MASSACHUSETTS WATER RESOURCES AUTHORITY

# Board of Directors Report

on

# Key Indicators of MWRA Performance

for

Third Quarter FY2016

| Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|
| | | ■ | |


Frederick A. Laskey, Executive Director
Michael J. Hornbrook, Chief Operating Officer
May 11, 2016

# Board of Directors Report on Key Indicators of MWRA Performance
## Third Quarter FY16

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


Frederick A. Laskey, Executive Director
Michael J. Hornbrook, Chief Operating Officer

May 11, 2016

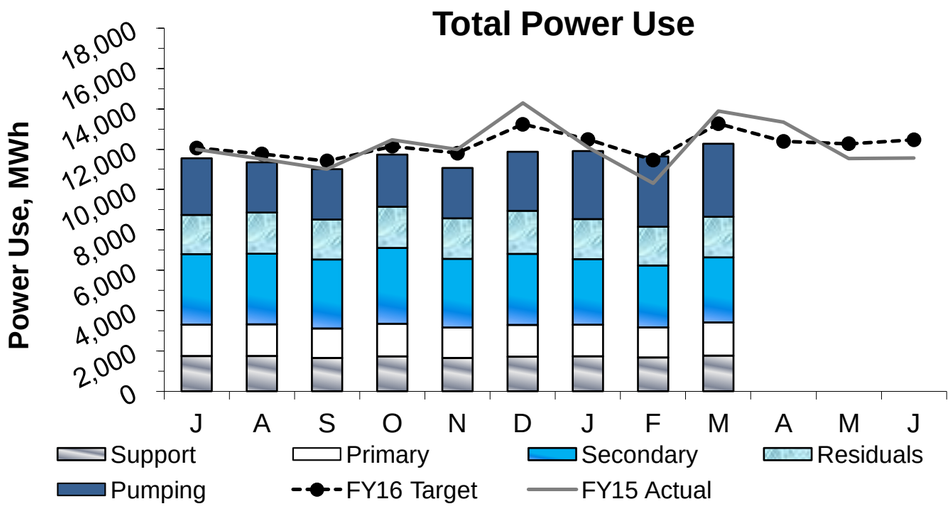
# OPERATIONS AND MAINTENANCE

# Deer Island Operations

3rd Quarter - FY16



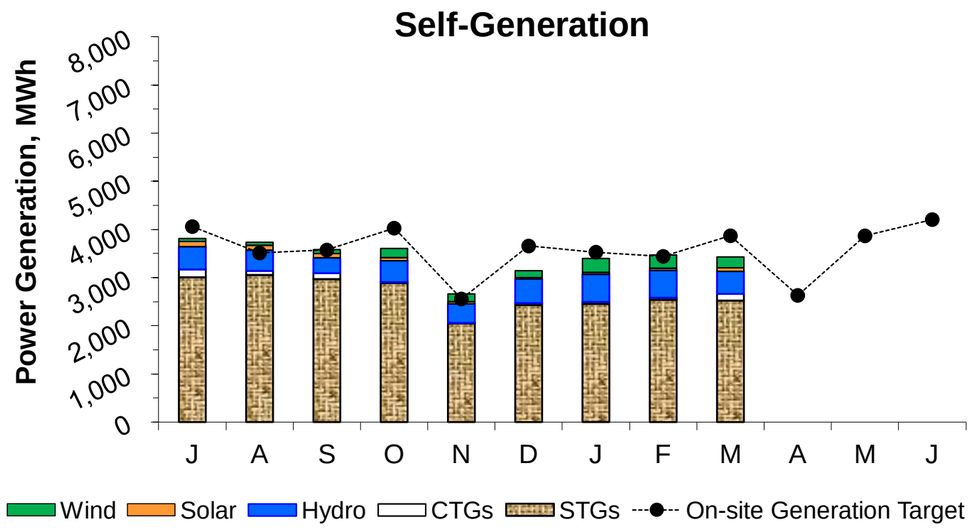
## Total Power Use




Total power usage in the 3rd Quarter was 3.7% below target as Total Plant Flow for the quarter was on target (-0.8%) with the 3 year average plant flow for the same period. Total Power usage for wastewater pumping operations was 6.7% below target due to the lower plant flow.

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

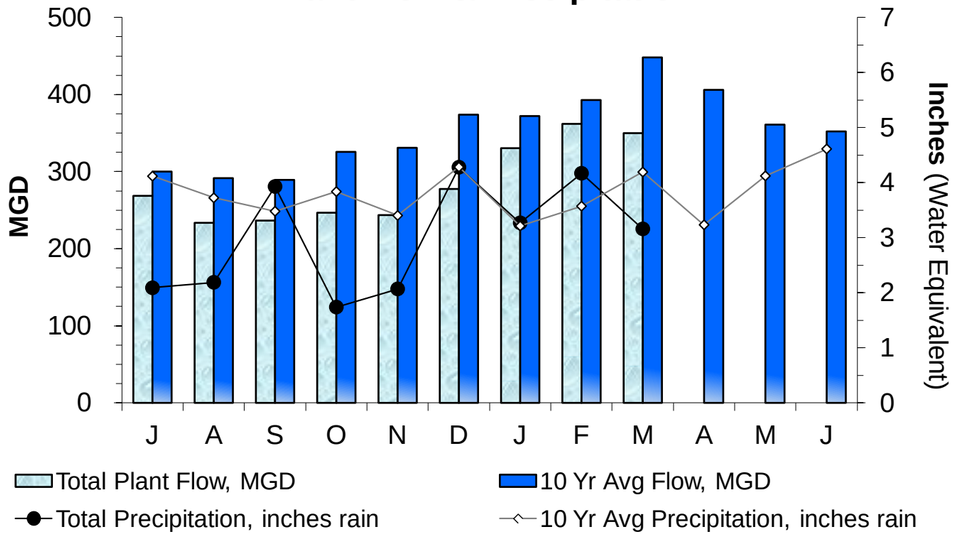
## Self-Generation




Power generated on-site during the 3rd Quarter was 5.0% below target. While generation by the STGs, Wind Turbines, and Solar Panels exceeded their target, generation by the CTGs and Hydro Turbines was below target. The CTGs generated 84.0% less power than expected during the quarter as the target assumed the CTGs would be operated for several wet weather events, but CTG operation during storms was not needed. The CTGs were however operated for approximately 12.9 hours during the 3rd Quarter for a plant-wide power outage, for opacity testing, and for maintenance/checkout purposes.

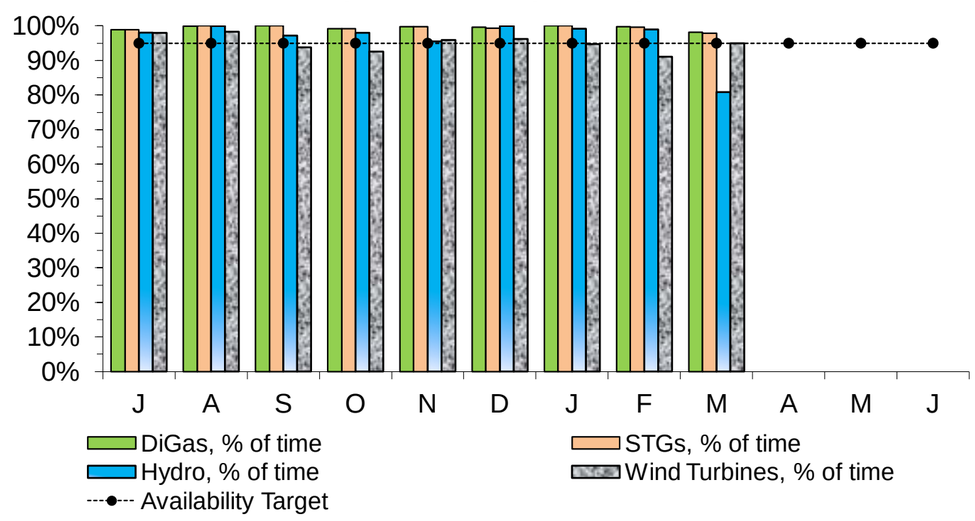
Note: Power generation data for the Solar Panels and the Wind Turbines may be difficult to see as the amount of power generated is low within the current scale of this graph; a total of 156.7 MWh was generated by the Solar Panels and 789.7 MWh was generated by the Wind Turbines in the 3rd Quarter.

## Plant Flow & Precipitation



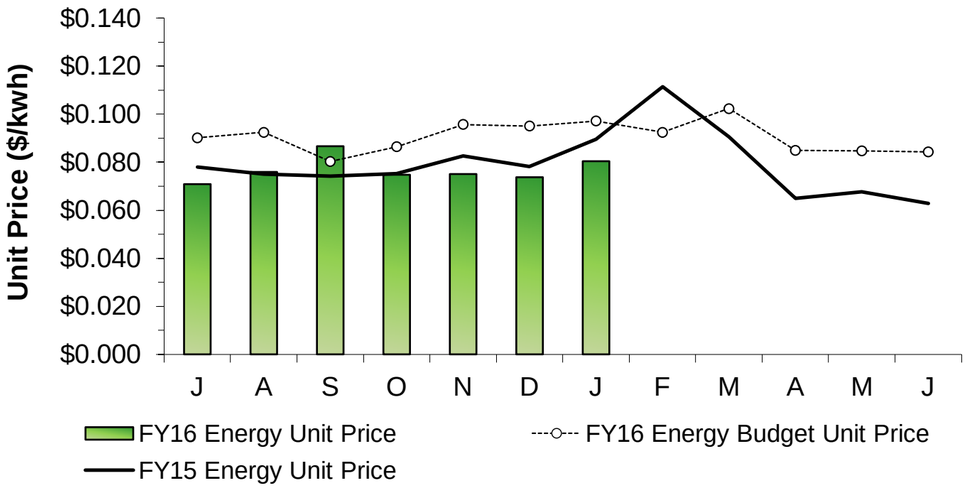

Total Plant Flow for the 3rd Quarter was 14.1% below target with the 10 year average plant flow (347.4 MGD actual vs. 404.4 MGD expected) as precipitation for the quarter was 3% lower than target (10.60 inches actual vs. 10.98 inches expected).

## Self-Generation Equipment On-Line
**(% of Time in Operation)**




The DiGas and STGs exceeded the 95% availability target for the 3rd Quarter, while the Wind Turbines fell 1.6% below target. The Hydro Turbines fell 2% below their availability target due to mechanical issues with the hydraulic system on Turbine #2 and exciter issues on Turbine #1 (that controls and adjusts the electrical currents in the excitation system of the generator) in late March.

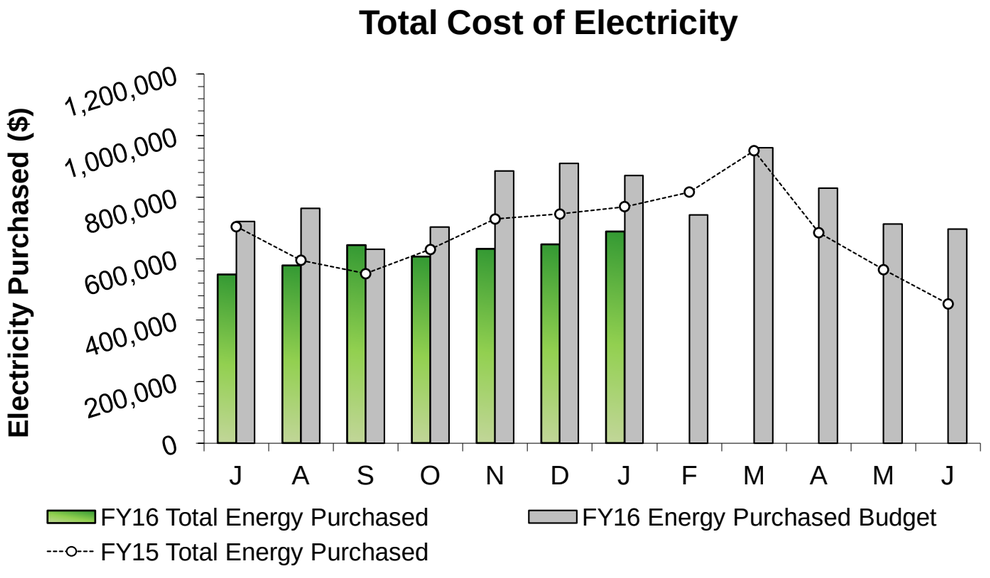
## Total Electricity Pricing
**(includes spot energy price, ancillary costs, and NSTAR's transmission & distribution costs)**




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 the 3rd Quarter (actuals for January only) was 17.3% lower than the FY16 budget estimate for the same period. The Total Energy Unit Price information for February and March are not yet available as the complete invoice for these months are still pending receipt and/or review as of reporting time. The Total Energy Unit Price includes a fixed block price, spot energy price, transmission & distribution charges, and ancillary charges.

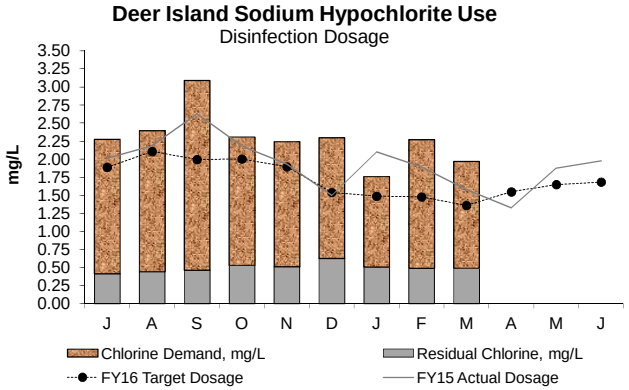
Note: Only the actual energy prices are reported. Therefore, the dataset lags by two (2) months due to the timing of invoice receipt.

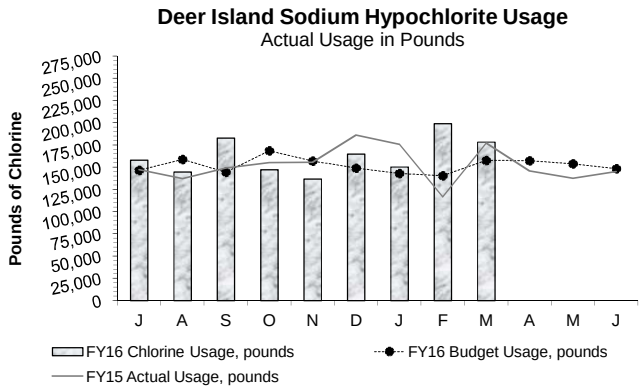
## Total Cost of Electricity




The total cost of Electricity Purchased during the 3rd Quarter (actuals for January only) was 20.9% lower than budgeted due mainly to lower than expected energy prices in the quarter (as reported). Year-to-date Total Cost of Electricity is $1,139,132 (20.8%) lower than budgeted through January as the Total Energy Unit Price and the Total Electricity Purchased are both lower than budgeted by 17.3% and 4.4% through January.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by two (2) months due to the timing of invoice receipt.




The disinfection dosing rate in the 3rd Quarter was 39% higher than the target. DITP maintained an average disinfection chlorine residual of 0.50 mg/L this quarter with an average dosing rate of 2.00 mg/L (as chlorine demand was 1.50 mg/L). The reported chlorine dosing was much higher than expected due to an issue with the flow measurement on a sodium hypochlorite feed pump. Sodium hypochlorite usage (in gallons and therefore pounds) was biased high for February and March due to inaccurately high flow measurements from the sodium hypochlorite feed pump that was in service from February 13 through March 8. The sodium hypochlorite disinfection dose value is therefore also biased high as a result. The issue was discovered in March and the feed pump with the inaccurate flow readings was then taken out of operation and replaced with a different feed pump. Hypochlorite usage in pounds of chlorine was biased high and was 19.7% higher than the target for this month.

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

**Secondary Blending Events**

| Month | Count of Blending Events | Count of Blending Events Due to Rain | Count of Blending Events Due to Non-Rain-Related Events | Secondary, as a Percent of Total Plant Flow | Total Hours Blended During Month |
|---|---|---|---|---|---|
| J | 1 | 1 | 0 | 99.8% | 3.97 |
| A | 0 | 0 | 0 | 100.0% | 0.00 |
| S | 1 | 1 | 0 | 98.5% | 10.63 |
| O | 1 | 1 | 0 | 99.96% | 1.50 |
| N | 0 | 0 | 0 | 100.0% | 0.00 |
| D | 1 | 1 | 0 | 99.97% | 2.46 |
| J | 2 | 2 | 0 | 99.5% | 8.00 |
| F | 2 | 2 | 0 | 99.9% | 4.42 |
| M | 0 | 0 | 0 | 100.0% | 0.00 |
| A | | | | | |
| M | | | | | |
| J | | | | | |
| Total | 8 | 8 | 0 | 99.7% | 30.98 |

99.8% of all flows were treated at full secondary in the 3rd Quarter. There were a total of four (4) separate secondary blending events in the quarter; all due to high plant flows resulting from heavy rain. The four (4) secondary blending events combined produced a total of 12.42 hours of blending and 66.22 Mgal of flow blended with secondary effluent. The Maximum Secondary Capacity for the quarter was 700 MGD.

**Secondary permit limits were met at all times during the 3rd Quarter of FY16.**

## Deer Island Operations & Maintenance Report

**Environmental/Pumping:**

The plant achieved a maximum average hourly flow rate of 1,003.6 MGD on January 10 in the afternoon, during a rain event that produced 1.39 inches of precipitation. Overall, Total Plant Flow in the 3rd Quarter was 14.1% below the 10 year average plant flow target for the quarter.

Additionally, one (1) low flow record was broken this quarter:

- 365 Dry Day Flow – 255.1 MGD set by the end of January 2016 (previous record was 255.9 MGD, one month earlier, at the end of December 2015).
- A number of North Main Pump Station (NMPS) and Winthrop Terminal Headworks (HW) Facility shutdowns are planned through July 2017 as part of a significant maintenance project to replace a large number of isolation valves in the NMPS and in the Winthrop Terminal HW Facility. There have been a total of 21 contractor construction shutdowns, seven (7) full North System shutdowns and 14 Winthrop Terminal HW Facility only shutdowns, since the start of the project in September 2015 through the end of March. MWRA projects upwards of 60 total shutdowns.
- There were ten (10) Winthrop Terminal HW Facility only shutdowns and no full North System shutdowns during the 3rd Quarter. For the Winthrop Terminal HW Facility shutdowns in March, flow was stopped between 4:30 a.m. and 6:30 a.m. and wastewater pumping through the Winthrop Terminal HW facility was restarted approximately 6 to 10.5 hours later after completion of the day's work. The flows from Caruso Pump Station were redirected to Chelsea Creek/NMPS starting on the day prior to and during these shutdowns, thereby reducing the total amount of flow going to the Winthrop Terminal HW Facility. No issues were encountered at DITP during these shutdowns or during the activities to restart the wastewater pumping.

# Deer Island Operations & Maintenance Report (continued)

**Primary and Secondary Treatment:**
Progress on the major Primary and Secondary Scum Tip Tube Replacement Project continues. The primary scope of this project is to replace 88 of the 96 primary treatment tip tubes, 72 treatment tip tubes in Secondary Batteries A and B, and modification of 36 secondary tip tubes in Secondary Battery C. The contractor is limited by the construction documents to working in no more than four (4) primary clarifiers (preferably limited to one battery) and three (3) secondary clarifiers (one or two per battery to minimize capacity constraints so as to not reduce the overall secondary capacity). Construction related to the physical replacement of the tip tubes was completed well ahead of schedule. Performance testing and adjustments to several of the newly installed tip tubes are both currently in progress.

**Secondary Treatment:**
An unanticipated leak in a connection from the Secondary Battery A RSL (Return Sludge) main header to a sampling line occurred on February 16. Immediate action was undertaken to repair the leak in order to stop the loss of return sludge (biomass) and to minimize the impact on the biological secondary activated sludge process. The 72 inch diameter RSL header line had to be drained before repairs could proceed, which meant temporarily suspending all sludge removal from the Secondary Battery A clarifiers (for wasting and recycling back into the process). The draining and sample line repair took approximately three (3) hours and there were no negative impacts to the overall treatment process.

**Odor Control:**
Televised inspections were completed in the East Odor Control (EOC) and West Odor Control (WOC) Facilities in February, and in the Residuals Odor Control (ROC) and North Pumping Odor Control (NPOC) Facilities in March to look for excessive sulfur precipitate build-up in the ductwork. The results of these inspections found very little dust or chemical residue in the ductwork. The ductwork in the EOC and the WOC Facilities were cleaned to remove any residue, and ductwork cleaning in the ROC and in the NPOC Facilities will be conducted at the end of April.

Activated carbon media in carbon adsorber (CAD) units #8 in the East Odor Control (EOC) Facility, unit #1 in the West Odor Control (WOC) Facility, and unit #5 in the Residuals Odor Cotrol (ROC) Facility was replaced in March as part of the routine practice to replace spent carbon.

The carbon adsorbers in the Residuals Odor Control (ROC) Facility were bypassed from March 28 to March 31 due to scheduled ductwork maintenance. All process airflows were treated using wet chemical scrubbers during this period. Stack emissions limits were met at all times and no resident odor complaints were received during this project.

**Energy and Thermal Power Plant:**
At 11:02 on Tuesday, March 22, 2016, a failure occurred on a control board at the Eversource (formerly NStar) Substation 385 in South Boston. This resulted in an unanticipated complete loss of power to the DITP. At the time of the power disruption, the DITP flow rate, typical of dry weather at this time of year, was 379 MGD. DITP staff powered up its backup generator, CTG-2B, and power was made available eight (8) minutes after of the outage. The DITP power grid on Bus-B was cleared of all faults and pumping operation began restoration within 19 minutes, with all sewer levels in the MWRA system restored to normal, pre-event conditions within 1.75 hours from the main loss of power. All flows were contained within the MWRA collection system. No untreated wastewater was released, and there were no NPDES permit violations as a result of this outage. MWRA staff continued to recover its systems on internal backup power until staff were certain that Eversource power had indeed been returned to stable operation and treatment plant flows and levels had returned to pre-event conditions. The facility was then fully reconnected to Eversource power by 3:05 pm. CTG-2B was shut down at 3:25 pm (4 hours and 23 minutes after the event) once the power from Eversource was restored and stabilized on both the A- and B-buses.

Solar power generation accounted for 1.52% (156.7 MWh) and Wind Turbine generation accounted for 7.67% (789.7 MWh) of the total power generated on-site in the 3rd Quarter. Overall, total power generated on-site accounted for 28.7% of Deer Island's total power use for the quarter. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 28.1% of Deer Island's total electrical power use for the quarter.

CTG-1A was taken out of service from January 11 to January 15 to allow DITP Thermal Plant staff working with the contractors to complete Major Audit preventative maintenance tasks. DITP electricians were also able to replace the station service transformer for this CTG at the same time while the CTG was out of service for the Major Audit activities. CTG-2B was available for operation during this time as emergency backup to utility power but was not needed. CTG-2B was taken out of service from January 26 to January 28 (during dry weather) to allow DITP electricians to replace the station service transformer for this CTG. CTG-1A was available for operation during this time as emergency backup to utility power but was not needed.

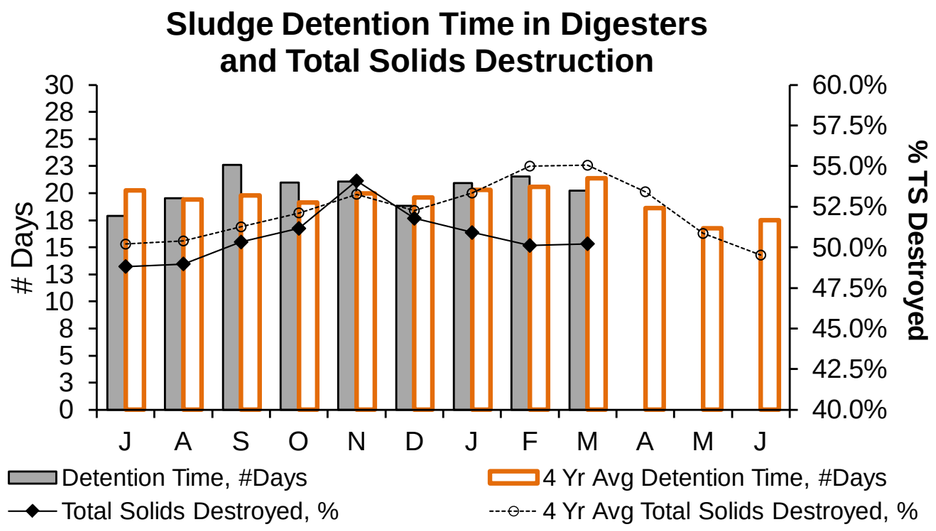
Annual opacity stack testing of both CTG units was successfully completed on March 9 as part of a regulatory emissions requirement. Additionally, the quarterly Continuous Emissions Monitoring System (CEMS) cylinder gas audits, along with the annual and quarterly Continuous Opacity Monitoring System (COMS) audits for the two (2) boilers in the Thermal Power Plant were successfully completed by contractors on March 10.

**Clinton AWWTP:**
The rehabilitation of the primary clarifiers and anaerobic digesters are nearly complete.
**Instrumentation:**
PLC wiring and instrumentation was installed to connect to existing SCADA. A total of 29 process alarms for digester building were installed.
**Primary Clarifiers 1&2:**
Contractor finished installing gear drives, flights and scum collectors. Modified handrails to accommodate operating tip tubes. Installed new isolation valves in primary clarifiers 1,2,3 and 4.Installed new primary pump #3.
**Primary Digester:**
New rubber roof was installed. Installed the new Ovivo Linear Motion mixer and Varec Relief Valve with flame arrester. Installed two new flame arresters on waste gas burners. Filled digester with water to check for leaks.
**Influent gates:**
Installed new influent gates on Clinton and Lancaster.

# Deer Island Operations and Residuals

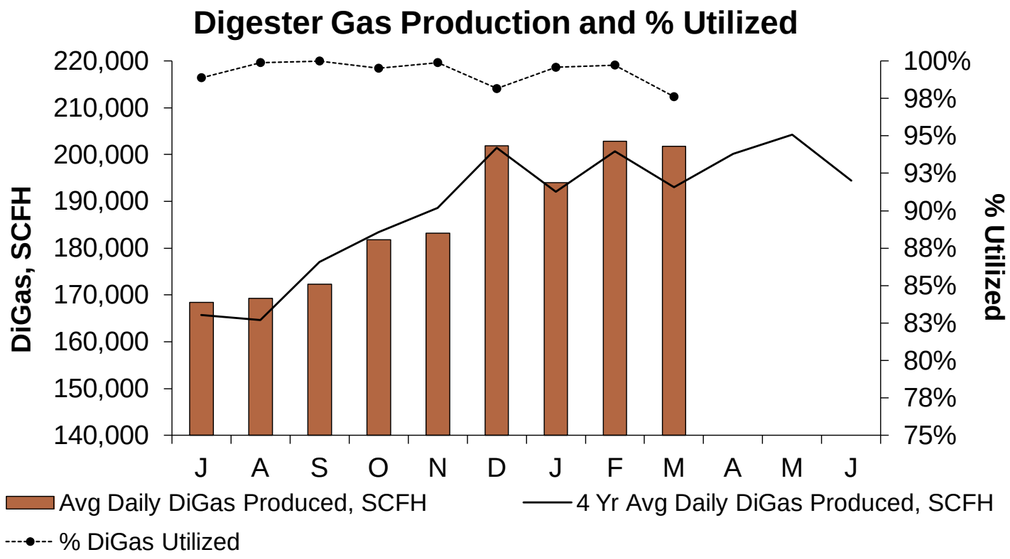
3rd Quarter - FY16






Total solids (TS) destruction following anaerobic sludge digestion averaged 50.4% during the 3rd Quarter, lower than the 4 year average of 54.5% for the same period. The sludge detention time in the digesters of 20.9 days was similar to the 4 year average of 20.9 days as DI operated with an average of 7.8 digesters during the 3rd Quarter. The shifting around of sludge during much of FY16 as a result of various digesters being taken in and out of service for maintenance, impacts overall solids destruction. The sludge digestion process is a biological process which requires a period of time before returning to stable digestion rates following changes in digester operation. Even though TS destruction is much lower than expected, Volatile Solids (VS) reduction (not shown here) has been higher than expected. This higher VS reduction has resulted in higher digester gas production. Therefore, the more reliable parameter to use for evaluating the performance of the digestion process during these last few months has been %VS reduced rather than the %TS destroyed.

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

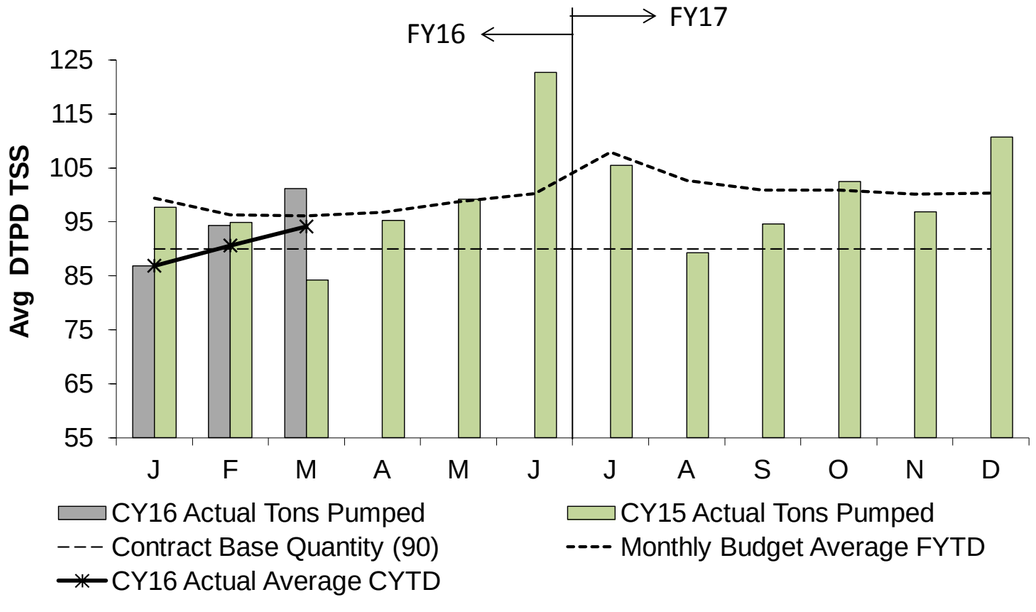



The Avg Daily DiGas Production in the 3rd Quarter was 2.2% higher than the 4 Year Avg Daily DiGas Production for the same period. On average, 99.0% of all the DiGas produced in the quarter was utilized at the Thermal Power Plant.

