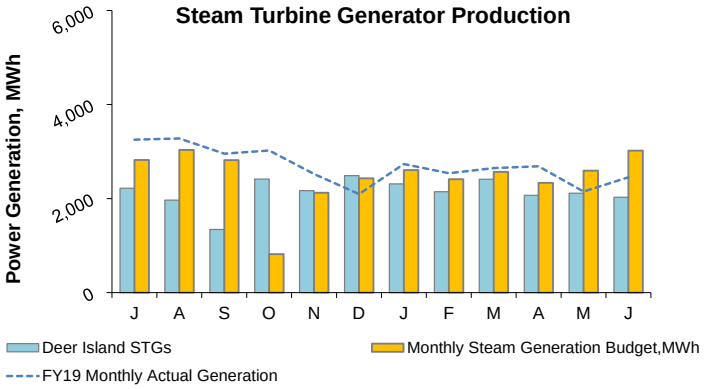
In the 4th quarter of FY20, the renewable energy produced from all hydro turbines totaled 5,102 MWh; 38% above budget[3]. The total energy produced to-date in FY20 is 20,620 MWh; 9% above budget[3].
The total savings and revenue[2] to date in FY20 (actuals through May[1]) is $873,271 ; 7% above budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).



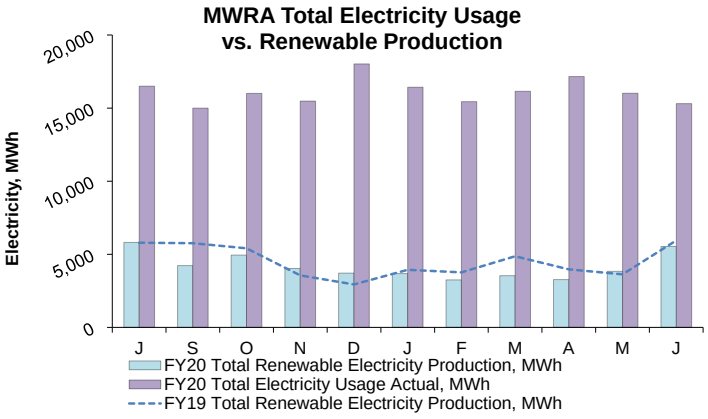
In the 4th quarter of FY20, the renewable energy produced from all wind turbines totaled 901 MWh; 7% above budget[3] . The total energy produced to-date in FY20 is 3,317 MWh; 10% below budget[3].
The total savings and revenue[2] to date in FY20 (actuals through May[1]) is $443,848 ; 14% below budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).

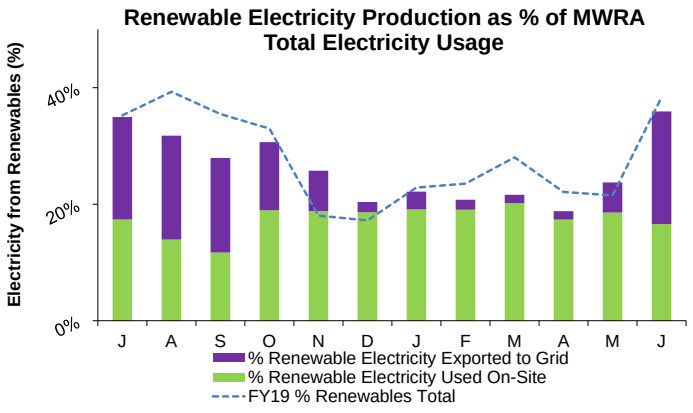


In the 4th quarter of FY20, the renewable energy produced from all solar PV systems totaled 429 MWh; 8% below budget[3] . The total energy produced to-date in FY20 is 1,351 MWh; 4% below budget[3].
The total savings and revenue[2] to date in FY20 (actuals through May[1]) is $240,418 ; 49% above budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).



In the 4th quarter of FY20, the renewable energy produced from all steam turbine generators totaled 6,211 MWh; 22% below budget[3]. The total energy produced to-date in FY20 is 25,683 MWh; 13% below budget[3].
The total savings and revenue[2] to date in FY20 (actuals through May[1]) is $2,215,072 ; 19% below budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).



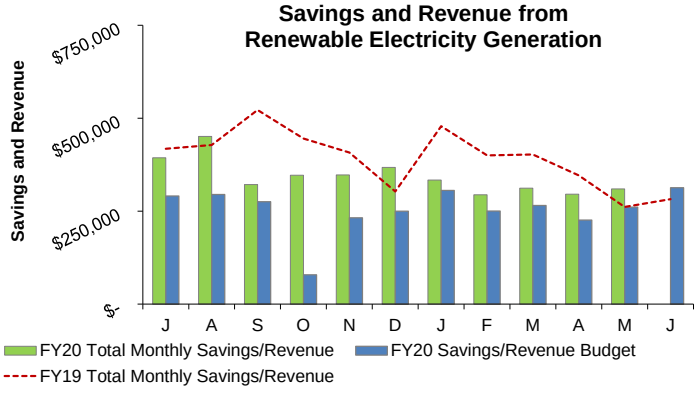


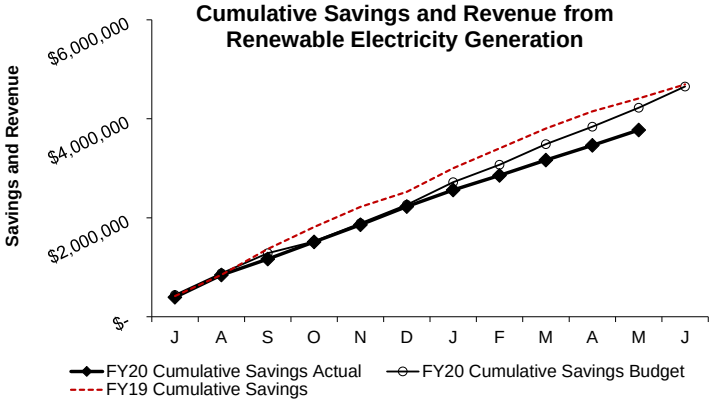
In FY20, MWRA's electricity totalgeneration by renewable resources was 50,971MWh. MWRA's total electricity usage was approximately 193,572 MWh. The MWRA total electricity usage is the sum of all electricity purchased for Deer Island and FOD plus electricity produced and used on-site at these facilities. 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 FY20, green power generation represented approximately 26% 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

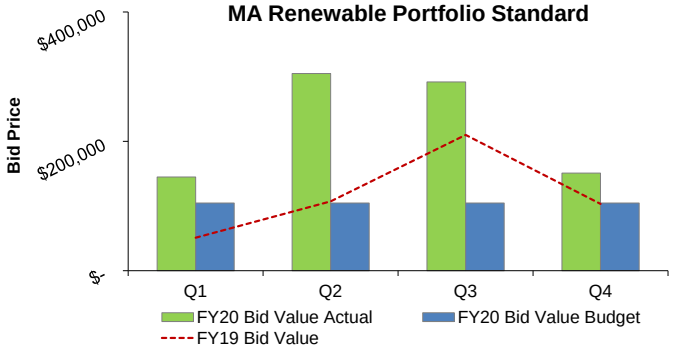
Fourth Quarter- FY20

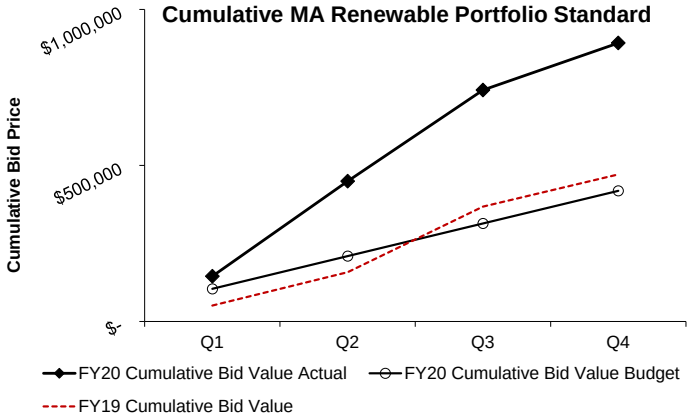




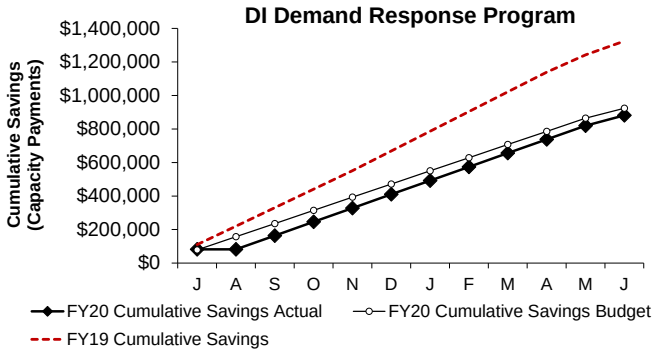
Savings and revenue from MWRA renewable electricity generation for the first eleven months of FY20 (actuals only through May[1]) is $3,772,610 which is 11% below the budget[3].

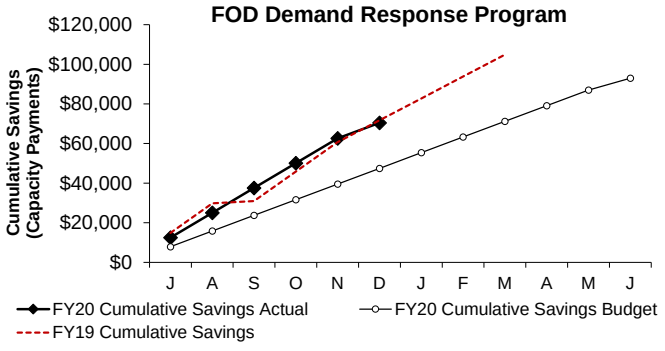
Savings and revenue[2] from all renewable energy sources include wind turbines, hydroelectric generators, solar panels, and steam turbines (DI). This includes savings and revenue due to electricity generation (does not include avoided fuel costs and RPS RECs).
The use of DITP digester gas as a fuel source 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 4th Quarter[1] from MWRA's renewable energy assets; 5,083 Q4 CY2019 Class I Renewable Energy Certificates (RECs), 1,597 Q4 CY2019 Class II RECs, and 36 Q4 CY2019 Solar RECs were sold for a total value of $150,816 RPS revenue; which is 44% above budget[3] for the Quarter. This is mostly due to Class I REC prices being over 100% above the 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.



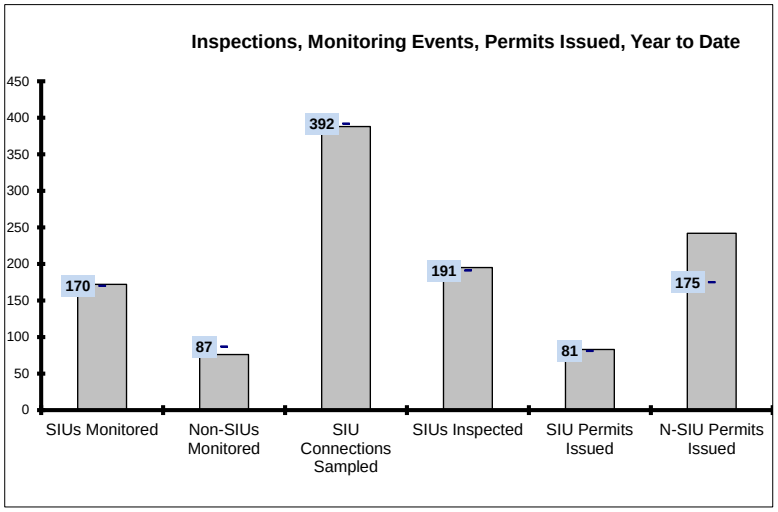


Currently Deer Island, JCWTP, and Loring Rd participate in the ISO-New England Demand Response Programs[4]. By agreeing to reduce demand and operate the facility generators to help reduce the ISO New England grid demand during periods of high energy demand, MWRA receives monthly Capacity Payments from ISO-NE. When MWRA operates the generators during an ISO-NE called event, MWRA also receives energy payments from ISO-NE. FY20 Cumulative savings (Capacity Payments only) through June[1] total $881,286 for DI and payments for FOD total $70,438 through December[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

4th Quarter - FY20



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; 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.

Due to the COVID-19 pandemic, all field operations (sampling and inspections) were put on hold on March 20,2020 and resumed in mid-June 2020. All of TRAC's inspections and permitting goals were met this fiscal year. Given the unique circumstances presented in 2020, TRAC sampled as many locations as possible, given time constraints and business closures.

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	2	19	0	0	0	0	2	19
Aug	4	21	0	4	1	0	5	25
Sep	7	16	0	0	0	0	7	16
Oct	6	19	0	1	0	1	6	21
Nov	5	17	0	2	0	0	5	19
Dec	9	12	0	3	0	1	9	16
Jan	4	16	0	3	0	0	4	19
Feb	7	25	0	3	0	0	7	28
Mar	4	5	0	1	1	2	5	8
Apr	5	22	0	1	0	2	5	25
May	9	19	3	0	0	0	12	19
Jun	14	14	2	2	0	11	16	27
% YTD	92%	85%	6%	8%	2%	7%	83	242

EPA requires MWRA to issue or renew 90 percent 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 percent of SIU permits to be issued within 180 days.

In the 4th quarter of FY20, 43 permits were issued, 16 of which were SIUs. Fourteen of the SIU permits were issued within the 120-day timeframe.

In total, 325 permits were issued during the fiscal year with 83 being SIUs. Ninety-two percent of the SIU permits were issued within 120 days. Seven were issued beyond the 120-day timeframe. Late payment of permit fees accounted for most of the late issuances. However, timely availability of data for the permit processing - especially for new permittees and construction dewatering permits did result in several permits being issued beyond the 120-day timeframe.

For the Clinton Sewer Service area, no SIU permit was issued in this quarter and none in the fiscal year. There were also 45 Municipal permits issued during the fiscal year. In FY20, a new group permit for Dental Discharges was created. TRAC issued 714 of these group permits.

EPA Required SIU Monitoring Events
for FY20: 170
YTD : **172**

Required Non-SIU Monitoring Events
for FY20: 87
YTD : **76**

SIU Connections to be Sampled
For FY20: 392
YTD: **388**

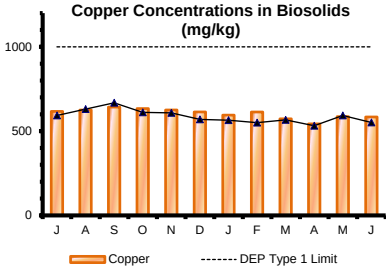
EPA Required SIU Inspections
for FY20: 191
YTD: **195**

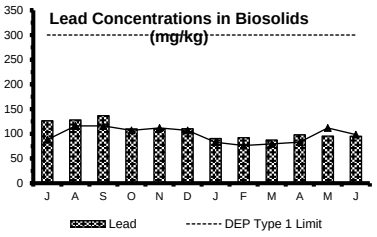
SIU Permits due to Expire
In FY20: 81
YTD: **83**

Non-SIU Permits due to Expire
for FY20: 175
YTD: **242**

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; and, increased inspections leading to permit category changes requiring additional monitoring events.

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. In May, TRAC reviewed all SIU inspections completed to date for the fiscal year and reclassified any SIU inspection that met





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.
Overall, 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

4th Quarter – FY20

Western Water Operations and Maintenance

- Carroll Water Treatment Plant: Due to COVID restrictions, staff maintained physical and social distance from each other throughout the fourth quarter. Field staff operated on an A/B rotation during this period, and returned to full staffing at the end of June. Staff replaced several broken lamps and sleeves in the UV system and supported Calgon in the trial of a new style lamp with a lower pressure rating.

Metro Water Operations and Maintenance

With COVID restrictions, Valve and Pipeline crews operated on an A/B rotation list throughout the fourth quarter of FY20 until June 22nd when the program transitioned back to full staffing.

- Valve Program: Valve operations to support in-house work included isolation, dewatering and reactivation of the Shaft 9-A line to support a blow-off retrofit. Dewatering to support a valve installation on Section 8. Also, tap and install a corporation stop for a new air valve installation on Section 8. Support of CIP work included the Commonwealth Avenue Pump Station project with flushing, sampling, activation of Section 75, activation of the yard piping at the East Station, and support with disinfection, installation of insertion valves by a contractor and a test shutdown.

- Water Pipeline Program: Staff completed the replacement of a 24-inch gate valve at the Edgell Road Pumping Station in Framingham. Staff completed the replacement of a 24-inch gate valve on Section 8, Marginal Street in Chelsea. Staff completed a blow-off retrofit project on the Shaft 9-A line in Medford. Staff completed a project to install a new air valve and chamber on Section 8 at Williams Street in Chelsea. Staff also completed the installation of a mounting pad for new energy storage batteries at Brattle Court Pumping Station.

Wastewater Operations & Maintenance

Wastewater and Water Operations Control Center (OCC) staff remained on a rotational A/B list until 6/20/20 when they transitioned back to full staffing. The limited staff in the OCC do a complete wipe down of phones, radios and touchable surfaces after every shift and keep a log.

- CSO Assessment: Operations staff attended monthly CSO Assessment coordination and notification meetings with the City of Cambridge, as well as a general meeting with Engineering, ENQUAL, Operations Engineering and Metering staff to discuss the details of existing metering, what is lacking, how data can be monitored during storm events and responded to in a timely manner,

- Training: There was no training done by Wastewater Operations due to COVID during the quarter.

Metro Equipment and Facility Maintenance

Painters: Taking advantage of the unoccupied building, staff prepped and painted a number of areas in the Chelsea Administration Building.

Metering

Water: Meter Data began tracking how the Commonwealth recommendations for sheltering in place has affected the demand in the fully supplied water communities. In general, most residential communities saw demand increases as the stay at home order was in effect, while larger commercial/college communities saw sharp decreases. In addition, a hot and dry June pushed system demand in residential communities even higher, with some communities seeing a nearly 30% increase in June compared to 3 year averages.

Wastewater: In response to COVID, starting in mid-March, Meter Maintenance personnel suspended all preventative maintenance, including replacing batteries. Because of this, many batteries died and data capture rate dropped to well under 50%. Staff made several presentations in June to the MWRA Advisory Board which approved the use of 3-year average flows, adjusted for the COVID water use changes, for billing in the months of April and May.

Upon returning to full staffing in June, the meter maintenance crews were quickly able to catch up on preventative and corrective maintenance requirements. The data capture rate steadily increased resulting an 85% data capture rate for the month. Currently our data capture rate is over 90%.

TRAC

Compliance and Enforcement

- TRAC issued 26 Notices of Violation, two Notices of Noncompliance and one Extension Letter. Compliance and Enforcement staff worked remotely during the quarter. They spent an increased amount of time working with industries through email and telephone conversations to remind them of reporting requirements and tracking industries that are not operating during the pandemic. Compliance staff

are only issuing Notices of Violation for discharge violations which resulted in a lower number of NOVs issued during the fourth quarter.

Inspections and Permitting

- This quarter TRAC issued a total of 112 MWRA 8(m) Permits allowing companies to work within MWRA easements. Permits issued this quarter were issued in an average of 115 days from the date the application for 8(m) permit was received by the MWRA.

- TRAC staff conducted 7 Annual SIU and 2 other inspections. Annual SIU Inspections are required under TRAC's EPA approved Industrial Pretreatment Program. Other inspections include inspections for enforcement, permit renewal, NSIU, follow-up, temporary construction dewatering sites, group/combined permit audits, out-of-business facility reviews, and surveys.

- 104 MWRA Sewer Use Discharge Permits (Permits) were issued and/or renewed to its sewer users. All remaining Dental Discharges permits were issued during the fourth quarter. In total, 712 permits were issued to dental facilities.

