Board of Directors Report
On Key Indicators of MWRA Performance
For First Quarter FY2018
Quabbin Precipitation

Inches

- Precipitation
- 10 Year Average

- October: 9.77 inches
- November, December, January, February, March, April, May, June, July, August, September: Lower values
- October: 9.77 inches

Graph showing precipitation and 10-year average for each month.
System Yield - Quabbin and Wachusett

MGD
System Yield
Monthly Yield
Long-Term Average

Oct-16  Nov-16  Dec-16  Jan-17  Feb-17  Mar-17  Apr-17  May-17  Jun-17  Jul-17  Aug-17  Sep-17  Oct-17

Yield
10 Year Average

424.34
System Withdrawal

![Graph showing system withdrawal and 10 year average. The x-axis represents months from Oct-16 to Oct-17, and the y-axis represents the withdrawal values. The chart shows a peak in withdrawal in Jun-17 and a trend towards decline from Sep-17 onwards.](image-url)
Total Water Use: MWRA Core Communities

Arlington, Belmont, BWSC, Brookline, Chelsea, Everett, Framingham, Lexington, Malden, Medford, Melrose, Milton, Newton, Norwood, Quincy, Reading, Revere, Somerville, Stoneham, Waltham, Watertown, Winthrop

- MGD
- CY2015
- CY2016
- CY2017
During the 1st Quarter of FY18, 37.73 miles of water mains were inspected. Surveyed below target due to staff training and availability. Metering staff provided leak detection assistance to eight communities this quarter.
Supply and Delivery of Ferrous Chloride to the Deer Island Treatment Plant
WRA-4425

November 15, 2017
• Used at Deer Island to:
  
  – Pretreat sludge to minimize hydrogen sulfide ($H_2S$) formation in digester gas
  
  – Prevent struvite in digesters and downstream pipes
Struvite = Magnesium Ammonium Phosphate Hexahydrate \( \text{Mg} (\text{NH}_4) \text{PO}_4 \text{ (H}_2\text{O})_6 \)

- A scale that forms in anaerobic digesters with secondary treatment processes
- Mostly limited to coastal plants (salt water is high in mg)
- Clogs lines increasing equipment downtime. Could take entire digester unit out for months or years
1. Prevention:
   – Add iron salts like Ferrous Chloride (FeCl$_2$) to bind up PO$_4$

2. Remediate:
   - Mechanical cleaning
   - High pressure wash

Last resort:
- Replace Pipe
Residuals technology options assessment/recent staff investigation

- **OSTARA process**
  - Forced struvite precipitation in controlled part of process

- **CALPrex Process**
  - Similar to OSTARA, different end product – dicalcium phosphate
• Innovative technologies
  - Not fully proven, some may be pilot scale only
  - Require major process changes at Deer Island (costly)
  - Still require some iron salt addition to pretreat for H$_2$S in digester gas

• Pipe replacement too disruptive to operation, impacting ability to treat

• Chemical prevention and light remediation best combination
Clinton Wastewater Treatment Plant
Phosphorus Reduction Design, CA/RE
Contract 7377, Amendment 4

November 15, 2017
Clinton Wastewater Treatment Plant
Total Phosphorus Limits

Average Daily Flow: 3.0 MGD
Maximum Daily Flow: 8.0 MGD
Peak Hourly Flow: 12.0 MGD

Existing Total Phosphorus Limits:
- 1.0 mg/l from May 1 to October 31
- No required limit from November 1 to April 30

Future Total Phosphorus Limits (April 2019):
- 0.15 mg/l from April 1 to October 31
- 1.0 mg/l from November 1 to March 31
Disk Filter and Phosphorus Operations Touch Screen
Disc Filter Process
Disc Filter Backwash Units
Amendment 4 Summary

• Six-month time extension due to contractor delays

• Increases Contract amount by $249,645.48

• Includes additional level of effort for:
  – six months of resident engineering services
  – additional on-site meetings/inspections/observations
  – construction advice/interpretation/clarification
  – review and processing of contractor submittals
  – additional start-up services
Southern Extra High Pipeline, Section 111 – Boston
Contract 6454, Change Order 3

November 15, 2017
36-inch Ductile Iron Pipe Being Installed Dedham Parkway, Boston
12-inch Drain Repair on Enneking Parkway
Typical Installation of Vertical Offsets
36-inch Gate Valve Vault
Ledge Removal on Enneking Parkway
Removing Rock
Pipe Installation Progress Plan

Current through October 30, 2017
% pipe installed: 63.3% (10,147/16,100)
Production rate: 58.1 ft/day (based on 177 working days)
% time elapsed: 96.9% (467/480)
Wachusett Aqueduct Pump Station
Contract 7157, Change Order 25

November 15, 2017
Construction Update - Front Entrance
Construction Update – Wachusett Aqueduct Connection
Change Order 25 – Pipe Gallery Dehumidification

• Change to Desiccant System from Refrigerant Type System

• Refrigerant type dehumidification was recently installed in the Carroll UV Building

• UV dehumidifiers experienced operational problems during warm weather

• Led to re-evaluation of Pump Station dehumidification options

• Timing too late to modify bid documents
Change Order 25 – Pipe Gallery Dehumidification
Change Order 25 – Pump Power Fluctuation Ride Through

• Millisecond power fluctuations - pumps susceptible to shutdown
• Pump start-up – over 1 hour
• May experience several power fluctuations per day
• For power ride through:
  – Provide DC Battery Circuits in each MCC
  – Provide UPS for each Pump Control Valve
## Change Order 25 – Summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Pipe Gallery Dehumidification</td>
<td>$184,456</td>
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<tr>
<td>Power Fluctuation Ride Through</td>
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<tr>
<td><strong>Total</strong></td>
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Wachusett Aqueduct Pumping Station