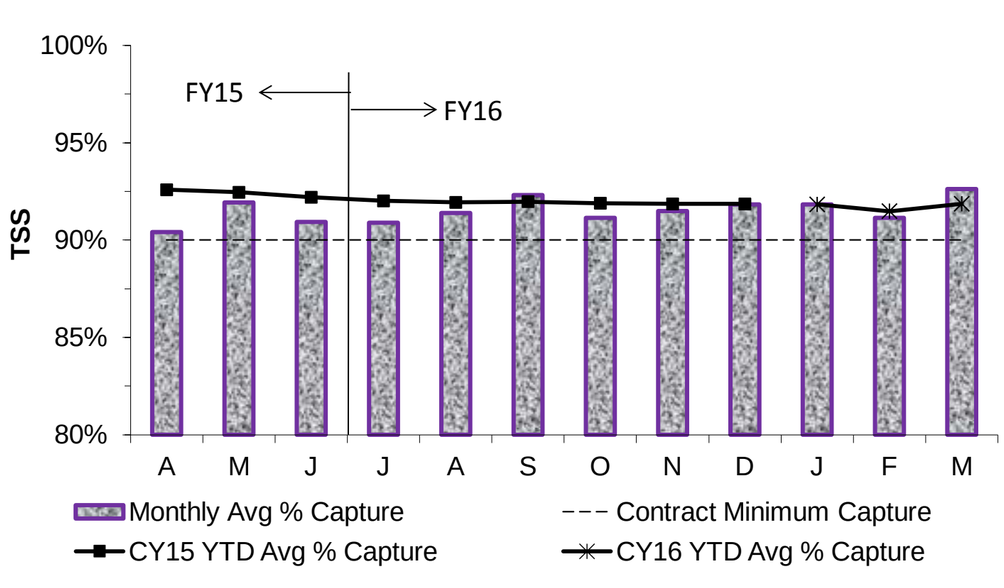
DiGas production on several days in March exceeded the Thermal Power Plant's capacity. Therefore, excess DiGas that could not be utilized was flared as waste gas during these periods. DiGas production was very high at times this period due to wet weather that resulted in high, readily digestible, primary solids production.

## Residuals Pellet Plant

MWRA pays a fixed monthly amount for the calendar year to process up to 90 DTPD/TSS as an annual average. The monthly invoice is based on 90 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. The base quantity of 90 DTPD/TSS was set for the 15-year term of the contract, even though, on average, MWRA processes more than 90 DTPD/TSS each year (FY15's budget is 102.9 DTPD/TSS and FY16's budget is 100.2 DTPD/TSS)).




The average total quantity of sludge pumped in the 3rd Quarter of FY16 was 94.1 DTPD - higher than FY16's average budget of 100.2 DTPD. The slightly higher amount is due mainly to slightly higher sludge production in December as a result of several days of wet weather that resulted in high, readily digestible, primary solids production.




The contract requires NEFCo to capture at least 90% of the solids delivered to the Biosolids Processing Facility in Quincy. The CY16 YTD average capture is 91.73%.

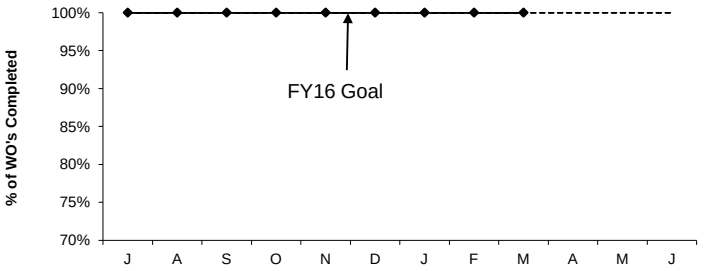
# Deer Island Maintenance

3rd Quarter FY16

## Productivity Initiatives

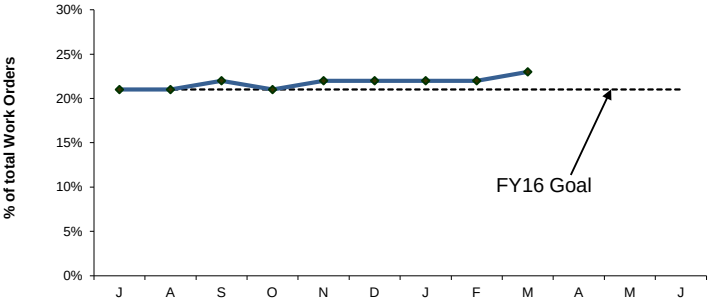
Productivity initiatives include increasing predictive maintenance compliance and increasing PdM work orders. Accomplishing these initiatives should result in a decrease in overall maintenance backlog.

**Predictive Maintenance Compliance**



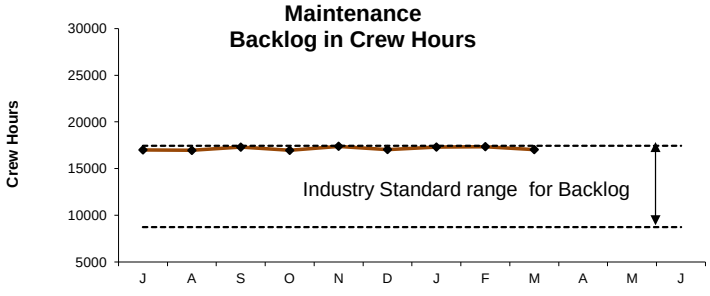

Deer Island's FY16 predictive maintenance goal is 100%. DITP completed 100% of all PdM work orders this quarter. DITP is continuing with an aggressive predictive maintenance program.

**Predictive Maintenance**




Deer Island's FY16 predictive maintenance goal is 21% of all work orders to be predictive. 22% of all work orders were predictive maintenance this quarter. The industry is moving toward increasing predictive maintenance work to reduce downtime and better predict when repairs are needed.

**Maintenance Backlog in Crew Hours**

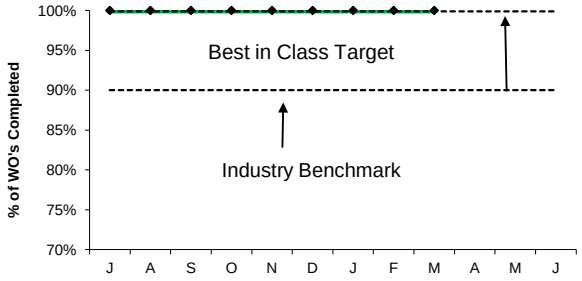



DITP's maintenance backlog at Deer Island is 17,230 hours this quarter. DITP is within the industry average for backlog. The industry Standard for maintenance backlog with 97 staff (currently planned staffing levels) is between 8,730 hours and 17,460 hours. Backlog is affected by four vacancies, a Welder/Fabricator , two Electricians and a Pipe Fitter/Plumber. Management continues to monitor backlog and to ensure all critical systems and equipment are available.

## Proactive Initiatives

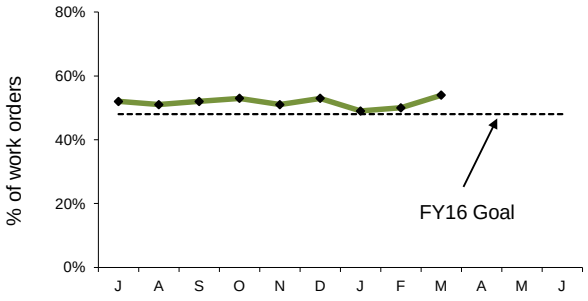
Proactive initiatives include completing 100% of all preventative maintenance tasks and increasing preventative maintenance kitting. These tasks should result in lower maintenance costs.

**Preventive Maintenance Compliance**



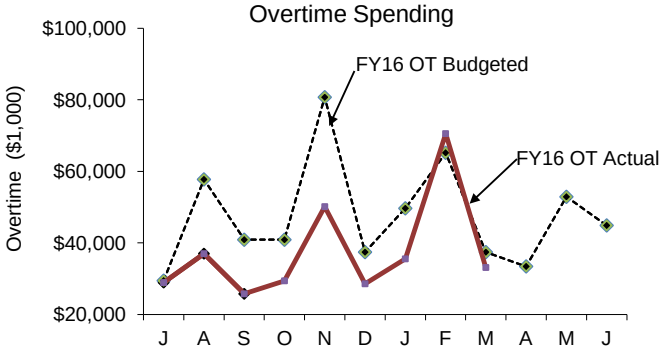

Deer Island's FY16 preventative maintenance goal is 100% completion of all work orders from Operations and Maintenance. DITP completed 100% of all PM work orders this quarter.

**Maintenance Kitting**




Deer Island's FY16 maintenance kitting goal is 48% of all work orders to be kitted. 51% of all work orders were kitted this quarter. Kitting is staging of parts or material necessary to complete maintenance work. This has resulted in more wrench time and increased productivity.

**Overtime Spending**

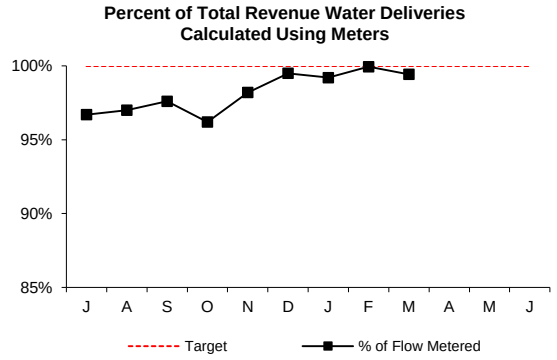



Maintenance overtime was under budget by $13K this quarter and $110k under for the FY16. Management continues to monitor backlog and to ensure all critical equipment and systems are available. This quarters overtime was predominately used for Storm Coverage, High Flows, Residuals Caustic Tank, East and West Odor Control Scrubbers, Waste Gas Burner #2, Primary Sludge Pumps, Winthrop Terminal Facility Bar Screen #1, and Boiler 201 Shut-Down/Start-Up for Maintenance.

# Operations Division Metering

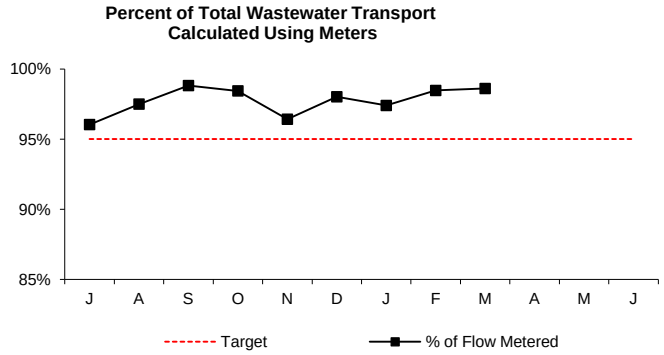
3rd Quarter - FY16

## WATER METERS



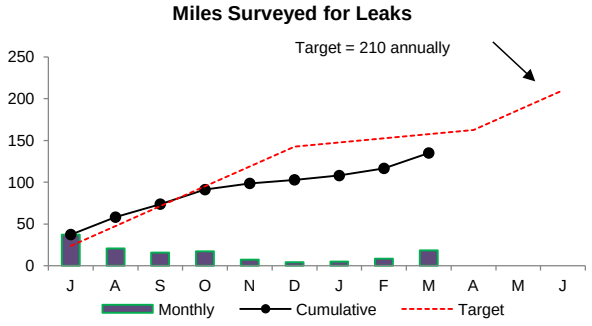

The target for revenue water deliveries calculated using meters is 100%. Estimates are generated for meters that are out of service due to instrumentation problems or in-house and capital construction projects. During the 3rd Quarter of FY16, meter actuals accounted for 99.52% of flow; only 0.48% of total revenue water deliveries were estimated. The following is the breakdown of reasons for estimations:
In-house and Capital Construction Projects - 0.21%
Instrumentation Failure - 0.27%

## WASTEWATER METERS




The target for revenue wastewater transport calculated using meters is 95%. Estimates are generated for meters missing data due to instrument failure and/or erratic meter behavior. Estimates are produced using data from previous time periods under similar flow conditions. During the 3rd Quarter of FY16, meter actuals accounted for 98.2% of flow, 1.8% of wastewater transport was estimated.

## WATER DISTRIBUTION SYSTEM PIPELINES




During the 3rd Quarter of FY16, 32.1 miles of water mains were inspected. The total inspected for the fiscal year to date is 134.93 miles.

**Leak Backlog Summary**

| Month | J | A | S | O | N | D | J | F | M | A | M | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leaks Detected | 3 | 3 | 1 | 4 | 0 | 0 | 7 | 4 | 1 | | | |
| Leaks Repaired | 1 | 4 | 1 | 4 | 3 | 1 | 3 | 4 | 1 | | | |
| Backlog | 10 | 9 | 9 | 9 | 6 | 5 | 9 | 9 | 9 | | | |
| | | | | | | | | | | | | |
| Avg. Lag Time | 25.7 | 44.1 | 59.4 | 61.1 | 72.4 | 82.1 | 68.8 | 68.6 | 75.0 | | | |

During the 3rd Quarter of FY16, twelve leaks were detected and eight repaired. Nine leaks remain unrepaired, of which, four are carried over from FY15. Refer to FY16 Leak Report below for details. Additionally during Q3 community assistance, ranging from individual leak location work to hydrant surveys were conducted in the following cities:

* January - Malden, Belmont, Somerville, Revere and Waltham
* February - Somerville, Brookline, Newton, Revere and Waltham
* March - Cambridge, Malden, Boston and Somerville

## FY16 Leak Report - 3rd Quarter

| Date Detected | Location of Leaks | Repaired |
|---|---|---|
| 5/9/2014 | General Edward Bridge, Revere/Lynn | 8/31/2015 |
| 5/7/2015 | West Street, Hyde Park Boston Proper | 7/8/2015 |
| 8/7/2015 | DCR Foss Park Broadway, Somerville | 8/7/2015 |
| 8/11/2015 | Broadway @ Mt Pleasant, Somerville | 8/18/2015 |
| 7/21/2015 | Broad Street @ Union Street, Lynn | 8/20/2015 |
| 7/1/2015 | Fellsway East Ext @ Pond Street, Stoneham | 9/2/2015 |
| 6/22/2015 | 825 University Ave., Norwood | 10/5/2015 |
| 10/6/2015 | General Lawrence Bridge, Medford | 10/21/2015 |
| 10/6/2015 | #49 Lynn Street @ Shute Street, Everett | 10/28/2015 |
| 10/26/2015 | Mystic Valley Parkway @ Rte 16, Medford | 10/30/2015 |
| 9/28/2015 | Winthrop Ave. @ Summer Street, Revere | 11/5/2015 |
| 5/12/2015 | 129 West Street, Hyde Park | 11/10/2015 |
| 10/27/2015 | Woodland road @ Pond Street, Stoneham | 11/23/2015 |
| 8/3/2015 | 630 Squire Rd., Revere | 12/30/2015 |
| 1/6/2016 | 644 Pleasant St., Belmont | 1/20/2016 |
| 1/19/2016 | Columbus Park Sewer Station, S. Boston | 1/20/2016 |
| 1/7/2016 | Common St., at Spring St., Watertwon | 1/25/2016 |
| 2/1/2016 | 376 Revere Beach Parkway, Revere | 2/10/2016 |
| 1/5/2016 | Forest Street @ Summer Street, Arlington | 2/11/2016 |
| 1/31/2016 | Pleasant Street @ Lake Street, Belmont | 2/16/2016 |
| 2/10/2016 | 45 Felton Street @ Water Street, Waltham | 2/23/2016 |

| Date Detected | Location of Leaks (cont) | Repaired |
|---|---|---|
| 2/19/2016 | Mount Vernon @ Albion Street, Somerville | 3/18/2016 |
| | | |
| | | |
| | | |

| Date Detected | Location of Leaks/Unrepaired |
|---|---|
| 1/6/2015 | Washington St. @ Arborway, West Roxbury - Contractor working |
| 1/11/2015 | Arborway @ St Joseph St., West Roxbury - Working on Traffic plan |
| 6/8/2015 | Allandale Rd. @ Grove St., Brookline - Requires a shutdown |
| 6/17/2015 | Washington St @ Lower E. Street, Dedham -Requires Night Shutdown |
| 7/16/2015 | Captain Robert Cook Dr., Needham - Difficult to isolate-working to resolve |
| 1/28/2016 | Charles St., @ Canal St., Malden - Waiting for Health & Safety Plan* |
| 1/31/2016 | 215 Pleasant Street, Arlington - Contractor working |
| 2/22/2016 | Waverly Oaks Rd., Waltham - Shaft 9 is down can't be repaired till up. |
| 3/23/2016 | Charles River - Section 80, Weston - to be repaired in April. |
| | |
| | |
| | |
| | |
| | |

* contaminated soil

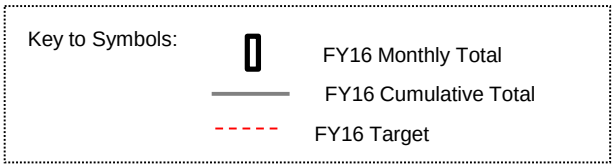
# Water Distribution System Valves

3rd Quarter - FY 16

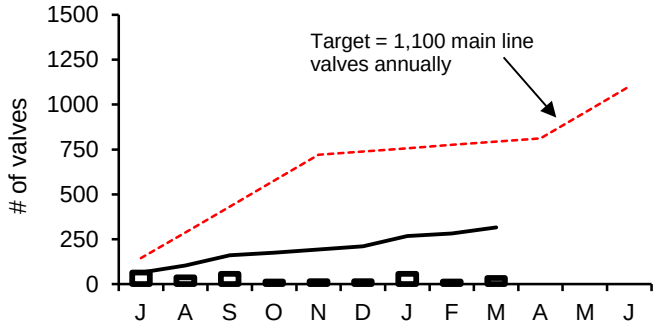
## Background

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 | |
|---|---|---|---|
| | | FY16 to Date | FY16 Targets |
| Main Line Valves | 2,159 | 96.3% | 95% |
| Blow-Off Valves | 1,317 | 94.3% | 95% |
| Air Release Valves | 1,380 | 92.8% | 95% |
| Control Valves | 49 | 100.0% | 95% |

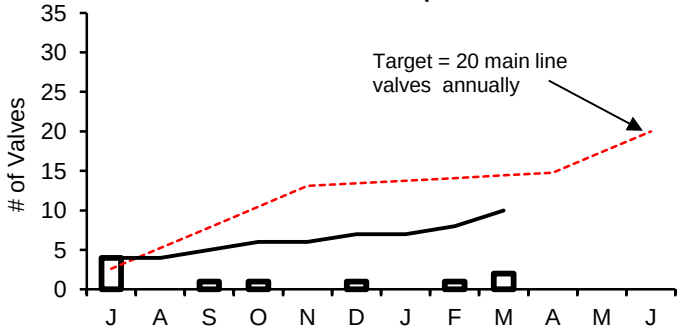



### Main Line Valves Exercised



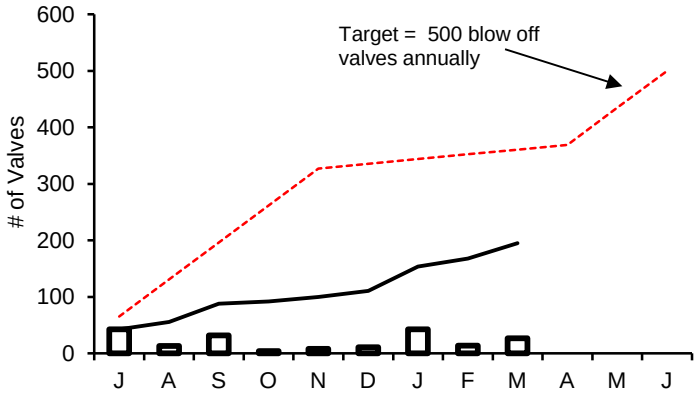

During the 3rd Q of FY16, staff exercised 106 main line valves. The total exercised for the fiscal year is 316. Below target due to high priority CIP projects.

### Main Line Valves Replaced



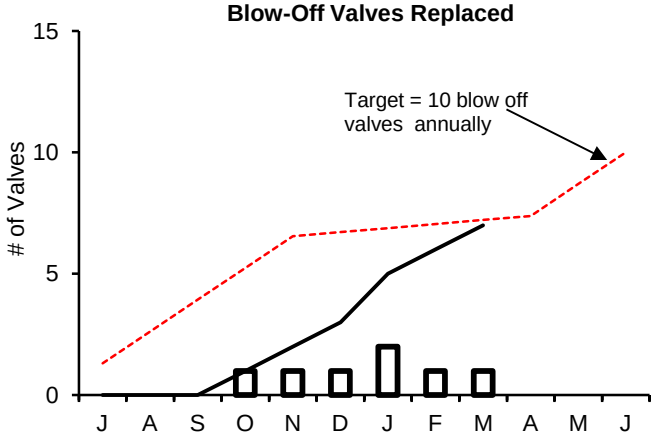

During the 3rd Q of FY16, staff replaced three main line valves. The total replaced for the fiscal year is ten.

### Blow-Off Valves Exercised




During the 3rd Q of FY16, staff exercised 84 blow off valves. The total exercised for the fiscal year is 195. Below target due high priority CIP projects.

### Blow-Off Valves Replaced



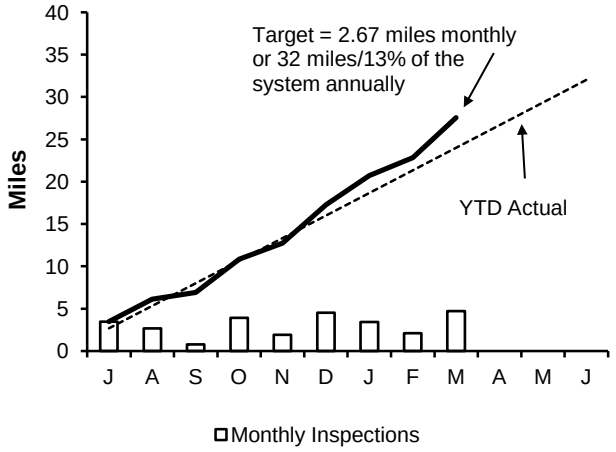

During the 3rd Q of FY16, staff replaced four blow off valves. The total replaced for the fiscal year is seven.

# Wastewater Pipeline and Structure Inspections and Maintenance

3rd Quarter - FY 16

## Inspections

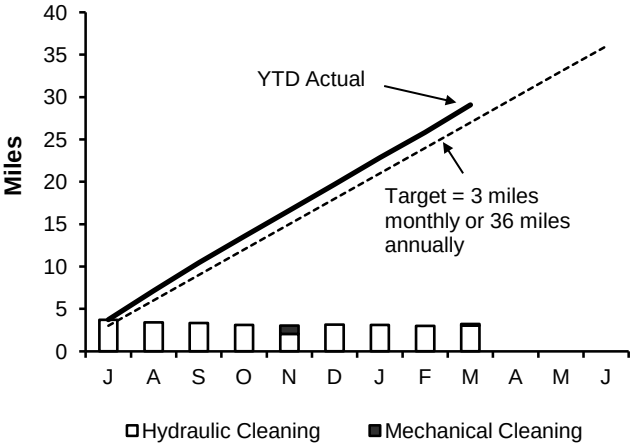
### Pipeline Inspections




Staff internally inspected 10.27 miles of MWRA sewer pipeline during this quarter. The year to date total is 27.54 miles.
No Community Assistance was provided this quarter.

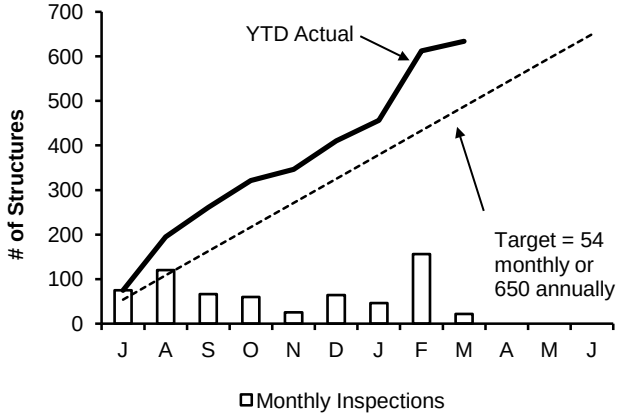
## Maintenance

### Pipeline Cleaning



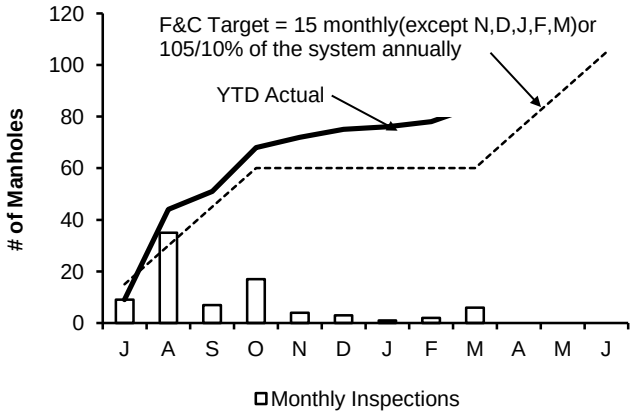

Staff cleaned 9.14 miles of MWRA's sewer system and removed 56 yards of grit and debris during thisquarter. The year to date total is 29.07 miles.
No Community Assistance was provided this this quarter.

### Structure Inspections



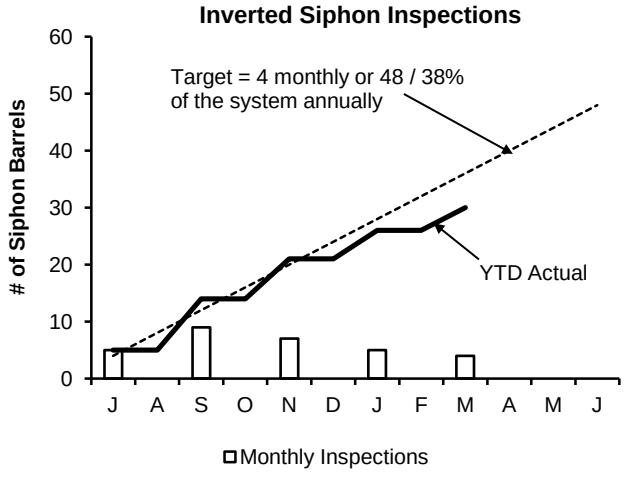

Staff inspected the 36 CSO structures and performed 188 additional manhole/structure inspections during this quarter.
The year to date total is 634 inspections.

### Manhole Rehabilitation



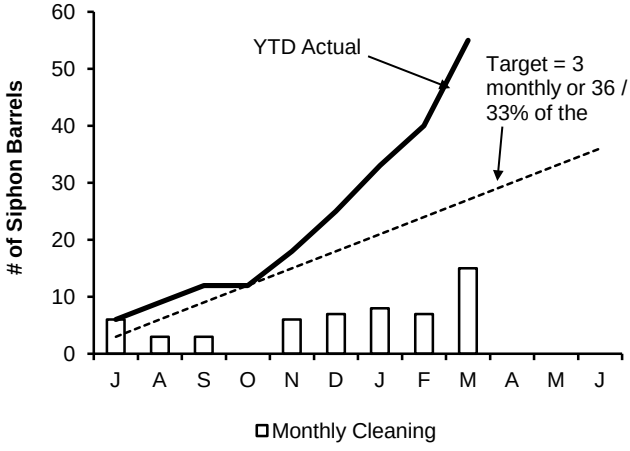

Staff replaced 9 frames & covers during this quarter.
The year to date total is 84.

### Inverted Siphon Inspections




Staff inspected 9 siphon barrels this quarter.
Year to date total is 30 inspections.

### Inverted Siphon Cleaning

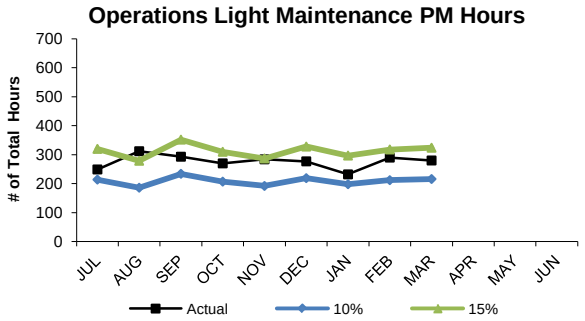



Staff cleaned 30 siphon barrels during this quarter.
The year to date total is 55 barrels.