- Two permits were issued in Clinton. One permit was issued within 90 days of the application. One permit was issued more that 90 days from receipt due to late payment of the permit fee by the company.

Monitoring

- During the fourth quarter, TRAC completed 43 SIU monitoring events, 7 NSIU monitoring events and 200 other events including Clinton NPDES sampling, Clinton Local Limits sampling, Clinton Landfill sampling, Sudbury Aqueduct monitoring, Cosgrove and Oakdale NPDES sampling, Carrol Water Treatment Plant Compliance sampling for discharge to Marlborough, Special Sulfide sampling, Muni sampling and CSO Hypochlorite Tank chemical sampling.

Environmental Quality-Water

Regulatory and Non-Regulatory Sampling Programs

- Due to COVID, MWRA requested flexibility in its regulatory sampling schedule; DEP approved spreading sampling outside the traditional monitoring period. As a result, staff collected quarterly samples from 33 sites for MWRA's Disinfection Byproducts Program and 27 samples for Optimum Water Quality Parameters (OWQP) program throughout April and May.

- Recognizing the risks of improper sampling due to the potential of regular samplers being unavailable, in April, staff finalized and distributed visual guides to coliform collection and chlorine residual testing. MassDEP distributed the guides as a "best management practice" to all public water systems through their program director email distribution. Staff also developed cooler labels for community and MWRA staff to place on their drinking water sampling coolers.

- COVID19 Coordination with DEP/EPA: MWRA staff held an online biweekly meeting with DEP and EPA throughout the quarter. MWRA provided updates on planning, operations and regulatory sampling programs and monthly compliance reporting.

Community Support

- In 2019, DEP encouraged all public water systems to collect voluntary PFAS samples at finished water locations, and for repeat samples raw water locations, to better understand PFAS presence in drinking water across Massachusetts. MWRA staff provided sampling and laboratory assistance to most partially-supplied communities.

Environmental/Chemical Contract Management

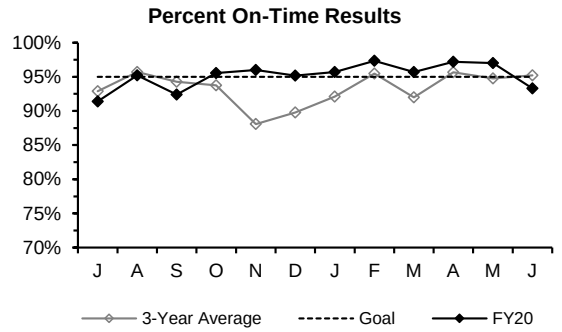
- Given COVID related concerns about supply chain reliability, staff provided weekly updates on bulk chemical supply conditions. All chemical inventories are at acceptable levels and vendors are not experiencing any issues with manufacture, distribution, or transport.

Environmental Quality-Wastewater

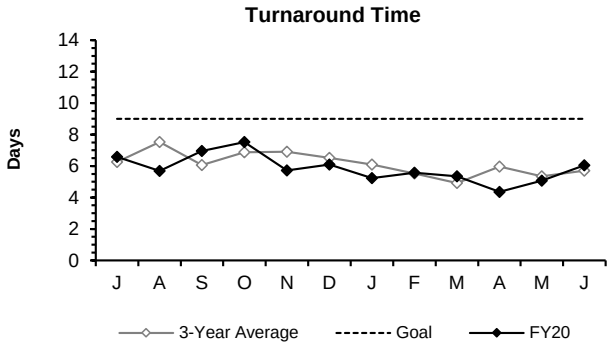
- Staff scaled back water column surveys to comply with COVID safety protocols while conducting permit-required Ambient Monitoring. Staff conducted annual flounder and three routine water column surveys in April to June, some delayed due to COVID, and one red tide rapid response survey in June. Ship availability delayed the hard-bottom benthic survey from mid-June into early July. Staff participated in an OMSAP subcommittee meeting evaluating issues related to pharmaceuticals and personal care products (PPCPs), and submitted an interim request for modification to Ambient Monitoring following earlier OMSAP recommendations. Seasonal CSO Receiving Water monitoring in variance waters continued, at a reduced level of effort due to COVID safety restrictions. Biweekly harborwide monitoring was on hold due to COVID but restarted June 23.

Laboratory Services

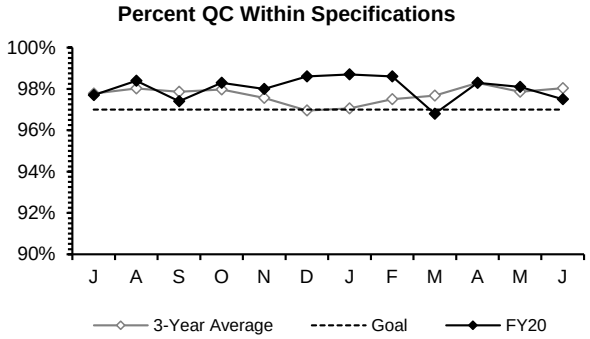
4th Quarter - FY20



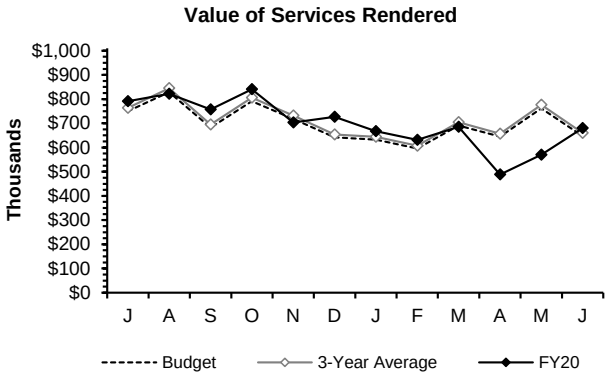
The Percent On-Time measurement fell below the 95% goal for June due to reduced staffing.



Turnaround Time met the 9-day goal.



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



Value of Services Rendered recoverd to the annual budget projection in June.

Highlights:

Performance: Met Turnaround Time, Percent on time and Percent QC within Specification indicators for the quarter at reduced staffing level. Value of Services Rendered was limited by a reduced level of staffing within the lab and other MWRA departments.

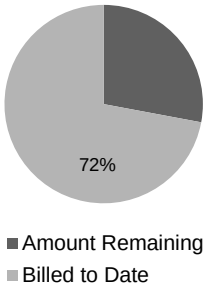
School Lead Program: During FY20, MWRA's lab completed 901 tests from 84 schools and childcare facilities in 33 communities. Additionally we completed 94 tests for the DPH program, and 1866 tests for other drinking water projects in FY20. Since 2016, MWRA's Laboratory has conducted over 37,000 tests from 487 schools and daycares in 44 communities.

Special Request: Tested samples from Colonial Water Company (Dover) in response to a boil order there, at the request of Mass DEP. The lab that Colonial normally uses does not accept samples on Sundays.

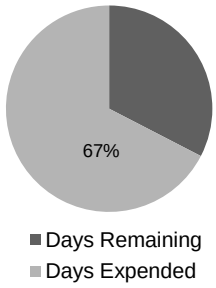
CONSTRUCTION PROGRAMS

Projects In Construction
4th Quarter– FY20

Money



Time

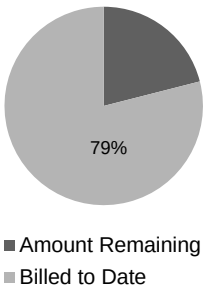


Southern Extra High Pipeline Section 111

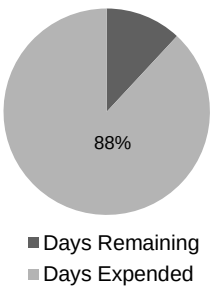
Project Summary: This project consists of 6,800 linear feet of 36-inch water main in Dedham and Westwood and includes pipe jackings at the Dedham Corporate MBTA Station and at the MassDOT Route 95 East Street Rotary.

Notice to Proceed: 10-Aug-2018 *Contract Completion:* 31-May-2021
Status and Issues: As of June, Crew 1 continued assisting Hayward Baker by removing spoils from piles drilled at the receiving pit area for the MBTA Crossing. Crew 2 installed erosion mats and silt socks on the North and South Slopes on the I-95 crossing and installed a concrete thrust block for a 45 degree bend at Station 52+72. They also loamed and seeded the island at the top of Allied Drive and East St. Rotary.

Money



Time



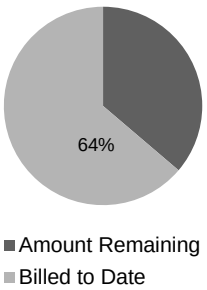
Chelsea Creek Headworks Upgrade

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.

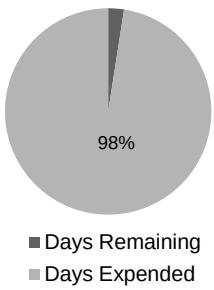
Notice to Proceed: 22-Nov-2016 *Contract Completion:* 21-Nov-2020

Status and Issues: As of June, the Contractor worked on cleaning Channel 2 for chain replacement, then disassembled and removed the flights and cut and removed the existing chain from the channel. In addition, they worked on saw cutting and demolition for the new HVAC openings in the Odor Control Room and dewatered and cleaned the grit pit for grit pods 1 and 2.

Money



Time



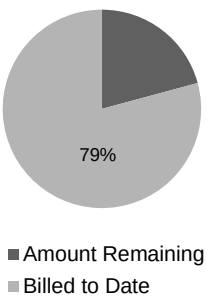
Cottage Farm & Gillis PS Roof Replacement

Project Summary: This project involves the replacement of the rubber roofing membrane system at the Cottage Farm CSO and the Gillis Pumping station.

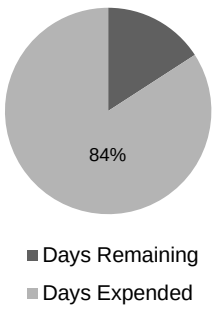
Notice to Proceed: 10-Jul-2019 *Contract Completion:* 9-Jul-2020

Status and Issues: As of June, the Contractor began the installation of lightning and ground protection including adhering copper clips for copper cable along the flat roof and provided a protective install between dis-similar metals (copper wire and anodized aluminum flashing). They installed ground plates at NW and NE corners of the flat roof and installed a copper ground at SW corner.

Money



Time



Commonwealth Ave Pump Station Improvements

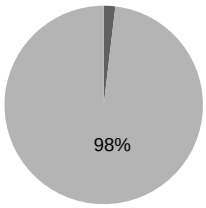
Project Summary: This project will provide a new connection to the station from two low service pipelines in Commonwealth A venue and add low service pumps so that the City of Newton can be supplied in the event of a City Tunnel failure.

Notice to Proceed: 28-Feb-2019 *Contract Completion:* 30-Sep-2020

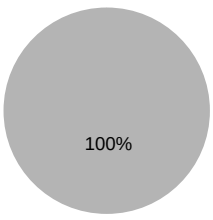
Status and Issues: As of June, the Contractor installed frames and covers on Vault D, insertion valves, new structures in the median, and grates on the new catch basins. They patched pavement from Vault B to the edge of Commonwealth Ave, and created an opening for a new exhaust louver and control damper in the East Pump Station Electrical Room.

Projects In Construction
4th Quarter– FY20

Money



Time



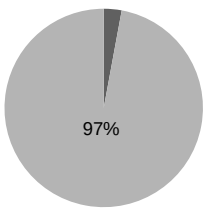
NIH Section 110 - Stoneham

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

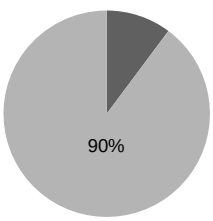
Notice to Proceed: 5-Sep-2017 *Contract Completion:* 1-Jun-2020

Status and Issues: As of June, the Contractor completed the installation of pavement markings on various streets with new overlay pavement. They cleaned all catch basins on DCR roadways and investigated leaks on Town of Stoneham water mains discovered by MWRA Leak Detection, and replaced sewer service to No 18 South Street.

Money



Time



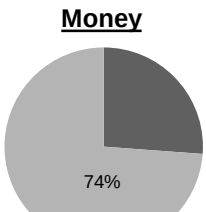
Capital Improvements at the Biosolids Facility

Project Summary: This project involves the replacement of nine mechanical conveyors and ancillary equipment, as well as three sludge processing rotary dryer drums.

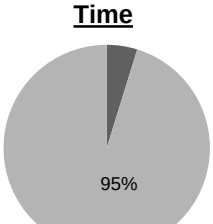
Notice to Proceed: 9-Apr-19 *Contract Completion:* 21-Aug-20

Status and Issues: As of June, the Contractor completed the installation of the T6 separator B and MCC 7. The MCC 8 install is on-going and MCC 3 labelling is 100% complete.

Money



Time



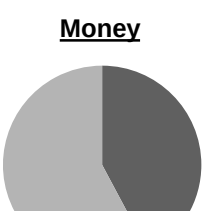
Winthrop Terminal VFD and Motor

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

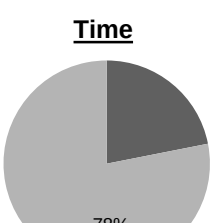
Notice to Proceed: 16-Jun-2016 *Contract Completion:* 12-Sep-2020

Status and Issues: VFD/Motor No 4 installation 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 June, the Contractor completed the resurfacing of the GT-3 tank walls and 90% of the tank wall coatings. In addition they installed 60% of the mechanism.

CSO CONTROL PROGRAM

4th Quarter – FY19

All 35 projects in the Long-Term CSO Control Plan were complete as of December 2015 in compliance with Schedule Seven. Of the $910.1 million budget in the FY19 CIP for the CSO Control Program, approximately $6.5 million remain to be spent. On April 17, 2019, the MWRA Board of Directors authorized Amendment 1 to CSO Contract 7572 in the amount of $931,490 (described below), increasing the remaining amount to be spent on CSO control to approximately $7.4 million.

Project/Item	Status as of June 30, 2019
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 recently completed sewer system evaluations and is preparing a construction contract for inflow removal that it plans to submit to MWRA for eligibility approval this fall.
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 review of the construction contracts Cambridge managed under the CSO MOU and Financial Assistance Agreement. Staff expect to complete the review and issue a final eligibility certification by September 30, 2019.
MWRA CSO Performance Assessment – Contract 7572	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 progress reports on the performance assessment on November 30, 2018 and May 3, 2019, and plans to issue a third progress report in October 2019. The issued progress reports presented the analyses of rainfall and CSO meter data collected in the periods April 15 - June 30, 2018 and July 1 – December 31, 2018, respectively. The third progress report will cover the data collection period of January 1 – June 30, 2019. Upgrade and improved calibration of MWRA's hydraulic model is underway and will be complete by August 31, 2019, allowing a comparison of model predicted and field measured CSO discharges, which will be presented in the October 2019 semiannual progress report. 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. AECOM also continues to conduct investigations at several outfalls where metered CSO discharges differ from historical model predictions. On April 17, 2019, the MWRA Board of Directors approved Amendment 1 to Contract 7572 in the amount of $931,470. The amendment adds receiving water quality modeling of the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River in lieu of water quality data statistical analyses; extends temporary CSO metering to June 2020 at 36 CSO regulators; and provides for the eventual transfer of the temporary meters at regulators tributary to MWRA CSO outfalls for MWRA's long-term use in complying with expected CSO public notification requirements. MWRA continue to collect water quality data in CSO affected waters, with emphasis in the Charles River and Alewife Brook/Upper Mystic River, in part to support AECOM's receiving water modeling.

CIP Expenditures

4th Quarter – FY20

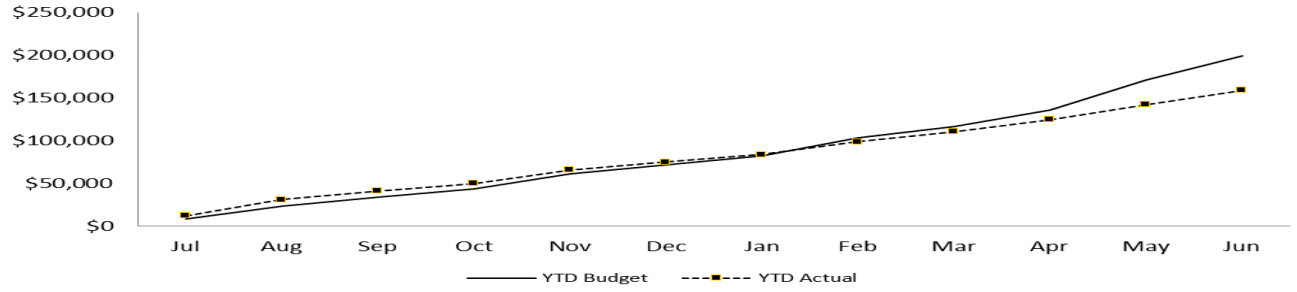
FY20 Capital Improvement Program Expenditure Variances through June by Program ($ in thousands)				
Program	FY20 Budget Through June	FY20 Actual Through June	Variance Amount	Variance Percent
Wastewater	122,504	97,234	(25,270)	-21%
Waterworks	64,166	58,054	(6,111)	-10%
Business and Operations Support	12,477	3,733	(8,744)	-70%
Total	$199,147	$159,021	($40,125)	-20%

Project underspending within Wastewater was due to updated schedules for the DI Primary and Secondary Clarifier Construction, Prison Point CSO Rehab Construction, Nut Island Odor Control and HVAC Improvements, Dorchester Interceptor Sewer Construction, Dorchester I/I Removal Construction, DI Motor Control Center Switchgear Replacement,, Somerville Marginal In-System Storage, Wastewater Metering Equipment Replacement, DI Radio Repeater Upgrade Phase 2, vibration issue on VFD No. 5 for the Winthrop Terminal Facility VFD Replacement Construction and project scope change for the Clinton Valves and Pipe Replacement project. This underspending was partially offset by timing of community requests for grants and loans for the Infiltration/Inflow (I/I) Program, contractor progress and ESDC for the Residuals Electrical, Mechanical, and Drum Dryer Replacements, Pellet Conveyance Piping Relocation, award greater than budgeted for Sections 191/192 Rehab, work anticipated in FY19 that was completed in FY20 for the Clinton Roofing Rehabilitation, and contractor progress on the DI Gravity Thickener and Overflow Pipe. Project underspending in Waterworks was due to, updated schedules for New Connecting Mains CP-3 Sections 23, 24 & 47 Rehab, less than anticipated consultant progress and reduction in scope for Section 50/57 Water and Section 21/20/19 Sewer Design, and schedule changes for CP-1 Shafts 6,8, and 9A, CP-7 Existing Facilities Modifications, and CWTP Ancillary Modifications. This was partially offset by contractor progress for SEH Section 111 Construction 3, timing of community loan requests, work anticipated in FY19 that was completed in FY20 for the Bellevue 2/Turkey Hill Tank Painting and Cosgrove Intake Roof Repair, and timing of final work for the Wachusett Aqueduct Pumping Station Design/CA/REI contract.

Budget vs. Actual CIP Expenditures

($ in thousands)

Total FY20 CIP Budget of $199,147



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 6/30/20	$141.5 million
Unused capacity under the debt cap:	$1.53 billion
Estimated date for exhausting construction fund without new borrowing:	Aug-20
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

* Cash based spending is discounted for construction retainage.

