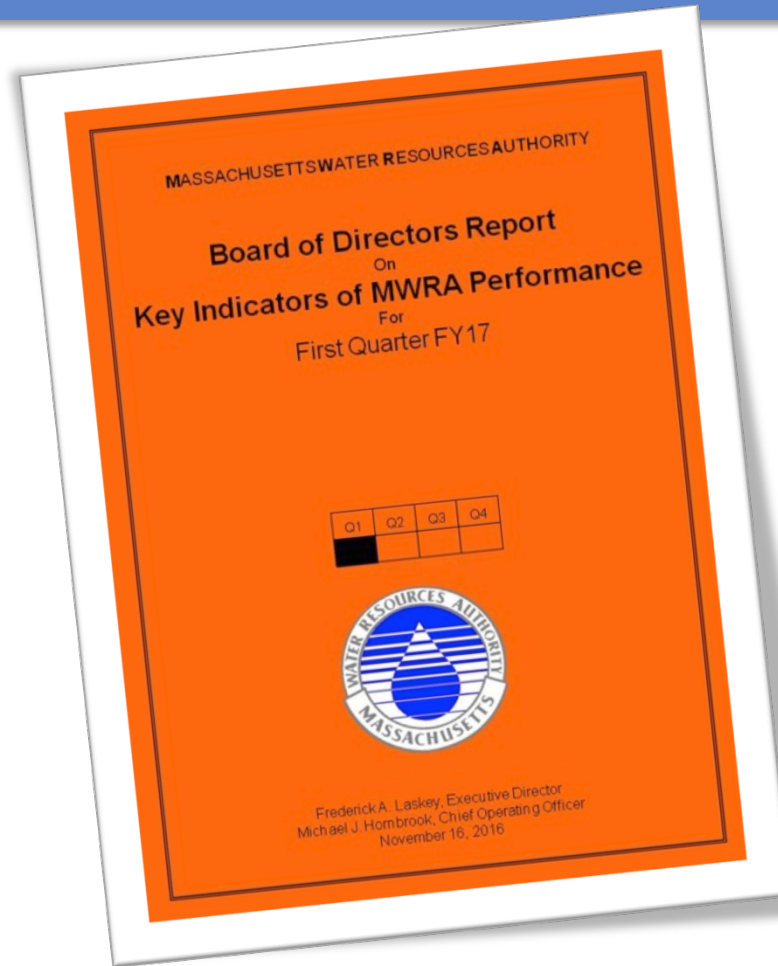






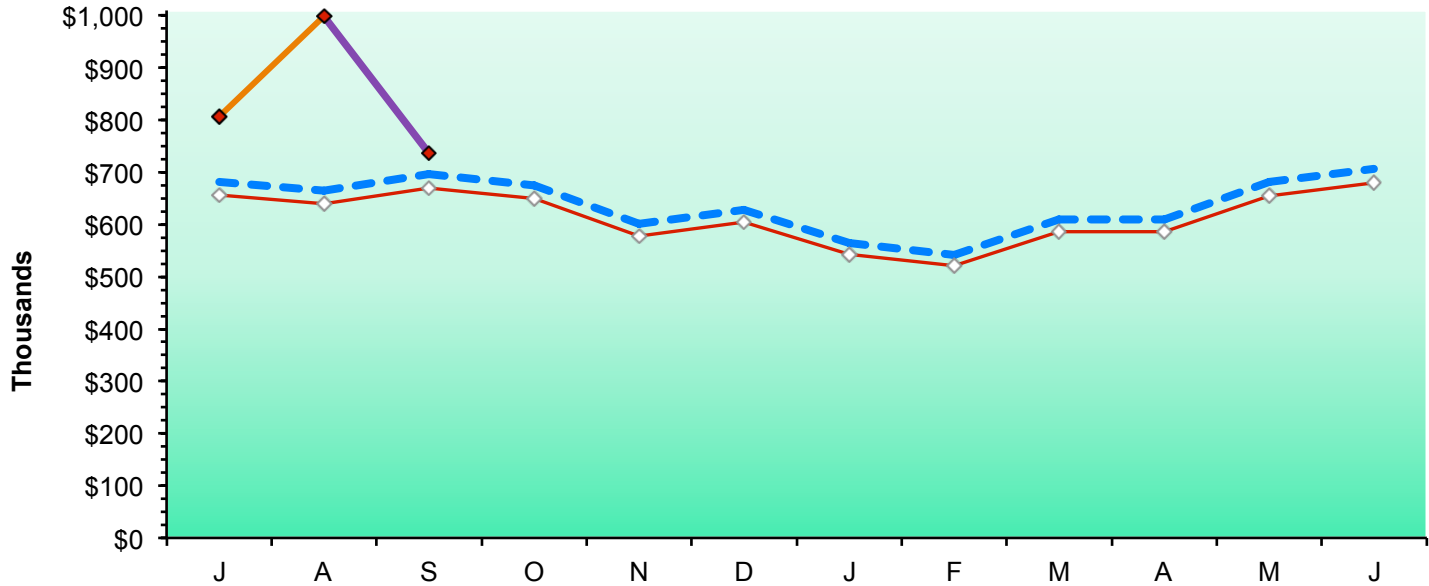
Massachusetts Water Resources Authority





Laboratory Services

Value of Services Rendered



--- Budget

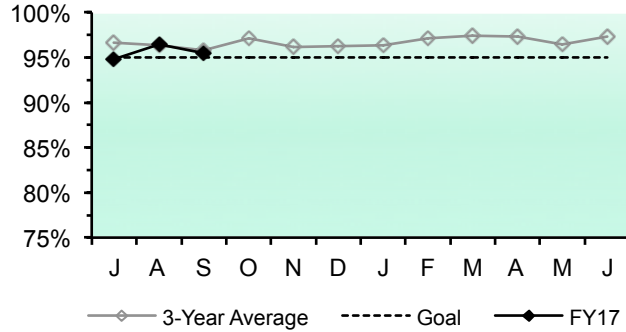
—◇— 3-Year Average

—◇— FY17



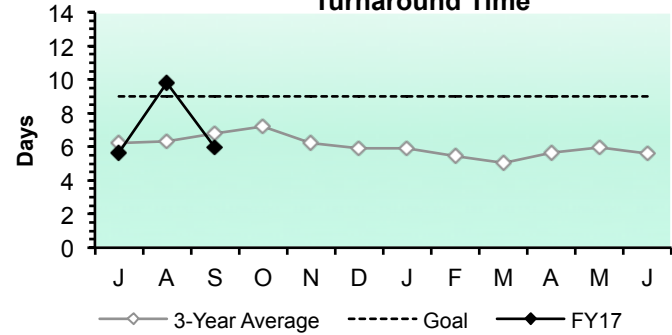
Laboratory Services

Percent On-Time Results



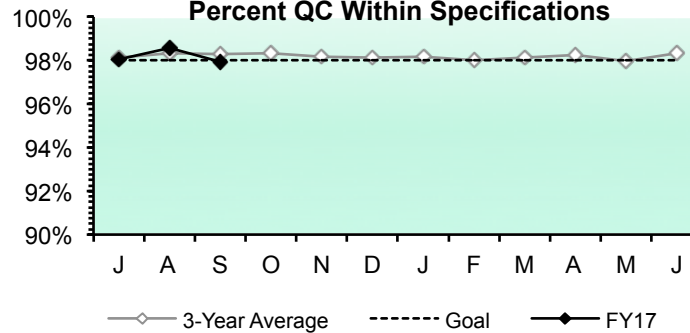
The Percent On-Time measurement was above the 95% goal.