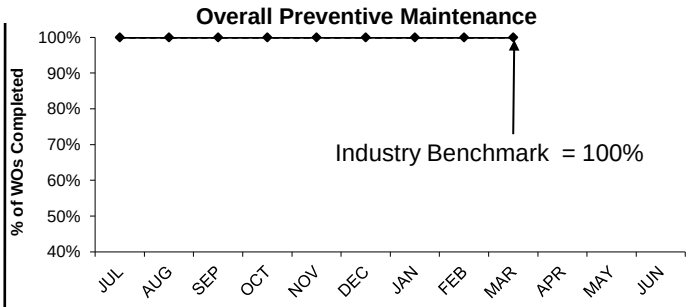
# Field Operations' Metropolitan Equipment & Facility Maintenance

3rd Quarter - FY16

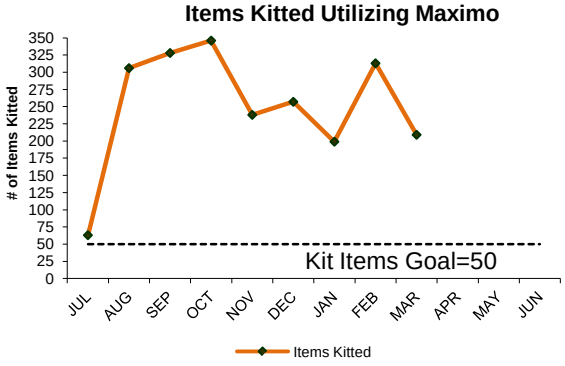
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus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



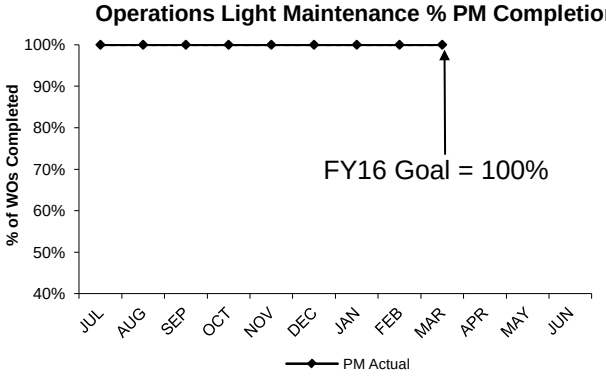

Operations staff averaged 267 hours of preventive maintenance during the 3rd Quarter, an average of 13% of the total PM hours for the 3rd Quarter, which is within the industry benchmark of 10% to 15%.



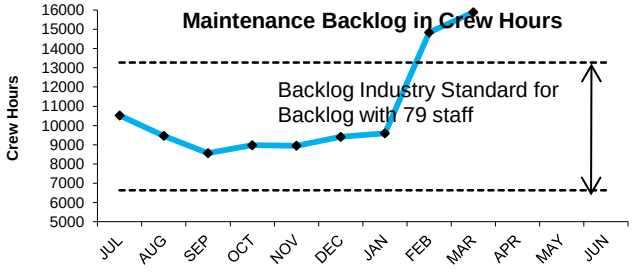

The Field Operations Department (FOD) preventive maintenance goal for FY16 is 100% of all PM work orders. Staff completed an average of 100% of all PM work orders in the 3rd Quarter.



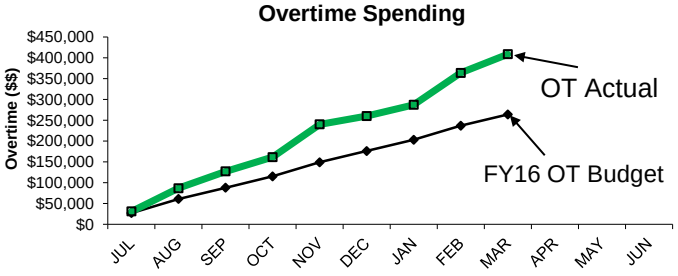

In an effort to more efficiently complete work, maintenance staff and work coordination staff have utilized the Lawson/Maximo interface to better kit stock and non stock material. The goal for FY16 is to "kit" 50 stock and non stock items total per month. An average of 240 items were kitted each month during the 3rd Quarter.




Wastewater Operators complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY16 PM goal is completion of 100% of all PM work orders assigned. Operations completed an average of 100% of PM work orders in the 3rd Quarter.



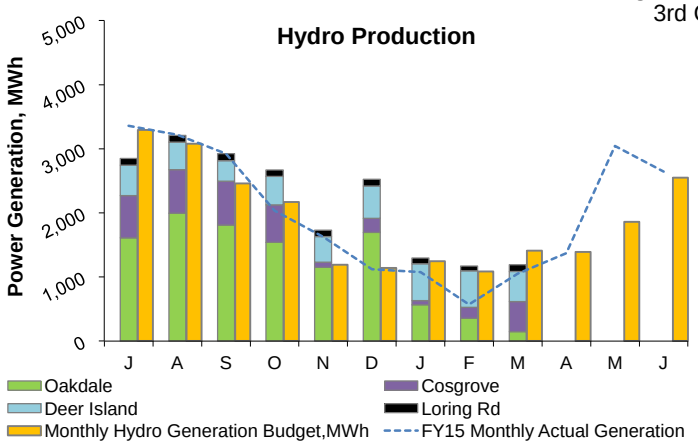

The 3rd Quarter backlog average is 13434 hours. Management's goal is to continue to control overtime and still stay within the industry benchmark of 6450 to 12,940 hours. Backlog hours are above the industry benchmark due to the Nut Island Incident response.



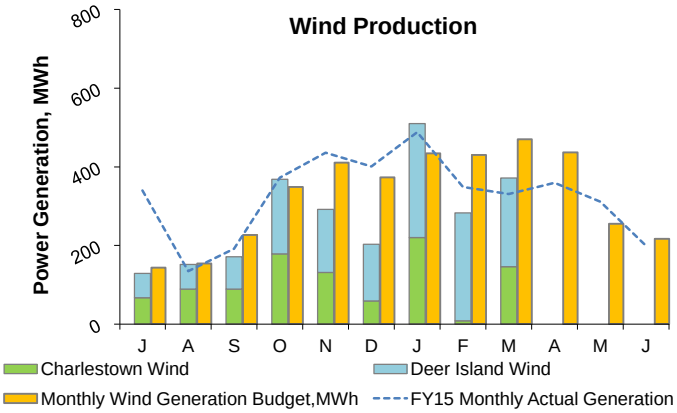

Maintenance overtime was $149k over budget for the 3rd Quarter. Overtime was used for staging for weather events, critical maintenance repairs, and the Nut Island Incident Response.

# Renewable Electricity Generation: Savings and Revenue

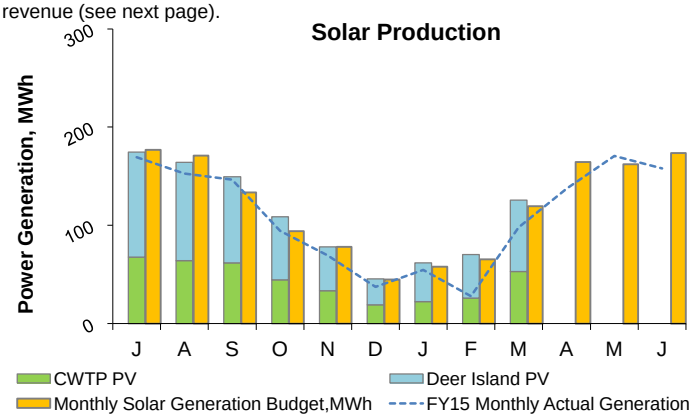
3rd Quarter - FY16



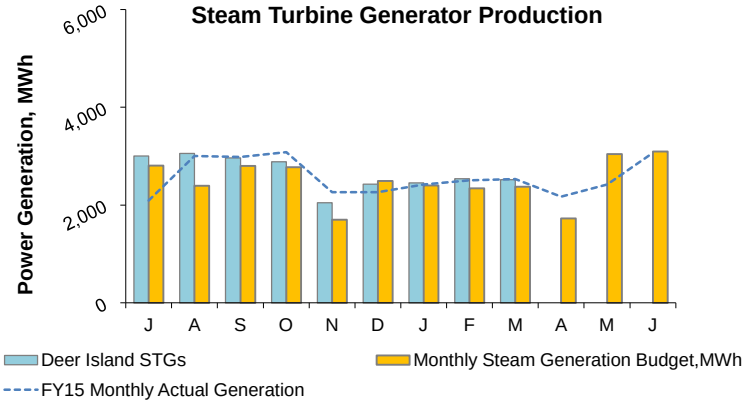

In the 3rd quarter, the renewable energy produced from all hydroelectric facilities totaled 3,652 MWh; 2% below budget[3]. The total energy produced to date in FY16 is 19,555 MWh; 15% above budget[3]; mostly due to Oakdale generating over 100% above budget in November and December. Oakdale generation values are estimated by the utility; this data was much higher than MWRA estimates and is reconciled after a few months. The total savings and revenue[2] to date in FY16 (actuals through January[1]) is $687,941; 17% below budget[3], partly due to the fact that the actual electricity unit price for Deer Island has been 15% below the budgeted[3] estimate for the same period, and due to Oakdale receiving a 41% on average lower than budget[3] price/kWh for the same period. Oakdale budget is based on a 3-year revenue average (FY12-FY14). The savings and revenue value does not include RPS REC revenue (see next page).



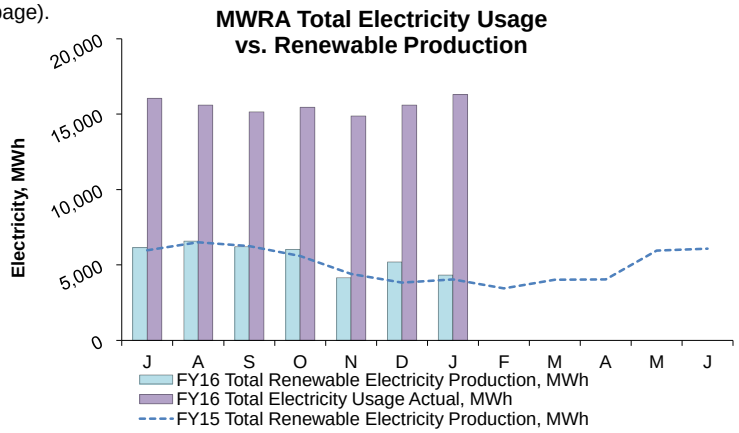

In the 3rd quarter, the renewable energy produced from all wind turbines totaled 1,165 MWh; 13% below budget[3]; mostly due to Charlestown Wind Turbine undergoing repairs of its main power converter. The total energy produced to date in FY16 is 2,479 MWh; 17% below budget[3]. The total savings and revenue[2] to date in FY16 (actuals through January[1]) is $240,612; 10% below budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).

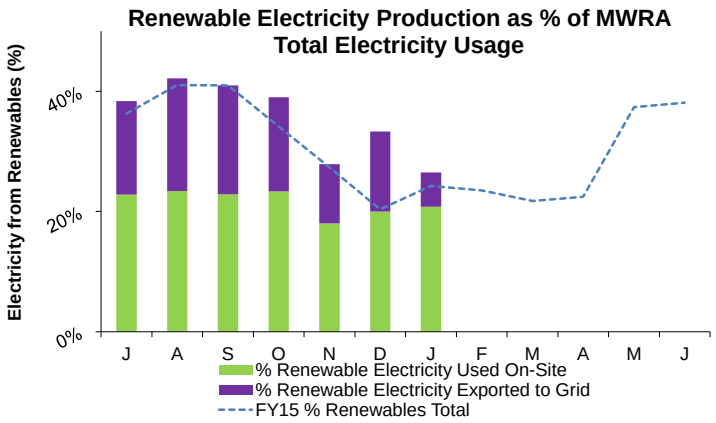



In the 3rd quarter, the renewable energy produced from all solar PV systems totaled 258 MWh; 6% above budget[3]. The total energy produced to date in FY16 is 979 MWh; 4% above budget[3]. The total savings and revenue[2] to date in FY16 (actuals through January[1]) is $90,612; 7% above budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).




In the 3rd quarter, the renewable energy produced from all steam turbine generators totaled 7,515 MWh; 6% above budget[3]. The total energy produced to date in FY16 is 23,909 MWh; 8% above budget[3]. The total savings and revenue[2] to date in FY16 (actuals through January[1]) is $1,448,559; 8% below budget[3]. The savings and revenue value does not include RPS REC revenue (see next page).



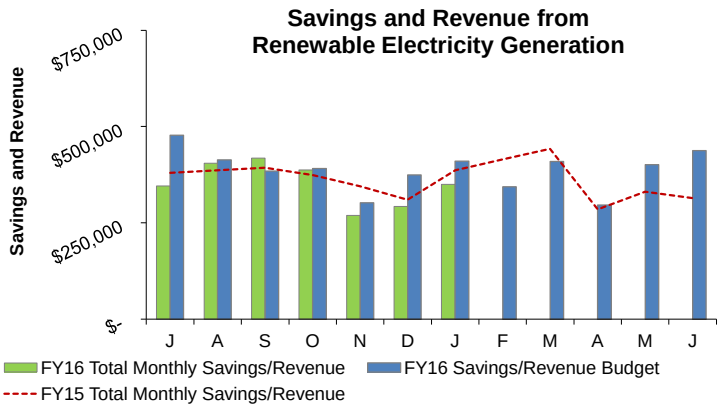

In the first 7 months of FY16, MWRA's electricity generation by renewable resources totaled 38,651 MWh. MWRA's total electricity usage was approximately 109,071 MWh. The MWRA total electricity usage is the sum of all electricity purchased for Deer Island and FOD plus electricity produced and used on-site at these facilities. Approximately 99% of FOD electrical accounts are accounted for by actual billing statements; minor accounts that are not tracked on a monthly basis such as meters and cathodic protection systems are estimated based on this year's budget.

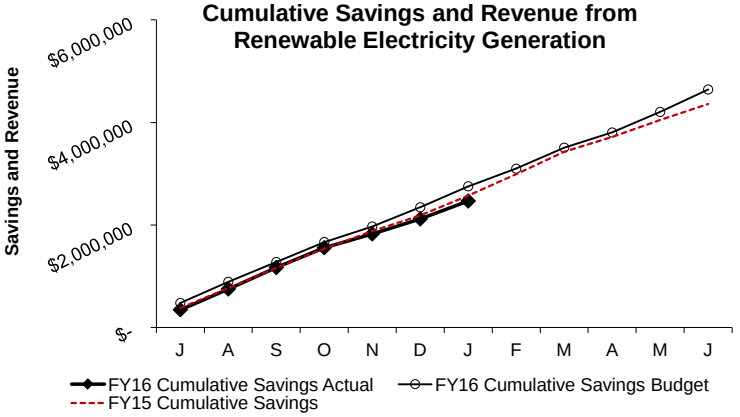
In the first 7 months of FY16, green power generation represented approximately 35% of total electricity usage. All renewable electricity generated on DI is used on-site (this accounts for more than 50% of MWRA renewable generation). Almost all renewable electricity generated off-DI is exported to the 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.

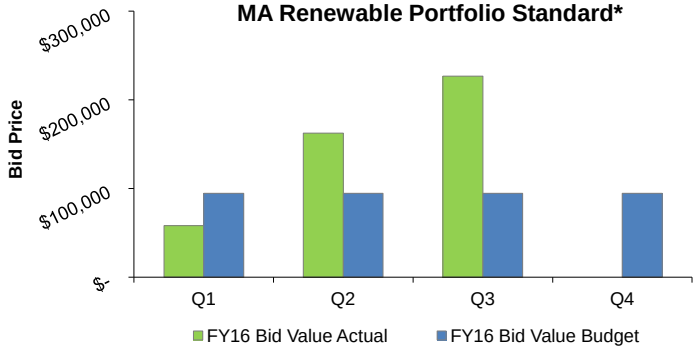
# Renewable Electricity Generation: Savings and Revenue

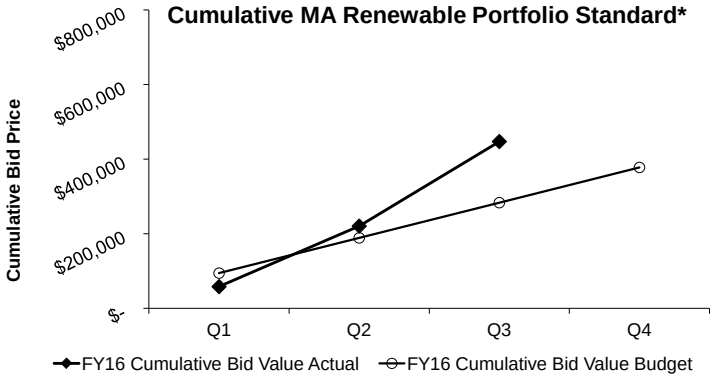
3rd Quarter - FY16



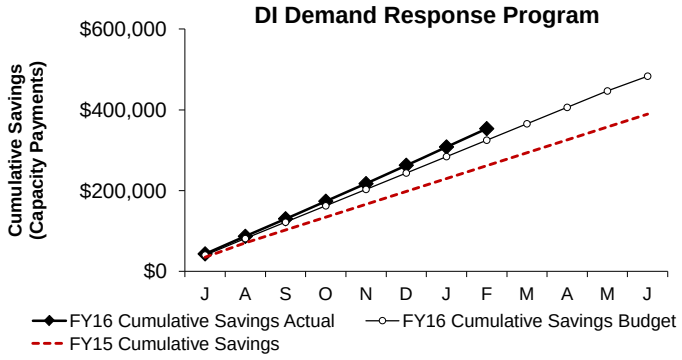

Savings and revenue from MWRA renewable electricity generation in the first 7 months of FY16 (actuals only through January[1]) is $2,467,724; which is 10% below the budget[3], partly due to the fact that the actual electricity unit price for Deer Island has been 15% below the budgeted[3] estimate for the same period. 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).

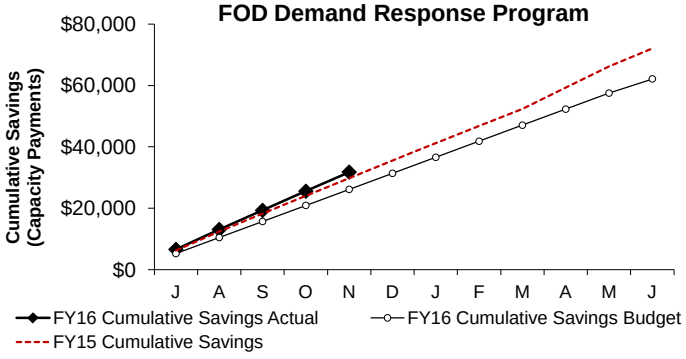



Bids were awarded during the 3rd Quarter[1] from MWRA's renewable energy assets; 6,620 Q3 CY2015 Class II Renewable Energy Certificates (RECs) and 104 Q3 CY2015 Solar RECs were sold for a total value of $226,681 RPS revenue; which is over 100% above budget[3] for the Quarter.
REC values reflect the bid value on the date that bids are accepted, even though the RECs were produced during Q3 of CY2015. Cumulative bid values reflects the total value of bids received to date.

*Only Class II and Solar RECs are being reported for Q3 CY2015 sales. Class I RECs have not been sold and are currently reserved for future sale.



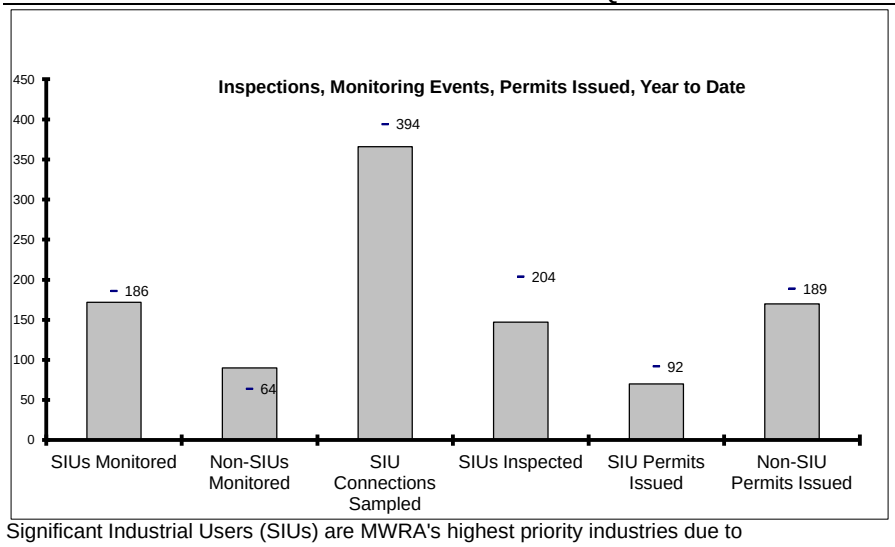




Deer Island, 2 Water, and 4 Wastewater facilites[4] participate in the ISO-New England Demand Response Programs. By agreeing to have its generators available to run and thus relieve the New England energy grid of some of MWRA's load during times of high energy demand, MWRA receives monthly Capacity Payments from ISO-NE. When MWRA operates back-up generators during an ISO-NE called event, MWRA also receives energy payments from ISO-NE. FY16 Cumulative savings (Capacity Payments only) through February[1] total $353,396 for DI and $31,787 for FOD through November[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. FOD Facilites include: CWTP, Loring Road, Chelsea Creek, Columbus Park, Ward St., and Nut Island.

# Toxic Reduction and Control

3rd Quarter - FY16




EPA Required SIU Monitoring Events
for FY16: 186
YTD : **172**

Required Non-SIU Monitoring Events
for FY16: 64
YTD : **90**

SIU Connections to be Sampled
For FY16: 394
YTD: **366**

EPA Required SIU Inspections
for FY16: 204
YTD: **147**

SIU Permits due to Expire
In FY16: 92
YTD: **70**

Non-SIU Permits due to Expire
for FY16: 189
YTD: **170**

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

TRAC'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 at any given time. During the course of the year, some SIUs do not discharge and cannot be monitored. TRAC also monitors one-third of the non-SIUs each year.

EPA requires MWRA to issue or renew 90% of SIU permits within 120 days of receipt of the application or the permit expiration date - whichever is later. EPA also requires the remaining 10% of SIU permits to be issued within 180 days. So

SIU and Non-SIU permits are issued with durations of two to five years, depending on the category of industry, varying the number of permits that expire in a given year.

**Number of Days to Issue a Permit**

| | 0 to 120 | | 121 to 180 | | 181 or more | | Total Permits Issued | |
|---|---|---|---|---|---|---|---|---|
| | SIU | Non-SIU | SIU | Non-SIU | SIU | Non-SIU | SIU | Non-SIU |
| Jul | 4 | 20 | 1 | 3 | 0 | 0 | 5 | 23 |
| Aug | 10 | 11 | 0 | 1 | 0 | 0 | 10 | 12 |
| Sep | 7 | 9 | 0 | 0 | 0 | 0 | 7 | 9 |
| Oct | 8 | 25 | 0 | 0 | 0 | 1 | 8 | 26 |
| Nov | 14 | 20 | 0 | 0 | 0 | 0 | 14 | 20 |
| Dec | 6 | 23 | 0 | 1 | 0 | 1 | 6 | 25 |
| Jan | 4 | 14 | 0 | 3 | 3 | 0 | 7 | 17 |
| Feb | 4 | 17 | 0 | 4 | 0 | 0 | 4 | 21 |
| Mar | 9 | 17 | 0 | 0 | 0 | 0 | 9 | 17 |
| Apr | | | | | | | 0 | 0 |
| May | | | | | | | 0 | 0 |
| Jun | | | | | | | 0 | 0 |
| % YTD | 94% | 92% | 1% | 7% | 4% | 1% | 70 | 170 |

In this the 3rd Quarter of FY16, seventy-five permits were issued, twenty of which were SIUs. Seventeen of the SIU permits and forty-eight of the non-SIU permits were issued in the 120-day timeframe. Seven non-SIU permits were issued in the 120-day to 180-day timeframe and three SIU permits were issued beyond the180-day period.

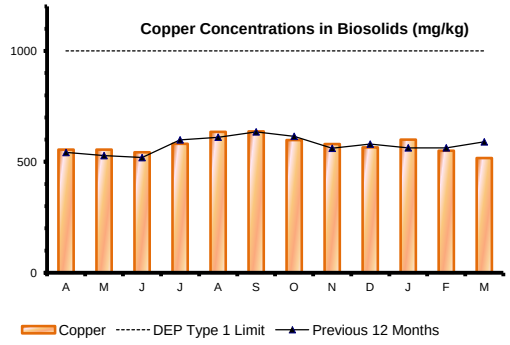
Late payment of permit fees is one of the reasons permits are issued after 120 days - together with delays due to workload, construction issues and information gathering for the determination of the permit category.

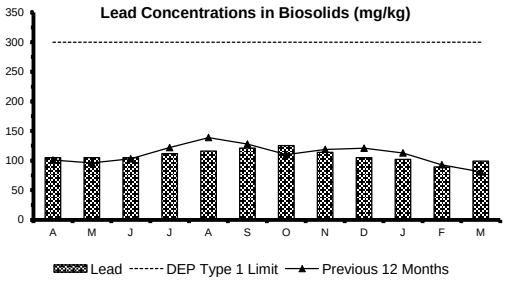
Copper, lead, and molybdenum are metals of concern for MWRA as their concentrations in its biosolids have, at times, exceeded regulatory standards for unrestricted use as fertilizer. Cooling tower usage typically causes a seasonal spike in molybdenum concentrations due to the blowdown on large AC systems that use corrosion inhibitors containing molybdenum. Levels drop again following the end of the cooling season, although this is delayed due to biosolids processing time. The hotter the season, the higher the spike.

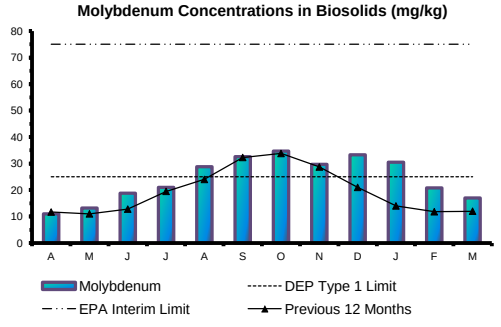
TRAC has an ongoing program to persuade cooling tower operators to switch to phosphate-based corrosion inhibitors, but the situation may necessitate considering additional regulatory options.

During this 3rd quarter of FY16, the level of molybdenum has been on a downward trend with two of the three months below the DEP type 1 Limit. However the readings have generally been higher than last year's.

MWRA and its contractor (NEFCO) generally do not distribute product in Massachusetts July to January, under its approval of suitability.



# Field Operations Highlights – Orange Notebook Bullets

3rd Quarter – FY16

**Western Water Operations and Maintenance**

- Carroll Water Treatment Plant: Staff completed the annual half-plant shutdown. This involves draining all of the tanks and flushing all systems. The primary contactors and storage tanks are then cleaned and maintenance tasks completed on all offline systems. This included replacing the rupture discs on the primary contactors, replacing back pressure valves on chemical feed systems, replacing UV Lamps that have reached the end of the service life as well many other tasks that can only be completed during the annual shutdown. Prior to the completion of half-plant, staff inspected the connecting piping between the Operations Building and the UV Treatment Facility and found several concrete joints that needed to be repaired. The piping was completely dewatered and staff made internal masonry repairs.

- Southborough Administration Building. There was a sprinkler line freeze in the conference room ceiling on the second floor of the administration building in mid-February, causing significant damage to both floors of the building. In house staff as well as risk management and contractors responded immediately and started the repair and recovery work. The carpet has been replaced in most areas, as well as drop ceiling, dry wall and insulation. Electrical staff are upgrading damaged light fixtures to efficient LED fixtures and replacing damaged outlets. The facility is getting a clean coat of paint. The work is ongoing but the facility has remained staffed and operational the entire time.

- Quabbin DCR Headquarters: Electrical Maintenance Staff provided troubleshooting assistance at the Headquarters Building. There were damaged wires connecting the main building to the hanger/maintenance facility. Staff removed the old cloth insulated wires from the connecting conduit and installed modern wiring, providing a safe reliable connection between the locations.

**Metro Water Operations and Maintenance**

- Work was completed for the season on Section 40 on Hyde Park Avenue and will continue in the spring. Four blow-off retrofits were completed (two in Revere on Sections 72 and 85 and two in Boston on Sections 20 and 58). Leaks were repaired on WASM 11 in Belmont on Section 25 in Watertown, the 4" water service line to the Columbus Park Headworks on Section 62 in Arlington, Section 69 in Revere, WASM 10 on Felton Street in Waltham, and at Shaft 9 in Somerville. The repair of the WASM 11 leak required isolation of a portion of the pipeline in Belmont, isolation of the suction line to the Belmont Pump Station, and activation of a Pressure Reducing Valve (PRV) within the Belmont Water System to replicate service from Meter 88. The existing Pressure Reducing Valve (PRV) at the Arlington Covered Reservoir from the Northern Extra High (NEH) Service Area provided supply to the Intermediate High (IH) Service Area with the Belmont Pump Station isolated.

- Excavation began on a leak on Section 49 adjacent to NGrid property on Charles Street, which requires the development of a health and safety plan due to soil conditions. The plan has been developed via task order, and the repair will begin next quarter. Section 49 remains isolated, and service remains normal in the Northern High Service (NHS) Area. The leak on Section 62 was on a joint on a tee that also connected to Section 63 at Forest Street. Both pipeline sections needed to be isolated to deal with the leaking tee. Isolation of Section 63 also required the isolation of the Turkey Hill Tank and Meter 130 to Winchester. The Meter 130 service area was temporarily supplied through an emergency connection from Arlington. The leak was successfully repaired by replacement of the tee and adjacent valve, and both pipelines were reactivated. There were no service issues in the area of Winchester normally supplied by Meter 130 during the operation.

- A leak on the piping at Shaft 9 was on the joint of a valve, requiring the valve to be replaced. Staff excavated and exposed the Hultman Aqueduct at Shaft 5A for inspection of the top of the leaking joint. Staff mobilized equipment and erosion protection barriers for a leak on Section 80 near Recreation Road in Weston. The repair is anticipated to be completed in early April. The need for the potential isolation of the main has been coordinated with Needham and Wellesley.

- Two staff members were part of the MEMA Snow Removal Response Team to Washington, D.C. with one of the sections front-end loaders. Our staff traveled in convoy with Mass DOT, DCR, and Massachusetts State Police down and back from Washington, D.C.

- Cambridge began taking water on February 2, as they have bid a contract to replace approximately 1500 feet of 40" transmission water main in their system. Supply to Cambridge is through Meter 145. The city plans on being capable of supplying the majority of their water needs utilizing their water treatment plant. Our connection will supply water generally through the higher demand periods during the day. This is expected to be primarily during the morning demand periods. Cambridge expects they will need 1 to 2 million gallons of water per day through the spring.

**Wastewater Operations & Maintenance**

- North Main Pump Station Shutdowns: Operations Staff continued to assist with the North Main Pump Station Contract Equipment Upgrades and Modifications which were onsite to ensure the proper operation of all wastewater facilities during the shutdowns. Staff previously provided wastewater system operating conditions and developed operational control strategies. Nine shutdowns were conducted of the Winthrop Terminal during the quarter.