DRINKING WATER QUALITY AND SUPPLY

Source Water – Microbial Results and UV Absorbance

4th Quarter – FY20

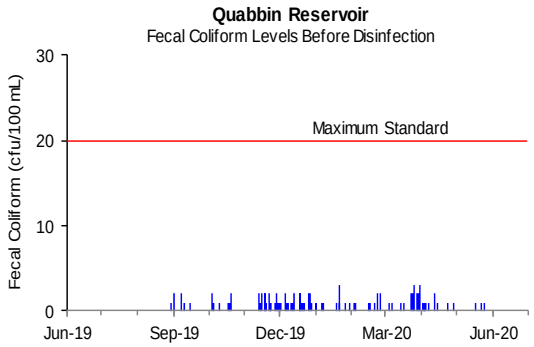
Source Water – Microbial Results

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 4th 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.**

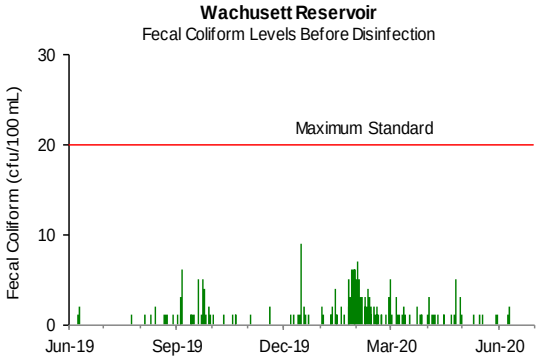


Sample Site: Wachusett Reservoir

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 4th Quarter were below 20 cfu/100ml. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL.**

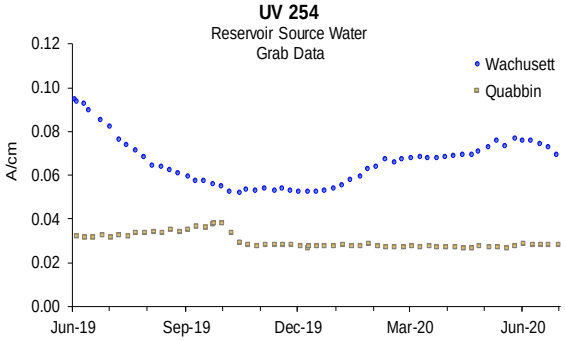


Source Water – UV Absorbance

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 0.28 A/cm at the end of the quarter.

Wachusett Reservoir UV-254 levels are currently around 0.69 A/cm at the end of the quarter.



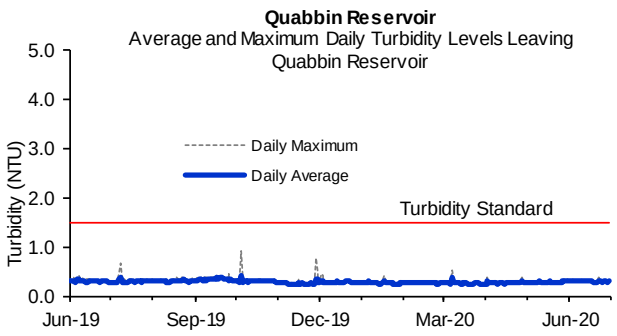
Source Water – Turbidity

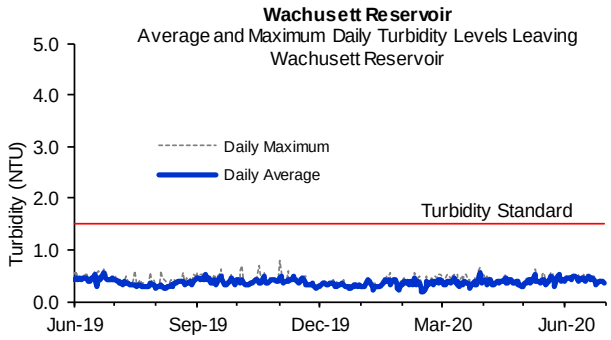
4th Quarter – FY20

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.



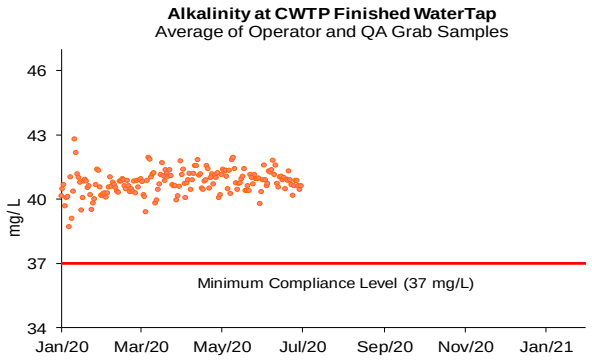


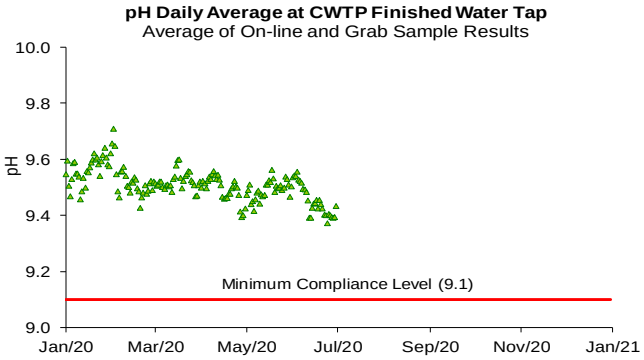
Treated Water – pH and Alkalinity Compliance

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.

Second quarter distribution system samples were collected over a course of six weeks. Distribution system sample pH ranged from 9.4 to 9.7 and alkalinity ranged from 40 to 42 mg/L. No sample results were below DEP limits for this quarter.





Treated Water – Disinfection Effectiveness

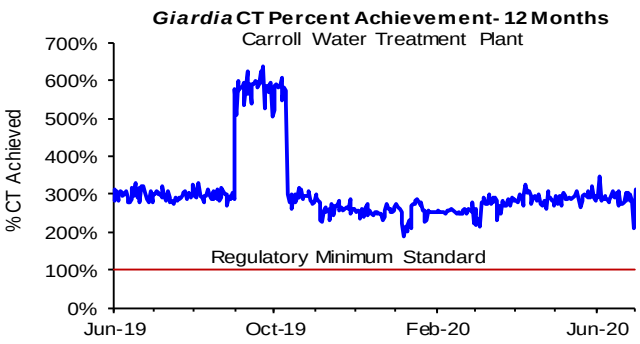
4th Quarter – FY20

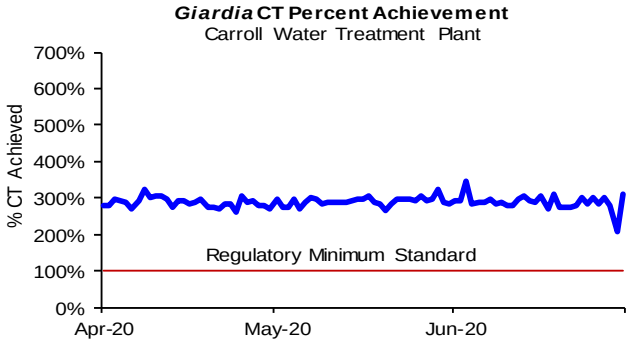
At the Carroll Water Treatment Plant (CWTP), MWRA meets the required 99.9% (3-log) inactivation of *Giardia* using ozone (reported as CT: concentration of disinfectant x contact time) and the required 99% (2-log) inactivation of *Cryptosporidium* using UV (reported as IT: intensity of UV x time). MWRA 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:

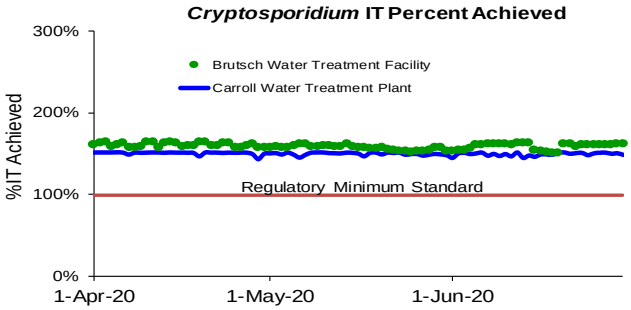
- Ozone dose at the CWTP varied between 2.0 to 2.8 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system this quarter, as well as every day for the last fiscal year.
- *Cryptosporidium* IT was maintained above 100% during the month. Off-spec water was less than 5%.
- The ozone dose was proactively increased from early September 2019 to mid October 2019 in response to a *Chrysosphaerella* algae bloom. This is visible in the top left graph.
- .

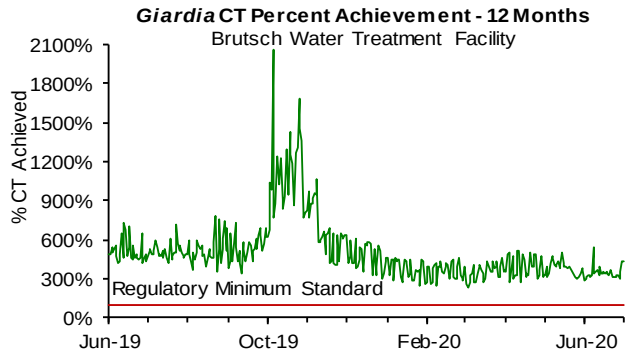


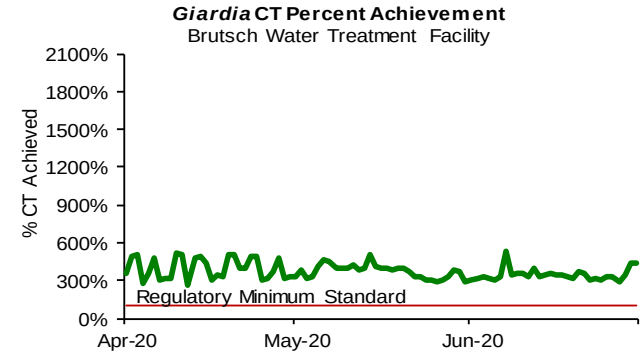


Quabbin Reservoir (CVA Supply) at: Brutsch Water Treatment Facility

- The chlorine dose at BWTF is adjusted in order to achieve MWRA's seasonal target of 0.75 - 0.85 mg/L (November 1 – May 31) and 0.85 - 1.05 mg/L (June 1 – October 31) at Ludlow Monitoring Station.
- The chlorine dose at BWTF varied between 1.3 to 1.5 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%.







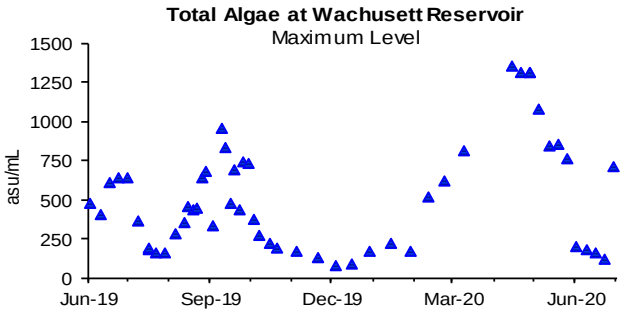
Source Water - Algae

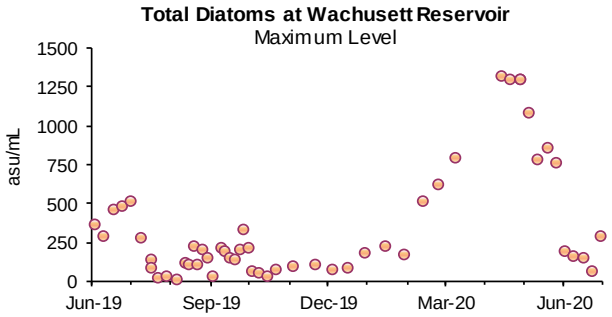
4th Quarter – FY20

Algae levels in the Wachusett and Quabbin 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 reservoirs 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 4th quarter, no taste and odor complaints which may be related to algae were reported from the local water departments.





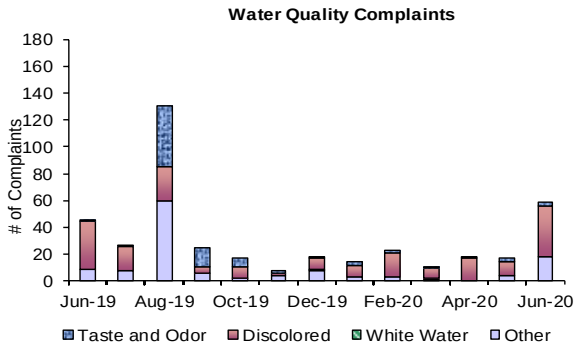
Drinking Water Quality Customer Complaints: Taste, Odor, or Appearance

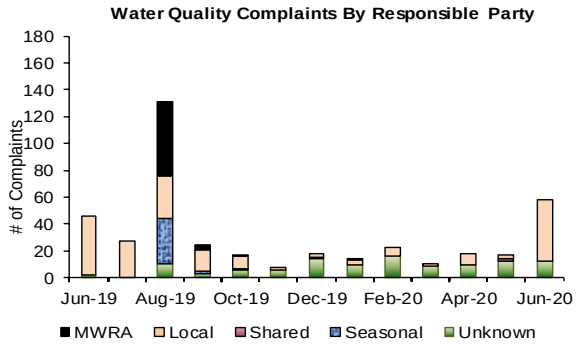
MWRA collects information on water quality complaints that typically fall into four categories: 1) discoloration due to MWRA or local pipeline work; 2) taste and odor due to algae blooms in reservoirs or chlorine in the water; 3) white water caused by changes in pressure or temperature that traps air 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 94 complaints during the quarter compared to 253 complaints from 4th Quarter of FY19. Of these complaints, 65 were for “discolored water”, 7 were for “taste and odor”, and 22 were for “other”. Of these complaints, 57 were local community issues, 2 were a shared MWRA and community related issue, and 35 were unknown in origin.

In June, Marblehead reported twenty-six water quality complaints due to an ongoing construction project. Eighteen of these complaints were from discolored water.





Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program

4th Quarter – FY20

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*). *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 4th Quarter, 4 of the 6,145 community samples (0.10% system-wide) submitted to MWRA labs for analysis tested positive for total coliform (May: Boston; June: Framingham, Lexington, Winthrop). Three of the 1,996 Shared Community/MWRA samples (0.15%) tested positive for total coliform (June: Lexington, Spot Pond Tank). No sample tested positive for *E.coli*. Only 0.3% of the Fully Served community samples had chlorine residuals lower than 0.2 mg/L for the quarter.

NOTES:

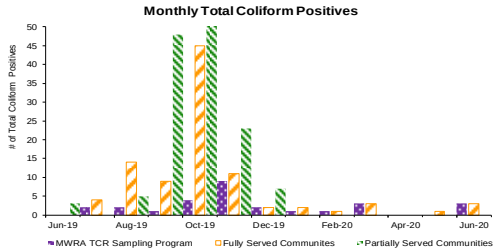
a) MWRA total coliform and chlorine residual results include data from community locations. In most cases these community results are indicative of MWRA water as it enters the community system; however, some are strongly influenced by local pipe conditions. Residuals in the MWRA system are typically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

e) MADEP determined that five Somerville total coliform samples collected from one routine sample site (sampling period from October through November) were invalid and not representative of the distribution system. Therefore, they are not represented in the table.



			Total Coliform # Samples (b)	Total Coliform # (%) Positive	*E.coli* # Positive	Assessment Required
MWRA	a	MWRA Locations	405	2 (0.49%)	0	
		Shared Community/MWRA sites	1591	1 (0.06%)	0	
		Total: MWRA	1996	3 (0.15%)	0	No
Fully Served		ARLINGTON	169	0 (0%)	0	
		BELMONT	104	0 (0%)	0	
		BOSTON	779	1 (0.13%)	0	No
		BROOKLINE	220	0 (0%)	0	
		CHELSEA	168	0 (0%)	0	
		DEER ISLAND	52	0 (0%)	0	
		EVERETT	169	0 (0%)	0	
		FRAMINGHAM	240	1 (0.42%)	0	No
		LEXINGTON	118	1 (0.85%)	0	No
		LYNNFIELD	18	0 (0%)	0	
		MALDEN	231	0 (0%)	0	
		MARBLEHEAD	72	0 (0%)	0	
		MARLBOROUGH	126	0 (0%)	0	
		MEDFORD	204	0 (0%)	0	
		MELROSE	126	0 (0%)	0	
		MILTON	101	0 (0%)	0	
		NAHANT	28	0 (0%)	0	
		NEWTON	276	0 (0%)	0	
		NORTHBOROUGH	48	0 (0%)	0	
		NORWOOD	99	0 (0%)	0	
		QUINCY	312	0 (0%)	0	
		READING	130	0 (0%)	0	
		REVERE	180	0 (0%)	0	
		SAUGUS	104	0 (0%)	0	
		SOMERVILLE	252	0 (0%)	0	
		SOUTHBOROUGH	30	0 (0%)	0	
		STONEHAM	91	0 (0%)	0	
		SWAMPSCOTT	50	0 (0%)	0	
		WALTHAM	216	0 (0%)	0	
		WATERTOWN	120	0 (0%)	0	
		WESTON	45	0 (0%)	0	
		WINTHROP	75	1 (1.33%)	0	No
		Total: Fully Served	*4953*	*4 (0.08%)*		
Partially Served	c	BEDFORD	57	0 (0%)	0	
		CANTON	91	0 (0%)	0	
		HANSCOM AFB	33	0 (0%)	0	
		NEEDHAM	123	0 (0%)	0	
		PEABODY	216	0 (0%)	0	
		WAKEFIELD	132	0 (0%)	0	
		WELLESLEY	113	0 (0%)	0	
		WILMINGTON	87	0 (0%)	0	
		WINCHESTER	84	0 (0%)	0	
		WOBURN	195	0 (0%)	0	
CVA	d	SOUTH HADLEY FD1	61	0 (0%)	0	
		Total: CVA & Partially Served	*1192*	*0 (0.0%)*		
		Total: Community Samples	*6145*	*4 (0.07%)*		

Chlorine Residuals in Fully Served Communities

	2019							2020					
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
% <0.1	0.0	0.2	0.3	0.7	1.1	1.7	0.2	0.1	0.1	0.1	0.1	0.0	0.1
% <0.2	0.1	0.7	1.3	2.3	3.3	3.3	1.5	0.4	0.2	0.2	0.2	0.3	0.4
% <0.5	0.9	2.5	4.5	7.2	8.7	7.7	4.1	2.0	1.5	1.1	1.6	1.3	1.5
% <1.0	3.2	7.0	11.0	14.9	17.8	12.6	7.3	3.9	2.9	3.5	4.6	4.0	4.3
% ≥1.0	96.8	93.0	89.0	85.1	82.2	87.4	92.7	96.1	97.2	96.5	95.4	96.0	95.7

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

4th Quarter – FY20

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.

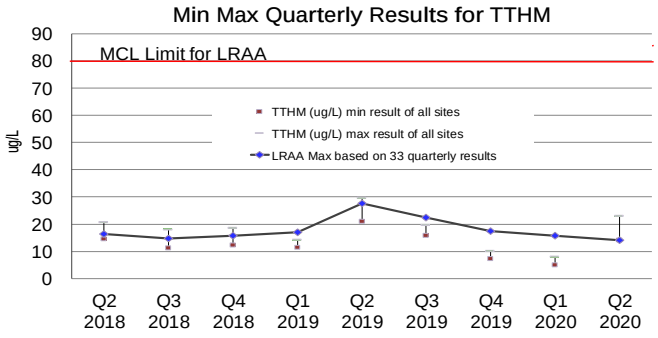
The locational running annual average calculated quarterly at each individual sampling location must be below the Total HAA5 or Total TTHM MCL standard. The charts below show the highest and lowest single values for all sites, and the LRAA of the highest location each quarter.