Turnaround Time



Turnaround Time was faster than the 9-day goal.

Percent QC Within Specifications

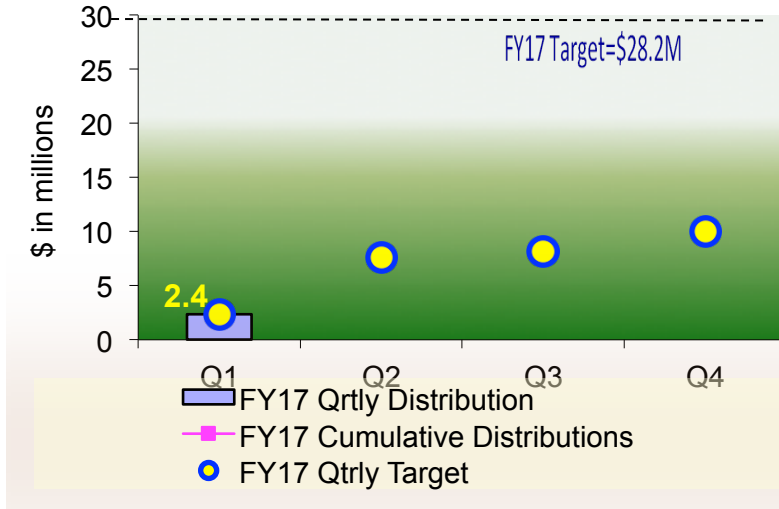


Percent of QC tests meeting specifications was at the 98% in-house goal.

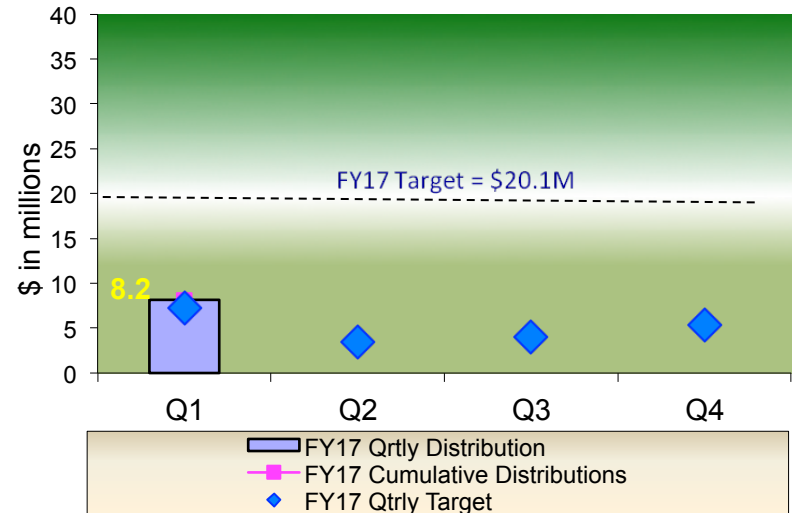


Local Financial Assistance Programs

FY17 Quarterly Distributions of Sewer Grant/Loans



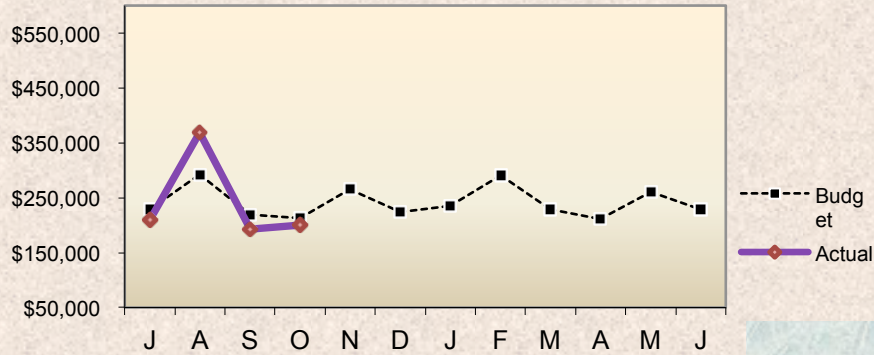
FY17 Quarterly Distributions of Water Loans