- Union Park Annual Operating Report: Wastewater Operations Staff met with Woodard & Curran Staff onsite at Union Park to review the 2015 Annual Operating Report and to perform a joint yearly inspection of the facility. Operations Staff also conducted a tour of Union Park for a new staff member of the Advisory Board.

**TRAC**

- Compliance Staff issued 57 Notices of Violations, 1 Demand Letter for stipulated penalties, 7 Notices of Noncompliance and 1 Return to Permit Letter; collected permit fees totaled $1,724,373.69; issued 4 Notices of Noncompliance and continued to negotiate resolutions to several high-level enforcement matters.

- Inspections and Permitting Staff monitored the Septage Receiving Sites a total of 69 times; conducted 3 septage hauler inspections necessary to renew and update a Septage Hauler Permit; conducted 213 inspections of existing gasoline/oil separators and inspected 47 new construction gasoline/oil separators; and conducted 63 Annual SIU Inspections and 195 other inspections.

- On March 25, 2016, TRAC was asked to respond to Chestnut Hill Reservoir to collect samples because of a concerned college student had observed strange yellow outlines around the rocks at the edge of the reservoir and a dead fish. Samples were brought to Deer Island for analysis where it was determined to be very similar to Scots Pine Pollen in the water.

**Environmental Quality-Water**

- The 2016 plan for algal toxin, taste and odor compound sampling was reviewed at the monthly Water Quality Team Meeting. The sampling approach will be consistent with that of EPA's proposed Unregulated Contaminant Monitoring Rule 4 (UCMR4).

- Worked with Planning and Laboratory staff to develop DEP's proposed revisions state Drinking Water Regulations, and to EPA's draft Unregulated Contaminant Monitoring Rule 4 (UCMR4).

- Staff provided presentations to community staff as part of MWRA's annual Emergency Response Training Program. Presentations focused on the importance of and logistics involved with water quality complaints.

**Environmental Quality-Wastewater**

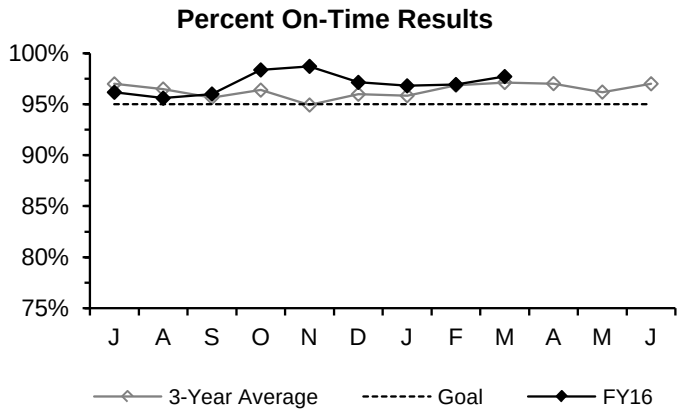
- Ambient Monitoring: Contingency Plan Threshold Tests were carried out on nuisance algae abundances in September and October surveys (there were no exceedances). Contingency Plan Threshold Tests on the mussel study and on the lobster results also showed no exceedances. The 2016 field season commenced with two Water Column Monitoring Surveys in the first quarter of CY2016.

- Harbor/Beach Monitoring: Harbor Monitoring Plans for 2016 have been finalized to emphasize water quality recovery time following wet weather. New harbor field data review and loading procedures for the 2016 monitoring year were introduced in January. Data from the 2015 field season was posted on the web.

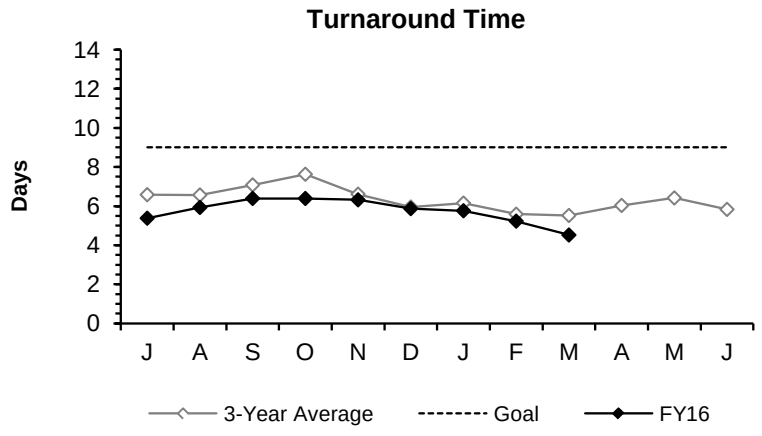
- NPDES Reporting: The SSO real-time reporting web page was posted in the NPDES Section of the MWRA web site, with its first public notification on January 17. A real-time reporting page for CSO treatment facilities is currently under development and will be published next quarter.

# Laboratory Services

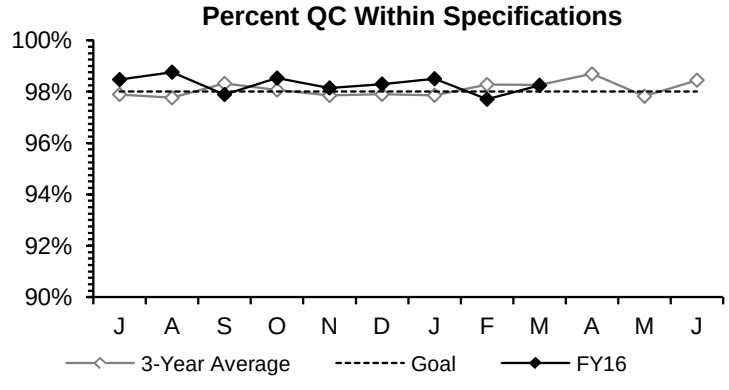
3rd Quarter - FY16



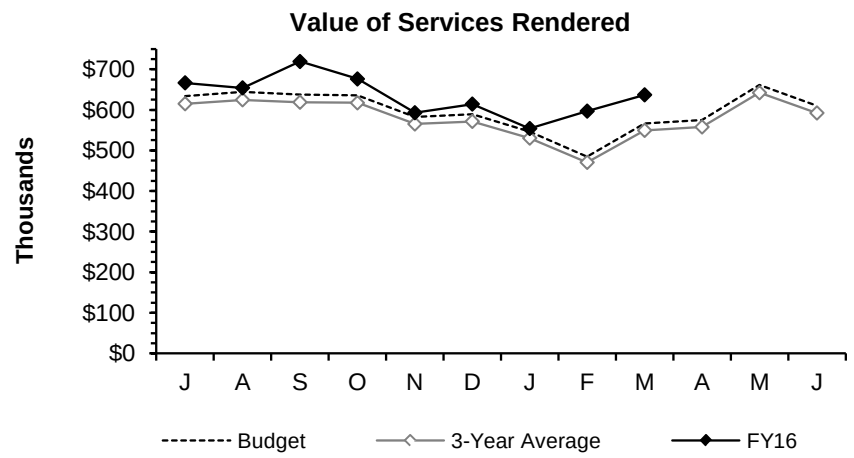

The Percent On-Time measurement was above the 95% goal each month of the quarter.




Turnaround Time was faster than the 9-day goal each month of the quarter.




Percent of QC tests meeting specifications met the 98% in-house goal for two months of the quarter.




Value of Services Rendered was above the seasonally adjusted budget projection each month of the quarter.

**Highlights:**

Lab Services has met or exceeded its on-time results and turnaround time goals each month for the past 27 months.

**Quality Assurance:**
Got acceptable results on 370 of 380 annual proficiency test results on the first try at all Lab locations for a passing rate of 97.4% for drinking water and wastewater. We have until the end of the calendar year to pass the remaining 10 parameters.

**Drinking Water:**
Performed rush tests for glycol to assist Norwood where a building was having backflow preventer problems.

**Residuals:**
Performed phosphorus leachability tests on fertilizer pellets to support discussions on agricultural regulations.

**"Reliable Determination of Cyanide in Treated Water"** by Michael F. Delaney and Charles Blodget was published in the February issue of JAWWA. Lab staff Nancy McSweeney, Ed Caruso Jr., Tamara Smirnova, and Kevin Constantino all made significant contributions to the paper.

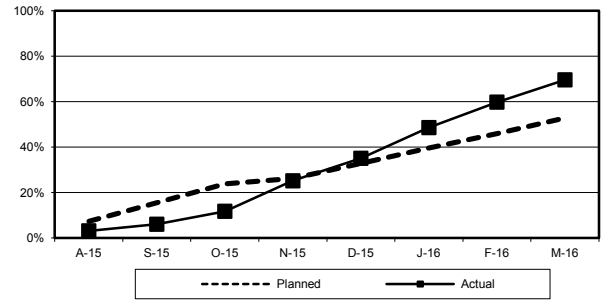
# CONSTRUCTION PROGRAMS

# Projects In Construction

3rd Quarter FY16

(Progress Percentages based on Construction Expenditures)

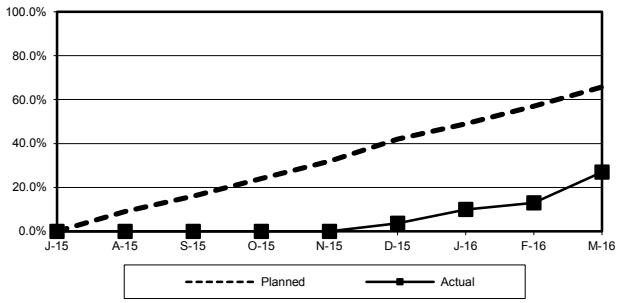
Southborough Water Quality Lab
Progress – March 2016




*Project Summary:* This project involves the rehabilitation of the Southborough Water Quality Laboratory. The work includes replacement of the roof , windows, doors and flooring, as well as modifications to the electrical, HVAC and fire protection systems.

*Status and Issues:* As of March, the Contractor completed the roof installation, lighting fixtures, fire alarm, acoustical ceiling tile, HVAC and lightening protection.

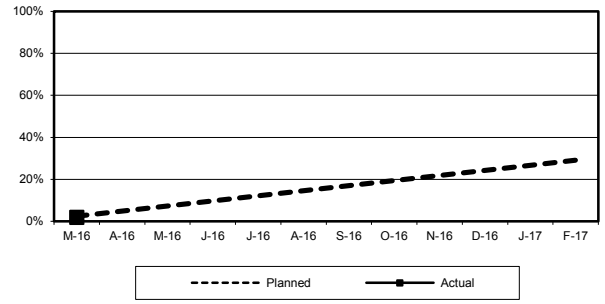
Upgrades to Chelsea Screen House
Progress – March 2016




*Project Summary:* This project involves the replacement of two dry side screens, seven gates and the rehabilitation of two wet side screens and the addition of two new gates. Also, a SCADA system will be added to the wet side to allow for remote wet weather operation.

*Status and Issues:* As of March, the Contractor installed stop logs upstream and downstream in Channel #1 on the Wet Side to perform work on Screen #1. They also removed the existing pin rack assembly on Screen #1 and installed the north side frame. A 72" diameter inflatable plug at the Gate 9 location was successfully installed.

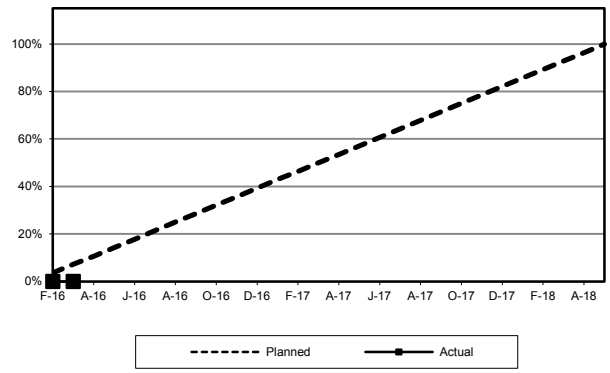
Wachusett Aqueduct Pumping Station
Progress – March 2016




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

*Status and Issues:* As of March, the Contractor began lowering the water level in the Forebay, conducted the pump station site precut excavation, installed erosion controls and began submitting shop drawings.

Alewife Brook Pump Station Rehabilitation
Progress – March 2016

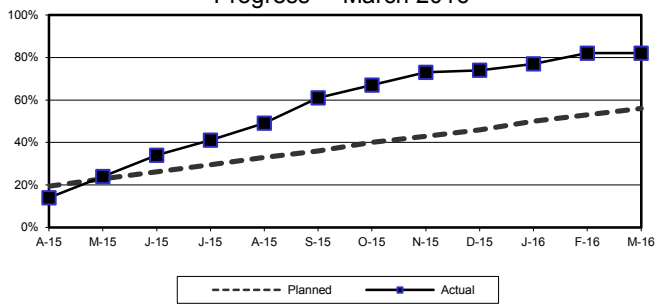



*Project Summary:* This project involves the replacement of wet-weather pumps, motors, gear drives, VFD's, MCC, screens, sluice gates, standby generator, roof, PLC's and HVAC. Also, the remediation of PCB's and asbestos and the installation of a flow meter on the 66-inch downstream Alewife Brook Conduit.

*Status and Issues:* As of March, the Contractor continued submitting shop drawings for Milestone 1, flood protection. Vendors and subcontractors have also been visiting the facility.

# Projects In Construction
## 3rd Quarter FY16
(Progress Percentages based on Construction Expenditures)

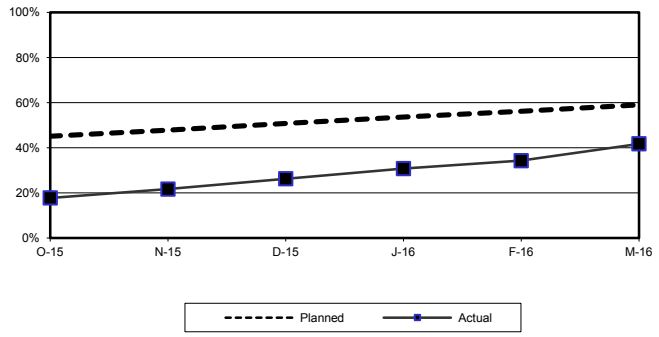
### Water Mains: Section 36, W11C and S9-A
### Progress – March 2016




*Project Summary:* This project includes the replacement of Section 36 in Arlington; the installation of a new water main (Section W11C); and the replacement of an inoperable 48-inch butterfly valve on Shaft 9-A pipeline in Medford.

*Status and Issues:* As of March, Section W11C was disinfected and activated. Crew mobilized to S9-A in Medford, removed fencing and staged on the Jiffylube/Metro Roofing Materials properties. The 48" water main was excavated and exposed, the pipe was cut and the existing butterfly valve was removed.

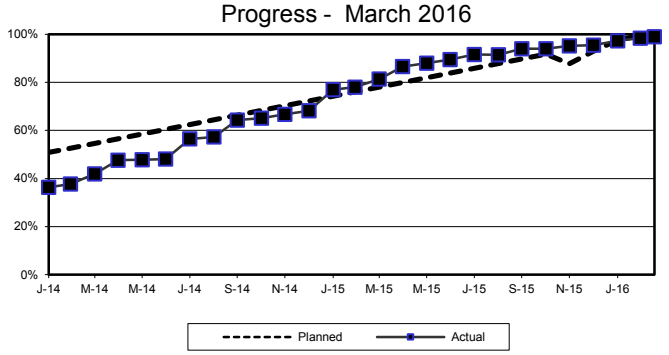
### Valves and Piping Replacements
### Progress - March 2016




*Project Summary:* This project involves the replacement of the twenty 60" butterfly valves and ten 60" flow meters in the NMPS; three 48", twelve 36" plug/check valves, six 30" flow meters and six 30-36" gate valves in the WTF.

*Status and Issues:* The Contractor completed the installation of the new 36" plug valve, knife gate and flow meter for WTF Pump Train #5 and #6. The work in the WTF has been declared substantially complete. In addition, they began replacement of the remaining Battery A PSL piping.

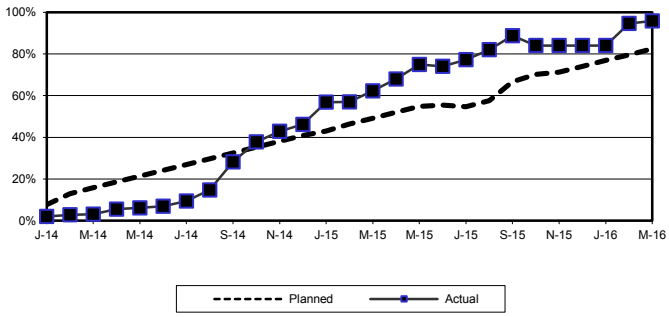
### North Main Pump Station VFDs & Motors
### Progress - March 2016




*Project Summary:* This project involves the replacement of the existing 3500 HP variable frequency drives and synchronous motors for the RWW pumps at the North Main Pump Station.

*Status and Issues:* During March, VFD #10 completed the second 10 day OAD. On-site systems training with MWRA, subcontractors and the vendor took place. Also, the Contractor worked on miscellaneous punchlist items.

### Primary and Secondary Clarifier Scum Tip Tubes
### Progress - March 2016




*Project Summary:* This project involves the replacement of the existing carbon steel tip tubes with 316 stainless steel in 48 primary and 54 secondary clarifiers to improve reliability and increase longevity.

*Status and Issues:* The scum skimmer installation is 99% complete in the Secondary Area and the instrumentation work is 94% complete. The functional testing on the Primary Batteries continues.

# CSO CONTROL PROGRAM

3rd Quarter - FY16

All 35 projects in the Long-Term CSO Control Plan are complete, in compliance with Schedule Seven. Remaining CSO related capital spending totaling $15 million is scheduled through December 2020. Remaining work includes completion of surface restoration work associated with the Cambridge CAM004 sewer separation contracts, BWSC's removal of additional inflow from its sewers in the South Dorchester Bay sewer separation areas of Dorchester, and the federal court mandated CSO post-construction monitoring and performance assessment.

| Project | Status as of March 31, 2016 |
|---|---|
| Reserved Channel Sewer Separation | BWSC attained substantial completion on December 11, 2015, in compliance with Schedule Seven. BWSC is preparing as-built plans and is closing out its engineering and construction contracts. MWRA staff are performing final eligibility reviews of the BWSC construction contracts. |
| South Dorchester Bay Sewer Separation Post-Construction Inflow Removal | As previously reported, BWSC has completed its investigation of alternatives for removing additional stormwater inflow from its Dorchester Interceptor, following the closing of CSOs several years ago. MWRA's CIP includes $5.4 million for the inflow removal effort, of which approximately $2.7 million has already funded BWSC design and construction contracts. Additional funding will follow decisions by BWSC on its recommendations and schedule for removing additional inflow. |
| Cambridge/Alewife Brook Sewer Separation | The City of Cambridge attained substantial completion on December 23, 2015, in compliance with Schedule Seven. Stormwater removed from the Cambridge and MWRA sewer systems now drains to the Alewife Wetland, and Cambridge has permanently closed Outfall CAM004 to CSO discharges. Extensive surface restoration work eligible for MWRA funding at a remaining cost of approximately $9 million is scheduled to continue through June 2017. |
| MWRA CSO Performance Assessment | Staff are reviewing the requirements of the EPA National CSO Control Policy, including EPA Guidance on CSO Post-Construction Monitoring, to support the development of an approach and scope for the three-year performance assessment Schedule Seven requires MWRA to conduct in the period 2018-2020. MWRA's FY16 CIP includes approximately $2 million for the performance assessment. |

# CIP Expenditures
## 3rd Quarter – FY16

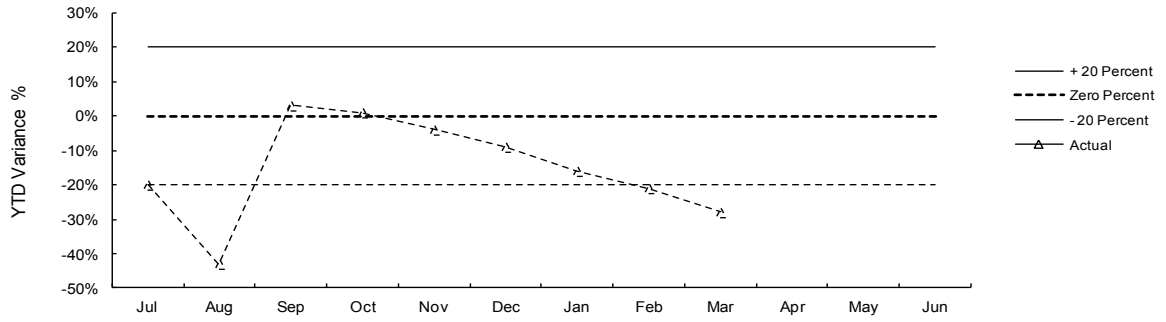
The Year-To-Date variances are highlighted below:

| FY16 Capital Improvement Program<br>Expenditure Variances through March by Program<br>($000) | | | | |
|---|---|---|---|---|
| Program | FY16 Budget Through March | FY16 Actual Through March | Variance Amount | Variance Percent |
| Wastewater | 58,364 | 45,722 | (12,642) | -22% |
| Waterworks | 27,815 | 17,640 | (10,176) | -37% |
| Business and Operations Support | 4,975 | 2,425 | (2,550) | -51% |
| Total | $91,154 | $65,786 | (25,368) | -28% |

Underspending within Wastewater is primarily due to less than anticipated community requests for grants and loans, updated schedules for Chelsea Creek Upgrades, Alewife Brook Pump Station Rehabilitation and Caruso Pump Station Improvements, timing of work for Electrical Equipment Upgrades, North Main Pump Stations VFD Replacements, Chelsea Screenhouse Upgrades, Thermal Power Plant Boiler Control Replacement, Scum Skimmer Replacement, and updated cost estimates for the Reserved Channel Sewer Separation project. This was partially offset by water use charges and updated cost estimates due to unforeseen conditions for Cambridge Sewer Separation and contractor progress on the North Main Pump Station and Winthrop Terminal Facility Butterfly Valve contracts. Underspending in Waterworks is primarily due to award less than budget and updated schedules for the Wachusett Aqueduct Pump Station and Section 89/29 Redundancy Phase 1B contracts, timing of Watershed Land purchases, legal settlement for Carroll Treatment Plant Ultraviolet Design, and lower than anticipated requests for Local Water System loans. This was partially offset by contractor progress on Section 36/C/S9-A11 Valve and Carroll Water Treatment Plant Existing Facilities Modifications CP-7 contracts.

### CIP Expenditure Variance

*Total FY16 CIP Budget of $140,498,000.*




### 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 3/26/2016 | $77.9 million |
| Unused capacity under the debt cap: | $1.043 billion |
| Estimated date for exhausting construction fund without new borrowing: | MAR-17 |
| Estimated date for debt cap increase to support new borrowing: | Not anticipated at this time |
| Commercial paper/Revolving loan outstanding:<br>Commercial paper capacity: | $149 million<br>$350 million |
| Budgeted FY16 capital spending*: | $116 million |

* Cash based spending is discounted for construction retainage.

# DRINKING WATER QUALITY AND SUPPLY

# Source Water – Microbial Results and UV Absorbance

3rd Quarter – FY16

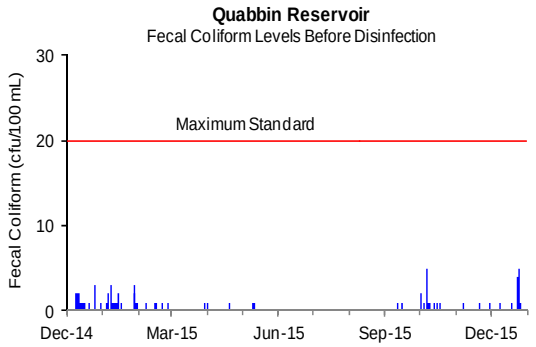
## Source Water – Microbial Results

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 (formerly Ware Disinfection Facility) raw water tap before being treated and entering the CVA system.

On January 4, one of the samples exceeded a count of 20 cfu/100mL. The other samples collected during the 3rd Quarter were below 20 cfu/100ml. **For the current six-month period, 0.06% of the samples have exceeded a count of 20 cfu/100mL.**

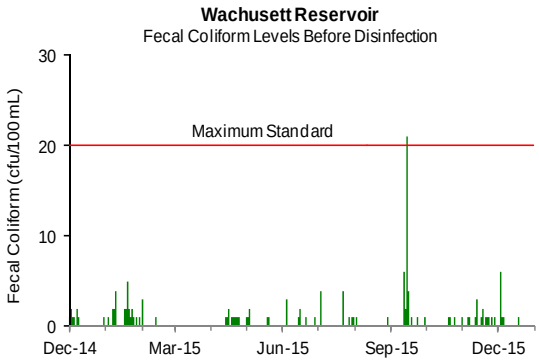



### Sample Site: Wachusett Reservoir

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 3rd Quarter were below 20 cfu/100ml. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL, compared to allowable 10%.**

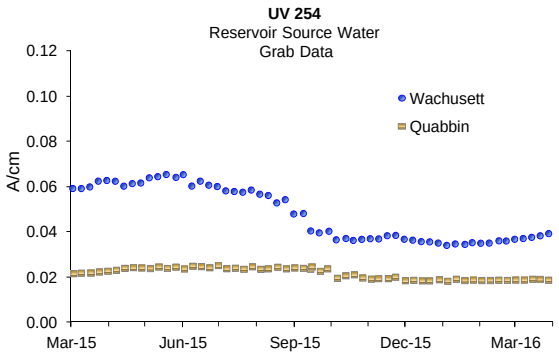



## Source Water – UV Absorbance

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 0.019 A/cm.

Wachusett Reservoir UV-254 levels are currently around 0.039 A/cm.



## Source Water – Turbidity

3rd Quarter – FY16

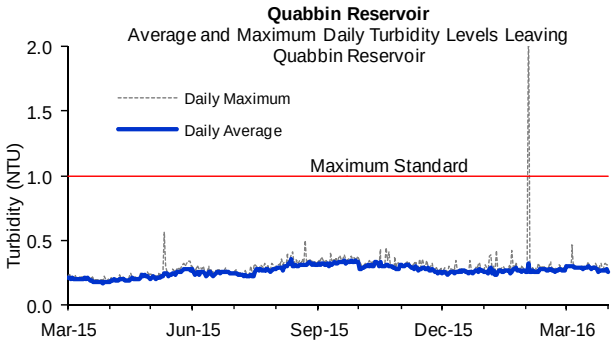
Turbidity is a measure of suspended and colloidal particles including clay, silt, organic and inorganic matter, algae and microorganisms. The effects of turbidity depend on the nature of the matter that causes the turbidity. High levels of particulate matter may have a higher disinfectant demand or may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

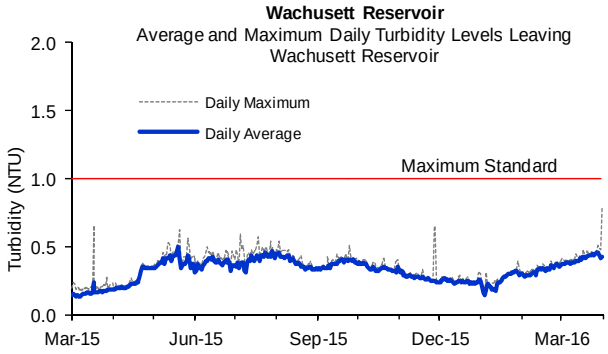
There are two standards for turbidity: all water must be below 5 NTU (Nephelometric Turbidity Units), and water only can be above 1 NTU if it does not interfere with effective disinfection.

Turbidity of Quabbin Reservoir water is monitored continuously at the William A. Brutsch Water Treatment Facility (WABWTF) 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.

On February 2, a CVA Intake valve operation created a short term turbidity spike at WABWTF. The online turbidity exceeded 1 NTU for 30 minutes and grab samples confirmed elevated turbidity. Disinfection effectiveness was not affected; CT was maintained at all times, downstream disinfectant residuals were maintained, and no coliform were detected in downstream samples.



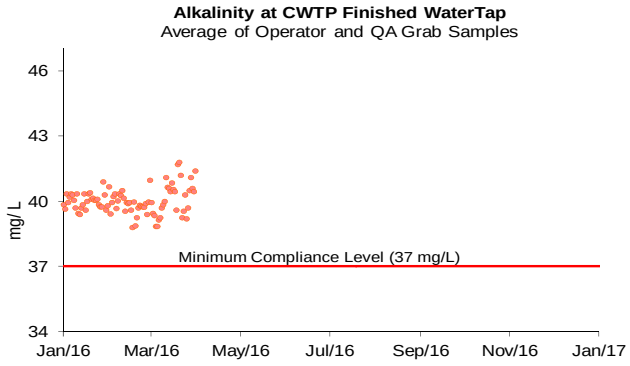



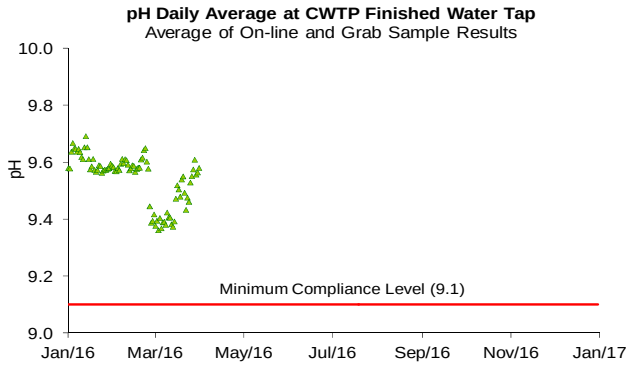

## Treated Water – pH and Alkalinity Compliance

MWRA adjusts the alkalinity and pH of Wachusett water 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 samples have a minimum compliance level of 9.1 for pH and 37 mg/L for alkalinity. Samples from 27 distribution system taps have a minimum compliance level of 9.0 for pH and 37 mg/L for alkalinity. Results must not be below these levels for more than nine days in a six month period. Distribution system samples are collected in March, June, September, and December.

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

Distribution system samples were collected on March 9 and 10, 2016. Distribution system sample pH ranged from 9.5 to 9.7 and alkalinity ranged from 39 to 41 mg/L. No sample results were below DEP limits for this quarter.