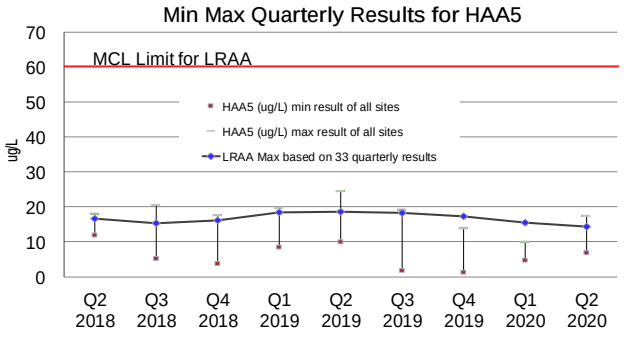
Partially served and CVA communities are responsible for their own compliance monitoring and reporting, and must be contacted directly for their individual results. The chart below combines data for all three CVA communities data (Chicopee, Wilbraham and South Hadley FD1). Although, they are separately regulated, however each community is regulated individually.

Bromate is tested monthly as required 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.

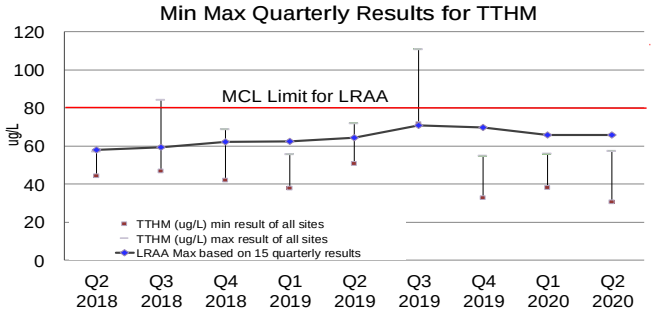
The LRAA for TTHMs and HAA5s for MWRA's Compliance Program (represented as the line in the top two graphs below) remain below current standards. The Max LRAA in the quarter for TTHMs = 15.7 ug/L; HAA5s = 15.4 ug/L. The current RAA for Bromate = 0.0 µg/L. During the Q4 2019 sampling, one CVA location exceeded an HAA5 Operational Evaluation Level. While this does not result in a violation this requires an analysis and review of their water system and a report to MADEP. No LRAA exceedances or violations occurred for Q1 and Q2 of 2020 for any of the CVA communities. MWRA and the CVA communities continue to closely monitor and manage the disinfection process to minimize DBP production.

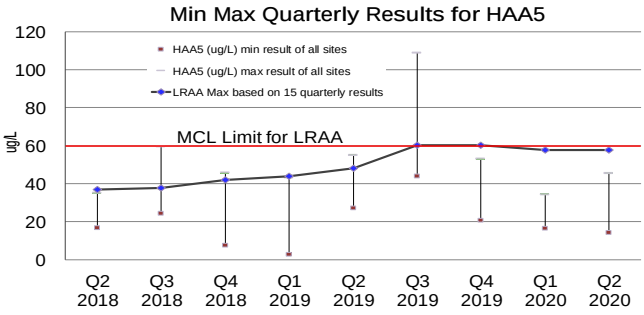
MetroBoston Disinfection By-Products





CVA Disinfection By-Products (Combined Results)





Water Supply and Source Water Management

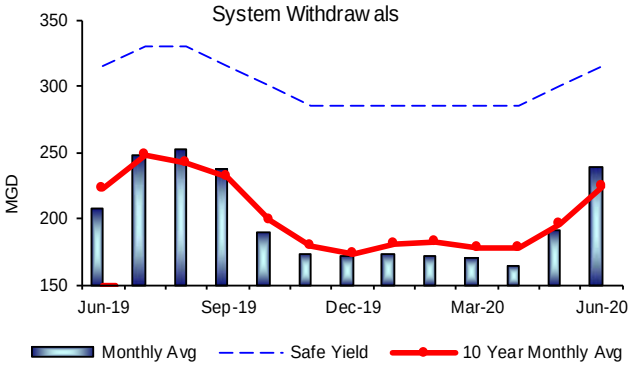
4th Quarter – FY20

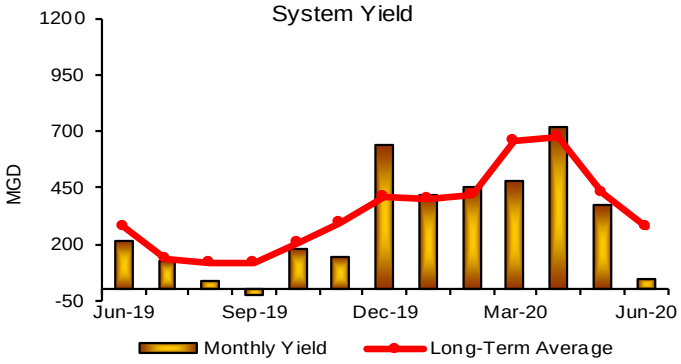
Background

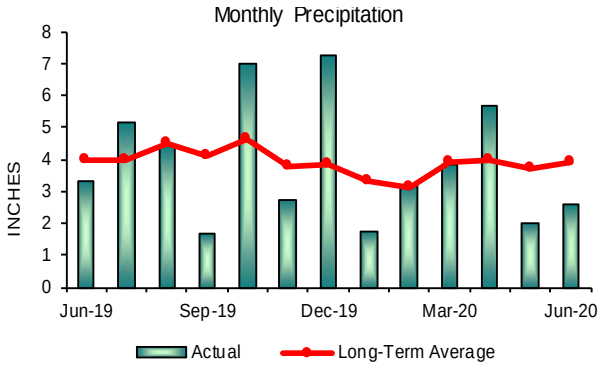
A reliable supply of water in MWRA's reservoirs depends on adequate precipitation during the year and seasonal hydrologic inputs from watersheds that surround the reservoirs. Demand for water typically increases with higher summer temperatures and then decreases as temperatures decline. Quabbin Reservoir 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.

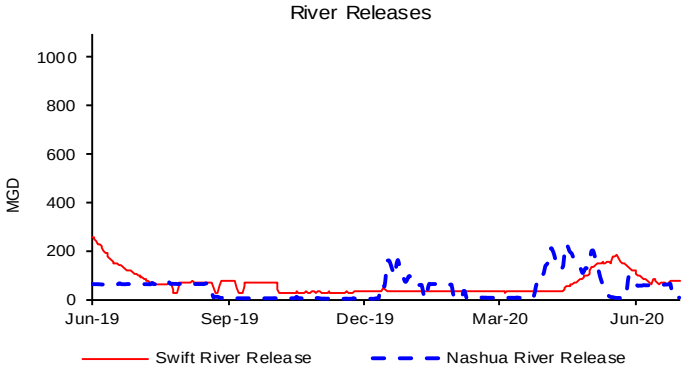
Outcome

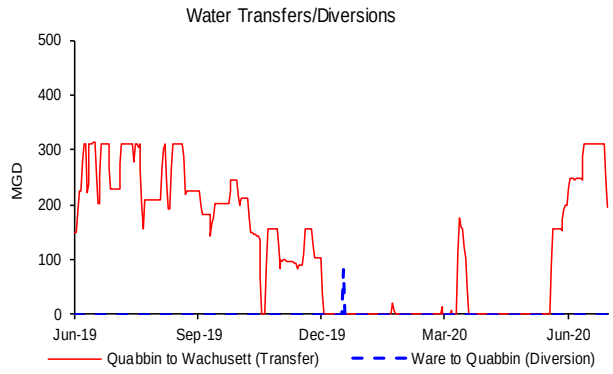
The volume of the Quabbin Reservoir was at 96.9% as of June 30, 2020; a 0.1% increase for the quarter, which represents an addition of 154 million gallons of storage and an increase in elevation of 0.02' for the quarter. System withdrawal, precipitation and yield were below their respective long term quarterly averages.

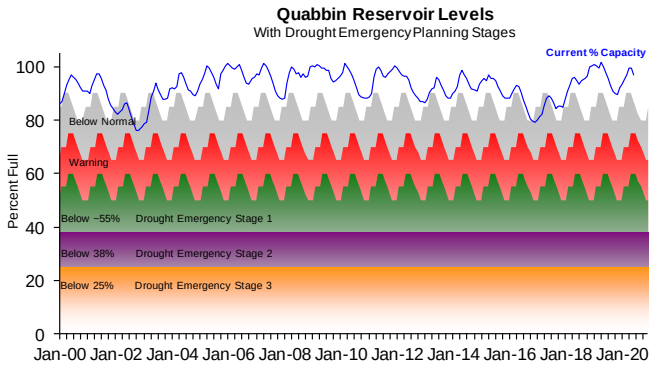












WASTEWATER QUALITY

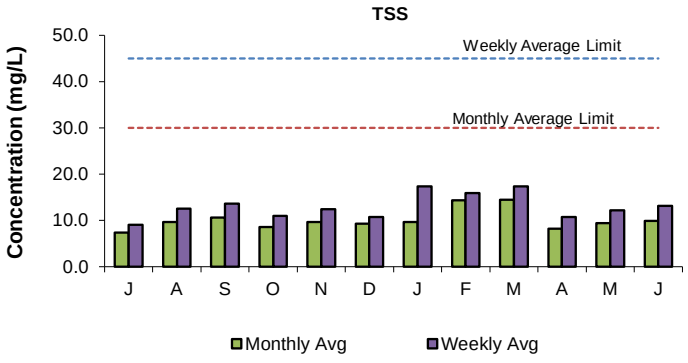
NPDES Permit Compliance: Deer Island Treatment Plant

4th Quarter - FY20

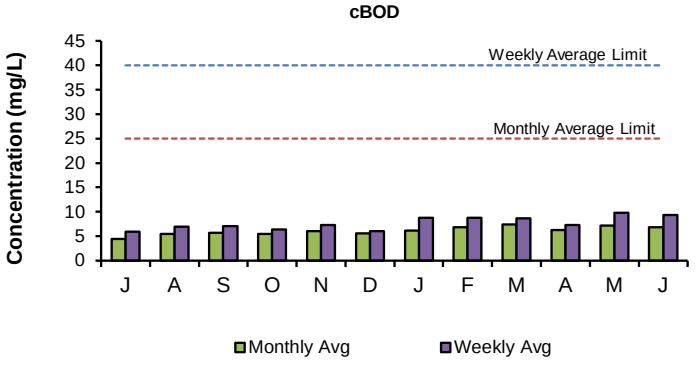
NPDES Permit Limits

Effluent Characteristics		*Units*	*Limits*	*April*	*May*	*June*	*4th Quarter Violations*	*FY20 YTD Violations*
Dry Day Flow (365 Day Average):		mgd	436	290.5	288.0	282.9	0	0
cBOD:	Monthly Average	mg/L	25	6.3	7.2	6.8	0	0
	Weekly Average	mg/L	40	7.3	9.8	9.3	0	0
TSS:	Monthly Average	mg/L	30	8.2	9.4	9.9	0	0
	Weekly Average	mg/L	45	10.8	12.2	13.2	0	0
TCR:	Monthly Average	ug/L	456	0.0	0.0	0.0	0	0
	Daily Maximum	ug/L	631	0.0	0.0	0.0	0	0
Fecal Coliform:	Daily Geometric Mean	col/100mL	14000	20.0	124.0	28.0	0	0
	Weekly Geometric Mean	col/100mL	14000	7.0	10.0	7.0	0	0
	% of Samples >14000	%	10	0.0	1.0	0.0	0	0
	Consecutive Samples >14000	#	3	0.0	0.0	0.0	0	0
pH:		SU	6.0-9.0	6.3-6.9	6.4-6.9	6.3-6.9	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	50	0	0

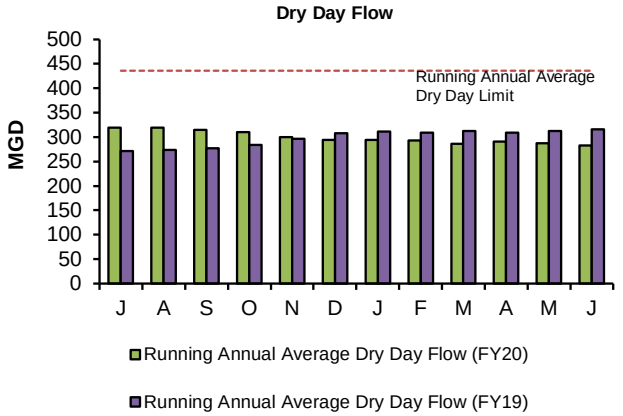
There have been no permit violations in FY20 to date at the Deer Island Treatment Plant (DITP).



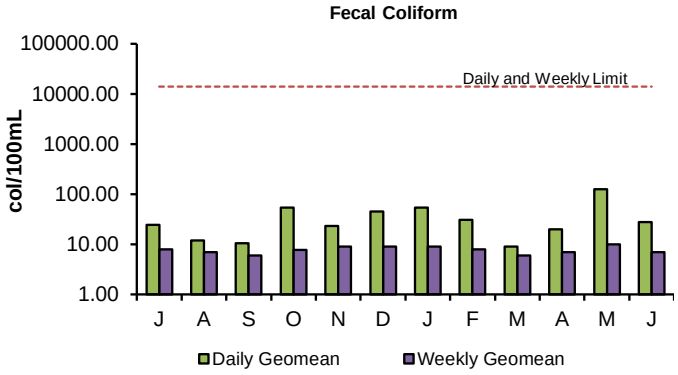
Total Suspended Solids (TSS) in the effluent is a measure of the amount of solids that remain suspended after treatment. All TSS measurements for the 4th Quarter were within permit limits.



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 4th 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 4th 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 4th Quarter, all permit conditions for fecal coliform were met.

NPDES Permit Compliance: Clinton Wastewater Treatment Plant

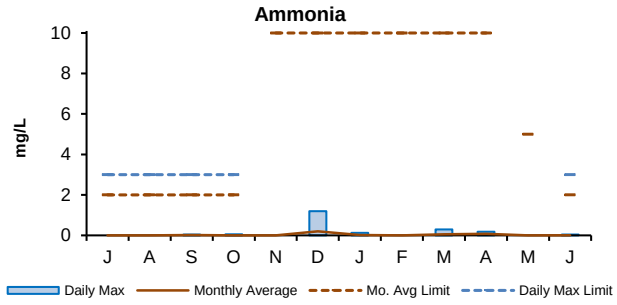
4th Quarter - FY20

NPDES Permit Limits

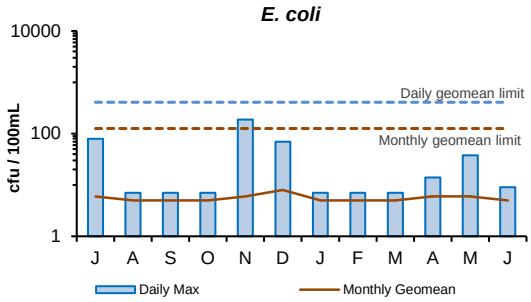
Effluent Characteristics		*Units*	*Limits*	*April*	*May*	*June*	*4th Quarter Violations*	*FY20 YTD Violations*
Flow:	12-month Rolling Average:	mgd	3.01	2.44	2.42	2.38	0	3
BOD:	Monthly Average:	mg/L	20	0.90	1.00	1.50	0	0
	Weekly Average:	mg/L	20	1.50	1.60	1.60	0	0
TSS:	Monthly Average:	mg/L	20	2.50	2.30	2.00	0	0
	Weekly Average:	mg/L	20	2.90	2.80	2.40	0	0
pH:		SU	6.5-8.3	6.8-7.4	7.1-7.6	7.3-7.7	0	0
Dissolved Oxygen:	Daily Average Minimum:	mg/L	6	10.00	9.10	8.20	0	0
E. Coli:	Monthly Geometric Mean:	cfu/100mL	126	6	6	5	0	0
	Daily Geometric Mean:	cfu/100mL	409	14	38	9	0	0
TCR:	Monthly Average:	ug/L	17.6	0.13	0.13	0.13	0	0
	Daily Maximum:	ug/L	30.4	4.00	4.00	4.00	0	0
Copper:	Monthly Average:	ug/L	11.6	3.52	5.36	6.27	0	0
	Daily Maximum:	ug/L	14.0	3.52	5.36	8.10	0	0
Total Ammonia Nitrogen: June 1st - October 31st	Monthly Average:	mg/L	2.0	0.08	0.00	0.01	0	0
	Daily Maximum:	mg/L	3.0	0.18	0.00	0.04	0	0
Total Phosphorus: April 1st - October 31st	Monthly Average:	ug/L	150	41	68	74	0	0
	Daily Maximum:	ug/L	RPT	85	143	129	0	0
Acute Toxicity+:	Daily Minimum:	%	≥100	N/A	N/A	>100	0	0
Chronic Toxicity+:	Daily Minimum:	%	≥62.5	N/A	N/A	62.5	0	0

There were three permit violations in FY20 at the Clinton Treatment Plant.
1st Quarter: There were three permit violations in the first quarter. The 12-month rolling average flow exceeded the limit of 3.01 MGD due to excessive rains in the region in late 2018.
2nd Quarter: There were no permit violations in the 2nd Quarter.
3rd Quarter: There were no permit violations in the 3rd Quarter.
4th Quarter: There were no permit violations in the 4th Quarter.

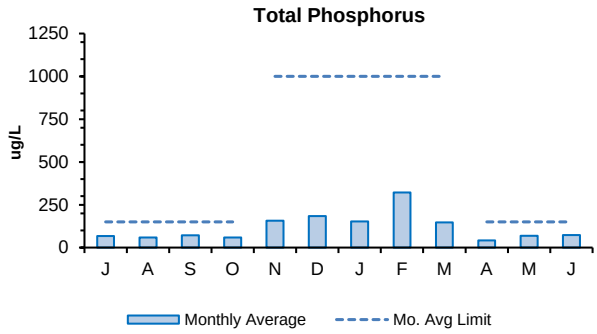
+ Toxicity testing at the Clinton Treatment Plant is conducted on a quarterly basis.



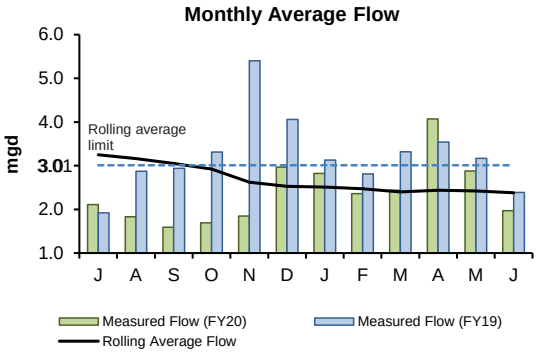
The 4th Quarter's monthly average and daily maximum concentrations of ammonia were below the permit limits. The monthly average and daily maximum limits for the 4th Quarter are variable, as low as 2.0 and 3.0 mg/L respectively. The permit limits are most stringent from June to October when warm weather 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 4th Quarter.The monthly and daily limits are 126 cfu/100 mL and 409 cfu/100 mL respectively.



The 4th Quarter's monthly average concentrations for total phosphorus were below permit limits. The new seasonal permit limits went into effect April 1, 2019.