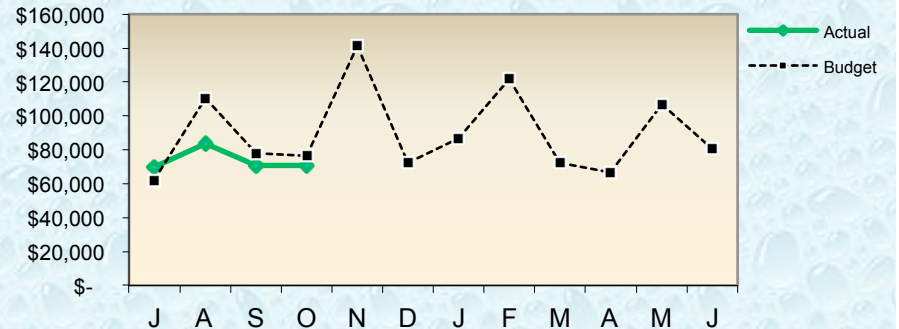


Overtime Reports

Field Operations Current Month Overtime \$



Deer Island Treatment Plant Current Month Overtime \$





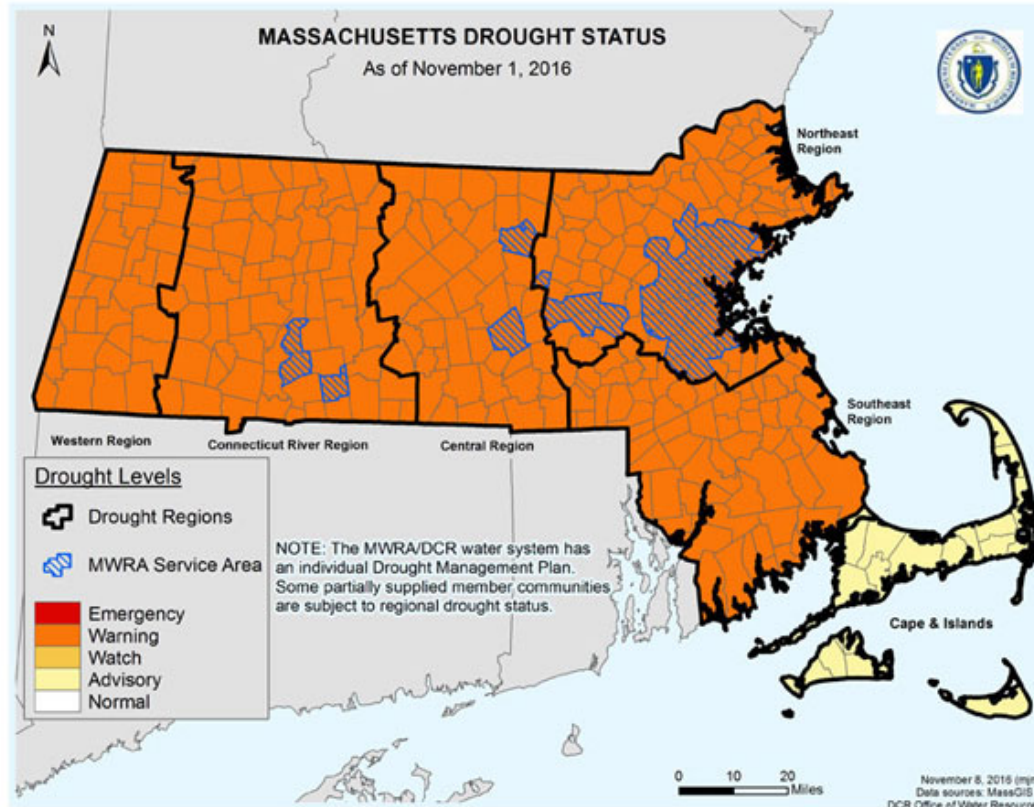


Quabbin Reservoir And Drought Status Update

November 16, 2016

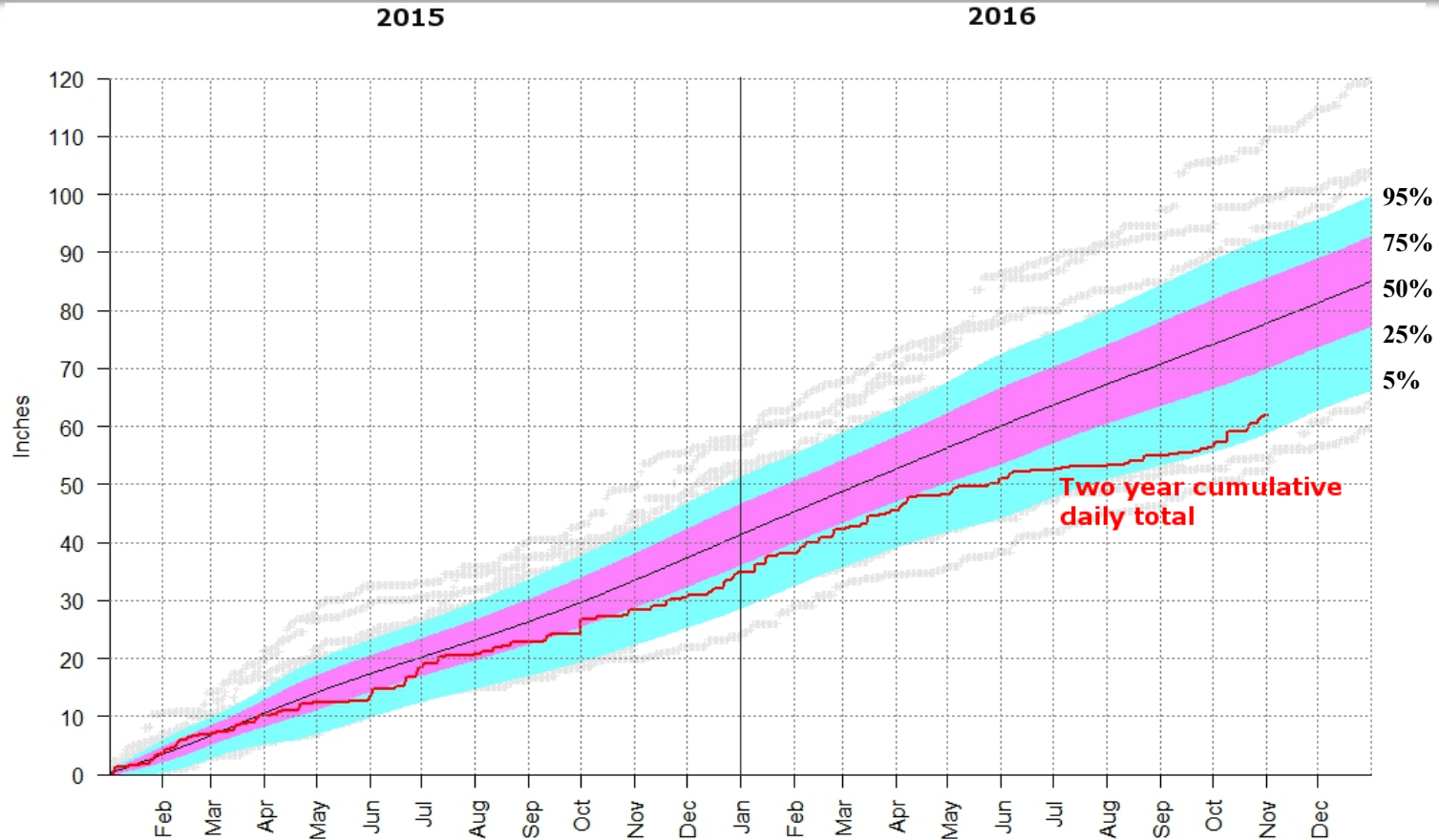


Massachusetts Drought Status Designations



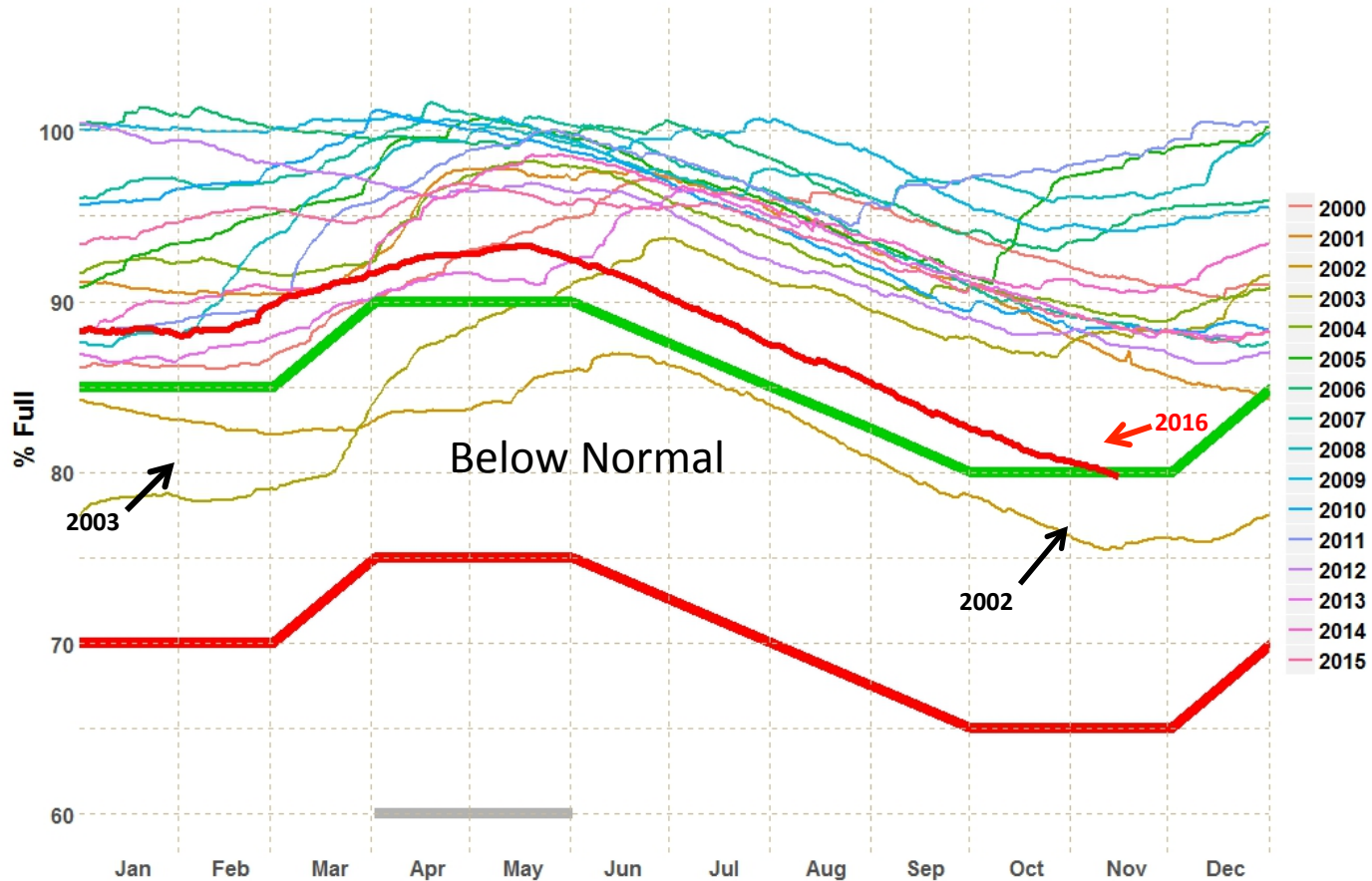


It Has Continued To Be Dry In the Service Area





Quabbin Dropped to "Below Normal" on November 12





Quabbin Reservoir Levels





Next Steps

- Staff will be contacting community elected officials and water superintendents with pointers to water conservation
- MWRA will be sending out Public Service Announcements asking residents and businesses to conserve water
- MWRA will use its website and social media to draw awareness of the need to conserve
- The target is to keep water usage at 2015 levels without issuing mandatory restrictions



Status Looking Forward from November 1, 2016

| | 1-Month | 3-Months | 6-Months | 12-Months |
|-----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Median Yield | Normal | Below Normal | Normal | Normal |
| Dry (75th Percentile) | Normal | Below Normal | Below Normal | Normal |
| Driest (of Record) | Below Normal | Below Normal | Below Normal | Below Normal |