# Treated Water – Disinfection Effectiveness

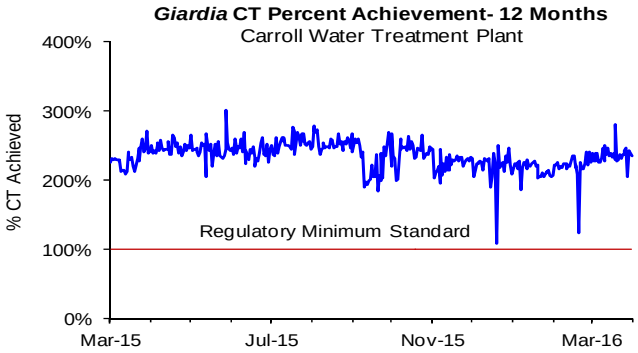
3rd Quarter – FY16

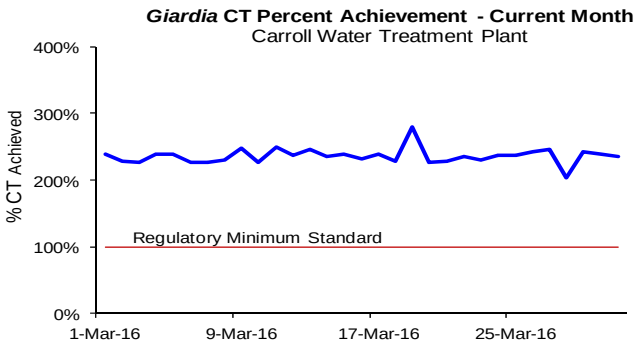
At the Carroll Water Treatment Plant (CWTP), MWRA meets the required 99.9% (3-log) inactivation of *Giardia* using ozone (reported as CT: concentration of disinfectant x contact time) and the required 99% (2-log) inactivation of *Cryptosporidium* using UV (reported as IT: intensity of UV x time). MWRA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

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

## Wachusett Reservoir – MetroWest/Metro Boston Supply:

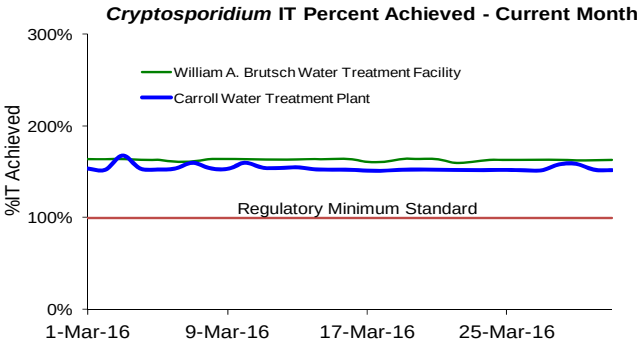
- Ozone dose at the CWTP varied between 1.0 to 1.3 mg/L for the quarter.
- *Giardia* CT was maintained above 100% at all times the plant was providing water into the distribution system this quarter, as well as every day for the last fiscal year.
- *Cryptosporidium* IT was maintained above 100% during the month. Off-spec water was less than 5%.
- A dip to 122% CT Achieved occurred on February 20 at 12:15pm, when Train B was activated upon completion of its winter maintenance. There was no regulatory impact.

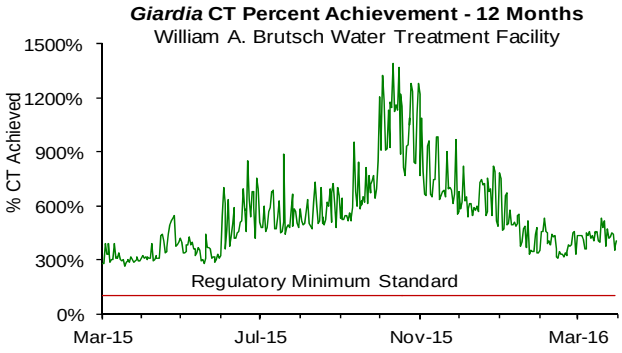


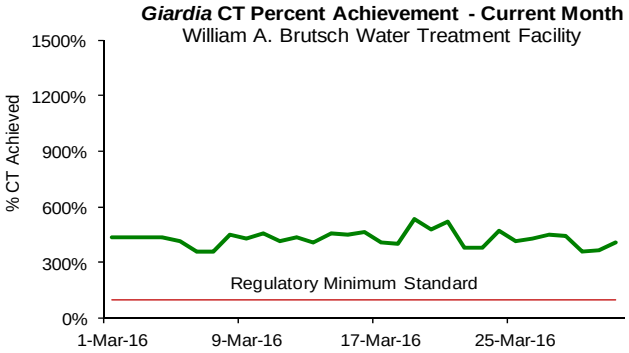




## Quabbin Reservoir (CVA Supply) at: William A. Brutsch Water Treatment Facility

- The chlorine dose at WABWTF is adjusted in order to achieve MWRA's seasonal (June 1 – October 31) target of ≥1.0 mg/L at Ludlow Monitoring Station.
- The chlorine dose at WABWTF ranged from 1.3 to 1.4 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%.



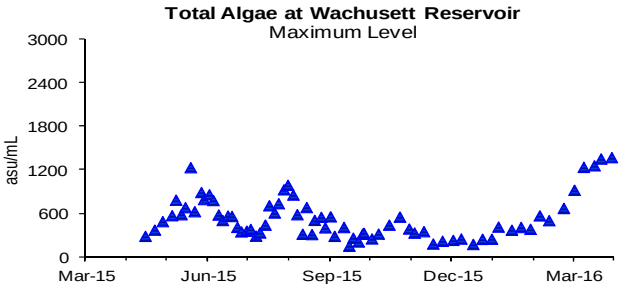
## Source Water - Algae

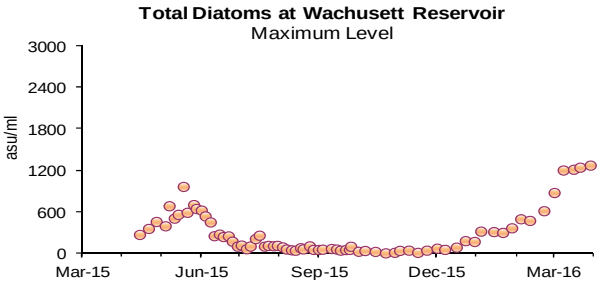
3rd Quarter – FY16

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

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

In the 3rd Quarter, six complaints which may be related to algae were reported from local water departments.




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

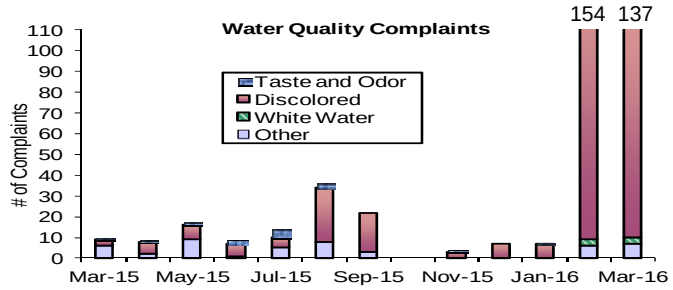
MWRA collects information on water quality complaints that typically fall into four categories: 1.) discoloration due to MWRA or local pipeline work; 2.) taste and odor due to algae blooms in reservoirs or chlorine in the water; 3.) white water caused by changes in pressure or temperature that traps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

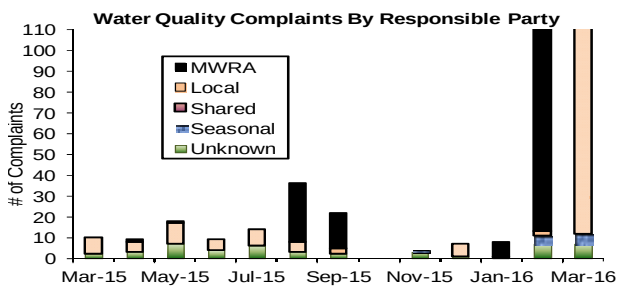
MWRA routinely contacts communities to classify and tabulate water complaints from customers. This count, reflecting only telephone calls to towns, probably captures only a fraction of the total number of customer complaints. Field Operations staff have improved data collection and reporting by keeping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

Communities reported 299 complaints during the quarter compared to 124 complaints for 3rd Quarter of FY15. Of these complaints, 268 were for “discolored water” and 12 were for “taste and odor”, 6 were for “white water”, and 13 were for “other”. Of these complaints, 124 were local community issues, 152 were MWRA related, 9 were seasonal in nature, and 14 were unknown in origin.

•On February 29, one hundred and forty discolored water complaints were reported from Medford when MWRA staff isolated Shaft 9a for a leak repair.

•On March 25, Medford received one hundred discolored water complaints due to a water main break.



# Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program

3rd Quarter – FY16

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 142 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.

The TCR requires that no more than 5% of all samples in a month may be total coliform positive (or that no more than one sample be positive when less than 40 samples are collected each month). Public notification is required if this standard is exceeded.

*Escherichia coli* (*E.coli*) is a specific coliform species whose presence likely indicates potential contamination of fecal origin. If *E.coli* are detected in a drinking water sample, this is considered evidence of a potential public health concern. Public notification is required if follow-up tests confirm the presence of *E.coli* or total coliform.

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 3rd Quarter, five of the 6,216 community samples (0.08% system-wide) submitted to MWRA labs for analysis tested positive for coliform (Brookline - March). One of the 1,943 MWRA samples (0.05%) tested positive for total coliform. No sample tested positive for *E.coli*. Only 1.1% of the samples had any chlorine residuals lower than 0.2 mg/L for the quarter.

| | | | # Coliform Samples (a) | Total Coliform # (%) Positive | E.coli # Positive | Public Notification Required? | Minimum Chlorine Residual (mg/L) | Average Chlorine Residual (mg/L) |
|---|---|---|---|---|---|---|---|---|
| MWRA | | MWRA Locations | 335 | 0 (0%) | 0 | | 2.02 | 2.37 |
| | d | Shared Community/MWRA sites | 1608 | 1 (0.06%) | 0 | No | 0.09 | 2.13 |
| | | *Total: MWRA* | 1943 | 1 (0.05%) | 0 | No | 0.09 | 2.18 |
| Fully Served | | ARLINGTON | 169 | 0 (0%) | 0 | | 0.08 | 1.92 |
| | | BELMONT | 104 | 0 (0%) | 0 | | 0.59 | 2.19 |
| | | BOSTON | 780 | 0 (0%) | 0 | | 1.50 | 2.40 |
| | | BROOKLINE | 237 | 5 (2.11%) | 0 | No | 0.80 | 2.07 |
| | | CHELSEA | 169 | 0 (0%) | 0 | | 1.58 | 2.08 |
| | | DEER ISLAND | 52 | 0 (0%) | 0 | | 1.90 | 2.19 |
| | | EVERETT | 169 | 0 (0%) | 0 | | 0.17 | 1.28 |
| | | FRAMINGHAM | 234 | 0 (0%) | 0 | | 0.60 | 2.22 |
| | | LEXINGTON | 117 | 0 (0%) | 0 | | 0.67 | 2.50 |
| | | LYNNFIELD | 18 | 0 (0%) | 0 | | 0.13 | 1.34 |
| | | MALDEN | 234 | 0 (0%) | 0 | | 0.09 | 2.13 |
| | | MARBLEHEAD | 72 | 0 (0%) | 0 | | 0.44 | 2.07 |
| | | MEDFORD | 221 | 0 (0%) | 0 | | 1.22 | 1.94 |
| | | MELROSE | 117 | 0 (0%) | 0 | | 0.62 | 1.87 |
| | | MILTON | 99 | 0 (0%) | 0 | | 0.50 | 1.93 |
| | | NAHANT | 30 | 0 (0%) | 0 | | 1.38 | 2.01 |
| | | NEWTON | 276 | 0 (0%) | 0 | | 0.38 | 2.08 |
| | | NORTHBOROUGH | 48 | 0 (0%) | 0 | | 0.34 | 2.02 |
| | | NORWOOD | 99 | 0 (0%) | 0 | | 0.06 | 1.99 |
| | | QUINCY | 299 | 0 (0%) | 0 | | 0.14 | 2.19 |
| | | READING | 130 | 0 (0%) | 0 | | 0.29 | 1.87 |
| | | REVERE | 180 | 0 (0%) | 0 | | 1.41 | 2.13 |
| | | SAUGUS | 104 | 0 (0%) | 0 | | 1.32 | 1.86 |
| | | SOMERVILLE | 273 | 0 (0%) | 0 | | 1.28 | 2.32 |
| | | SOUTHBOROUGH | 30 | 0 (0%) | 0 | | 0.05 | 1.95 |
| | | STONEHAM | 91 | 0 (0%) | 0 | | 1.63 | 2.11 |
| | | SWAMPSCOTT | 53 | 0 (0%) | 0 | | 0.54 | 1.83 |
| | | WALTHAM | 216 | 0 (0%) | 0 | | 0.67 | 2.09 |
| | | WATERTOWN | 130 | 0 (0%) | 0 | | 1.55 | 2.16 |
| | | WESTBORO HOSPITAL | 15 | 0 (0%) | 0 | | 0.05 | 0.51 |
| | | WESTON | 48 | 0 (0%) | 0 | | 1.93 | 2.32 |
| | | WINTHROP | 72 | 0 (0%) | 0 | | 1.15 | 2.37 |
| | | *Total: Fully Served* | *4886* | *5 (0.10%)* | | | | |
| CVA&Partially Served | b | BEDFORD | 54 | 0 (0%) | 0 | | 0.34 | 1.79 |
| | | CANTON | 87 | 0 (0%) | 0 | | 0.01 | 1.15 |
| | | HANSCOM AFB | 27 | 0 (0%) | 0 | | 0.36 | 1.65 |
| | | MARLBOROUGH | 126 | 0 (0%) | 0 | | 0.26 | 2.14 |
| | | NEEDHAM | 123 | 0 (0%) | 0 | | 0.13 | 0.81 |
| | | PEABODY | 234 | 0 (0%) | 0 | | 1.23 | 2.07 |
| | | WAKEFIELD | 143 | 0 (0%) | 0 | | 0.49 | 1.49 |
| | | WELLESLEY | 114 | 0 (0%) | 0 | | 0.04 | 0.80 |
| | | WILMINGTON | 85 | 0 (0%) | 0 | | 0.92 | 1.92 |
| | | WINCHESTER | 91 | 0 (0%) | 0 | | 0.16 | 1.48 |
| | | WOBURN | 198 | 0 (0%) | 0 | | 0.15 | 0.92 |
| | c | SOUTH HADLEY FD1 | 48 | 0 (0%) | 0 | | 0.14 | 0.52 |
| | | *Total: CVA & Partially Served* | *1330* | *0 (0%)* | | | | |
| | | *Total: Community Samples* | *6216* | *5 (0.08%)* | | | | |

(a) The number of samples collected depends on the population served and the number of repeat samples required.
(b) These communities are partially supplied, and may mix their chlorinated supply with MWRA chloraminated supply.
(c) Part of the Chicopee Valley Aqueduct System. Free chlorine system.
(d) MWRA total coliform and chlorine residual results include data from 125 community pipe locations as described above. In most cases these community results are accurately indicative of MWRA water as it enters the community system; however, some are clearly strongly influenced by local pipe conditions. Residuals in the MWRA system are typically between 1.0 and 2.8 mg/L.

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

3rd Quarter – FY16

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 running annual average (RAA) standard is 80 µg/L for TTHMs and 60 µg/L for HAA5s. For the MetroBoston system, effective Q2 2013, under the Stage 2 DBP Rule, compliance is based on locational running annual averages (LRAA). Sampling locations have increased from 16 to 32 each quarter.

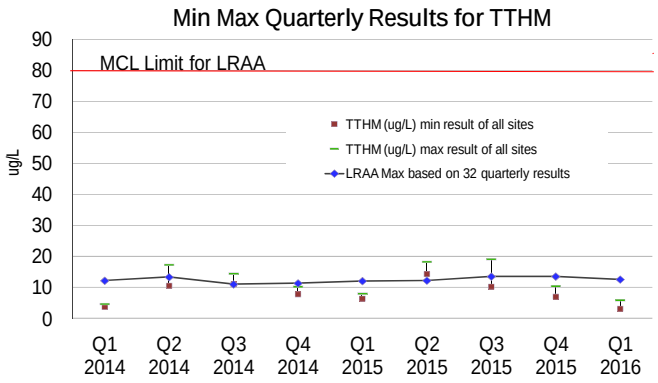
For the CVA communities, effective Q3 2013, under the Stage 2 DBP Rule, compliance is based on a LRAA for each community. Sampling locations have increased from 12 to 14 each quarter. The chart below combines all three CVA communities data.

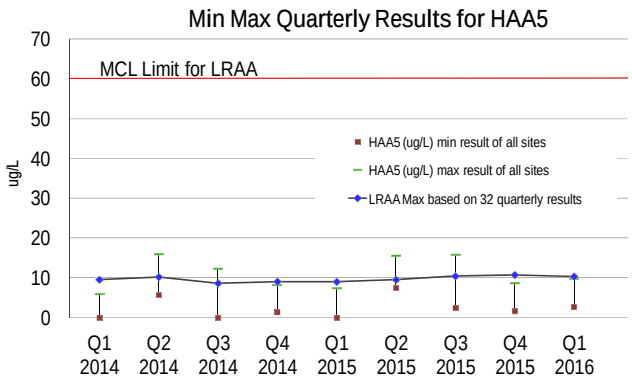
Partially served and CVA communities are responsible for their own compliance monitoring and reporting, and must be contacted directly for their individual results.

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

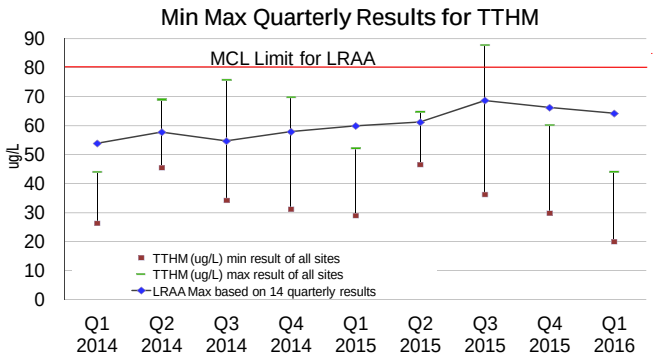
The LRAA for TTHMs and HAA5s for MWRA's Compliance Program (represented as the line in the top two graphs below) remain below current standards. The LRAA for TTHMs = 12.6 ug/L; HAA5s = 10.3 ug/L. The current RAA for Bromate = 0.0 ug/L. CVA's DBP levels continue to be below current standards.

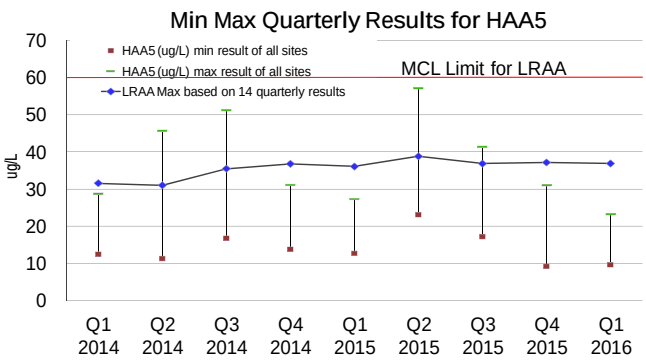
### MetroBoston Disinfection By-Products




### CVA Disinfection By-Products (Combined Results)



# Water Supply and Source Water Management

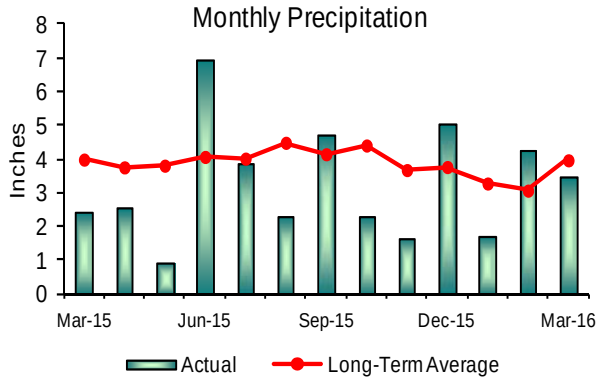
3rd Quarter – FY16

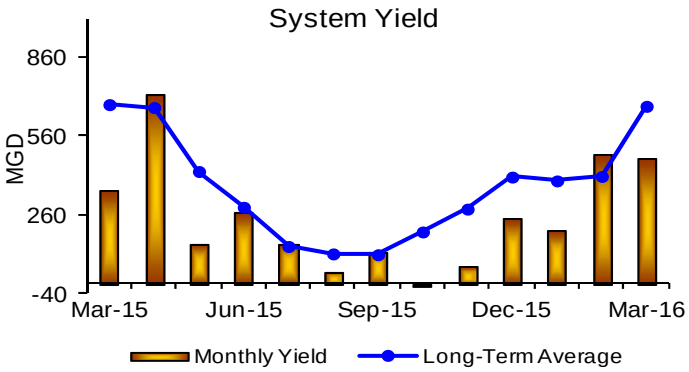
**Background**

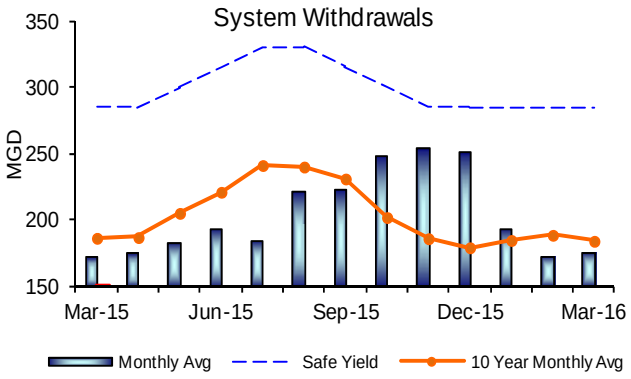
A reliable supply of water in MWRA's reservoirs depends on adequate precipitation during the year and seasonal hydrologic inputs from watersheds that surround the reservoirs. Demand for water typically increases with higher summer temperatures and then decreases as temperatures decline. Quabbin Reservoir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

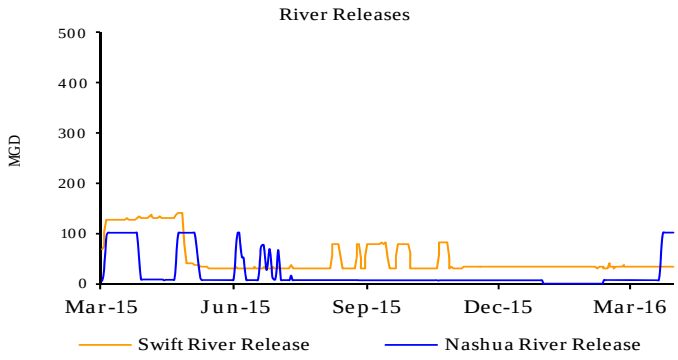
**Outcome**

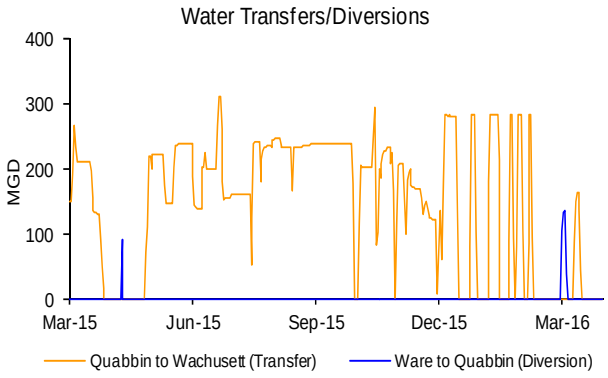
Quabbin Reservoir level remains within the normal operating range for this period of the year. The volume of the Quabbin Reservoir was at 91.6% as of March 31, 2016; a 3.3% increase for the quarter, which represents an increase of more than 13.7 billion gallons of storage. Yield and precipitation for the quarter were below their respective quarterly long term averages. System withdrawal continues to be below its long-term average.

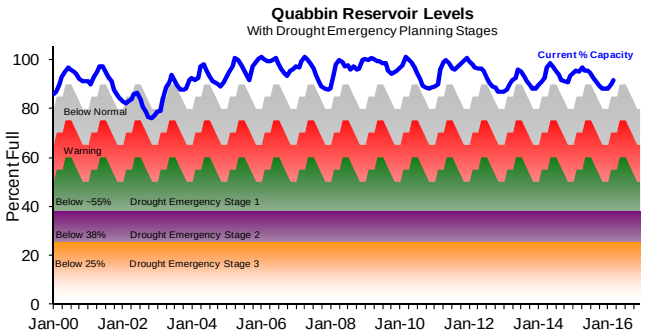


# WASTEWATER QUALITY

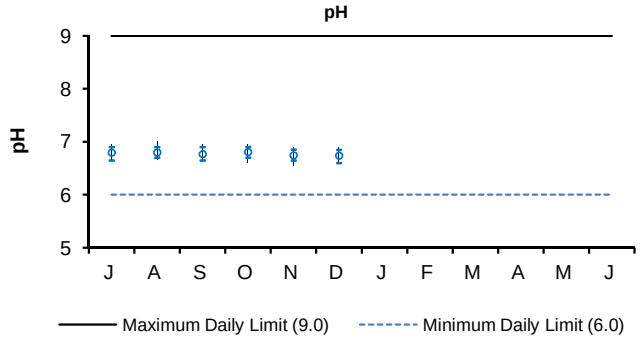
## NPDES Permit Compliance: Deer Island Treatment Plant

3rd Quarter - FY16

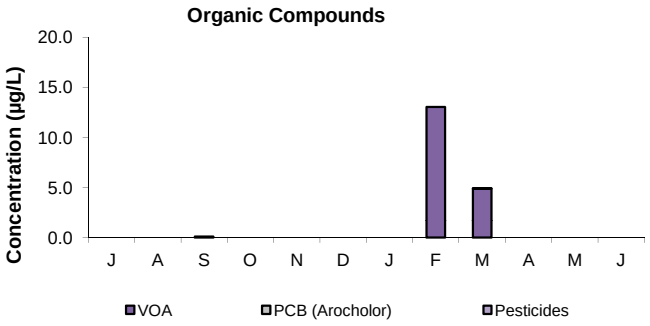
**NPDES Permit Limits**

| *Effluent Characteristics* | | *Units* | *Limits* | *January* | *February* | *March* | *3rd Quarter Violations* | *FY16 YTD Violations* |
|---|---|---|---|---|---|---|---|---|
| Dry Day Flow: | | mgd | 436 | 255.1 | 258.2 | 262.2 | 0 | 0 |
| cBOD: | Monthly Average | mg/L | 25 | 6.1 | 6.9 | 6.9 | 0 | 0 |
| | Weekly Average | mg/L | 40 | 7.7 | 8.1 | 8.0 | 0 | 0 |
| TSS: | Monthly Average | mg/L | 30 | 7.8 | 11.6 | 11.5 | 0 | 0 |
| | Weekly Average | mg/L | 45 | 11.1 | 14.5 | 12.5 | 0 | 0 |
| TCR: | Monthly Average | ug/L | 456 | <40 | <40 | 2 | 0 | 0 |
| | Daily Maximum | ug/L | 631 | <40 | <40 | 67 | 0 | 0 |
| Fecal Coliform: | Daily Geometric Mean | col/100mL | 14000 | 7 | 7 | 7 | 0 | 0 |
| | Weekly Geometric Mean | col/100mL | 14000 | 12 | 13 | 16 | 0 | 0 |
| | % of Samples >14000 | % | 10 | 0 | 0 | 0 | 0 | 0 |
| | Consecutive Samples >14000 | # | 3 | 0 | 0 | 0 | 0 | 0 |
| pH: | | SU | 6.0-9.0 | 6.5-7.1 | 6.6-7.0 | 6.6-7.0 | 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 | 50 | 50 | 100 | 0 | 0 |
| | Inland Silverside | % | ≥1.5 | 100 | 100 | 100 | 0 | 0 |

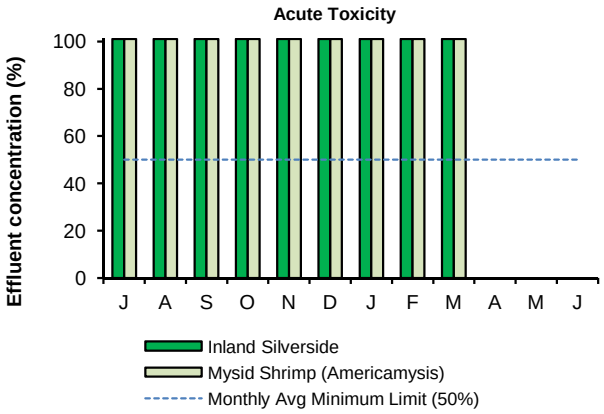
There have been no permit violations in FY16 to date at the Deer Island Treatment Plant.



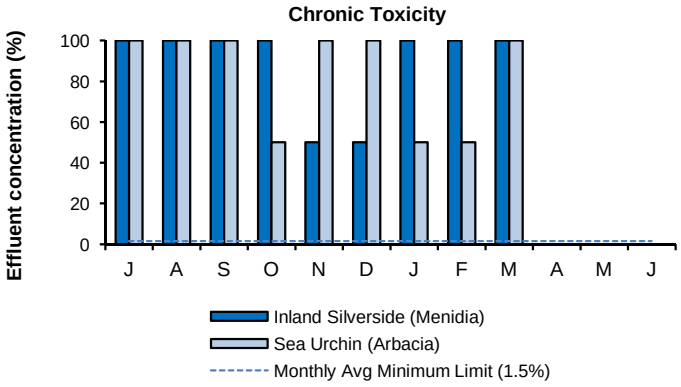

pH is a measure of alkalinity or acidity. Fluctuations in effluent pH are unlikely to impact on marine environments, which have significant buffering capacity. Because of the pure oxygen used in the activated sludge process, effluent pH tends to be at the lower end of the permit-required range. All pH measurements for the 3rd Quarter were within the daily permit limits.