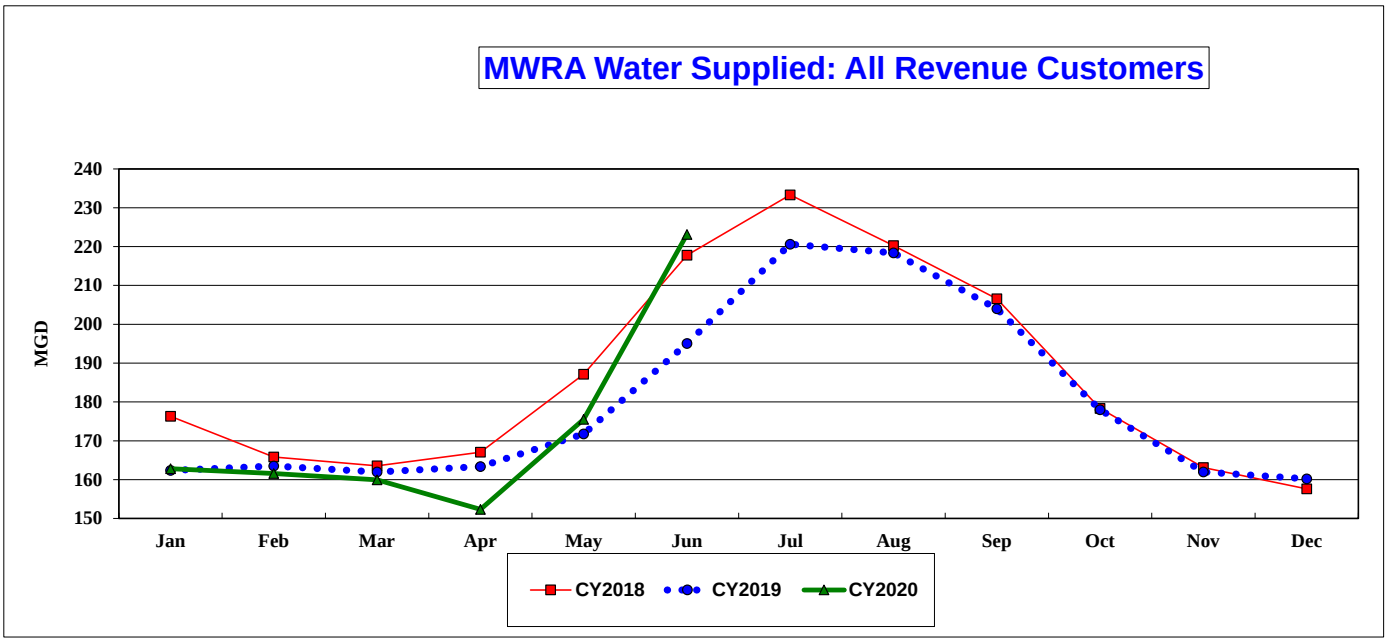


The graph depicts the rolling annual average monthly flow, measured in million gallons per day, exiting the plant.
The 12-month rolling average flows during the 4th Quarter were below the permit limit.

COMMUNITY FLOWS AND PROGRAMS

Customer Water Use

4th Quarter - FY20



MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Average	Annual Average
CY2018	176.294	165.841	163.539	167.056	187.145	217.776	233.321	220.268	206.586	178.340	163.125	157.612	179.695	186.553
CY2019	162.367	163.492	161.984	163.350	171.773	195.025	220.621	218.376	203.996	177.998	161.941	160.207	169.662	180.220
CY2020	162.804	161.557	159.930	152.336	175.530	223.143	0.000	0.000	0.000	0.000	0.000	0.000	172.504	172.504

MG	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Total	Annual Total
CY2018	5,465.125	4,643.548	5,069.719	5,011.695	5,801.508	6,533.267	7,232.949	6,828.310	6,197.590	5,528.550	4,893.739	4,885.979	32,524.861	68,091.978
CY2019	5,033.385	4,577.769	5,021.508	4,900.488	5,324.952	5,850.742	6,839.258	6,769.663	6,119.890	5,517.952	4,858.240	4,966.431	30,708.844	65,780.279
CY2020	5,046.925	4,685.154	4,957.836	4,570.086	5,441.415	6,694.297	0.000	0.000	0.000	0.000	0.000	0.000	31,395.712	31,395.712

The June 2020 Community Water Use Report was recently distributed to communities served by the MWRA waterworks systems. 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 to MWRA water communities. Calendar year 2020 water use will be used to allocate the FY2022 water utility rate revenue requirement.

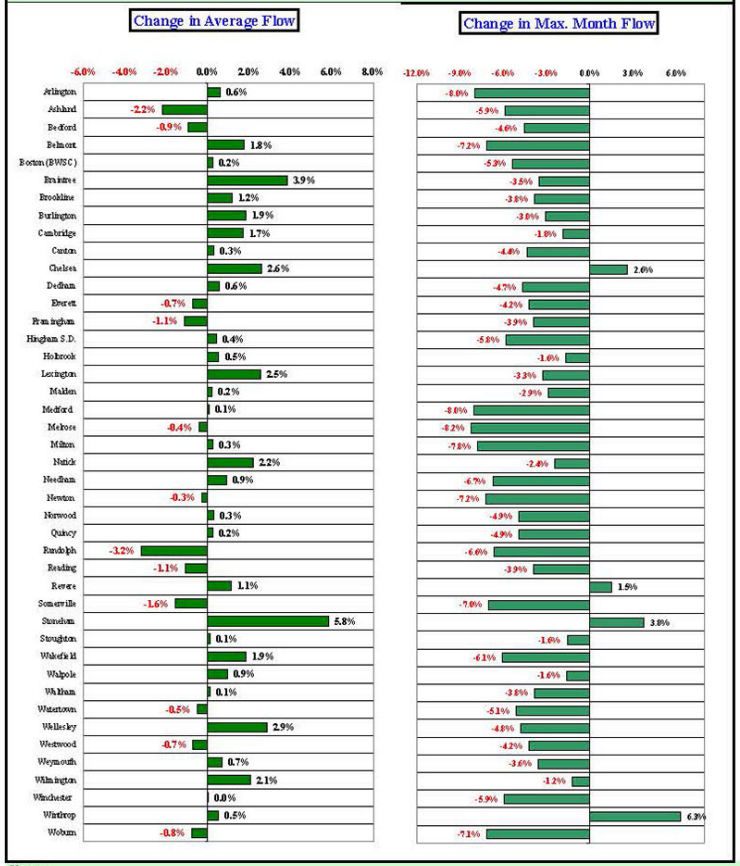
MWRA customers used an average of 189.6 mgd in the 4th quarter (Apr-Jun) of FY2020. This is an increase of 7.1 mgd or 3.9% compared to the 4th quarter of FY2019.

Community Wastewater Flows

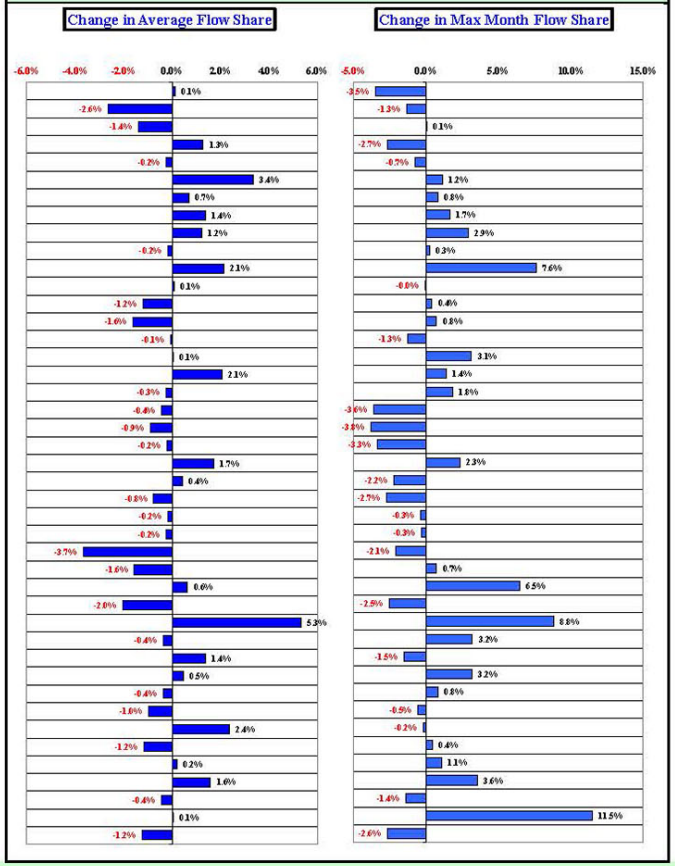
4th Quarter – FY20

How Projected CY2020 Community Wastewater Flows Could Effect FY2022 Sewer Assessments [1,2,3]

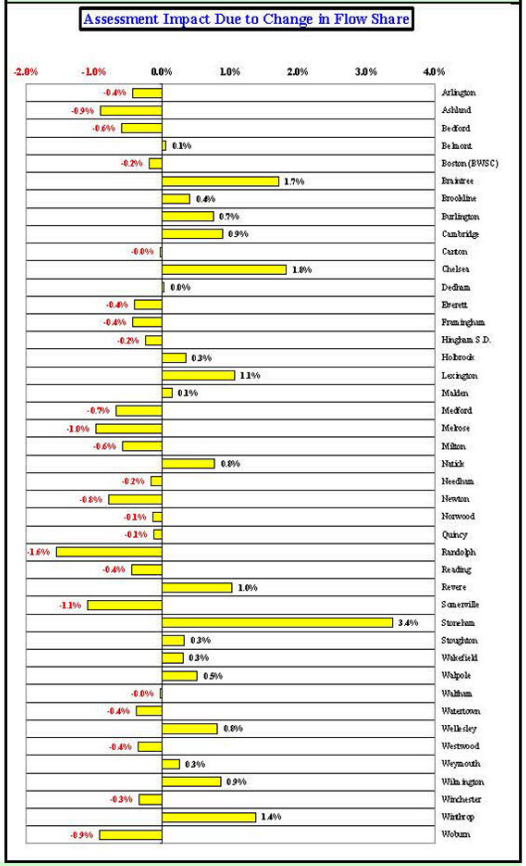
The flow components of FY2022 sewer assessments will be calculated using a 3-year average of CY2018 to CY2020 wastewater flows compared to FY2021 assessments that used a 3-year average of CY2017 to CY2019 wastewater flows.



But as MWRA's sewer assessments are a ZERO-SUM calculation, a community's assessment is strongly influenced by the RELATIVE change in CY2018 to CY2020 flow share compared to CY2017 to CY2019 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 actual flows for 2017 to 2019, and January to March, and June 2020 (as of 08/20/20). April & May 2020 based on the average of three prior years, adjusted for April & May 2020 water use. July-December 2020 based on the average of the three prior years.

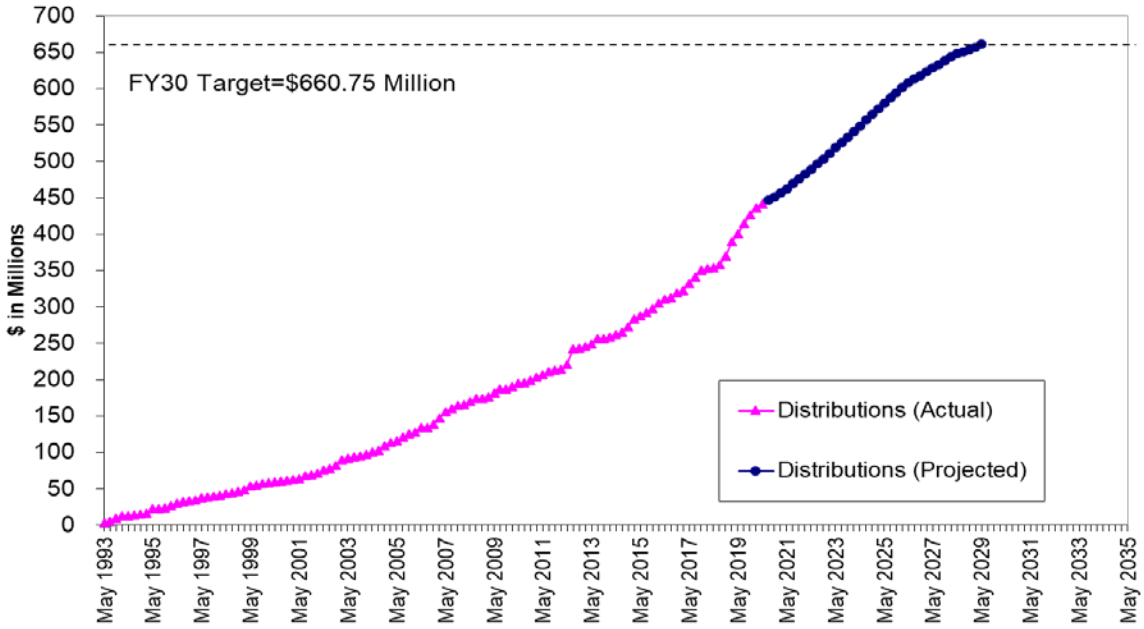
[3] Flow data is preliminary and subject to change pending additional MWRA and community review.

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

Infiltration/Inflow Local Financial Assistance Program

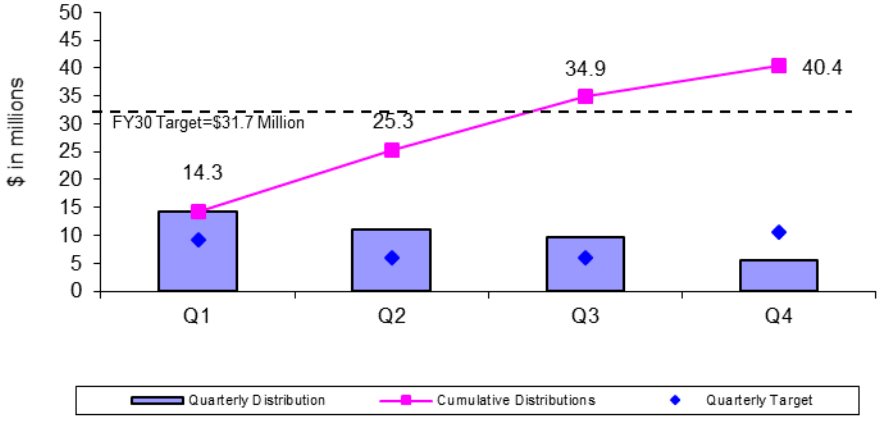
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides $760.75 million in grants and interest-free loans (average of about $20 million per year from FY93 through FY30) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned 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. Phase 13 provides an additional $100 million in loan-only funds (not yet included in the graph of distributions below).

I/I Local Financial Assistance Program Distribution FY93-FY30



During the 4th Quarter of FY20, $5.5 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Brookline, Framingham, and Winthrop. Total grant/loan distribution for FY20 is $40.4 million. From FY93 through the 4th Quarter of FY20, all 43 member sewer communities have participated in the program and $441 million has been distributed to fund 605 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.

FY20 Quarterly Distributions of Sewer Grant/Loans



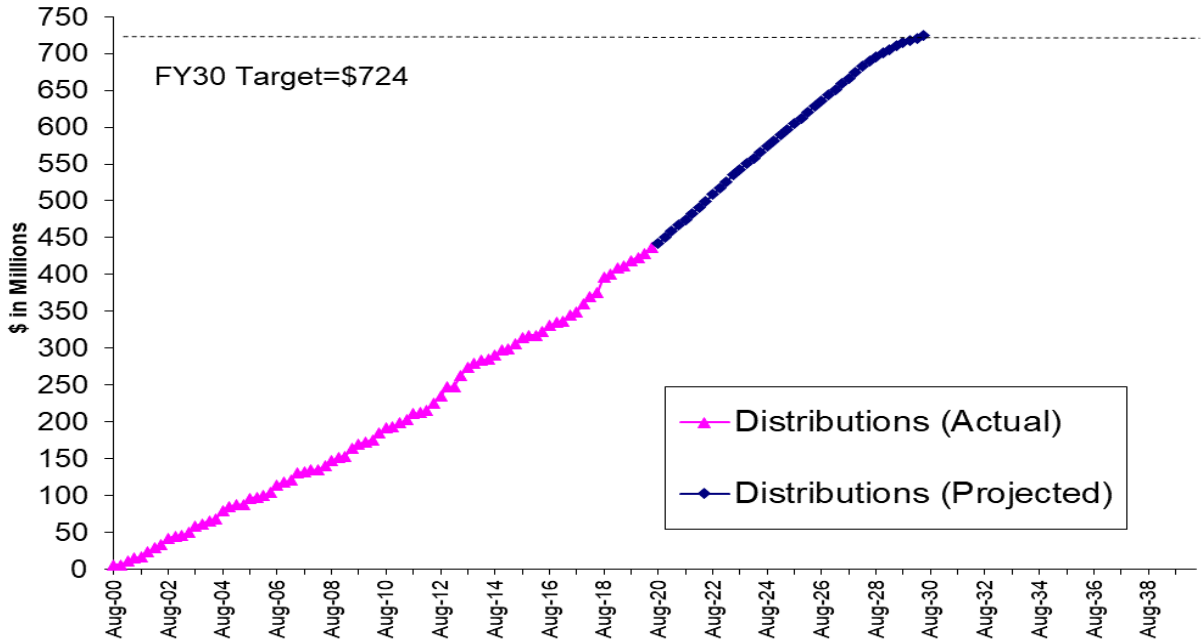
Community Support Programs

4th Quarter – FY20

Local Water System Assistance Program

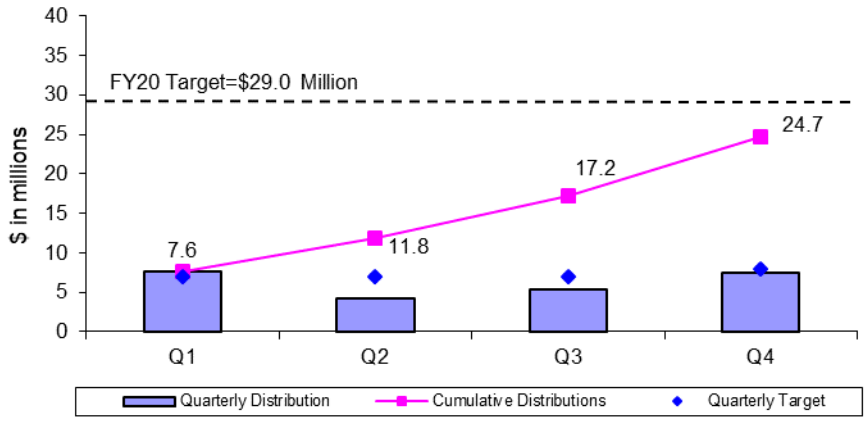
MWRA's Local Water System Assistance Programs (LWSAP) provides $724 million in interest-free loans (an average of about $24 million per year from FY01 through FY30) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. There have 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 4th Quarter of FY20, $7.5 million in interest-free loans was distributed to fund local water projects in Nahant, Quincy, and Saugus. Total loan distribution for FY20 is $24.7 million. From FY01 through the 4th Quarter of FY20, $436 million has been distributed to fund 466 local water system rehabilitation projects in 43 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.

FY20 Quarterly Distributions of Water Loans



Community Support Programs

4th Quarter – FY20

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 – MWRA made three Lead Loans.

FY18 was the second year of the Lead Loan Program - MWRA made five Lead Loans.

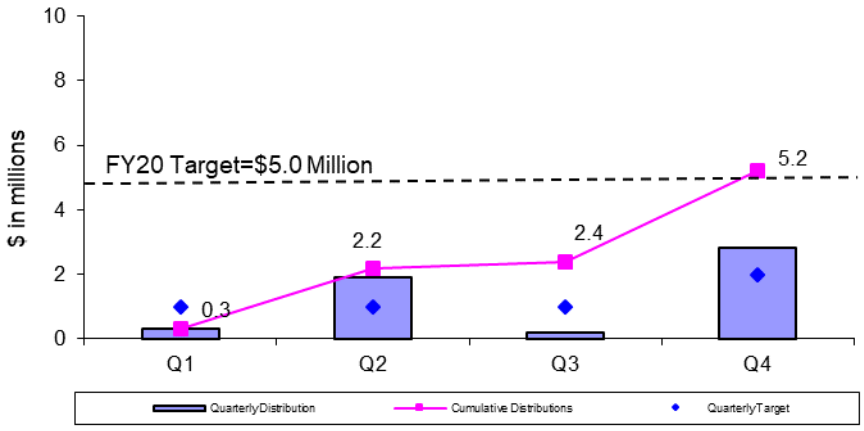
FY19 was the third year of the Lead Loan Program - MWRA made four Lead Loans.