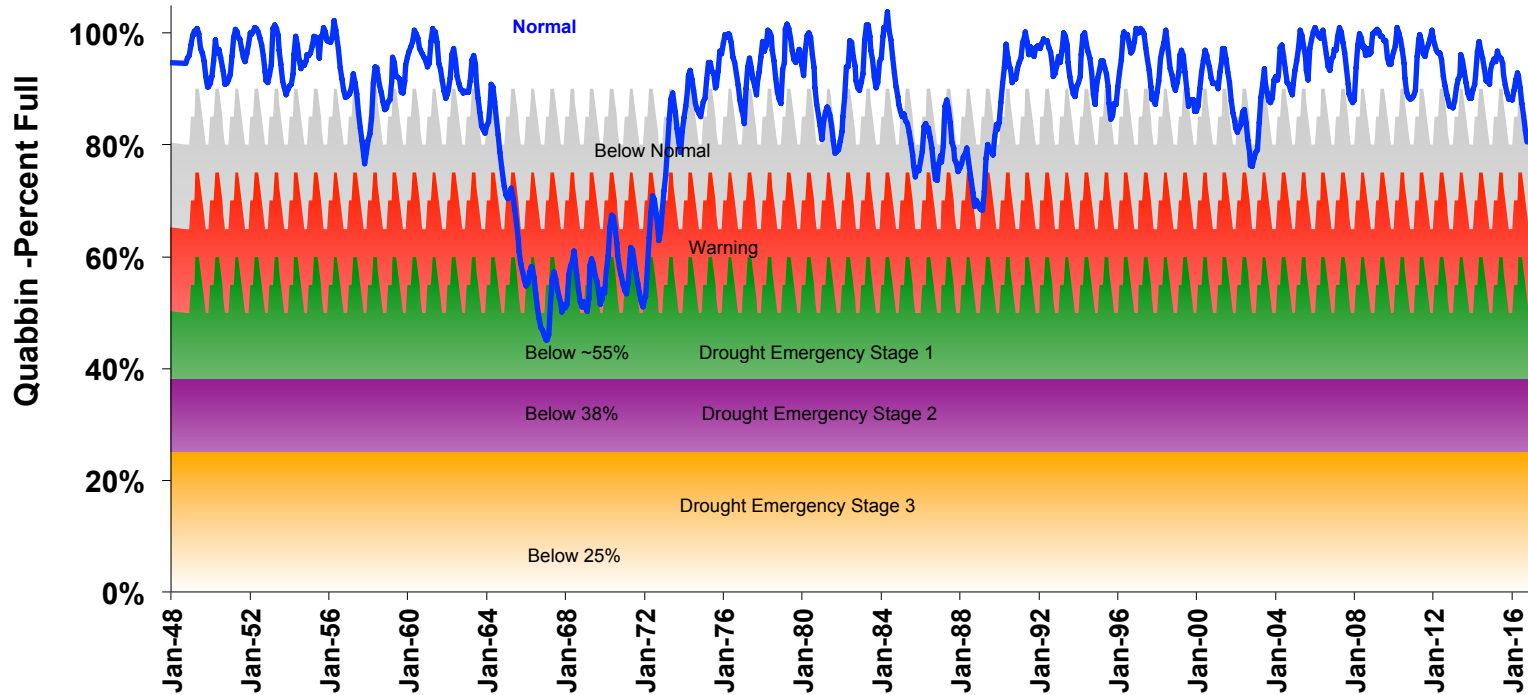


MWRA Drought Management Stages

| Stage | Target Water Use Reduction |
|---|--|
| Normal Operation Below Normal Drought Warning | 0 Previous year's use (Voluntary) 5% (Primarily Voluntary) |
| Drought Emergency Stage 1 Stage 2 Stage 3 | (Mandatory Restrictions) 10% 15% 30% |



Quabbin's Long-term Track





Communities That Have Requested For Emergency Supply

- Worcester
- Cambridge
- Ashland
- Cherry Valley and Rochdale Water District
- Burlington
- Lynn