An important wastewater component monitored in the effluent is organic compounds, such as volatile organic acids, pesticides, and polychlorinated biphenyls, which are all sampled monthly. The secondary treatment process significantly reduces organic compounds in the effluent stream. In the 3rd Quarter, some volatile organic compounds were detected in the effluent in February and March. All other organic compounds were below the detection limit for the quarter.




The acute toxicity test simulates the short-term toxic effects of chemicals in wastewater effluent on marine animals. The test measures the concentration (percent) of effluent that kills half the test organisms within four days. The higher the concentration of effluent required, the less toxic the effluent. For permit compliance, the effluent concentration that causes mortality to mysid shrimp and inland silverside must be at least 50%. Acute toxicity permit limits were met for the 3rd Quarter for both the inland silverside and mysid shrimp.




Typically, effects of chronic exposures differ from those of acute exposures. Because of this, chronic toxicity responses are not necessarily related to acute toxicity. The chronic toxicity test simulates the long-term toxic effects of chemicals in wastewater effluent on marine animals. To meet permit limits, a solution of 1.5% effluent and 98.5% dillution water must show no observed effect on the growth and reproduction of the test species. Chronic toxicity permit limits were met for the 3rd Quarter for both the inland silverside and sea urchin.

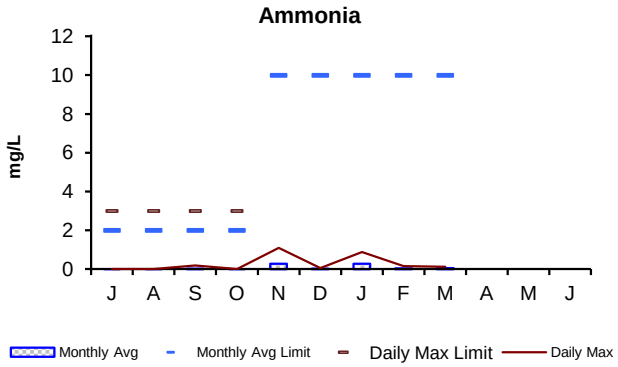
# NPDES Permit Compliance: Clinton Wastewater Treatment Plant

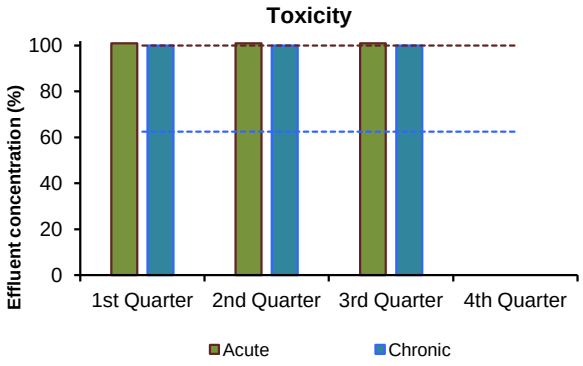
3rd Quarter - FY16

**NPDES Permit Limits**

| *Effluent Characteristics* | | *Units* | *Limits* | *January* | *February* | *March* | *3rd Quarter Violations* | *FY16 YTD Violations* |
|---|---|---|---|---|---|---|---|---|
| Flow: | | mgd | 3.01 | 2.55 | 2.62 | 2.62 | 0 | 0 |
| BOD: | Monthly Average: | mg/L | 20 | 4.1 | 3.0 | 3.1 | 0 | 0 |
| | Weekly Average: | mg/L | 20 | 5.3 | 3.3 | 3.7 | 0 | 0 |
| TSS: | Monthly Average: | mg/L | 20 | 5.0 | 4.0 | 5.3 | 0 | 0 |
| | Weekly Average: | mg/L | 20 | 6.3 | 4.3 | 7.9 | 0 | 0 |
| pH: | | SU | 6.5-8.3 | 6.9-7.5 | 7.0-7.5 | 7.1-7.7 | 0 | 0 |
| Dissolved Oxygen: | Daily Minimum: | mg/L | 6 | 8.0 | 9.8 | 9.6 | 0 | 0 |
| Fecal Coliform: | Daily Geometric Mean: | col/100mL | 400 | 4 | 5 | 4 | 0 | 0 |
| | Monthly Geometric Mean: | col/100mL | 200 | 7 | 3 | 3 | 0 | 0 |
| TCR: | Monthly Average: | ug/L | 50 | 0 | 0.0 | 0.1 | 0 | 0 |
| | Daily Maximum: | ug/L | 50 | 0.0 | 0.0 | 2.5 | 0 | 0 |
| Total Ammonia Nitrogen: | November 1 - March 31 | | | | | | | |
| | Monthly Average: | mg/L | 10.0 | 0.28 | 0.04 | 0.05 | 0 | 0 |
| | Daily Maximum: | mg/L | 35.2 | 0.89 | 0.16 | 0.13 | 0 | 0 |
| Copper: | Monthly Average: | ug/L | 20 | 5.4 | 7.4 | 6.0 | 0 | 0 |
| Phosphorus: | May 1 - Oct 31 | | | | | | | |
| | Monthly Average: | mg/L | 1.0 | -- | -- | -- | 0 | 0 |
| Acute Toxicity: | Daily Minimum: | % | ≥100 | *N/A | *N/A | > 100 | 0 | 0 |
| Chronic Toxicity: | Daily Minimum: | % | ≥62.5 | *N/A | *N/A | 100 | 0 | 0 |

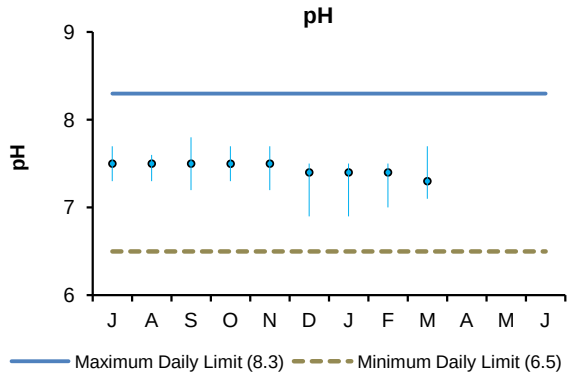
There have been no permit violations in FY16 at the Clinton Treatment Plant.
**3rd Quarter:** There have been no permit violations in the second quarter.
*Toxicity testing at the Clinton Treatment Plant is conducted on a quarterly basis.



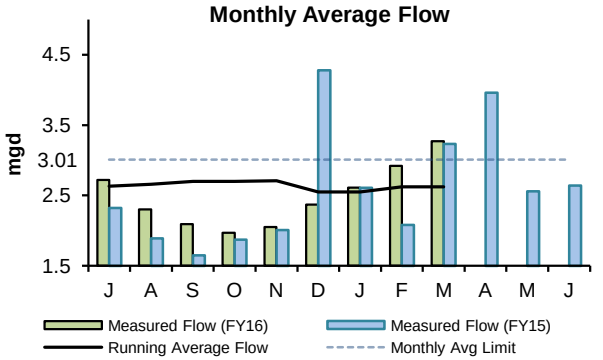




The 3rd Quarter's monthly average and daily maximum concentrations were below the permit limits. The monthly average and daily maximum limits for the 3rd Quarter are 10 mg/L and 35.2 mg/L, respectively. The permit limits are most stringent from June to October when warm weather conditions are most conducive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

Acute and chronic toxicity testing simulates the short- and long-term toxic effects of chemicals in wastewater effluent on aquatic animals. For permit compliance, the effluent concentration that causes mortality to the daphnid in acute and chronic testing must be at least >100% and 62.5%, respectively. Toxicity limits were met during the 3rd Quarter.




pH is a measure of the alkalinity or acidity of the effluent. All daily pH results for the 3rd Quarter were within the range set by the permit.




The graph depicts the running annual average monthly flow, measured in million gallons per day, exiting the plant. February and March high flows did not cause the running annual average to exceed permit limits.

# COMMUNITY FLOWS AND PROGRAMS

# Total Water Use
3rd Quarter - FY16

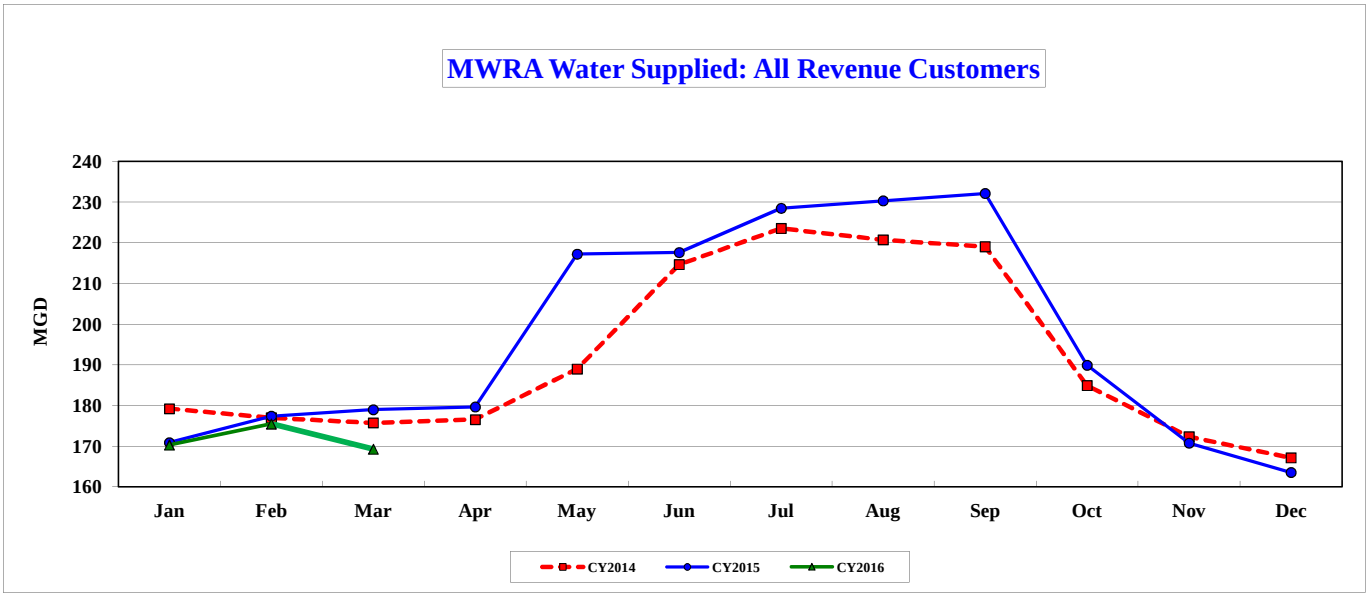
**MWRA**

**Water Supplied: All Revenue Customers**

| YTD CHANGES (CY16 vs. CY15) |
|---|
| Water Supplied |
| **-1.2%** |

| MGD | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | YTD Average | Annual Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CY2014 | 179.212 | 176.987 | 175.736 | 176.536 | 188.974 | 214.660 | 223.544 | 220.734 | 219.049 | 184.918 | 172.333 | 167.145 | 177.322 | 191.729 |
| CY2015 | 170.874 | 177.386 | 178.975 | 179.653 | 217.221 | 217.619 | 228.484 | 230.316 | 232.125 | 189.905 | 170.763 | 163.550 | 175.690 | 196.522 |
| CY2016 | 170.294 | 175.470 | 169.273 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 171.596 | 171.596 |

| MG | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | YTD Total | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CY2014 | 5,555.575 | 4,955.629 | 5,447.807 | 5,296.068 | 5,858.182 | 6,439.790 | 6,929.849 | 6,842.752 | 6,571.479 | 5,732.472 | 5,169.979 | 5,181.506 | 15,959.011 | 69,981.088 |
| CY2015 | 5,297.089 | 4,966.801 | 5,548.216 | 5,389.596 | 6,733.842 | 6,528.559 | 7,082.997 | 7,139.787 | 6,963.760 | 5,887.062 | 5,122.884 | 5,070.040 | 15,812.106 | 71,730.633 |
| CY2016 | 5,279.121 | 5,088.631 | 5,247.463 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 15,615.215 | 15,615.215 |




The March 2016 Community Water Use Report 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 2016 water use will be used to allocate the FY18 water utility rate revenue requirement.

March 2016 water supplied of 169.3 mgd (for revenue generating users) is down 9.7 mgd or 5.4% compared to March 2015. System-wide year to date consumption for CY16 is also lower than CY15 with 171.6 mgd being supplied to MWRA customers **through March**.

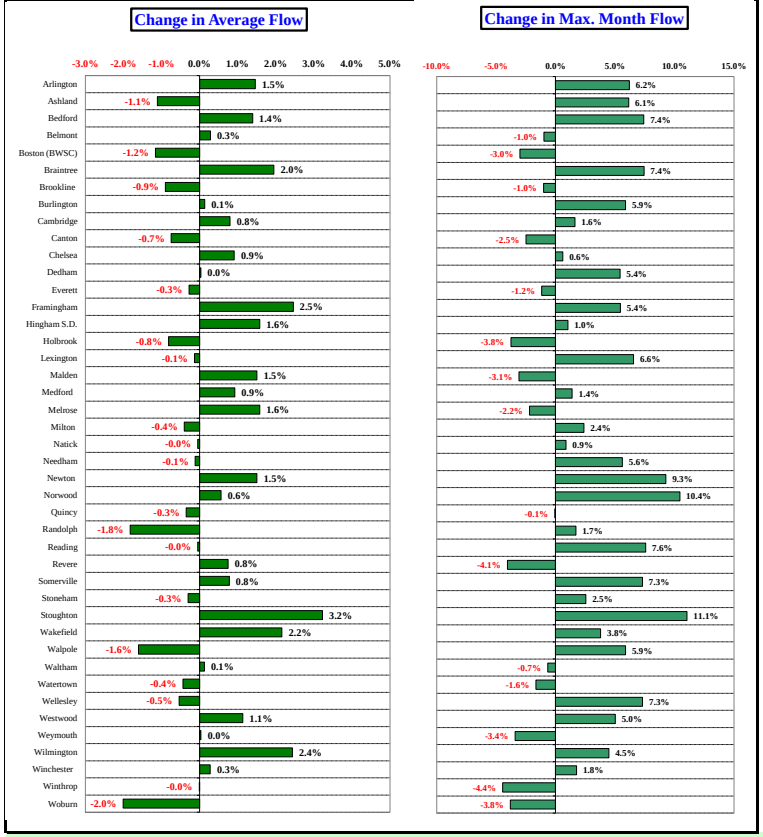
This is 4.1 mgd lower than CY15, and is a decrease of 2.3%.

# Community Wastewater Flows

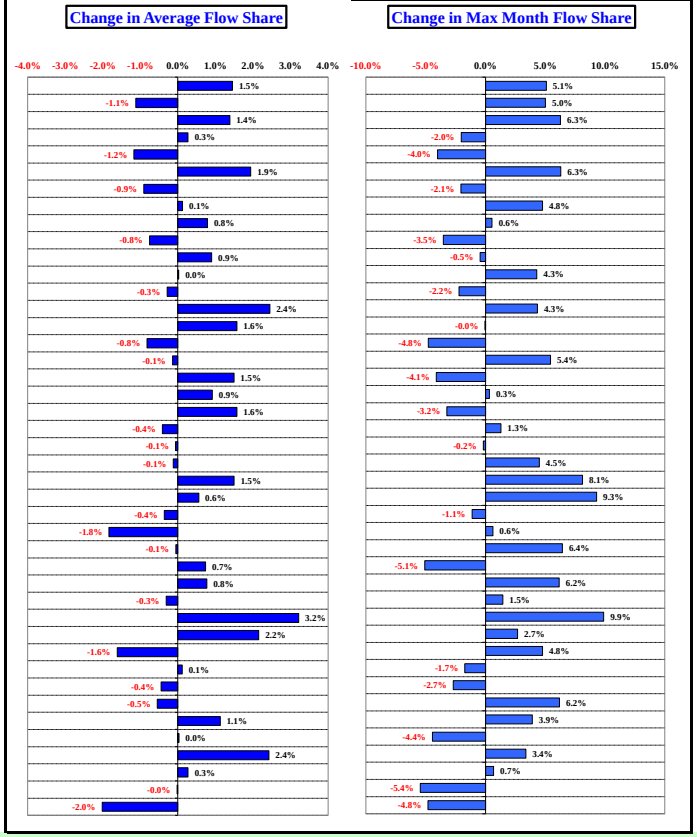
3rd Quarter - FY16

## How Projected CY2016 Community Wastewater Flows Could Effect FY2018 Sewer Assessments [1,2,3]

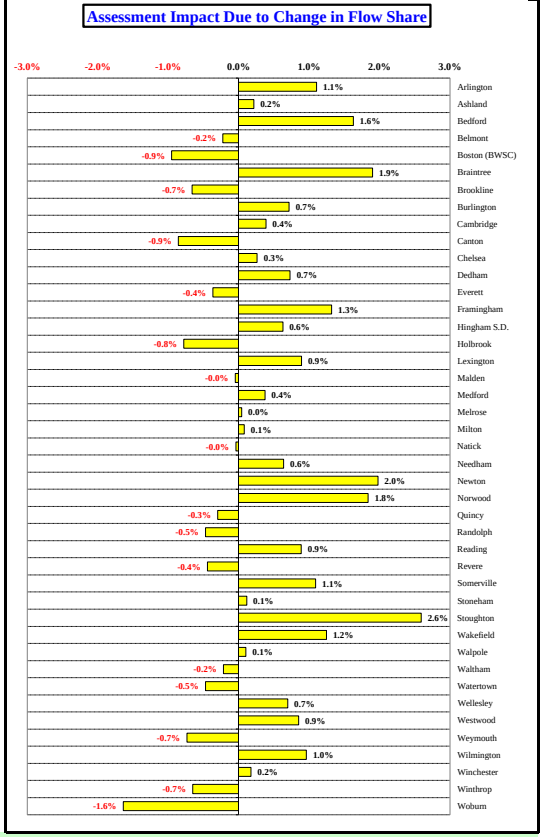
**The flow components of FY2018 sewer assessments will be calculated using a 3-year average of CY2014 to CY2016 wastewater flows compared to FY2017 assessments that will use a 3-year average of CY2013 to CY2015 wastewater flows.**




**But as MWRA's sewer assessments are a ZERO-SUM calculation, a community's assessment is strongly influenced by the RELATIVE change in CY2014 to CY2016 flow share compared to CY2013 to CY2015 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 CY2013 to CY2016 average wastewater flows as of 03/18/16. Flow data is preliminary and subject to change pending additional MWRA and community review.**

[3] **CY2013 to February CY2016 wastewater flows based on actual meter data. March to December 2016 flows based on the average of the prior three years.**

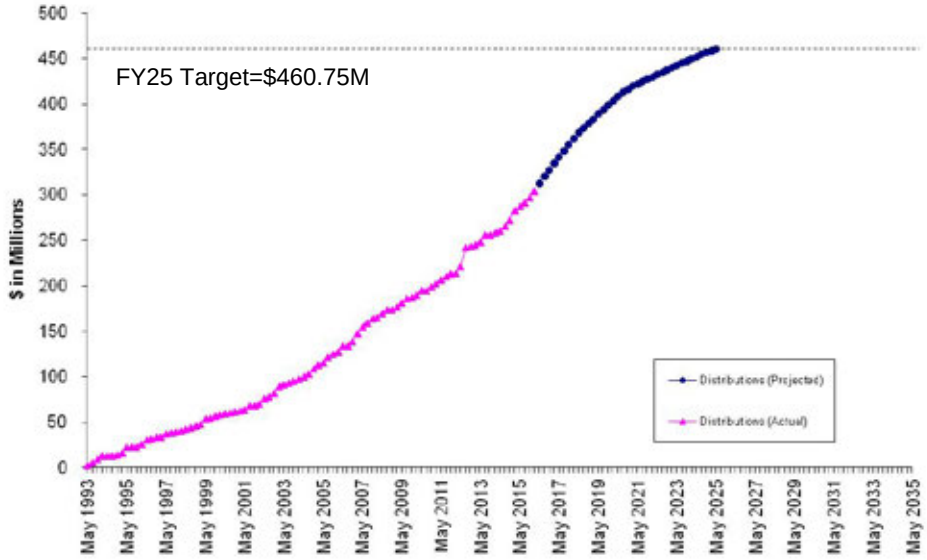
[4] **Represents ONLY the impact on the total BASE assessment resulting from the changes in average and maximum wastewater FLOW SHARES.**

# Community Support Programs
3rd Quarter – FY16

## Infiltration/Inflow Local Financial Assistance Program

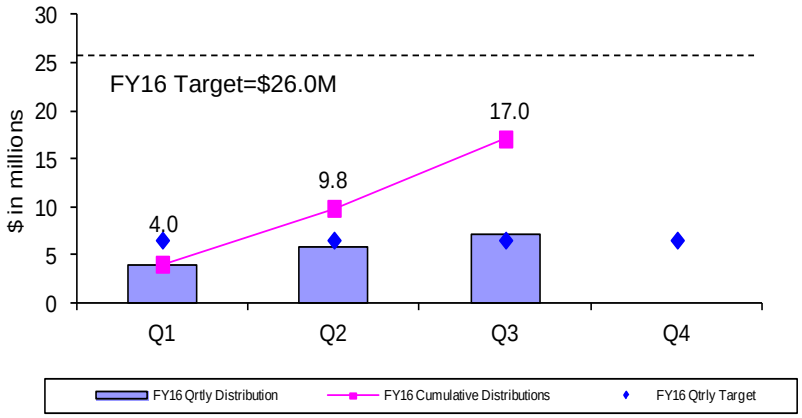
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides $460.75 million in grants and interest-free loans (average of about $14 million per year from FY93 through FY25) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned 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/55% loans with interest-free loans repaid to MWRA over a five-year period. Phase 9 and 10 funds (total $160 million) are distributed as 75% grants and 25% loans with interest-free loans repaid to MWRA over a ten-year period.

### I/I Local Financial Assistance Program Distribution FY93-FY25




During the 3rd Quarter of FY16, $7.2 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Arlington, Braintree, Everett, Hingham, Lexington, Stoughton, Wellesley, Weymouth, Wakefield and Woburn. Total grant/loan distribution for FY16 is $17.0 million. From FY93 through the 3rd Quarter of FY16, all 43 member sewer communities have participated in the program and more than $304 million has been distributed to fund 501 local I/I reduction and sewer system rehabilitation projects. Distribution of the remaining funds has been approved through FY25 and community loan repayments will be made through FY36. All scheduled community loan repayments have been made.

### FY16 Quarterly Distributions of Sewer Grant/Loans

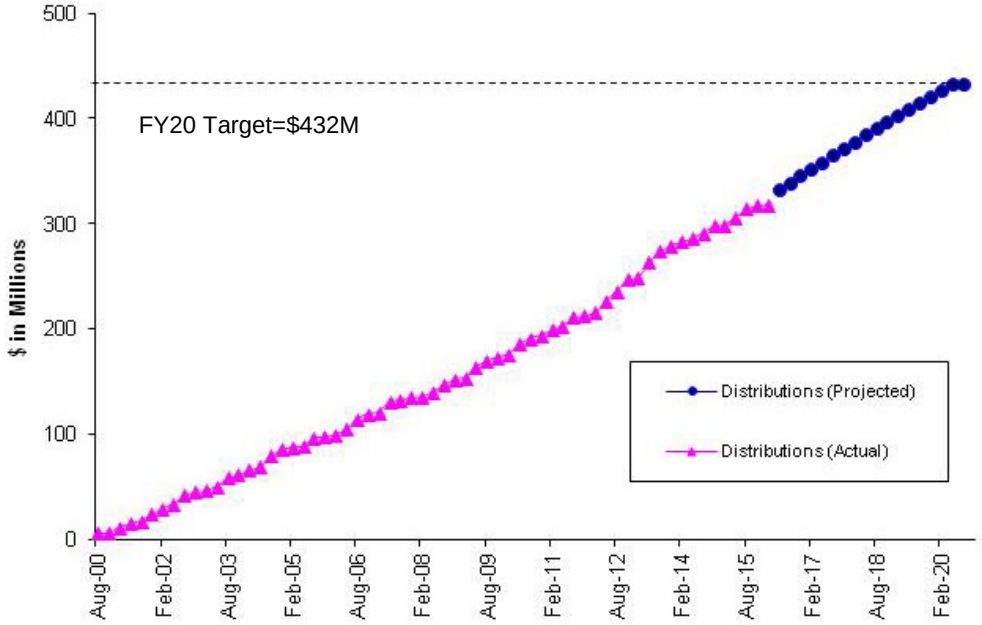


# Community Support Programs
3rd Quarter – FY16

## Water Local Pipeline and Water System Assistance Programs

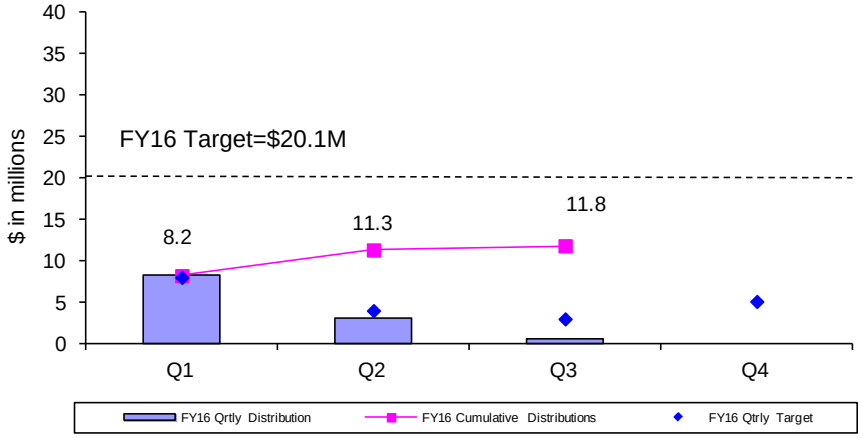
MWRA's Local Pipeline and Water System Assistance Programs (LPAP and LWSAP) provide $432 million in interest-free loans (an average of about $22 million per year from FY01 through FY20) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. 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 - LPAP concluded in FY13 with $222 million in loan distributions. The Phase 2 - LWSAP continues through FY20.

### Local Pipeline and Water System Assistance Programs Distribution FY01-FY20




During the 3rd Quarter of FY16, $0.5 million in interest-free loans was distributed to fund a local water project in Belmont. Total loan distribution for FY16 is $11.8 million. From FY01 through the 3rd Quarter of FY16, more than $317 million has been distributed to fund 360 local water system rehabilitation projects in 38 MWRA member water communities. Distribution of the remaining funds has been approved through FY20 and community loan repayments will be made through FY30. All scheduled community loan repayments have been made.

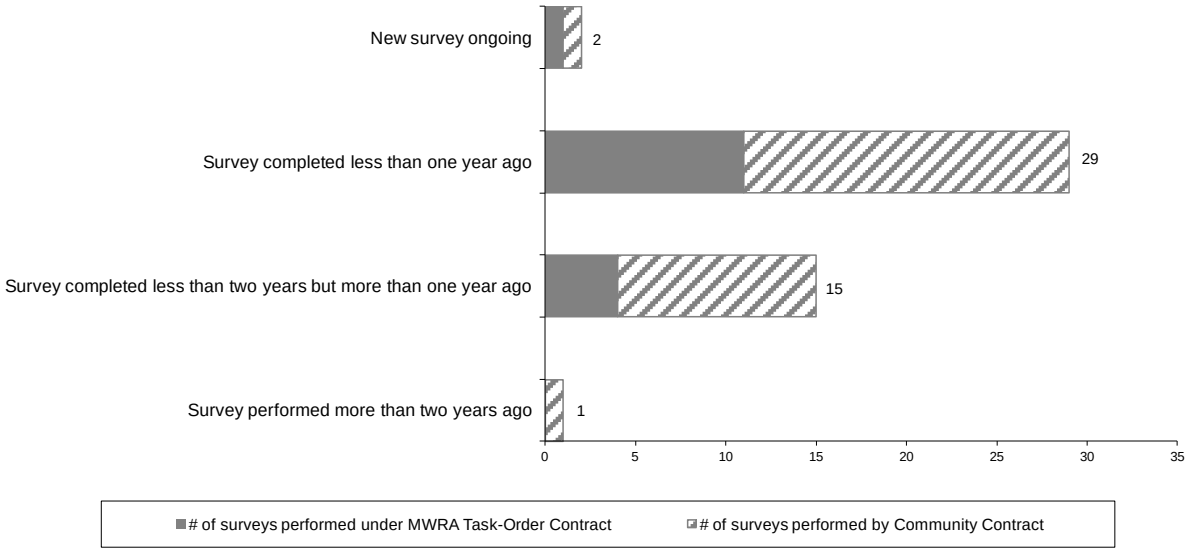
### FY16 Quarterly Distributions of Water Loans



# Community Support Programs
3rd Quarter – FY16

## 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 FY16, only one member water community, Milton, was not 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 210 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 | 1,066 | 19,283 | 104,102 | | 124,451 |
| Low-Flow Fixtures (showerheads and faucet aerators) | 10,000 | 2,924 | 2,210 | 3,158 | | 8,292 |
| Toilet Leak Detection Dye Tablets | ------ | 1,688 | 2,446 | 1,553 | | 5,687 |

# BUSINESS SERVICES

# Procurement: Purchasing and Contracts

3rd Quarter FY16

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

**Outcome:** Processed 89.0% of purchase orders within target; Average Processing Time was 5.02 days vs. 6.00 days in Qtr 3 of FY15. Processed 83% (25 of 30) of contracts within target timeframes; Average Processing Time was 110 days vs. 154 days in Qtr 3 of FY15.

## Purchasing


| | No. | TARGET | PERCENT IN TARGET |
|---|---|---|---|
| $0 - $500 | 1011 | 3 DAYS | 87.9% |
| $500 - $2K | 841 | 7 DAYS | 96.6% |
| $2K - $5K | 368 | 10 DAYS | 92.7% |
| $5K - $10K | 70 | 25 DAYS | 90.9% |
| $10K - $25K | 78 | 30 DAYS | 75.8% |
| $25K - $50K | 14 | 60 DAYS | 66.6% |
| Over $50K | 37 | 90 DAYS | 87.5% |

The Purchasing Unit processed 2419 purchase orders, 14 more than the 2405 processed in Qtr 3 FY16 for a total value of $13,156,591 versus a dollar value of $8,150,857 in Qtr 3 FY15.