FY20 is the fourth year of the Lead Loan Program – a total of $5.15 Million was distributed. One Lead Loan was made during the 1st quarter of FY20: $300,000 to Chelsea. Two Lead Loans were made during the 2nd quarter of FY20: $1.0 Million to Everett and $900,000 to Somerville. One Lead Loan was made during the 3rd quarter of FY20: $160,000 to Weston. Four Lead Loans were made during the 4th quarter of FY20: $500,000 to Everett, $1.0 Million to Marlborough, $600,000 to Winchester, and $690,000 to Winthrop.

Summary of Lead Loans:

Everett in FY20	$0.5 Million
Marlborough in FY20	$1.0 Million
Winchester in FY20	$0.6 Million
Winthrop in FY20	$0.7 Million
Weston in FY20	$0.2 Million
Everett in FY20	$1.0 Million
Somerville in FY20	$0.9 Million
Chelsea in FY20	$0.3 Million
Marlborough in FY19	$1.0 Million
Winthrop in FY19	$0.5 Million
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	$16.7 Million

FY20 Quarterly Distributions of Lead Service Line Replacement Loans

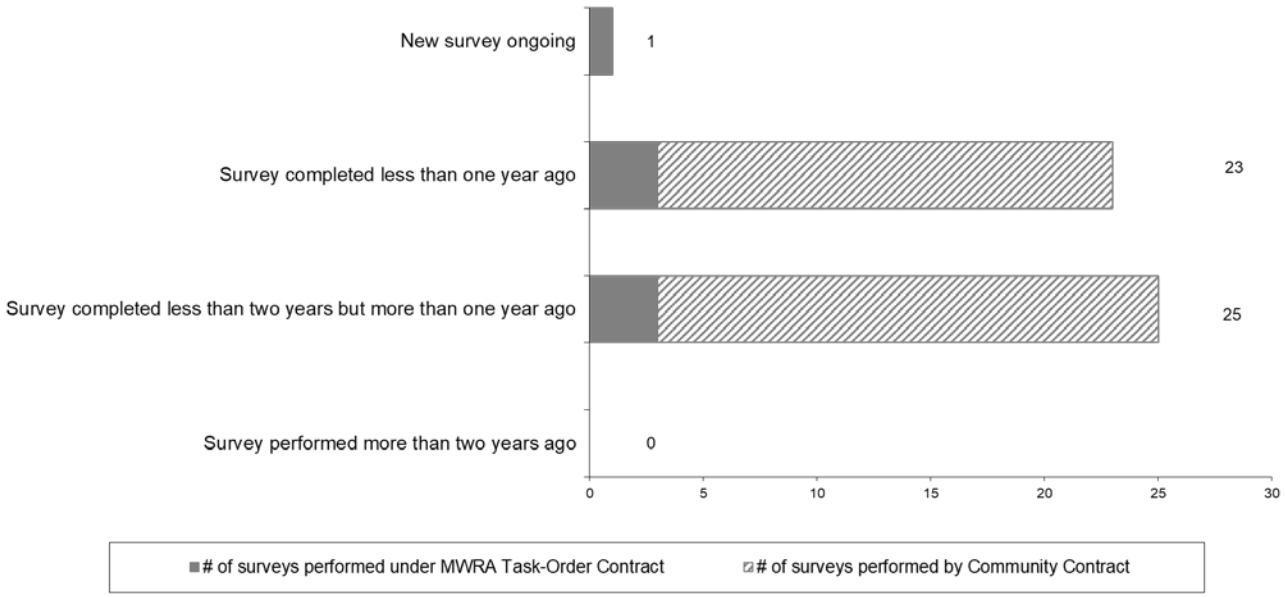


Community Support Programs

4th Quarter – FY20

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 3rd Quarter of FY20, 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	640	19,735	109	9,208	29,692
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	791	832	433	942	2,998
Toilet Leak Detection Dye Tablets	_____	419	35,431	258	620	36,728

BUSINESS SERVICES

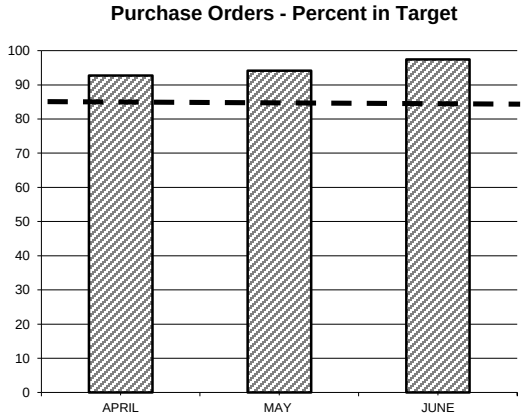
Procurement: Purchasing and Contracts

4th Quarter - FY20

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

Outcome: Processed 97% of purchase orders within target; Average Processing Time was 4.57 days vs. 5.04 days in Qtr 4 of FY19. Processed 20% (1 of 5) of contracts within target timeframes; Average Processing Time was 193 days vs. 157 days in Qtr 4 of FY19.

Purchasing



	No.	TARGET	PERCENT IN TARGET
$0 - $500	426	3 DAYS	97.1%
$500 - $2K	483	7 DAYS	97.9%
$2K - $5K	312	10 DAYS	98.0%
$5K - $10K	30	25 DAYS	93.3%
$10K - $25K	44	30 DAYS	86.3%
$25K - $50K	20	60 DAYS	70.0%
Over $50K	33	90 DAYS	100.0%

The Purchasing Unit processed 1348 purchase orders, 633 less than the 1981 processed in Qtr 4 of FY19 for a total value of $10,674,862 versus a dollar value of $13,034,538 in Qtr 4 of FY19.

The purchase order processing target was not met for the $10K-$25K category due to staff summary requirements.

Contracts, Change Orders and Amendments

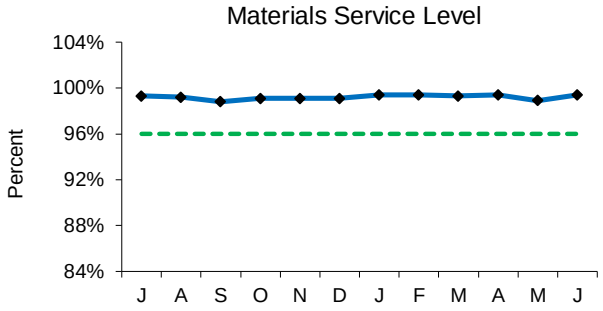
Procurement processed five contracts with a value of $6,204,413 and eleven amendments with a value of $1,525,408. Twenty seven change orders were executed during the period. The dollar value of all non-credit change orders during Q4 FY20 was $1,547,810 and the value of credit change orders was ($135,403).

Four contracts were not processed within the target timeframes. Two contracts were delayed due to delays by the consultant in preparing E-tables in addition to delays caused by COVID-19 and the challenges associated with obtaining electronic signatures. Another contract was delayed due to delays in obtaining electronic signatures. The final contract was delayed due to the bidder's misstated intended bid, delays in returning contract documents to the MWRA and the COVID-19 circumstances which necessitated the establishment of a new contract execution process. In addition, the contractor took extra time to review and accept the contract documents and return the acknowledged Notice to Proceed letter.

Staff reviewed 55 proposed change orders and 34 draft change orders.

Materials Management

4th Quarter - FY20



The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 5,735 (99.2%) of the 5,781 items requested in Q4 from the inventory locations for a total dollar value of $1,047,311.

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 FY20 goal is to reduce consumable inventory from the July '19 base level ($8.4 million) by 2.0% (approximately $169,249), to $8.2 million by June 30, 2020 (see chart below). Reduction fell short of the goal buy $138,713. Increased purchases of Pandemic supplies impacted meeting this goal.

Items added to inventory this quarter include:

- Deer Island – pressure switches, flowmeters, solenoid valves, and pressure gauges for I&C; hand sanitizer, face masks and anti-bacterial wipes for Pandemic; transducers and current boards for HVAC; box covers and control panels for Electrical; filters and conduit seals for Power and Pump.
- Chelsea – Grit collection chain for Work Coordination; face shields, face masks and hand sanitizer for Pandemic.
- Southboro – chemical coveralls, face masks, PPE kits, disinfectant wipes and disinfectant spray for Pandemic.

Property Pass Program:

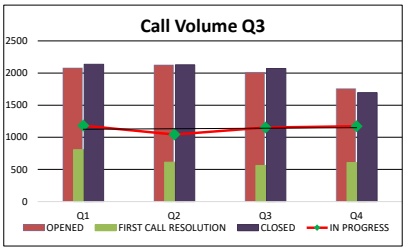
- There were no audits conducted during Q4 due to the Pandemic circumstances.
- Scrap revenue received for Q4 amounted to $7,384. Year to date revenue received amounted to $31,560
- Revenue received from online auctions held during Q4 amounted to $0 due to Pandemic circumstances. Year to date revenue received amounted to $293,126.

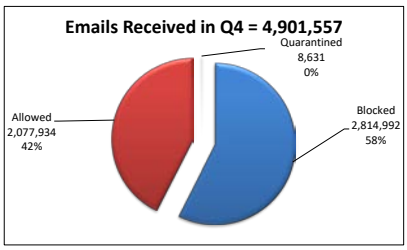
Items	Base Value July-19	Current Value w/o Cumulative New Adds	Reduction / Increase To Base
Consumable Inventory Value	8,462,463	8,431,927	-30,536
Spare Parts Inventory Value	9,183,923	9,119,560	-64,363
Total Inventory Value	17,646,386	17,551,487	-94,899

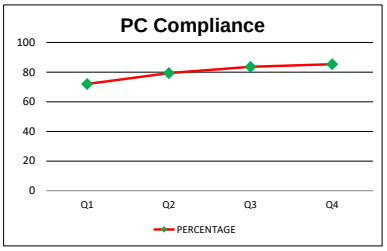
Note: New adds are items added at an inventory location for the first time for the purpose of servicing a group/department to meet their business needs/objectives.

MIS Program

4th Quarter - FY20







Performance & Backlog for Q4

- 1695 calls were completed this quarter.
- Call closure averaged 7.9 days.
- Priority 1 & 2 Service Level Agreements (SLA) were met this quarter.

Cyber Security Q4

- In Q4, 199 security fixes/updates were pushed to desktops/servers. 85% of all PCs/Laptops are compliant with approved patches.
- McAfee quarantined 68 distinct viruses from 4 PC. PCs are current with antivirus signatures for known malware.
- 58% of all email was blocked upon initial receipt and evaluation.

INFRASTRUCTURE & SECURITY

Teleworking: Continued to support a diversly located work environment.

AWIA Risk and Resiliency Assessment: Phase I & II Assessments completed. Conducting Phase I remediation process with a bi-weekly Application and SysAdmin group meeting discussion and action items. Began drafting Task List for Phase II vulnerability assessment remediating items.

Cyber Security: Evaluated a few proof-of-concept solutions including DUO Multifactor Authentication, Proofpoint Email Gateway with DMARC/DKIM/SPF, Secure Web Gateway and One Identity Password Manager. Implemented Commvault Journaling, Citrix Notate Pro, Quest Auditing. Installed security updates on all key infrastructure components..

Infrastructure Upgrades: Migrated File, GIS, and DMZ servers to new respective Windows 2019 environment.

Audio/Visual Upgrades: The Chelsea EOC is complete. Working with the vendor on configurations for nine remaining rooms.

Chelsea Environmental Controls Monitoring System: Design is complete. Installation scheduled for July 9th.

PBX (Telephone System) Upgrade: Reviewing the SOW and working with other PBX/Unified Communication providers to evaluate a complete unified communication collaboration solution.

LAWSON & MAXIMO

Lawson: Designed two new pay codes and customized the COBOL library, which determines employee hourly rates, to meet the pay code rules for the new mandated Paid Family Leave CARES Act.

Infor/Lawson Upgrade: RFQ/P, SOW finalized and will be posted to the supplier portal in July. Proposals will be due in August.

Maximo/Lawson Interface: A selection committee meeting was held on June 29th to discuss the scope of work and RFQ/P for the Maximo-Lawson interface project.

Maximo 01080 Form Automation: When complete, tis initiative will allow construction contractors to submit specification form data electronically in a format that can be imported into Maximo. A working prototype and associated training materials were completed and 14 of 15 forms have been developed to date. Once all forms are complete, User Acceptance Testing will begin.

IT STEERING COMMITTEE UPDATES

The IT Steering Committee met in May. Five (5) Project Initiation Forms were discussed. The following projects were prioritized, due to COVID-19, to have resources assigned as soon as they are available: Visitor Management (for contact tracing) and Infor/Lawson Learning Management System (for non-classroom/on-line training).

Learning Management System: Drafted an SOW and began procurement process. Explored high-level integration capabilities with on-line training vendors, existing LMS system and existing Infor/Lawson training module.

Visitor Management System: Documented business requirements, including current and future business flows, badge requirements, data security issues, and reporting needs. Assessed a solution by using the trail version.

OTHER SOFTWARE / CUSTOM APPLICATIONS

Enterprise Content Management (ECM)/e-Construction: Reviewed answers to MWRA clarifications questions from all proposers. Held selection Committee meeting to evaluate preliminary scores to identify vendor for future demos. Identified demo topics and scheduled preliminary demos from three proposers with MWRA subject matter experts in July.

Fuel Management System: MWRA's former fuel management system (Gasboy) was replaced with Fleet Data System, which went live in Chelsea and Deer Island on June 22nd. Users were trained and have started using the system.

Dental Permits/Certifications: Application was moved to the pilot phase.

MHC Software: Working with vendor to replace the current check printing software (Bottomline) with new check printing software (MHC) due to ongoing security and browser compatibility issues. Implementation is in progress and expected to last approximately four months.

LIBRARY, RECORD CENTER, IT TRAINING

Library FY20: Undertook 108 research requests, supplied 99 books for circulation, provided 80 articles, and 115 standards and the MWRA Library Portal supported 10,721 end-user searches.

Record Center FY20: Handled a total of 732 boxes and dispose 233 approved box for destruction. The RC received 16 geological samples. Due to COVID-19 the RC had limited Record Center activities in Q4.

IT Training: Due to the Covid-19 pandemic, instructor-led classes were not held this quarter. A total of 21 classes were completed by 74 staff through Q3. 5% of the workforce has attended at least one class year-to-date. Job-aids were developed to support remote Teleworking staff including Webex conferencing job

39

Legal Matters
4th Quarter - FY 20

PROJECT ASSISTANCE

Real Estate, Contract, Environmental and Other Support:

- 8(m) Permits: Reviewed one hundred and thirty-one (131) 8(m) permits. Drafted 8(m) permit 2480 issued to Cadence Education, LLC for use of existing playground on aqueduct property located at 210 South Avenue in Weston. Reviewed Direct Connect Permit 20-01-181DC for the City of Newton to connect to Section 219 Station 342+07 at Farwell Street in Newton; Direct Connect Permit 20-02-182DC Department of Conservation and Recreation to disconnect Special Connection BB-018-S to MWRA Section 164 at Station 55+00 440 North Beacon Street in Brighton; and Direct Connect Permit 20-03-184DC for City of Cambridge to disconnect Public Connection CB-095-P to MWRA Section 184 at Station 35+29 in Cambridge, MA.

- **Real Property:** Finalized for recording an easement agreement between MBTA and MWRA for a MWRA easement and reviewed and revised Keolis license agreement for pipe jacking under the tracks at MBTA Dedham Corporate Station on Allied Drive in Dedham MBTA for MWRA Contract 7505 - MWRA Section 111 redundant 36-inch pipeline through Boston, Dedham, and Westwood. Reviewed Wachusett Watershed Fee Acquisition (W-001226) for Kittredge property on Worcester Road in West Boylston, MA. Recorded grant of temporary easement and easement plan at Suffolk Registry of Deeds for MWRA Contract 7279 - Dorchester Interceptor Sewer Rehabilitation (Sections 240/241/242). Finalized for recording First Amendment to Grant of Permanent Access Easement located at 777 Dedham Street, Canton, MA. Finalized and executed Massachusetts State Police License for placement of an antenna on DITP's Administration/Laboratory building for the purpose of gathering information pertinent to communications between drones and their remote controls. Reviewed Tenant Estoppel Certificate related to MWRA's lease for its records center building located at 34 Saint Martin Drive in Marlborough. Reviewed MWRA's property interests in a parcel of land adjacent to the Chelsea Bridge in Chelsea; 60 Winter Street in Malden; land acquired for MWRA's backup landfill in Walpole; Commonwealth Avenue in Boston for Section 8 of its Wachusett Aqueduct Supply Main 4; the proposed Montvale Avenue Development Project site in Woburn; and Tafts Avenue in the area of the Winthrop/Boston boundary.

- **Sewer Connections Serving Property Partially Located in a Non-MWRA Community**: Reviewed and prepared for execution Sewer Connection Agreement between MWRA and The Rivers School located at 333 Winter Street in Weston, MA.

- **Environmental:** Reviewed regulations at 310 CMR 19.00 relating to MWRA's landfill in Clinton, MA. Reviewed 2019 Summary of CSO receiving Water Quality Monitoring in Upper Mystic River/Alewife Brook and Charles River prepared pursuant to requirements in the CSO water quality variances for the Upper Mystic River/Alewife Brook and Lower Charles River/Charles River Basin. Reviewed proposed 2020 standard signatory conditions for multi-sector general permit for stormwater discharges from industrial activity. Reviewed letter sent to EPA and DEP regarding a non-wet weather activation of MWRA's Union Park Combined Sewer Overflow (“CSO”) Treatment Facility due to BWSC water main break. Drafted summary of United States Supreme Court Decision for County of Maui, Hawaii v. Hawaii Wildlife Fund et al (U.S Supreme Court Case decision April 23, 2020). Reviewed CSO Discharge Estimates and Rainfall Analysis for calendar year 2019 and supplemental discharge information for calendar year 2018.

- **Boston Harbor Case**: Reviewed Semi-Annual Compliance and Progress Report.

- **Miscellaneous:** Reviewed and advised on orders and guidance related to COVID-19 pandemic.

- **Public Records Requests:** During the fourth quarter of FY 2020, MWRA received and responded to one hundred thirty five (135) public records requests.

LABOR, EMPLOYMENT AND ADMINISTRATIVE

New Matters
Two demands for arbitration were filed.

A union filed a charge of prohibited practice at the Massachusetts Department of Labor Relations alleging the MWRA violated Chapter 150E when it unilaterally began deductions for paid medical and family leave under Chapter 175M without bargaining to impasse.

A union filed a charge of prohibited practice at the Massachusetts Department of Labor Relations alleging the MWRA violated Chapter 150E when it allegedly changed the assignment of overtime in Western Operations.

Matters Concluded

Received an arbitrator's decision in favor of the MWRA following its Motion to Dismiss a grievance alleging that it violated a collective bargaining agreement when it did not select the grievant for a vacancy.

Received an MCAD dismissal due to settlement of a complaint alleging that the MWRA discriminated against a current employee on the basis of sexual orientation and retaliation against him for not receiving promotions to a higher job title.

LITIGATION/CLAIMS

New lawsuits/claims: One new bankruptcy matter was received in April.

Frontier Communications Corporation, et al.
In April, debtor Frontier Communications Corporation filed a Notice of Chapter 11 bankruptcy in Southern New York Bankruptcy court, Docket No. 20-22476 (RDD).

Significant Developments Pursuant to the "Supreme Judicial Court updated Court Order dated May 26, 2020 and effective June 1, 2020, regarding court operations under the exigent circumstances created by the COVID-19 (coronavirus) pandemic" all filing and tracking order deadlines have been extended until at least July 1, 2020.