**Commonwealth Avenue
Pumping Station
Improvements
Contract 7523**

November 16, 2016

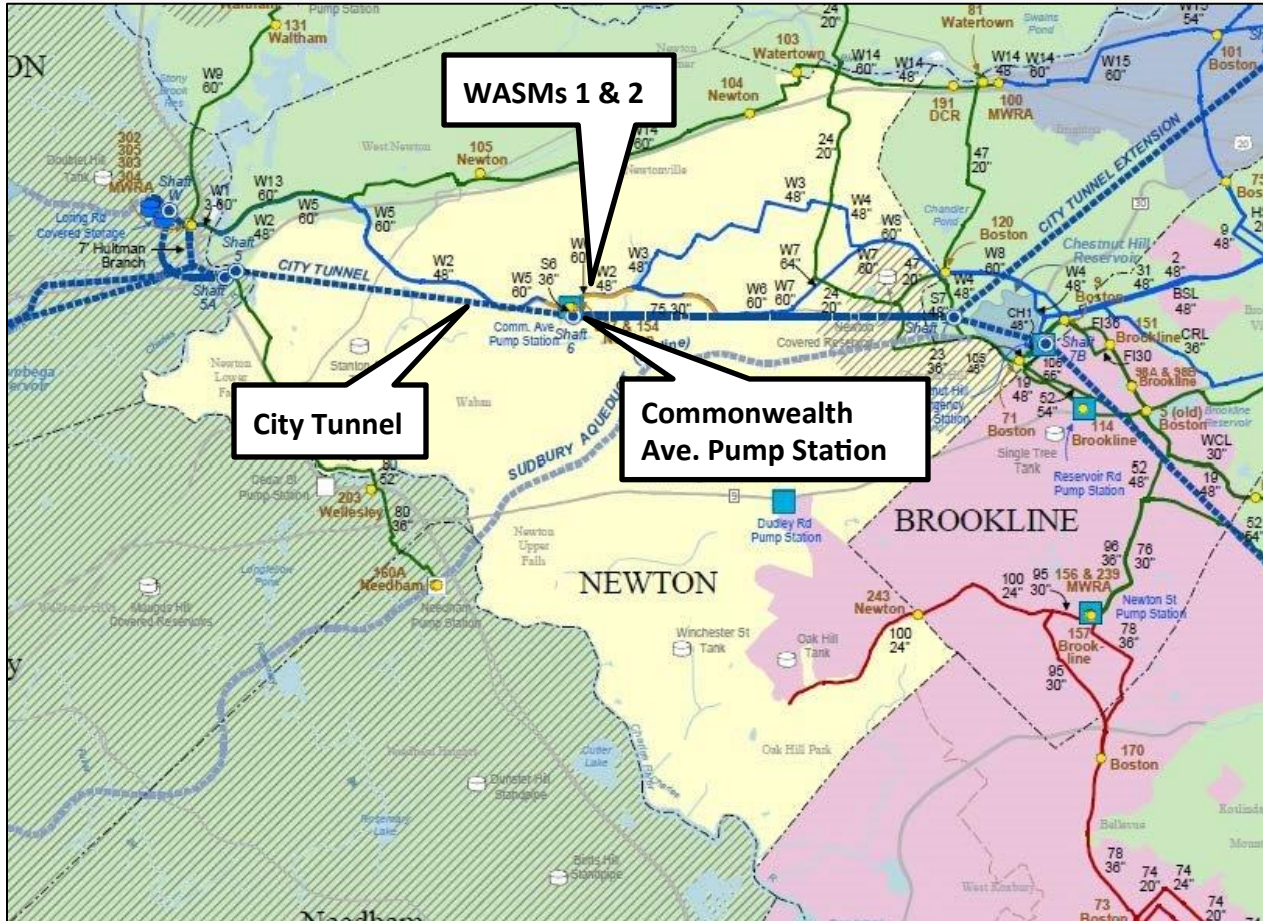


Commonwealth Avenue Pumping Station





Project Location Map



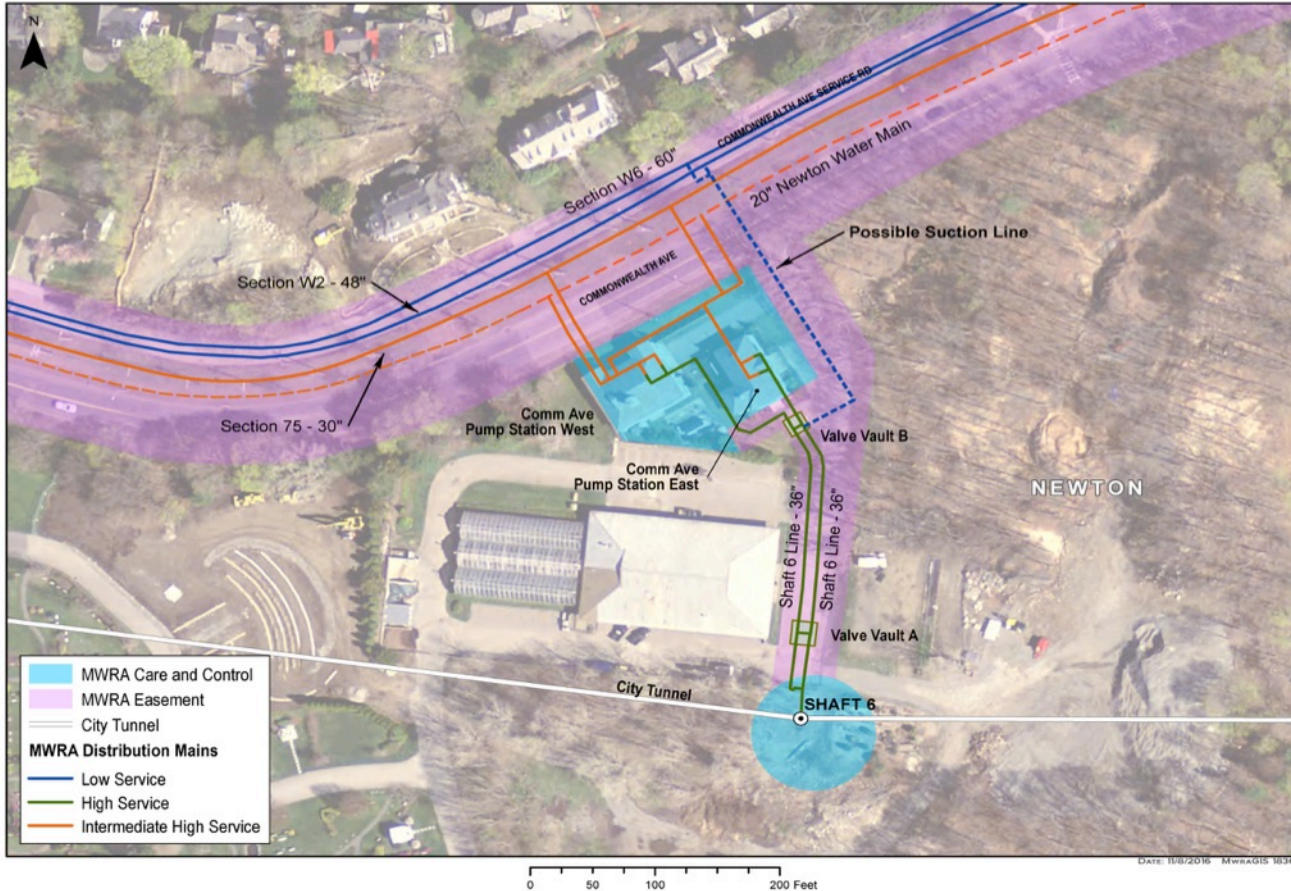


Proposed Work

- New connections to WASMs 1 & 2 for low service supply
- Add one new Low Service pump
- Replace existing pump with new Low Service pump
- Replace outdoor switchgear, main transformers, service disconnect switches and associated equipment
- Replace the HVAC system
- New Supervisory Control & Data Acquisition (SCADA) controls