The purchase order processing target was not met for the $10K - $25K due to decision to delay outside work until more favorable weather conditions existed and another due to decisions regarding the type of contract for the procurement; the $25k - $50K was due to staff summary requirements.

## Contracts, Change Orders and Amendments

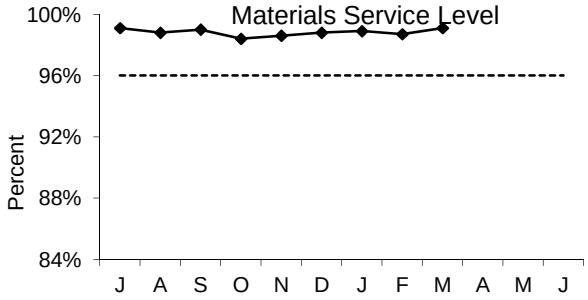
Five contracts were not processed within the target timeframes. One was due to a significant amount of contractor questions, resulting in additional addenda and extensions of the bid opening. Further, the notice to proceed was delayed due to the contractor's delay in responding to the award letter. The second contract was delayed due to changes in contract language necessitated by the Dodd-Frank Wall Street Reform and Consumer Protection Act. For the third contract, certain terms were renegotiated. For the fourth contract, further hazmat testing was required prior to the award of the contract. The final contract was delayed because of a determination of responsibility for the installation of a gasline to the project site.

Procurement processed thirty contracts with a value of $5,727,352 and seven amendments with a value of $145,750. Twenty five change orders were executed during the period. The dollar value of all non-credit change orders during Q3 FY16 was $532,266 and the value of credit change orders was ($642,332).

Staff reviewed 40 proposed change orders and 27 draft change orders.

# Materials Management

3rd Quarter, FY16




The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 8,376 (98.9%) of the 8,471 items requested in Q3 from the inventory locations for a total dollar value of $1,187,878.

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 FY16 goal is to reduce consumable inventory from the July '15 base level ($7.6 million) by 2.0% (approximately $154,371), to $7.5 million by June 30, 2016 (see chart below).

Items added to inventory this quarter include:

- Deer Island – fan motor, air filters, and butterfly valve for HVAC; pulley bushings, electronic module, stainless steel couplingsand ballasts for Residuals; pressure switch and actuators for I&C; hex and allen head screws for Liquid Train; washers, nuts and level switches for Power & Pump.
- Chelsea – pressure switches, batteries, filters, tie rods, and inverter connectors for Fleet Services; marine antifreeze, 3 Volt battery, couplings, enclosure cabinet, emergency lighting bracket and sump pump for Work Order Coordination Group; latex gloves for Engineering and Construction; manhole and covers, diamond blades and test stations for Pipeline; switches, meters, light fixtures, security keys and fire extinguishers for Wastewater Operations; spirals seals for Maintenance.
- Southboro – boot studs, boot trekkers and propane tank for Facilities Maintenance; UPS replacement battery for Quality Assurance.

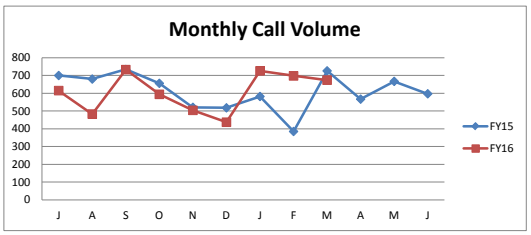
Property Pass Program:

- Seventeen audits were conducted during Q3.
- Numerous obsolete projectors, laptops, keyboards, printers and monitors have been received into Property Pass as surplus. Disposition is being handled as part of our ongoing recycling efforts.
- Scrap revenue received for Q3 amounted to $11,904. Year to date revenue received amounted to $25,097.
- Revenue received from online auctions held during Q3 amounted to $25,680. Year to date revenue received amounted to $196,131.

| **Items** | Base Value July-15 | Current Value w/o Cumulative New Adds | Reduction / Increase To Base |
|---|---|---|---|
| Consumable Inventory Value | 7,663,973 | 7,860,900 | -50,531 |
| Spare Parts Inventory Value | 8,263,059 | 8,393,542 | -218,012 |
| Total Inventory Value | 15,927,032 | 16,254,442 | -268,543 |

**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.

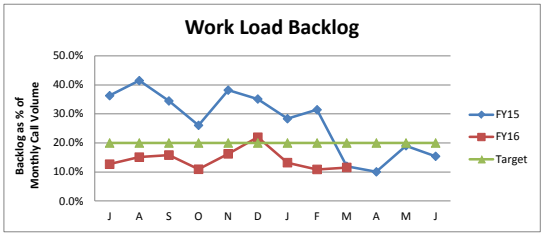
# MIS Program
3rd Quarter FY16

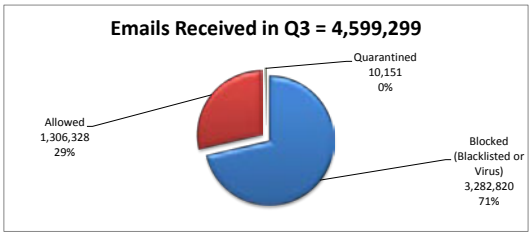



**Performance and Backlog**

Call Volume: Peaked in January. FY16-Q3 call volume increased by 24% from FY15-Q2 last year.

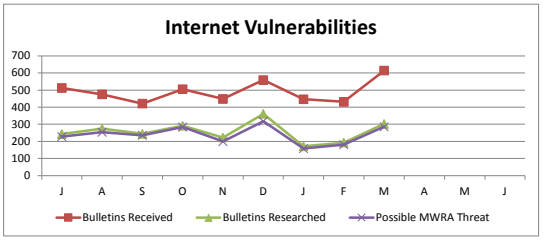
Call Backlog: Peaked in January. FY16-Q3 backlog average is 8% below the targeted benchmark of 20%.




**Information Security**

During Q3, pushed security fixes/updates to desktops/ servers to protect against 101 vulnerabilities. LANDesk Antivirus quarantined 11 distinct viruses from 13 PCs. PCs are current with anti-virus providers' signatures for all known malware.




## Infrastructure:

Citrix Mobile Application Design and Development: Device Migration to XenMobile10 is 80% complete. 21 applications are being delivered through Citrix Receiver. Sharefile pilot started and initial feedback is positive. Creating support documentation and Brown Bag session scripts for Citrix Receiver and Sharefile. Sharefile job aid is complete and quick reference card is being developed. Exchange has been migrated to new Netscalers.

## Applications/Training/Records Center:

Lawson /Maximo: Reviewed the Maximo/Lawson interface design document developed by the Maximo upgrade consultant; reviewed the reporting requirements and then developed and posted a Statement of Work for the Infor/Lawson development effort. Infor Process Automation (IPA) application will be used for automating the Lawson side of the Maximo interface and software installation, and configuration activities are complete, and staff training is underway to support the upcoming development efforts.

Lawson Support: Processed and printed the W2s and 1099s. Reformatted and loaded annual health insurance buy-out file for Payroll. Because of the change in the bank used for the Purchase Card program, staff ran numerous tests to pass data between the MWRA and the Bank of America (BOA). Staff manually downloaded new BOA-posted files from their Business-to-Business (B2B) portal and validated data. Automation of this process is now underway.

Everbridge Mass Communication and Notification Subscription System: Ran Employee Notifications training classes and went live with this module in January. Worked with a designated user to set up the EOC Everbridge account. The Community Contacts module went live in February – no training was required; job aids were sufficient. Updated all the user profiles and sent out final instructions to staff.

Amicus Attorney Upgrade: Successfully upgraded the Legal Case Management application to the 2015 version. The upgrade included installation of software on a new virtual server and on staff PCs.

Talent Acquisition Application (LTA): Attended several webex sessions with HR department for both the Job Application and Onboarding/Hiring processes. Staff continued to make template and configuration changes based on business decisions. Held dedicated meetings with staff from HR and AACU that focused on reports, including gap analysis and custom reporting needs, and began initial programming of them. Conducted workshops with members of HR concentrating on requisition approval through applicant selection workflow, identification of the most common job openings, and establishing the library of job templates (hands on). Successfully tested a process allowing Senior Management to approve job requisitions by email rather than logging into ApplicantPro.

Portia: Began implementation of the Portia application upgrade used by Treasury to manage investments. Met with the Portia consultant and key users to review implementation requirements for the Cash Management and Automated Import Modules to ensure requirements are complete; the modules are activated. Q4 focus will be on the Cash Management and AIIM Modules which replace the AdvanteGard's Treasury WorkStation (TWS), formerly XRT Cash and Debt Management application.

Telog: Downloaded daily flow data to SQL database from Oracle. Compiled monthly and yearly water consumption totals by community. Uploaded the new community mailing list to SQL database and uploaded the user verified maximum flow week spreadsheet. After user approval, used the web application to create and send the 2015 annual water consumption reports in PDF format for 47 communities.

Records Management System Replacement Project: Staff reviewed consolidation requirements from twelve Access databases into a new system with E&C staff. The following items were identified: (1) Reserve a set of consecutive numbers for accession numbers, on a project basis, to identify the physical locations of the drawings. (2) Implement the Infostar replacement in three phases: a) Marlboro Boxed Records Phase (MWRA, DI, Walnut Hill, and MetroWest); b) DI TIC Active Physical Records Management Phase; and c) Physical Drawings phase. Use cases to be developed including two for Phase 1 (box level, folder level) and one for each part of Phase 2. Because different departments use InfoStar for different purposes, a single solution may not be appropriate to meet all users' requirements.

Library Systems Consolidation Project: Data migration efforts continue. The focus has been on identifying and downloading official Library of Congress catalog records for our books and artifacts using automated processes as much as possible. Water Research Foundation (WRF) provided abstracts and links to enhance retrieval of the 700+ or their reports that we include in our new catalog. Continued refining Periodicals, Reports, and Subscriptions data for the final import. Completed the physical move of the MWRA reports and the relocation of legal reference materials.

Maximo Upgrade Project: Approved Maximo Calibration Solution, PI Interface, Asset/Work Management, Maximo/Lawson Interface design documents. Created data migration environment which allows contractor (TRM) to start data consolidation. Started work on Maximo data migration.

Library & Records Center: The Library fulfilled 49 (130 YTD) research requests, cataloged 42 (249 YTD) books and Reports, provided 282 (693 YTD) periodicals, standards, books & reports, supported 69 (553 YTD) staff online searches [i.e. Gale, ASCE]. Research topics included the Sudbury 'Black Lagoon', methane from anaerobic digestion, articles on ozonation and cyanobacteria. The Records Center added 24 (201 YTD) boxes, and attended 2 Records Conservation Board Meetings. Over the last 6 months, our Metropolitan Water Works collection on the Digital Commonwealth had 3 photos in the top 10 of contributor's items visited.

IT Training: For the quarter, 191 staff attended 35 classes. 32% of the workforce has attended at least one class year-to-date. Training classes were held for IBM SmartCloud Control Desk, Requirements Development, Documentation and Management, Lawson Time Entry, and Everbridge Dispatcher training. Additionally, Timesheet Adjustment training was held in Chelsea, Charlestown, Deer Island, and Southborough to support the rollout of the new MIS Timesheet Adjustments application. Job aids were developed for Requisitioning Non-Stock Items, Using ShareFile on the PC (including a Quick Reference Card), and the new Bank of America Works Account.

# Legal Matters
## 3rd Quarter - FY16

## PROJECT ASSISTANCE

COURT AND ADMINISTRATIVE ORDER

- **Boston Harbor Litigation and CSO:** Presented MWRA's final CSO Annual Progress Report to Judge Stearns in a formal court appearance attended by most of the court parties.

- **NPDES:** Reviewed EPA's draft guidelines for the General MS4 NPDES Permit.

REAL ESTATE, CONTRACT AND OTHER SUPPORT

- **Chelsea Headworks:** Recorded Deed at Suffolk County Registry of Deeds conveying Congress Avenue Extension in Chelsea from the City of Chelsea to MWRA for build out of MWRA's Chelsea Headwork's facility.

- **Public Access:** Finalized an Amendment to the 8(m) permit for Wellesley Country Club. Drafted 8(m) permits for Pine Brook Country Club in Weston for use of land taken for the Weston Aqueduct, and 8(m) permits for Babson College and Franklin W. Olin College of Engineering for use of portions of the Sudbury Aqueduct in Needham, MA.

- **Contract 7471 – Northern Intermediate High Pipeline Section 110 Reading/Woburn:** Finalized license from the Town of Reading to MWRA for the use of Leach Park as a lay down area.

- **NGRID:** Reviewed and provided comments on the contract terms for NGRID to provide gas service for the Clinton Treatment plant.

- **Watershed Acquisition:** Reviewed the documents for the acquisition of a watershed parcel in Sterling MA, No. W-000493 and two (2) watershed parcels in West Boylston, MA, Nos. W-1160 and W-1164.

- **Order of Conditions:** Recorded Order of Conditions (MADEP File 297-0380) for MWRA Contract 7478 – Northern Intermediate High Pipeline, Order of Conditions (MADEP File 212-1132) for MWRA Contract 7157 - Wachusett Aqueduct Pump Station in Marlborough, MA., Order of Conditions for DEP File Nos. 006-1453 for Contract No. 6453 - Southern Extra High Pipeline Section 111; Recorded Certificates of Compliance for Orders of Conditions DEP File No. 337-0961 for Contract No. 6975 - Hultman Aqueduct Interconnections and for Orders of Conditions DEP File No. 337 1068 for Contract No. 6975 - Shaft 5 Water Main Break Restoration at Middlesex South Registry of Deeds.

- **NSTAR/HEEC:** Drafted and filed Pre-Filed Direct Testimony in the Harbor Electric Energy Company Rate Tariff proceeding at the Department of Public Utilities, D.P.U. 15-157.

- **Cross Harbor Cable:** Reviewed a draft Stipulation and Order from the U.S. Attorney's Office regarding the potential resolution of NSTAR/HEEC's failure to site the cable at the proper Permit depth.

- **Contractor Claims:** Reviewed and provided a recommendation on one (1) construction contractor claim, under Contract No. 7398, "Cryogenic Chillers Replacement DITP".

MISCELLANEOUS

- Reviewed and approved fifty-seven (57) Section 8(m) Permits and one (1) Direct Connect Permit; investigated past purchases by MWRA of liquid aluminum sulfate re: class action suits asserting price fixing, bid rigging and monopolization.

## LABOR, EMPLOYMENT AND ADMINISTRATIVE

**New Matters**

Four demands for arbitration were filed.

A Charge was filed at the Massachusetts Commission Against Discrimination alleging that the MWRA retaliated against an employee.

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

A Charge was filed at the Equal Employment Opportunity Commission alleging that the MWRA discriminated against an employee on the basis of age.

**Matters Concluded**

Received an arbitrator's decision in favor of MWRA finding that the MWRA did not violate a collective bargaining agreement when it terminated an employee.

Received an arbitrator's decision in favor of MWRA finding that the MWRA did not violate a collective bargaining agreement when it suspended an employee for two days.

Received an arbitrator's decision in favor of a Union finding that the MWRA did violate a collective bargaining agreement when it denied grievants first refusal for overtime opportunities.

Settled a charge of discrimination filed against the MWRA at the MCAD.

## LITIGATION/TRAC

**New Matters**

**TG v. (Current Employee):** This is a Wage Garnishment matter that was received on March 18, 2016 regarding an Order of Withholding From Earnings from Texas Guaranteed Student Loan Corporation for payment of defaulted student loans in the amount of $299,012.31 for current MWRA employee.

**Significant Claim Not in Court**

**HEEC Tariff Petition to Mass Dept of Public Utilities:** Harbor Electric Energy Company (HEEC) filed a request for a tariff approval with the MA Department of Public Utilities concerning the costs of service payable by MWRA associated with the cross-harbor cable. The tariff proposed by HEEC could include the costs to protect the cable from Massport's upcoming harbor dredging project. (Petition of Harbor Electric Energy Co.; DPU 15-157)

**Significant Developments**

Daniel O'Connell's Sons v. MWRA v. Allied-Locke: Deposed key witness Mike Humcke and completed designation of five expert witnesses for MWRA's case. Completed supplemental expert disclosure

MWRA v. HEEC and NSTAR: Completed opposition to defendants' motion to dismiss Complaint; Discussion with Army Corps. legal counsel re: no permittee role for MWRA in next permit for dredging project and cable protection. Completed pre-filed testimony of John Navoy and Robert Mudge.

Antonio Rosa Claim: Prepared settlement proposal.

**Matters Concluded**

No matters have been concluded.

**Subpoenas**

During the Third Quarter of FY 2016, no new subpoenas were received and no subpoenas were pending at the end of the Third Quarter FY 2016.

**Public Records**

During the Third Quarter of FY 2016, thirteen public records requests were received and six public records requests were closed.

**SUMMARY OF PENDING LITIGATION MATTERS**

| TYPE OF CASE/MATTER | As of April 2016 | As of Dec 2015 | As of Sept 2015 |
|---|---|---|---|
| Construction/Contract/Bid Protest (other than BHP) | 5 | 5 | 5 |
| Tort/Labor/Employment | 2 | 2 | 3 |
| Environmental/Regulatory/Other | 2 | 1 | 1 |
| Eminent Domain/Real Estate | 0 | 0 | 0 |
| **total – all defensive cases** | **9** | **8** | **9** |
| Affirmative cases not in suit: | 0 | 0 | 0 |
| Other Litigation matters (restraining orders, etc.)<br>MWRA v. Thomas Mercer<br>MWRA v. NSTAR and HEEC | 2 | 2 | 1 |
| **total – all pending lawsuits** | **11** | **10** | **10** |
| Significant claims not in suit:<br>Rosa, Antonio<br>Poli, Mark | 2 | 2 | 4 |
| Bankruptcy | 2 | 2 | 1 |
| Wage Garnishment | 14 | 13 | 13 |
| TRAC/Adjudicatory Appeals | 3 | 3 | 2 |
| Subpoenas | 0 | 0 | 0 |
| **TOTAL – ALL LITIGATION MATTERS** | **32** | **30** | **30** |

## TRAC/MISC.

**New Appeals** There was one new TRAC appeal received in the 3rd Quarter FY 2016.

Nova Biomedical Corp.; MWRA Docket No. 16-01

**Settlement by Agreement of Parties** No cases were **s**ettled by Agreement of Parties in the 3rd Quarter FY 2016.

**Stipulation of Dismissal** No cases were dismissed by Stipulation of Dismissal, fine waived.

**Notice of Dismissal Fine paid in full** No cases were dismissed by Joint Stipulation of Dismissal with Prejudice, fine paid in full.

**Tentative Decisions** One Tentative Decisions was issued in the 3rd Quarter FY 2016.

School of the Museum of Fine Arts; MWRA Docket No. 15-01

**Final Decisions** No Final Decisions were issued during the 3rd Quarter FY 2016.

# INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES
# 3rd Quarter - FY16

## Highlights

During the 3rd quarter, Internal Audit (IA) prepared analyses and issued reports on overtime and sick time. In conjunction with the Office of Emergency Preparedness, IA conducted a review of the security system alarms resulting in 3 recommendations which have been implemented or are in the process of being implemented. Management advisory services included a financial review, contract pricing and an analysis of the Chelsea facility real estate taxes over the years.

IA completed two incurred cost audits including CDM, where the refund has already been received.

At the request of the Law Division, IA audited a construction litigation claim and recommended substantial reductions to the costs claimed. IA also performed three construction labor burden reviews resulting in large reductions to the rates.

## Status of Recommendations

There were 46 recommendations made in FY16. A total of 42 recommendations were closed from prior and current fiscal years.

IA follows-up on open recommendations on a continuous basis. All open recommendations have target dates for implementation. When a recommendation has not been acted on within 48 months, the appropriateness of the recommendation is re-evaluated during a subsequent audit. On closed assignments 98% of recommendations have been implemented.

| Report Title (date) | Audit Recommendations | | |
|---|---|---|---|
| | Total | Closed | Open |
| Physical Security at the Chelsea Facility (12/31/12) | 32 | 30 | **2** |
| Hardware Equipment Management (5/22/13) | 36 | 27 | **9** |
| Follow-Up Report on Fleet Services Activities (12/31/13) | 17 | 13 | **4** |
| Expanded Affirmative Action Requirements (9/30/14) | 16 | 15 | **1** |
| 8(m) Permit Fee (11/17/14) | 6 | 4 | **2** |
| Records Management (12/5/14) | 8 | 6 | **2** |
| AVL Tracking System, Contract A586 (4/22/15) | 5 | 1 | **4** |
| Unmatched Receipts and Accruals (6/30/15) | 10 | 5 | **5** |
| Halon Inspections at DITP (9/30/15) & Caruso and DeLauri (12/31/15) | 18 | 13 | **5** |
| Warehouse Cycle Counts: DITP (11/5/15),Southborough (11/6/15),and Chelsea (12/4/15) | 25 | 16 | **9** |
| Security System Alarms (3/3/16) | 3 | 1 | **2** |
| **Total Recommendations** | **176** | **131** | **45** |

### Cost Savings

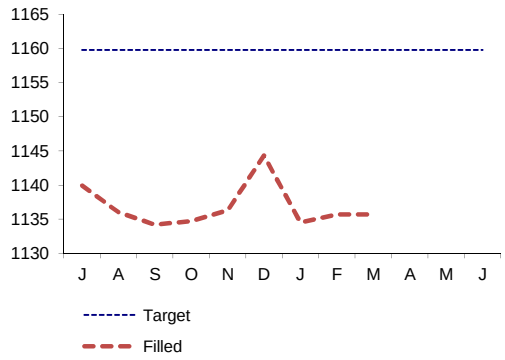
IA's target is to achieve at least $1 million in cost savings each year. Cost savings vary each year based upon many factors. In some cases, cost savings for one year may be the result of work in prior years.

| Cost Savings | FY12 | FY13 | FY14 | FY15 | FY16, Q3 | TOTAL |
|---|---|---|---|---|---|---|
| Consultants | $259,245 | $587,314 | $294,225 | $87,605 | $86,120 | $1,314,509 |
| Contractors & Vendors | $435,760 | $2,153,688 | $415,931 | $1,146,742 | $1,523,064 | $5,675,185 |
| Internal Audits | $407,350 | $391,083 | $923,370 | $543,471 | $37,500 | $2,302,774 |
| **Total** | **$1,102,355** | **$3,132,085** | **$1,633,526** | **$1,777,818** | **$1,646,684** | **$9,292,468** |

# OTHER MANAGEMENT

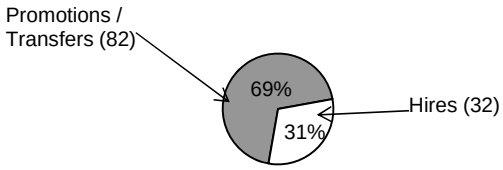
# Workforce Management
3rd Quarter FY16

**FTE Tracking**



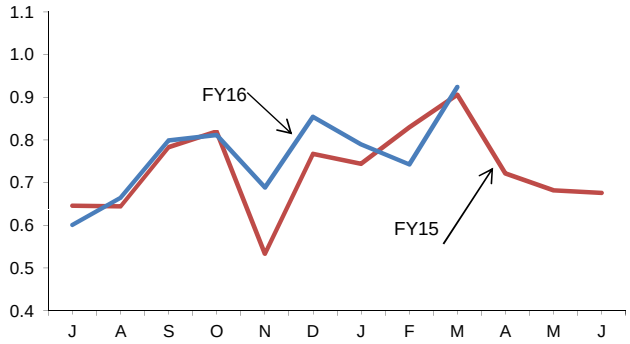

FY16 Target for FTE's = 1159.8
FTE's as of March 2016 = 1135.7

**Positions Filled by Hires/Promotions**
FY16-YTD




| | Pr/Trns | Hires | Total |
|---|---|---|---|
| FY13 | 82 (64%) | 47 (36%) | 129 |
| FY14 | 111 (69%) | 51 (31%) | 162 |
| FY15 | 133 (67%) | 65 (33%) | 198 |
| FY16 | 82 (69%) | 32 (31%) | 118 |

**Average Monthly Sick Leave Usage**
Per Employee



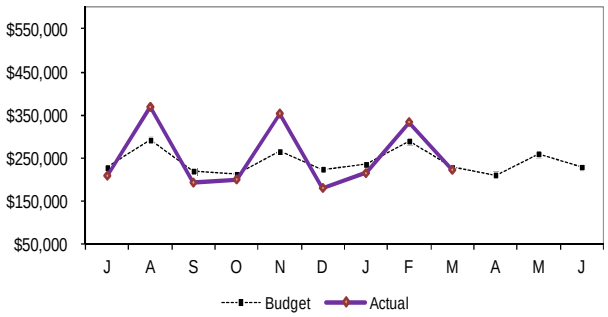

Average monthly sick leave for the 3rd Quarter of FY16 decreased as compared to the 3rd Quarter of FY15 (9.92 to 9.83 days).

In Q3 of FY16, the average quarterly sick leave usage has decreased 0.91% from the same time last year.

| | Number of Employees | YTD | Annualized Total | Annual FMLA % | FY15 |
|---|---|---|---|---|---|
| Admin | 137 | 6.55 | 8.73 | 18.9% | 9.61 |
| Aff. Action | 6 | 6.09 | 8.12 | 0.0% | 16.89 |
| Executive | 5 | 11.17 | 14.90 | 82.5% | 7.20 |
| Finance | 35 | 7.70 | 3.78 | 34.2% | 5.56 |
| Int. Audit | 7 | 2.84 | 3.78 | 18.7% | 5.56 |
| Law | 15 | 8.90 | 11.87 | 29.3% | 11.30 |
| OEP | 5 | 4.41 | 5.88 | 0.0% | 13.28 |
| Operations | 932 | 6.89 | 9.19 | 18.0% | 8.53 |
| Pub. Affs. | 14 | 6.70 | 8.93 | 30.1% | 7.26 |
| **MWRA Avg** | **1156** | **6.88** | **9.17** | **19.2%** | **8.75** |

Percent of sick leave usage for FY16, attributable to Family and Medical Leave Act (FMLA) is 19.2% .

**Field Operations**
**Current Month Overtime $**

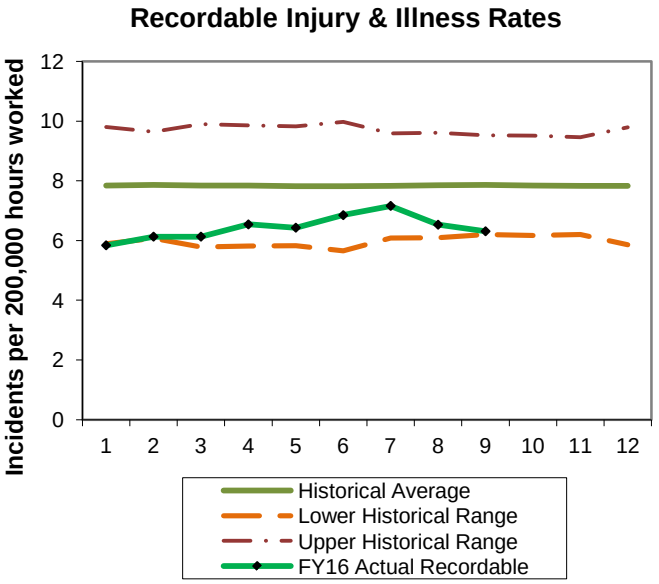


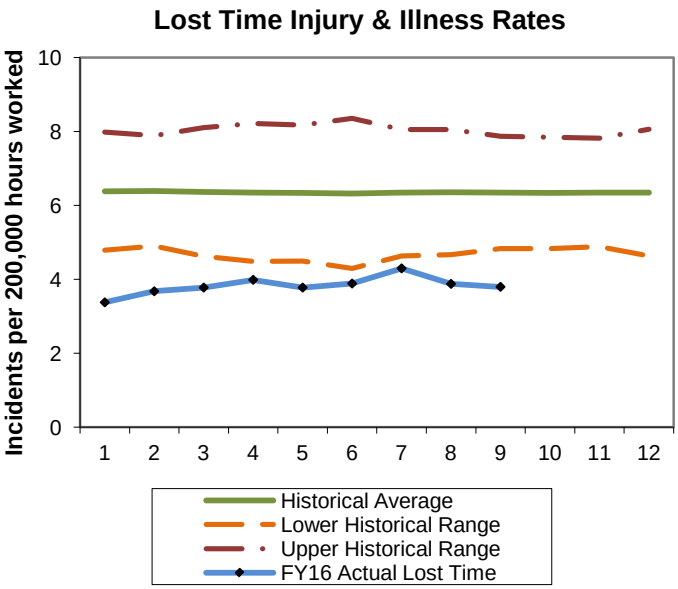

Total Overtime for Field Operations for the third quarter was $770,646 which is $17k over budget. Emergency overtime was $329k, which was ($4k) under budget, mainly due to relatively dry weather. Emergency maintenance totaled $111k for the month, $77k of which was for response to the Nut Island Fire. Coverage overtime was $141k, which was $4k over budget, reflecting the month's shift coverage requirements. Planned overtime was $301k or $16k over budget, mainly for maintenance off-hours work at $85k, maintenance work completion at $50k, and half plant operations at Carroll at $48k. YTD, Field Operations has spent $2,274,689 on overtime which is $80k over budget.

**Deer Island Treatment Plant**
**Current Month Overtime $**


Deer Island's total overtime expenditure for the third quarter was $75K, which is $3K over budget. Higher than anticipated combination of planned/unplanned overtime, $18K combined with greater than budgeted shift coverage requirements, $5K, are offset in part by less than anticipated storm coverage requirements, ($20K). YTD Deer Island has spent $755,500 on overtime, which is ($66K) under budget.

# Workplace Safety
Third Quarter - FY16




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

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

3 The “Historical Average” is computed using the actual MWRA monthly incident rates for FY99 through FY14. The “Upper” and “Lower Historical Ranges” are computed using these same data – adding and subtracting two standard deviations respectively. FY15 actual incident rates can be expected to fall within this historical range.