J. D'Amico, Inc. v. MWRA v. Green International Affiliates, Inc., et al, Suffolk Superior Court C.A. No. 17-4097-BLS2. The parties have reached a settlement to resolve MWRA's cost recovery claims arising out of completion of the Watertown Section Rehabilitation project, which settlement was approved by MWRA's Board of Directors at its June 24, 2020 meeting. It is expected that the parties will executed a formal Settlement Agreement and file a Stipulation of Dismissal with the court within the next 60 days.

Closed Cases: Bennett v. MWRA, Suffolk Superior Court C.A. No. 1984-CV02670. The parties entered into a Settlement Agreement to resolve plaintiff's lawsuit alleging that temporary fencing owned by MWRA fell on her causing her personal injury. The MWRA filed a Stipulation of Dismissal with Court on July 21, 2020.

Closed Claims: There are no closed claims to report.

Subpoenas During the 4th Quarter of FY 2020, no subpoenas were received and no subpoenas were pending at the end of the Fourth Quarter FY 2020.

Wage Garnishments There are currently fifteen Trustee Process matters, only two of which are considered active and monitored by Law Division.

SUMMARY OF PENDING LITIGATION MATTERS

TYPE OF CASE/MATTER	As of June 2020	As of Marc 2020	As of Dec 2019
Construction/Contract/Bid Protest (other than BHP)	2	2	2
Tort/Labor/Employment	3	4	4
Environmental/Regulatory/Other	2	2	2
Eminent Domain/Real Estate	0	0	0
Total	**7**	**8**	**8**
Other Litigation matters (restraining orders, etc.) 1. Army Corp of Engineers v. MWRA, NSTAR & Harbor Electric 2. IN RE: GSE Bonds Anti-Trust Litigation	2	2	1
Total – all pending lawsuits	**9**	**10**	**9**
Claims not in suit:	0	0	0
Bankruptcy	1	0	0
Wage Garnishment	2	2	1
TRAC/Adjudicatory Appeals	0	0	1
Subpoenas	0	0	0
TOTAL – ALL LITIGATION MATTERS	**12**	**12**	**14**

TRAC/MISC.

New Appeals: There are no new appeals in 4th Quarter FY 2020.

Settlement by Agreement of Parties There are no Settlement by Agreement of Parties in 4th Quarter FY 2020.

Stipulation of Dismissal No Joint Stipulation of Dismissals filed.

Notice of Dismissal Fine paid in full No Notices of Dismissal, Fine Paid in Full.

Tentative Decision There are no Tentative Decisions issued in the 4th Quarter FY 2020.

Final Decisions There are no Final Decisions issued in the 4th Quarter FY 2020.

INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES
4th Quarter - FY20

Highlights
During the 4th quarter FY20, Internal Audit (IA) compared the cleaning contract requirements for Chelsea, DITP, Western Operations and Clinton to the CDC guidance to ensure compliance. Audit support was provided for review of workplace reopening plans using guidance issued by the CDC, OSHA, Commonwealth of Massachusetts, City of Boston and industry best practices.

IA completed a true-up of 2019 operating expenses for the HEEC cable, reviewed the 2019 financial information of NEFCo for the operations of the pellet plant, reviewed the Department of Unemployment Assistance Monetary Determinations for unemployment claim calculations and eligibility, provided assistance on facility lease agreements, completed 2 consultant preliminary reviews and 2 construction labor burden reviews. IA assisted the Procurement Department with analysis during contract preparation and provided assistance to Operations with a review of the electricity interval accounts. IA issued a total of 52 indirect cost rate letters to professional service consultants during FY20.

Status of Recommendations
During FY20, 35 recommendations were closed of which 22 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 36 months, the appropriateness of the recommendation is re-evaluated.

All Open Recommendations Pending Implementation – Aging Between 0 and 36 Months

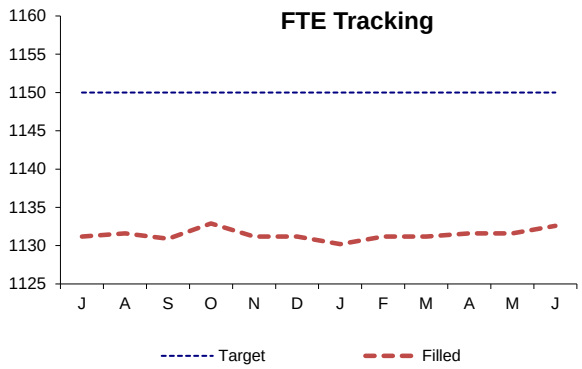
Report Title (issue date)	Audit Recommendations		
	Open	Closed	Total
Fleet Services Process Review (6/30/18)	1	4	5
Fuel Use & Mileage Tracking (12/31/18)	3	5	8
Asset Tracking – Fleet Data Verification (8/21/19)	8	8	16
Fleet Services Non-Plated Equipment Inspections (3/30/20)	11	4	15
Total Recommendations	*23*	*21*	*44*

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.

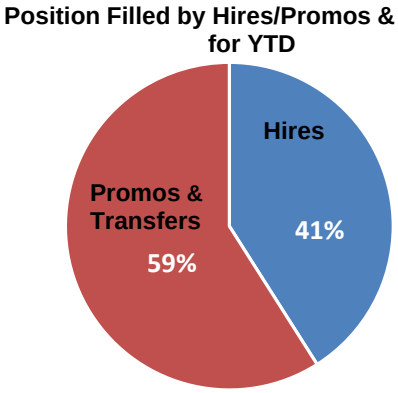
Cost Savings	FY16	FY17	FY18	FY19	FY20 Q4	TOTALS
Consultants	$88,312	$272,431	$118,782	$262,384	$643,845	$1,385,754
Contractors & Vendors	$1,772,422	$3,037,712	$1,323,156	$3,152,884	$2,097,729	$11,383,903
Internal Audits	$220,929	$224,178	$204,202	$210,063	$212,517	$1,071,889
Total	**$2,081,663**	**$3,534,321**	**$1,646,140**	**$3,625,331**	**$2,954,091**	**$13,841,546**

OTHER MANAGEMENT

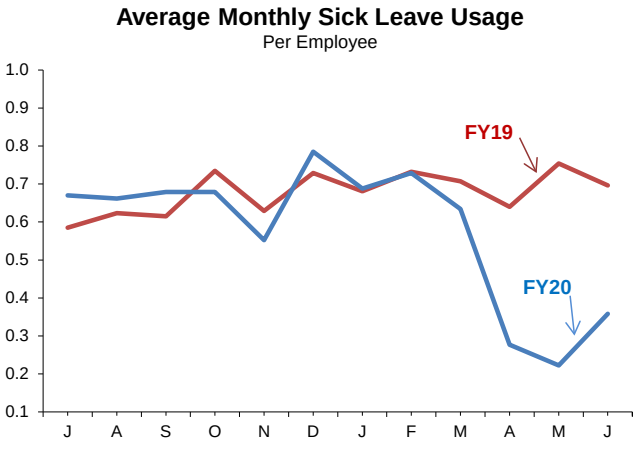
Workforce Management
4th Quarter - FY20



FY20 Target for FTE's = 1150
FTE's as of June 2020 = 1132.6
Tunnel Redunancy as of June 2020 = 7.0



	Pr/Trns	Hires	Total
FY18	118 (61%)	74 (39%)	192
FY19	112 (60%)	76 (40%)	188
FY20	84 (59%)	58 (41%)	142

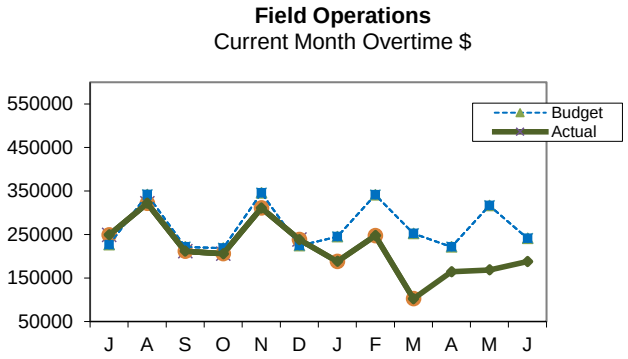


Average monthly sick leave for the 4th Quarter of FY20 decreased as compared to the 4th Quarter of FY19 (0.696 to 0.358)

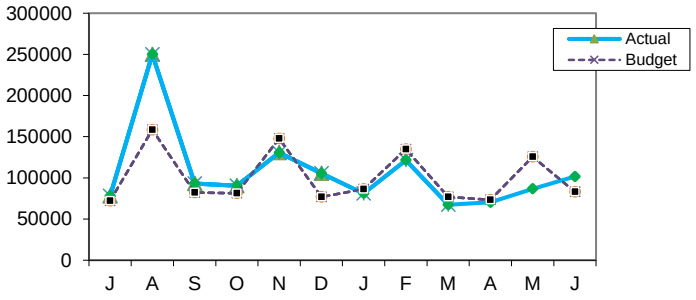
MWRA Average Cumulative Sick Leave Use By Division Per Employee

	Number of Employees	YTD	Annualized Total	Annual FMLA %	FY19
Admin	138	6.48	6.48	23.8%	7.78
Aff. Action	5	6.43	6.43	7.7%	6.28
Executive	4	1.81	1.81	0.0%	7.05
Finance	33	4.09	4.09	0.0%	2.28
Int. Audit	6	5.08	5.08	12.1%	4.06
Law	13	6.71	6.71	18.2%	7.80
OEP	4	1.00	1.00	0.0%	5.97
Operations	925	7.27	7.27	22.9%	8.35
Tunnel Red	7	4.31	4.31	46.0%	8.11
Pub. Affs.	11	7.96	7.96	59.2%	4.45
MWRA Avg	**1146**	**0.77**	**6.94**	**23.0%**	**8.13**

Percent of Sick Leave Usuage for FY20 attributable to Family and Medical Leave Act (FMLA is 23%).



Total Overtime for Field Operations for the fourth quarter of 2020 was $507k which is ($259k) under budget. Emergency overtime was $298k, which was ($88k) under budget. Rain events totaled $194k, Emergency Maintenance was $19k and Emergency Operations was $9k. Coverage overtime was $129k, which was ($36k) under budget, reflecting the month's shift coverage requirements. Planned overtime was $80k or ($137k) under budget. Maintenance Off-Hours was $35k and Planned Operations was $14k. Year-to-date, FOD has spent $2.5m on overtime, which is ($615k) under budget.

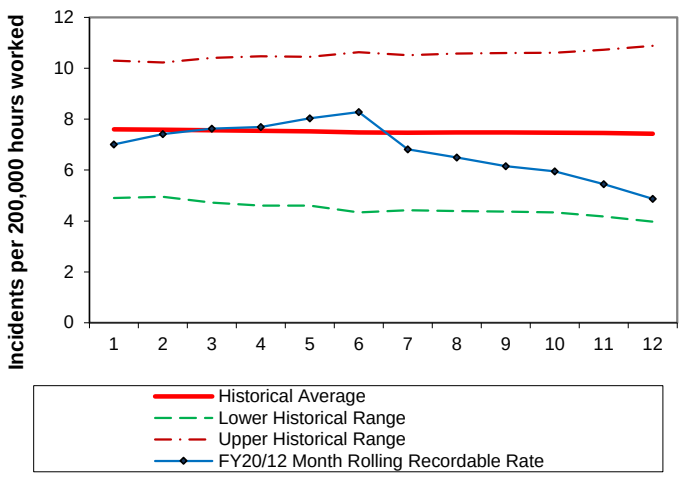


Deer Island's total overtime expenditure for the Fourth quarter was $259K, which was $23K or 8.2% under budget. In the fourth quarter Deer Island experienced lower than anticipated planned/unplannded overtime of ($40k) and storm coverage of ($19k). This is offset by higher shift coverage requirements of $35K. YTD Deer Island's overtime spending is $1.3M, which is $78k or 6.5% over budget due to higher spending related to the HEEC cable outage of $110k, shift coverage $101k. This is offset by lower spending on storm coverage of ($94K) and planned/unplannded (non HEEC related) of ($40k). The FY20 CEB included $30k for HEEC overtime vs. $140k spent. The outage lasted 18 days as opposed to the 5 days anticipated

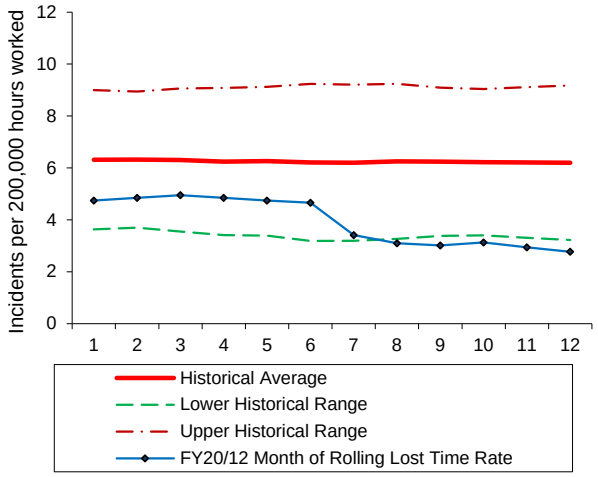
Workplace Safety

4th Quarter - FY20

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. Each month this rate is calculated using the previous 12 months of injury data.

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. Each month this rate is calculated using the previous 12 months of injury data.

3 The "Historical Average" is computed using the actual MWRA monthly incident rates for FY99 through FY19. The "Upper" and "Lower Historical Ranges" are computed using these same data – adding and subtracting two standard deviations respectively.

4 With Changes in state law, in February 1, 2019, MWRA began record keeping and reporting according to Federal OSHA standards for injury and illness record keeping. Strictly adhering to the federal OSHA reporting regulation has caused an increase in recorded injuries and illnesses. This increase is causing both the Recordable injury and illness Rate and the Lost TIme Injury and Illness rate to trend higher than in past years but does not necessarily mean there is an increase in injuries or illnesses. OSHA injuries and illnesses, and lost time are recorded differently than the Massachusetts Workers' Compensation standards and could result in an increase in the OSHA rate while the Workers' Compensation claims are decreasing. Over time, the rise on the charts should stabilize as new data replaces the older data..

WORKERS COMPENSATION HIGHLIGHTS

	4th Quarter Information		
	New	Closed	Open Claims
Lost Time	4	12	46
Medical Only	4	11	15
Report Only	8	8	
	QYTD		FYTD
Regular Duty Returns	1		17
Light Duty Returns	1		2
Indeminity payments as of June 30 2020 included in open claims listed			17

COMMENTS:

Regular Duty Returns

APR 0 Employees returned to full duty/no restrictions

MAY 0 Employees returned to full duty/no restrictions

JUNE 1 Employees returned to full duty/no restrictions

Light Duty Returns

APR N/A

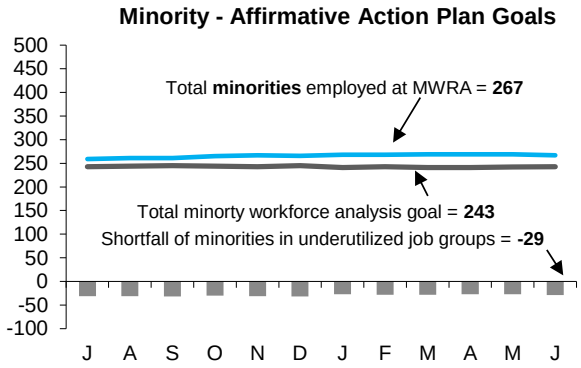
MAY N/A

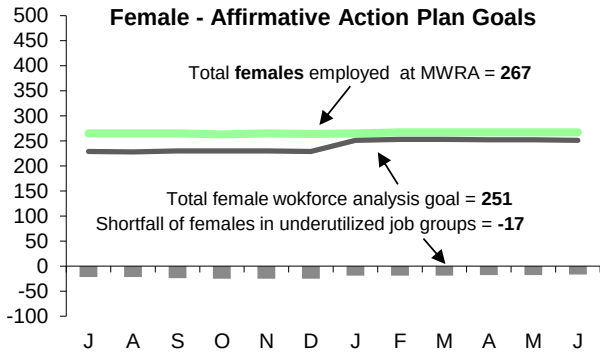
JUNE 1

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

4th Quarter - FY20





Highlights:

At the end of Q4 FY20, 5 job groups or a total of 29 positions are underutilized by minorities as compared to 7 job groups for a total of 32 positions at the end of Q4 FY19; for females 8 job groups or a total of 17 positions are underutilized by females as compared to 6 job groups or a total of 22 positions at the end of Q4 FY19. During Q4, 2 minorities and 0 females were hired. During this same period 3 minorities and 1 female were terminated.

Underutilized Job Groups - Workforce Representation

Job Group	Employees as of 6/30/2020	Minorities as of 6/30/2020	Achievement Level	Minority Over or Under Underutilized	Females As of 6/30/2020	Achievement Level	Female Over or Under Underutilized
Administrator A	23	3	3	0	11	6	5
Administrator B	24	0	7	-7	7	7	0
Clerical A	29	11	5	6	26	21	5
Clerical B	26	10	7	3	5	7	-2
Engineer A	81	26	18	8	17	18	-1
Engineer B	60	20	16	4	14	9	5
Craft A	117	15	24	-9	0	4	-4
Craft B	141	21	23	-2	3	5	-2
Laborer	67	23	15	8	5	3	2
Management A	97	24	24	0	34	34	0
Management B	44	9	6	3	9	10	-1
Operator A	65	5	14	-9	2	4	-2
Operator B	69	19	11	8	3	1	2
Professional A	29	3	5	-2	19	13	6
Professional B	164	46	41	5	80	73	7
Para Professional	52	16	13	3	25	29	-4
Technical A	56	14	10	4	7	6	1
Technical B	6	2	1	1	0	1	-1
Total	**1150**	**267**	**243**	**53/-29**	**267**	**251**	**33/-17**

AACU Candidate Referrals for Underutilized Positions

Job Group	Title	# of Vac	Requisition Int. / Ext.	Promotions /Transfers	AACU Ref. External	Position Status
Engineer A	Project Engineer, Planning	1	Int.	1	0	Promo = BF
Engineer A	Project Engineer	1	Int.	1	0	Promo = BF
Craft B	Electrcian	2	Ext.	0	0	NH = (WM) (HM)
Craft B	Facilities Specialist	1	Ext.	0	0	NH = MW

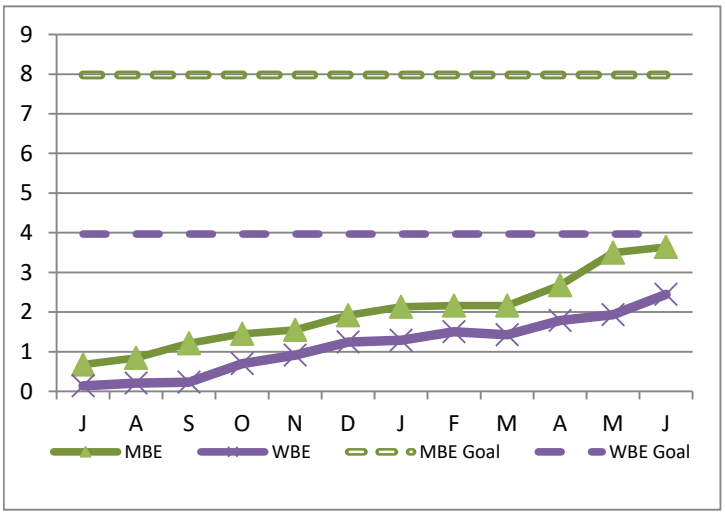
MBE/WBE Expenditures

4th Quarter - FY20

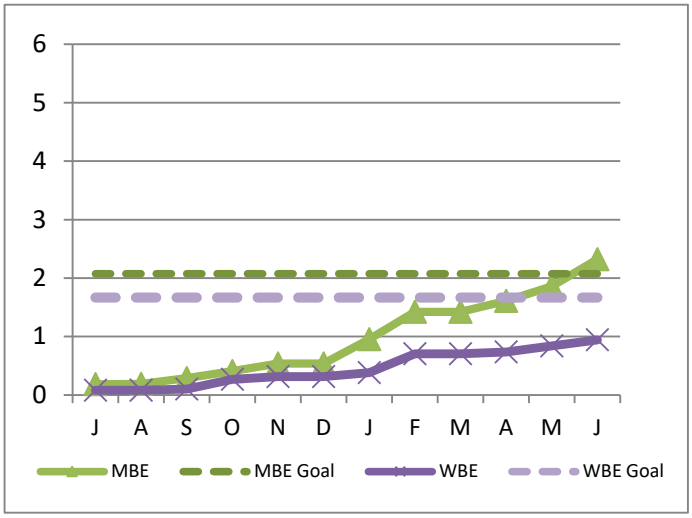
MBE/WBE targets are determined based on annual MWRA expenditure forecasts in the procurement categories noted below. The goals for FY20 are based on 85% of the total construction and 75% of the total professional projected spending for the year. Certain projects have been excluded from the goals as they 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 June.