Site Plan





Proposed Location of New Pump



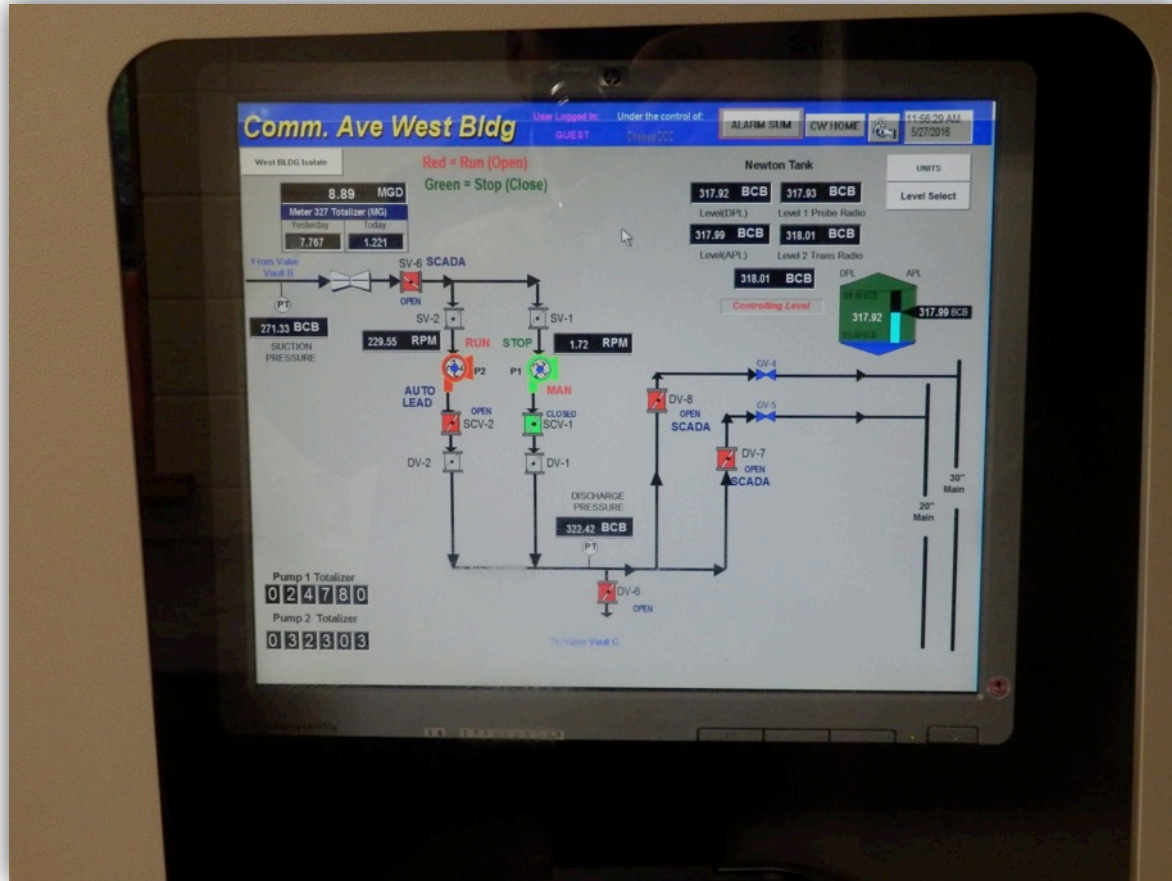


Electrical Switch Gear to be Replaced





SCADA Equipment will be Updated





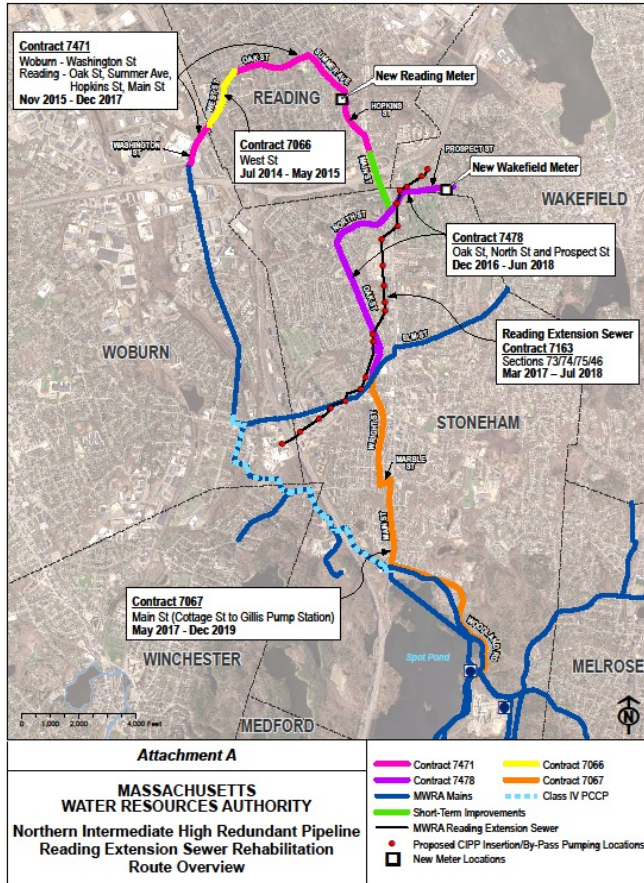


**Northern Intermediate High Redundancy Pipeline
Section 110 and 112 - Stoneham and Wakefield
Contract 7478**

November 16, 2016



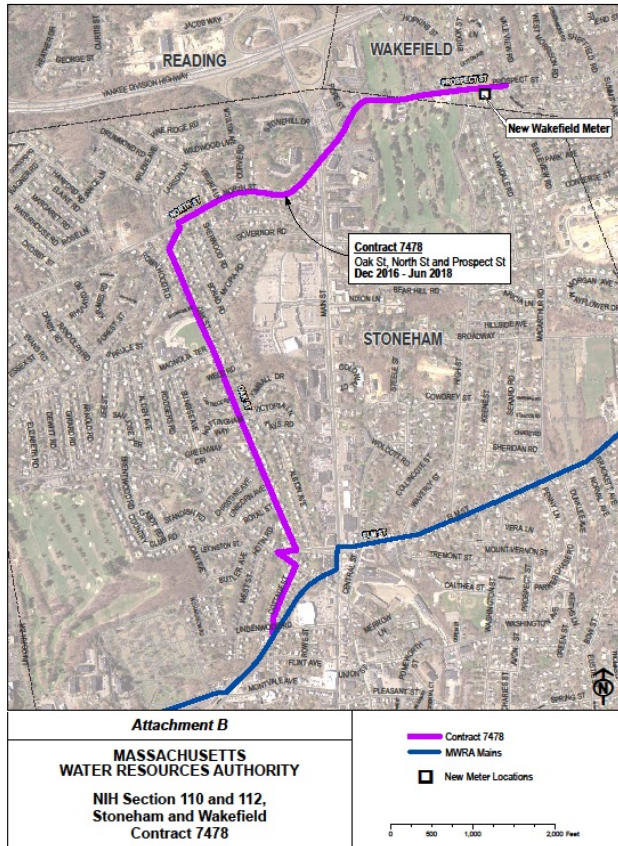
NIH Section 110 and 112 Project Location



- **Contract 7066:**
 - 2,400 linear feet of 36-inch pipeline
 - Completed May 2015.
- **Contract 7471:**
 - 8,800 linear feet of 36-inch pipeline
 - NTP January 2016
 - Substantial Completion December 2017
- **Contract 7478: This Award.**
 - 7,800 linear feet of 48-inch pipeline
 - 2,600 linear feet of 16 and 12-inch pipeline
 - Substantial Completion June 2018
- **Contract 7067:**
 - 14,000 linear feet of 48-inch pipeline
 - Anticipated NTP May 2017
 - Substantial Completion December 2019



Contract 7478 NIH Section 110 and 112 Project Location



- 7,800 LF of 48-inch diameter DI pipe
- 2,600 LF of 12 and 16-inch diameter DI pipe
- Revenue Meter 96 (Wakefield)
- NTP December 2016
- Substantial Completion June 2018



Contract 7478 NIH Section 110 and 112 - Procurement