## Workers Compensation Claims Highlights - 3rd Quarter FY16

| | New | Closed | Open Claims |
|---|---|---|---|
| Lost Time | 13 | 13 | 62 |
| Medical Only | 20 | 25 | 16 |
| Report Only | 28 | 28 | |
| | | | |
| | **New** | | **YTD Light Duty Returns** |
| Light Duty Returns | 5 | | 1 |

## Highlights/Comments:

**Light Duty Returns**

January One employee returned to light duty from workers comp
February Two employees returned to light duty from workers comp
March Two employees returned to light duty from workers comp

**Regular Duty returns**

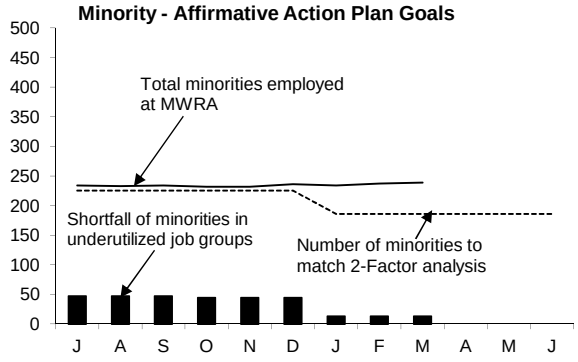
January One employee returned to full duty from workers comp
February Four employees returned to full duty from workers comp
March Two employees returned to full duty from workers comp

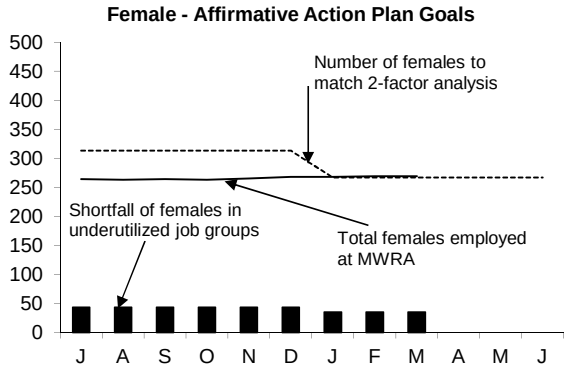
Note: Claims may initially be counted in one category and changed to another category at a later date. Examples include a medical treatment only claim (no lost time from work) but the employee may require surgery at a later date resulting in the claim becoming a lost time claim. At that time we would 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

3rd Quarter - FY16




**Highlights:**

At the end of Q3 FY16, 5 job groups or a total of 13 positions are underutilized by minorities as compared to 11 job groups or a total of 54 positions at the end of Q3 FY15; for females 11 job groups or a total of 36 positions are underutilized by females as compared to 10 job groups or a total of 43 positions at the end of Q3 FY15. During Q3, 4 minority and 2 female were hired. During this same period 2 minorities and 1 female terminated.

### Underutilized Job Groups - Workforce Representation

| Job Group | Employees as of 3/31/2016 | Minorities as of 3/31/2016 | Achievement Level | Minority Over or Under Underutilized | Females As of 3/31/2016 | Achievement Level | Female Over or Under Underutilized |
|---|---|---|---|---|---|---|---|
| Administrator A | 21 | 2 | 2 | 0 | 7 | 6 | 1 |
| Administrator B | 21 | 0 | 3 | -3 | 2 | 5 | -3 |
| Clerical A | 38 | 14 | 5 | 9 | 33 | 34 | -1 |
| Clerical B | 33 | 8 | 8 | 0 | 12 | 17 | -5 |
| Engineer A | 83 | 19 | 14 | 5 | 13 | 12 | 1 |
| Engineer B | 56 | 17 | 11 | 6 | 11 | 7 | 4 |
| Craft A | 113 | 17 | 15 | 2 | 0 | 7 | -7 |
| Craft B | 145 | 29 | 17 | 12 | 3 | 4 | -1 |
| Laborer | 67 | 20 | 15 | 5 | 3 | 3 | 0 |
| Management A | 96 | 13 | 15 | -2 | 36 | 24 | 12 |
| Management B | 40 | 6 | 3 | 3 | 9 | 10 | -1 |
| Operator A | 66 | 5 | 10 | -5 | 1 | 9 | -8 |
| Operator B | 67 | 11 | 2 | 9 | 4 | 1 | 3 |
| Professional A | 35 | 4 | 6 | -2 | 22 | 14 | 8 |
| Professional B | 163 | 45 | 35 | 10 | 81 | 67 | 14 |
| Para Professional | 55 | 14 | 11 | 3 | 26 | 29 | -3 |
| Technical A | 51 | 14 | 10 | 4 | 5 | 10 | -5 |
| Technical B | 7 | 1 | 2 | -1 | 1 | 2 | -1 |
| | | | | | | | |
| **Total** | 1157 | 239 | 184 | 68/-13 | 269 | 261 | 43/-35 |

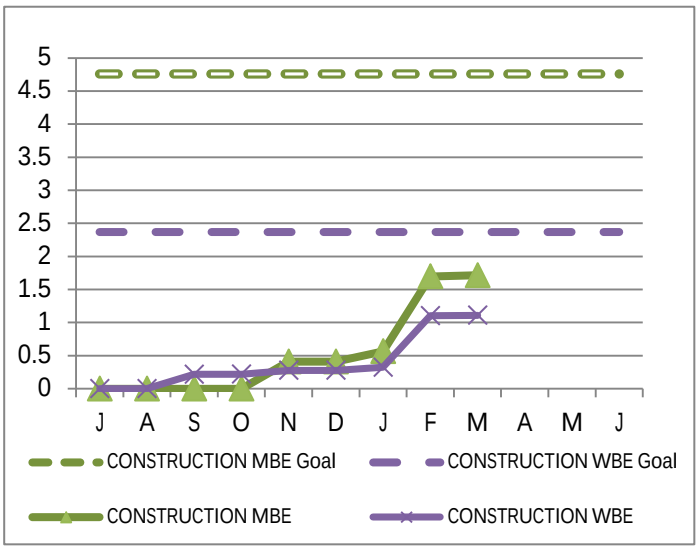
## AACU Candidate Referrals for Underutilized Positions

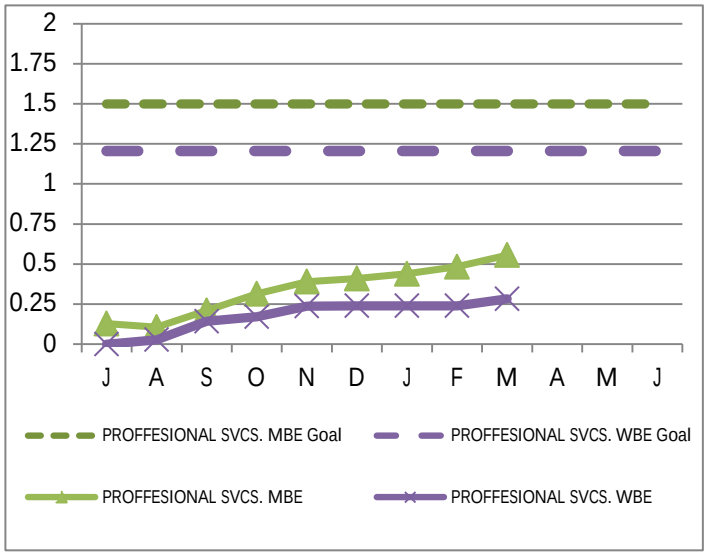
| Job Group | Title | # of Vac | Requisition Int. / Ext. | Promotions/ Transfers | AACU Ref. External | Position Status |
|---|---|---|---|---|---|---|
| **Craft A** | M&O Specialist | 2 | Int | 2 | 0 | Promo = HM & WM |
| **Craft B** | HVAC Specialist | 1 | Int/Ext | 0 | 1 | NH = WM |
| **Craft B** | Plumber/Pipefitter | 1 | Int/Ext | 0 | 0 | NH = WM |
| **Clerical A** | Payables Coordinator | 1 | Int/Ext | 0 | 0 | NH = WM |
| **Clerical A** | Payroll Specialist | 1 | Int/Ext | 0 | 2 | In Progress |
| **Engineer A** | Program Manager, SCADA | 1 | Int | 1 | 0 | Transfer = WM |
| **Engineer A** | Senior Program Manager | 1 | Int/Ext | 0 | 0 | NH = WM |
| **Engineer B** | Staff Engineer | 2 | Int/Ext | 0 | 0 | NH = BF & AM |
| **Engineer B** | Assistant Civil Engineer | 1 | Int/Ext | 0 | 1 | In Progress |
| **Laborers** | Skilled Laborer | 1 | Int/Ext | 0 | 0 | NH = HM |
| **Laborers** | OMC Laborer | 4 | Int/Ext | 1 | 0 | NH = (2)WM & BM; T = WM |
| **Management A** | Construction Coordinator | 1 | Int/Ext | 0 | 0 | NH = WF |
| **Management B** | Manager, Process Control | 1 | Int | 1 | 0 | Promo = AF |
| **Operator A** | Research Vessel Operator | 1 | Int | 1 | 0 | Promo = WM |
| **Operator A** | Transmission & Treatment Operator | 1 | Int | 1 | 0 | Promo = WM |
| **Operator B** | Operator | 1 | Int | 1 | 0 | Transfer = WM |
| **Professional B** | IT Architect | 2 | Int/Ext | 2 | 0 | Promo = BM & AM |
| **Professional B** | Systems Analyst Programmer II | 1 | Int/Ext | 0 | 1 | In Progress |
| **ParaProfessional** | Payroll Administrator | 1 | Int | 1 | 0 | Promo = BM |
| **Technical A** | Senior Instrument Technician | 1 | Int | 1 | 0 | Transfer = WM |

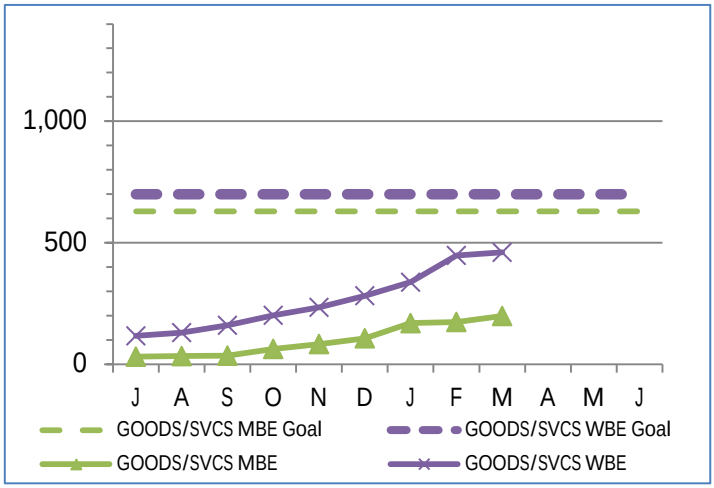
# MBE/WBE Expenditures
## 3rd Quarter - FY16

**Background**: MBE/WBE targets are determined based on annual MWRA expenditure forecasts in the procurement categories noted below. The goals for FY16 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 March.




FY16 spending and percentage of goals achieved, as well as FY15 performance are as follows:

| | MBE | | | | WBE | | | |
|---|---|---|---|---|---|---|---|---|
| | FY16 Year-to-Date | | FY15 | | FY16 Year-to-Date | | FY15 | |
| | Amount | Percent | Amount | Percent | Amount | Percent | Amount | Percent |
| Construction | 1,713,993 | 36.0% | 2,314,979 | 106.5% | 1,102,844 | 46.6% | 3,566,302 | 146.8% |
| Professional Svc. | 556,227 | 37.1% | 633,926 | 55.4% | 282,413 | 23.4% | 345,476 | 37.6% |
| Goods & Svcs. | 198,390 | 31.5% | 387,847 | 69.9% | 460,023 | 65.7% | 870,175 | 180.3% |
| Total | 2,468,610 | 35.8% | 3,336,752 | 86.2% | 1,845,280 | 43.2% | 4,781,953 | 124.8% |

FY15 MBE/WBE dollar totals do not include MBE and WBE payments to prime contractors and consultants.

# CEB Expenses through
## 3rd Quarter – FY16

| | March 2016 Year-to-Date | | | | | |
|---|---|---|---|---|---|---|
| | Period 9 YTD Budget | Period 9 YTD Actual | Period 9 YTD Variance | % | FY16 Approved | % Expended |
| **EXPENSES** | | | | | | |
| WAGES AND SALARIES | $ 71,840,962 | $ 69,512,899 | $ (2,328,063) | -3.2% | $ 99,363,168 | 70.0% |
| OVERTIME | 3,197,824 | 3,260,895 | 63,071 | 2.0% | 4,219,293 | 77.3% |
| FRINGE BENEFITS | 14,377,009 | 14,290,061 | (86,948) | -0.6% | 19,326,756 | 73.9% |
| WORKERS' COMPENSATION | 1,757,250 | 1,623,398 | (133,852) | -7.6% | 2,343,000 | 69.3% |
| CHEMICALS | 7,126,576 | 6,836,644 | (289,932) | -4.1% | 9,790,848 | 69.8% |
| ENERGY AND UTILITIES | 17,392,913 | 14,153,176 | (3,239,737) | -18.6% | 23,164,822 | 61.1% |
| MAINTENANCE | 18,459,781 | 21,197,087 | 2,737,306 | 14.8% | 28,698,772 | 73.9% |
| TRAINING AND MEETINGS | 281,206 | 235,613 | (45,593) | -16.2% | 413,714 | 57.0% |
| PROFESSIONAL SERVICES | 4,169,816 | 4,050,497 | (119,319) | -2.9% | 5,819,611 | 69.6% |
| OTHER MATERIALS | 2,893,230 | 3,692,567 | 799,337 | 27.6% | 6,164,589 | 59.9% |
| OTHER SERVICES | 17,422,863 | 17,131,777 | (291,086) | -1.7% | 23,529,902 | 72.8% |
| **TOTAL DIRECT EXPENSES** | **$ 158,919,430** | **$ 155,984,614** | **$ (2,934,816)** | **-1.8%** | **$ 222,834,475** | **70.0%** |
| INSURANCE | $ 1,620,598 | $ 1,536,473 | $ (84,125) | -5.2% | $ 2,160,797 | 71.1% |
| WATERSHED/PILOT | 21,072,175 | 20,696,996 | (375,179) | -1.8% | 28,096,233 | 73.7% |
| BECo PAYMENT | 1,340,112 | 1,193,011 | (147,101) | -11.0% | 1,946,157 | 61.3% |
| MITIGATION | 1,050,000 | 1,140,000 | 90,000 | 8.6% | 1,400,000 | 81.4% |
| ADDITIONS TO RESERVES | (26,195) | (26,195) | - | 0.0% | (34,927) | 75.0% |
| RETIREMENT FUND | 8,159,521 | 8,159,521 | - | 0.0% | 8,159,521 | 100.0% |
| POST EMPLOYEE BENEFITS | - | - | - | --- | 5,224,848 | 0.0% |
| **TOTAL INDIRECT EXPENSES** | **$ 33,216,211** | **$ 32,699,806** | **$ (516,405)** | **-1.6%** | **$ 46,952,629** | **69.6%** |
| STATE REVOLVING FUND | $ 57,628,678 | $ 58,019,620 | $ 390,942 | 0.7% | $ 81,876,277 | 70.9% |
| SENIOR DEBT | 210,128,430 | 203,062,398 | (7,066,032) | -3.4% | 283,024,431 | 71.7% |
| CORD FUND | - | - | - | --- | - | --- |
| DEBT SERVICE ASSISTANCE | - | - | - | --- | - | --- |
| CURRENT REVENUE/CAPITAL | 8,400,000 | 8,400,000 | - | 0.0% | 11,200,000 | 75.0% |
| SUBORDINATE MWRA DEBT | 36,607,032 | 36,607,032 | - | 0.0% | 49,222,442 | 74.4% |
| LOCAL WATER PIPELINE CP | 3,111,930 | 3,111,930 | - | 0.0% | 4,149,240 | 75.0% |
| CAPITAL LEASE | 2,412,795 | 2,412,795 | - | 0.0% | 3,217,060 | 75.0% |
| VARIABLE DEBT | - | (10,456,635) | (10,456,635) | --- | - | 0.0% |
| BOND REDEMPTION SAVINGS | - | - | - | --- | - | --- |
| DEFEASANCE ACCOUNT | - | 17,131,725 | 17,131,725 | --- | - | 0.0% |
| **TOTAL DEBT SERVICE** | **$ 318,288,865** | **$ 318,288,865** | **$ -** | **0.0%** | **$ 432,689,450** | **73.6%** |
| **TOTAL EXPENSES** | **$ 510,424,506** | **$ 506,973,284** | **$ (3,451,222)** | **-0.7%** | **$ 702,476,554** | **72.2%** |
| **REVENUE & INCOME** | | | | | | |
| RATE REVENUE | $ 504,330,000 | $ 504,330,000 | $ - | 0.0% | $ 672,440,000 | 75.0% |
| OTHER USER CHARGES | 6,352,023 | 6,456,474 | 104,451 | 1.6% | 8,683,898 | 74.3% |
| OTHER REVENUE | 10,791,306 | 12,684,533 | 1,893,227 | 17.5% | 12,000,066 | 105.7% |
| RATE STABILIZATION | - | | - | --- | - | --- |
| INVESTMENT INCOME | 6,874,246 | 7,263,887 | 389,641 | 5.7% | 9,352,590 | 77.7% |
| **TOTAL REVENUE & INCOME** | **$ 528,347,575** | **$ 530,734,894** | **$ 2,387,316** | **0.5%** | **$ 702,476,554** | **75.6%** |

As of March 2016, total expenses were $507.0 million, $3.5 million or 0.7% lower than budget and total revenue was $530.7 million, $2.4 million or 0.5% higher than budget, for a net variance of $5.8 million.

**Direct Expenses** are $156.0 million, $2.9 million or 1.8% lower than budget.

- **Wages & Salaries** are under budget by $2.3 million or 3.2%. At the end of March the average Full Time Equivalent (FTE) positions were 1,137, 23 positions less than the 1,160 budgeted FTE's.
- **Utilities** are underspent by $3.2 million or 18.6% due to lower Electricity of $1.9 million mainly due to Deer Island with underspending of $1.6 million for lower commodity and T&D costs, lower plant flows resulted in reduced electricity demand; and an overaccrual at the end of FY15. Additionally, lower diesel prices contributed $1.3 million to the variance.
- **Maintenance** is over budget by $2.7 million or 14.8%. Materials were overspent by $1.7 million due mainly to timing of energy efficiency projects. Services are over budget by $989k due to schedule shifts for planned projects for this year.
- **Chemicals** are under budget by $290k or 4.1% due to lower than budgeted spending on Soda Ash of $319k due to lower usage to meet corrosion control targets and timing of deliveries, Sodium Bisulfite of $125k due to time of deliveries at DITP and lower usage at the CWTP for Ozone residual removal. This is partially offset by overspending on Hydrogen Peroxide of $184k due to increased need for pretreatment of hydrogen sulfide gas due to plant flows.
- **Other Materials** were higher than budget by $799k or 27.6% mainly due to the timing of Vehicle Purchases of $752k and Computer Hardware of $114k. The overspending is offset by lower spending for Vehicle Expenses of $289k mostly due to lower fuel prices.
- **Other Services** spending was lower than budget by $291k or 1.7% due to lower spending of $160k for sludge pelletization services for lower utility index adjustments; $88k for Space Lease Rentals for the Chelsea facility lease due to an overpayment of escrow for insurance; $87k for Grit and Screenings disposal services due to lower quantities; and $59k for Other Rentals. Lower spending is offset by higher spending on Telephone Services of $65k associated with new and more SCADA lines, Other Services of $56k for Ward Street Headworks tower demolition and Membership/Dues/Subscriptions of $49k.

**Indirect Expenses** of $32.7 million $516k or 1.6% lower than budget mainly due lower Watershed reimbursement of $375k due to FY15 overaccrual and lower Insurance of $84k mainly due to lower lower premiums, lower PILOT payments of $39k, and lower HEEC cost of $1487, partially offset by higher spending of $90k for mitigation.

**Debt Service Expenses** totaled $318.30 million, which was at budget level after transferring $17.1 million to the Defeasance Account YTD. The short-term rates related variance is $10.5 million and an additional $6.7 million in underspending is due to defeasances and a deferred senior debt issuance scheduled for November 2015.

**Revenue / Income** through March is $530.7 million, $2.4 million over budget mainly due to higher Non-Rate revenue $1.9 million due to $610k for TRAC Penalties, $593k from unplanned water purchase from the City of Lynn, $224k for U.S. Treasury rebates, higher surplus equipment sales of $249k, Energy Rebates of $254k, and greater Investment Income of $390k.

# Cost of Debt
## 3rd Quarter – FY16

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.

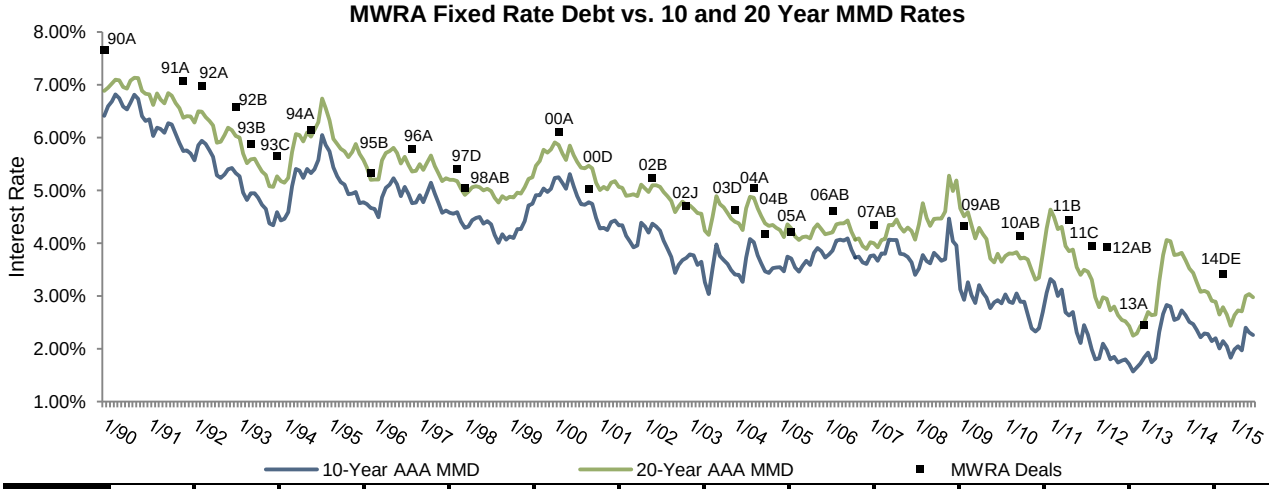
**Average Cost of MWRA Debt**

| | |
|---|---|
| Fixed Debt ($3,738) | 4.23% |
| Variable Debt ($484.2) | 0.56% |
| SRF Debt ($982.8) | 1.31% |
| Weighted Average Debt Cost ($5,205) | 3.34% |

**Most Recent Senior Fixed Debt Issue**
**November 2014**

| | |
|---|---|
| 2014 Series D-F ($243.9) | 3.41% |

**MWRA Fixed Rate Debt vs. 10 and 20 Year MMD Rates**

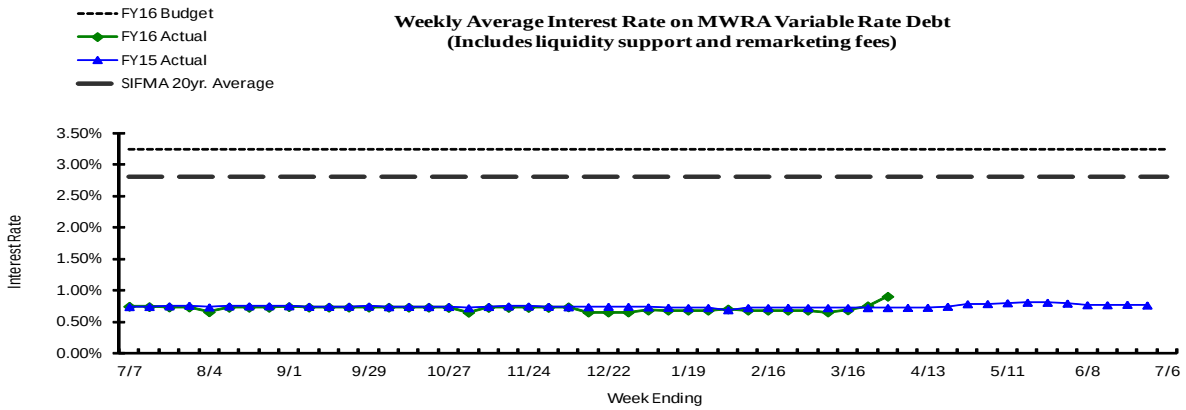



| Bond Deal | 1990A | 1991A | 1992A | 1992B | 1993B | 1993C | 1994A | 1995B | 1996A | 1997D | 1998AB | 2000A | 2000D | 2002B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rate | 7.67% | 7.08% | 6.98% | 6.58% | 5.89% | 5.66% | 6.15% | 5.34% | 5.78% | 5.40% | 5.04% | 6.11% | 5.03% | 5.23% |
| Avg Life | 21.8 yrs | 19.8 yrs | 22.6 yrs | 6.3 yrs | 19.8 yrs | 19.1 yrs | 19.5 yrs | 20.5 yrs | 19.5 yrs | 21.6 yrs | 24.4 yrs | 26.3 yrs | 9.8 yrs | 19.9 yrs |

| Bond Deal | 2002J | 2003D | 2004A | 2004B | 2005A | 2006AB | 2007AB | 2009AB | 2010AB | 2011B | 2011C | 2012AB | 2013A | 2014DE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rate | 4.71% | 4.64% | 5.05% | 4.17% | 4.22% | 4.61% | 4.34% | 4.32% | 4.14% | 4.45% | 3.95% | 3.93% | 2.45% | 3.41% |
| Avg Life | 19.6 yrs | 18.4 yrs | 19.6 yrs | 13.5 yrs | 18.4 yrs | 25.9 yrs | 24.4 yrs | 15.4 yrs | 16.4 yrs | 18.8 yrs | 16.5 yrs | 17.9 yrs | 9.9 yrs | 15.1 yrs |

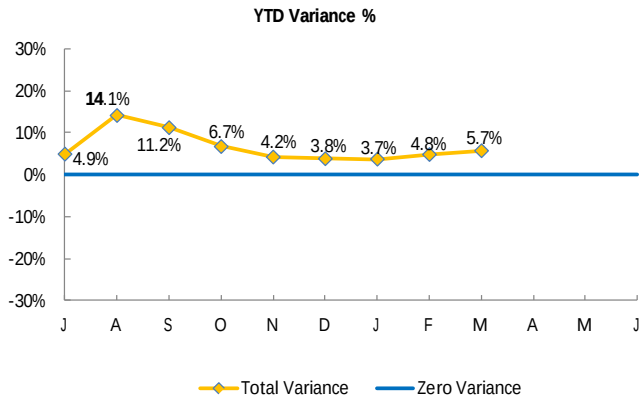
**Weekly Average variable Interest Rates vs. Budget**

MWRA currently has ten variable rate debt issues with $1.0 billion outstanding, excluding commercial paper. Of the ten outstanding series, five have portions which have been swapped to fixed rate. Variable rate debt has been less expensive than fixed rate debt in recent years as short-term rates have remained lower than long-term rates on MWRA debt issues. In March, SIFMA rates ranged from 0.02% to 0.29% 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.

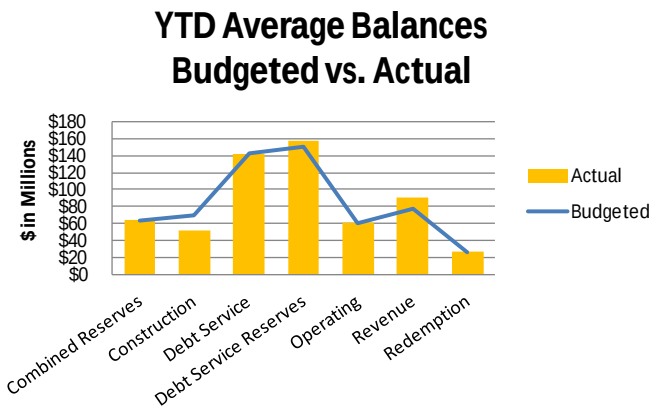


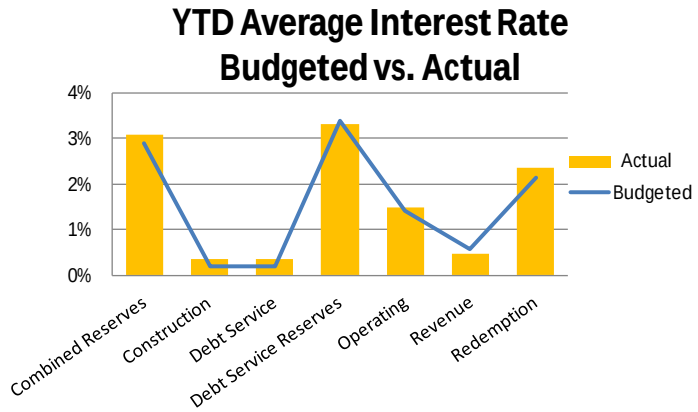
# Investment Income
3rd Quarter – FY16

## Year To Date




| | YTD BUDGET VARIANCE ($000) | | | |
|---|---|---|---|---|
| | BALANCES IMPACT | RATES IMPACT | TOTAL | % |
| Combined Reserves | $5 | $93 | 98 | 7.2% |
| Construction | ($60) | $92 | 33 | 31.8% |
| Debt Service | $1 | $173 | 174 | 83.0% |
| Debt Service Reserve | $40 | ($10) | 30 | 0.8% |
| Operating | $11 | $15 | 26 | 4.1% |
| Revenue | $9 | ($22) | (13) | -4.0% |
| Redemption | $3 | $39 | 41 | 9.9% |
| Total Variance | $9 | $380 | $390 | 5.7% |




## Monthly