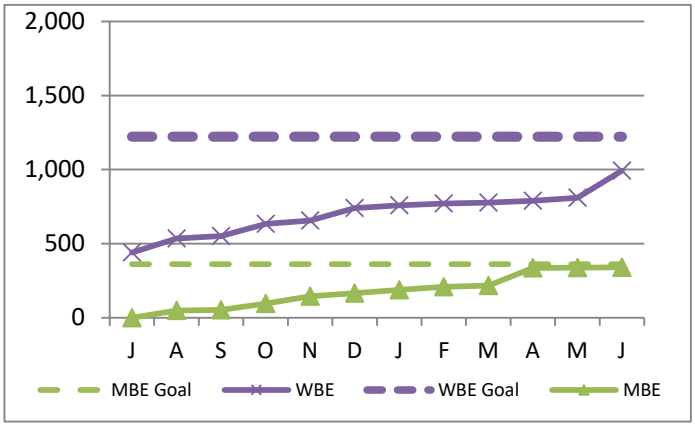
Construction



Professional Services



Goods/Services



FY20 spending and percentage of goals achieved, as well as FY19 performance are as follows:

MBE					WBE			
FY20 YTD		FY19			FY20 YTD		FY19	
Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent
3,641,145	45.6%	11,699,641	150.6%	Construction	2,446,388	61.7%	20,152,509	521.8%
2,322,007	111.9%	2,285,171	134.1%	Prof Svcs	942,850	56.6%	1,551,120	113.2%
340,656	94.1%	213,198	40.3%	Goods/Svcs	993,375	81.3%	780,760	46.7%
6,303,808	60.5%	14,198,010	142.0%	**Totals**	4,382,613	63.9%	22,484,389	325.6%

FY20 MBE/WBE dollar totals do not include MBE and WBE payments to prime contractors and consultants.

MWRA FY20 CEB Expenses
4th Quarter - FY20

As of June 2020, total expenses are $774.3 million, $18 million or 2.3% lower than budget, and total revenue is $792.2 million, $46k or 0.01% lower than budget, for a net variance of $17.9 million.

Expenses –

Direct Expenses are $235.7 million, $12.5 million or 5.0% under budget.

- **Ongoing Maintenance** expense $3.0 million under budget or 9.1%, as underspending on Plant & Machine Services of $1.5 million, Pipeline Service underspending of $681k, and Special Equipment Services underspending of $494k were partially offset by $528k in overspending on Plant & Machinery Materials. Maintenance variance reflects the actual timing of projects.
- **Wages & Salaries** are under budget by $2.2 million or 2.0%. Regular pay is $2.2 million under budget, due to lower head count, and timing of backfilling positions. YTD through June, the average Full Time Equivalent (FTE) positions was 1,139, nineteen fewer than the 1,158 FTE's budgeted.
- **Professional Services** expenses are $1.7 million under budget or 20.6%, primarily due to under spending for Computer System Consultants of $745k and $468k underspending on Other Professional Services, including Finance and Law.
- **Utilities** are $1.3 million under budget or 5.3% as lower electricity spending of $1.4 million reflecting CTG usage at Deer Island during HEEC cable electrification and lower pricing. Deer Island electricity underspending was $1.2 million of the variance. Lower interval account pricing also contributing to overall electricity variance. This underspending was partially offset by overspending on diesel of $71k for CTG operation during HEEC cable installation and fuel deliveries to replenish diesel inventory.
- **Other Materials** expenses are $1.2 million under budget or 17.0%, primarily due to underspending on computer hardware underspending of $344k, equipment and furniture underspending of $310k, vehicle expense underspending of $308k, and vehicle purchases underspending of $153k
- **Fringe Benefit** expenses are $871k under budget or 4.0%, primarily due to under spending for Health Insurance of $682k, driven by lower headcount.
- **Chemical** expenses are $813k under budget or 6.9%, primarily due to Sodium Hypochlorite was $322k under budget due to lower contract cost and lower spending on Activated Carbon of $271k driven by improvements in odor control processes which reduced usage at Deer Island and lower replacement cost at Nut Island. Lower than budget spending on Soda Ash of $231k due to the Carroll Water Treatment Plant having lower dosing reflecting higher alkalinity and plant lower flows. This is partially offset by higher than budget spending on ferric chloride which is over budget by $200k due to lower flows of 3.1% Deer Island through June. Timing of deliveries is an important factor in chemical spending.
- **Worker's Compensation** expenses are $491k under budget or 20.9%, reflecting lower compensation payments of $257k, medical payments of $163k, and administrative expenses of $72k.

Indirect Expenses are $46.1 million, $4.8 million or 9.3% under budget driven by lower than expected Watershed Reimbursement of $4.8 million due to lower costs associated with compensation, fringe benefits, maintenance, equipment, professional services, and prior period adjustments.

Debt Service Expenses totaled $492.4 million, $657k under budget, after $25.2 million of YTD savings was used to defease bonds in June. This savings reflects lower than budgeted variable interest expense and additional savings due to the timing of new money and SRF transactions.

Revenue and Income –

Total Revenue and Income is $792.2 million, or $46k under budget. Rate Revenue was $892k under budget as June Assessments were reduced by an appropriation of $892k from the Commonwealth. Other User Charges were over budget by $0.7 million or 7.9% due to Stoughton's prepayment of entrance fee. Other Revenue is $2.6 million or 45.8% over budget reflecting $892k from the Commonwealth to offset rate revenue reduction, miscellaneous revenue $548k, energy revenue for RPS credits $411k, income from the disposal of equipment $393k, and Energy Rebates of $160k. Investment Income was $2.5 million or 16.2% under budget due to lower interest rates.

	Jun 2020 Year-to-Date			
	Period 12 YTD Budget	Period 12 YTD Actual	Period 12 YTD Variance	%
EXPENSES				
WAGES AND SALARIES	$ 109,953,483	$ 107,776,261	$ (2,177,222)	-2.0%
OVERTIME	4,898,965	4,484,054	(414,911)	-8.5%
FRINGE BENEFITS	21,717,533	20,846,345	(871,188)	-4.0%
WORKERS' COMPENSATION	2,354,256	1,862,942	(491,314)	-20.9%
CHEMICALS	11,811,222	10,998,339	(812,883)	-6.9%
ENERGY AND UTILITIES	24,454,796	23,151,712	(1,303,084)	-5.3%
MAINTENANCE	32,726,954	29,737,299	(2,989,655)	-9.1%
TRAINING AND MEETINGS	504,394	288,045	(216,349)	-42.9%
PROFESSIONAL SERVICES	8,295,315	6,588,621	(1,706,694)	-20.6%
OTHER MATERIALS	6,867,239	5,697,624	(1,169,615)	-17.0%
OTHER SERVICES	24,683,370	24,306,370	(377,000)	-1.5%
TOTAL DIRECT EXPENSES	**$ 248,267,527**	**$ 235,737,612**	**$ (12,529,917)**	**-5.0%**
INSURANCE	$ 2,611,222	$ 2,615,589	$ 4,367	0.2%
WATERSHED/PILOT	26,833,600	22,075,059	(4,758,541)	-17.7%
HEEC PAYMENT	4,429,316	4,429,316	-	0.0%
MITIGATION	1,654,618	1,651,068	(3,550)	-0.2%
ADDITIONS TO RESERVES	2,094,284	2,094,284	-	0.0%
RETIREMENT FUND	7,315,000	7,315,000	-	0.0%
POST EMPLOYEE BENEFITS	5,962,457	5,962,457	-	0.0%
TOTAL INDIRECT EXPENSES	**$ 50,900,497**	**$ 46,142,773**	**$ (4,757,724)**	**-9.3%**
STATE REVOLVING FUND	$ 92,797,294	$ 88,126,851	$ (4,670,443)	-5.0%
SENIOR DEBT	202,299,609	242,220,498	39,920,889	19.7%
DEBT SERVICE ASSISTANCE	(890,235)	(890,235)	-	0.0%
CURRENT REVENUE/CAPITAL	15,200,000	15,200,000	-	0.0%
SUBORDINATE MWRA DEBT	169,609,845	146,194,843	(23,415,002)	-13.8%
LOCAL WATER PIPELINE CP	5,846,823	2,117,483	(3,729,340)	-63.8%
CAPITAL LEASE	3,217,060	3,217,060	-	0.0%
VARIABLE DEBT	-	(8,763,344)	(8,763,344)	---
DEFEASANCE ACCOUNT	-	-	-	---
DEBT PREPAYMENT	5,000,000	5,000,000	-	0.0%
TOTAL DEBT SERVICE	**$ 493,080,396**	**$ 492,423,156**	**$ (657,240)**	**-0.1%**
TOTAL EXPENSES	**$ 792,248,420**	**$ 774,303,541**	**$ (17,944,876)**	**-2.3%**
REVENUE & INCOME				
RATE REVENUE	$ 761,767,000	$ 760,875,467	$ (891,533)	-0.1%
OTHER USER CHARGES	9,216,425	9,941,799	725,374	7.9%
OTHER REVENUE	5,761,022	8,399,901	2,638,879	45.8%
RATE STABILIZATION	-	-	-	---
INVESTMENT INCOME	15,503,973	12,985,469	(2,518,504)	-16.2%
TOTAL REVENUE & INCOME	**$ 792,248,420**	**$ 792,202,637**	**$ (45,783)**	**0.0%**

Cost of Debt

4th Quarter – FY20

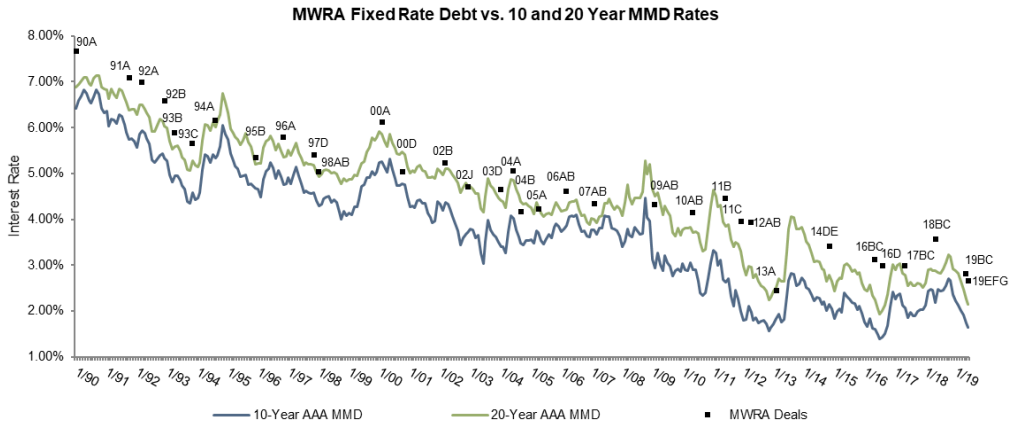
MWRA borrowing costs are a function of the fixed and variable tax exempt interest rate environment, the level of MWRA's variable interest rate exposure and the perceived creditworthiness of MWRA. Each of these factors has contributed to decreased MWRA borrowing costs since 1990.

Average Cost of MWRA Debt FYTD

Fixed Debt ($3.46 billion)	3.47%
Variable Debt ($354.8 million)	1.61%
SRF Debt ($921.4 million)	1.55%
Weighted Average Debt Cost ($4.91 billion)	2.96%

Most Recent Senior Fixed Debt Issue
November 2019

2019 Series E, F &G ($620.6 million) 2.66 %

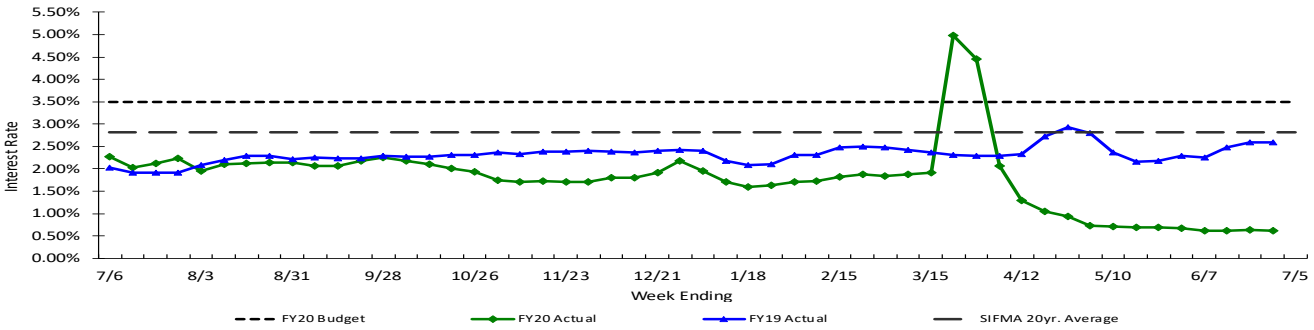


Bond Deal	1994A	1995B	1996A	1997D	1998AB	2000A	2000D	2002B	2002J	2003D	2004A	2004B	2005A	2006AB
Rate	6.15%	5.34%	5.78%	5.40%	5.04%	6.11%	5.03%	5.23%	4.71%	4.64%	5.05%	4.17%	4.22%	4.61%
Avg Life	19.5 yrs	20.5 yrs	19.5 yrs	21.6 yrs	24.4 yrs	26.3 yrs	9.8 yrs	19.9 yrs	19.6 yrs	18.4 yrs	19.6 yrs	13.5 yrs	18.4 yrs	25.9 yrs

Bond Deal	2007AB	2009AB	2010AB	2011B	2011C	2012AB	2013A	2014D-F	2016BC	2016D	2017BC	2018BC	2019BC	2019EFG
Rate	4.34%	4.32%	4.14%	4.45%	3.95%	3.93%	2.45%	3.41%	3.12%	2.99%	2.98%	3.56%	2.82%	2.66%
Avg Life	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	11.9yrs	9.73 yrs.

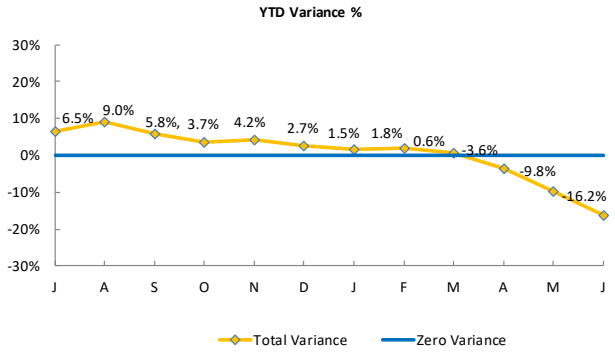
Weekly Average Variable Interest Rates vs. Budget

MWRA currently has ten variable rate debt issues with $782.2 million outstanding, excluding commercial paper. Of the ten outstanding series, four 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 June, SIFMA rates ranged from a high of 0.13% to a low of 0.11% 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.



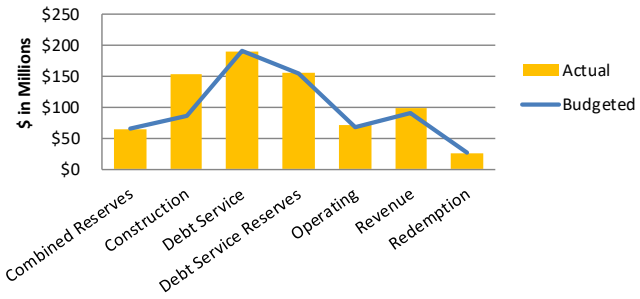
Investment Income
4th Quarter – FY20

Year To Date

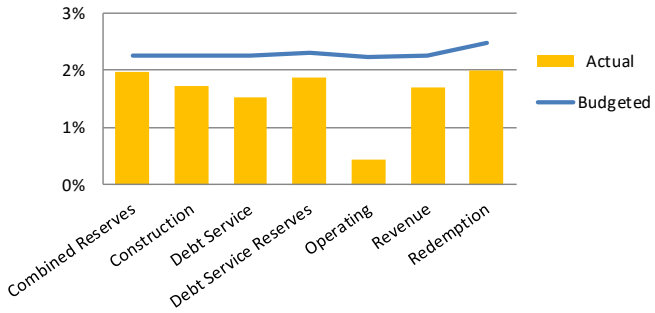


	YTD BUDGET VARIANCE ($000)			
	BALANCES IMPACT	RATES IMPACT	TOTAL	%
Combined Reserves	$13	($195)	(183)	-12.4%
Construction	$1,401	($720)	682	35.0%
Debt Service	($27)	($1,382)	(1,410)	-32.8%
Debt Service Reserves	$47	($664)	(617)	-17.4%
Operating	$58	($557)	(499)	-32.6%
Revenue	$185	($549)	(364)	-17.7%
Redemption	$2	($129)	(128)	-19.6%
Total Variance	$1,678	($4,196)	($2,519)	-16.2%

YTD Average Balances Budgeted vs. Actual

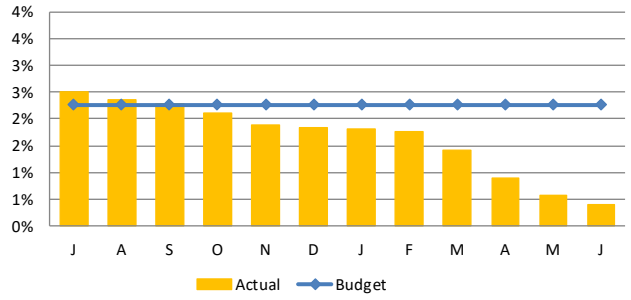


YTD Average Interest Rate Budgeted vs. Actual

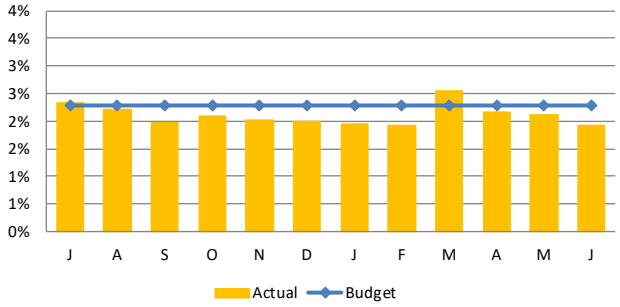


Monthly

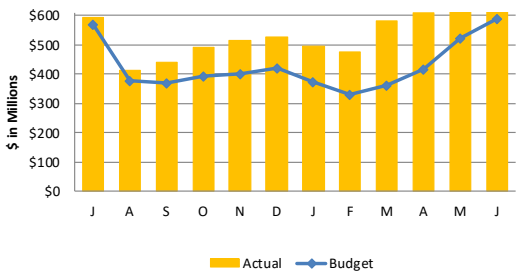
Short -Term Interest Rates



Long -Term Interest Rates



Short-Term Average Balances



Long-Term Average Balances