- Bids Opened November 7, 2016
- Seven Bids Received
- Lowest Responsible Bidder: Albanese D&S Inc. **\$17,817,999**



Contract 7478 NIH Section 110 and 112

| Bidder | Bid Price |
|------------------------------|---------------------|
| Engineer's Estimate | \$21,900,000 |
| Albanese D&S Inc. | \$17,817,999 |
| P. Gioioso & Sons, Inc. | \$18,299,000 |
| RJV Construction Corp. | \$19,303,500 |
| Baltazar Contractors Inc. | \$19,525,000 |
| Revoli Construction, Inc. | \$20,278,000 |
| Albanese Bros. Inc. | \$20,973,317 |
| Barletta Heavy Division Inc. | \$25,584,000 |





Presentation to

MWRA Board of Directors

**SECTION 80 REPAIR
CONTRACT 7532**

November 16, 2016



Section 80 Repair - Project Location

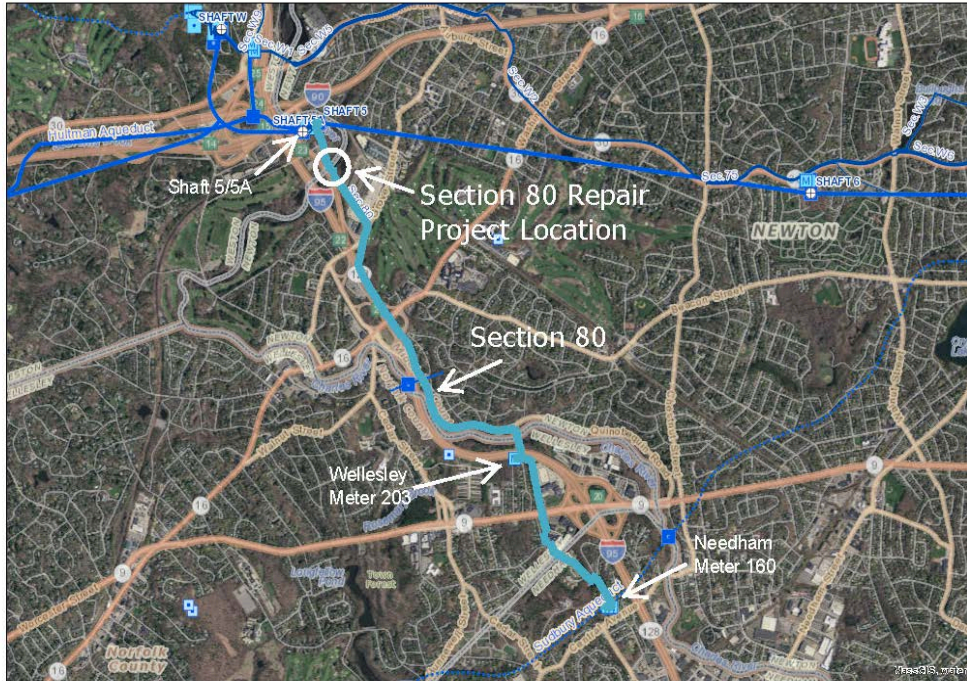


Figure 3 - Section 80 Repair Location Map

Date: 10/21/2016

Security Operational - For MWRA use ONLY



Figure 2- Section 80 Repair Site Map





Background

- Constructed in 1959 by Former MDC.
- Starts at Shaft 5/5A in Weston and Terminates at the Saint Mary Street Pumping Station in Needham
- Partially Supplies Water to the Towns of Needham and Wellesley.
- Approximately 10,000 Lf of 48-inch Diameter Steel Pipe and 5,000 Lf of 36-inch Diameter Steel Pipe.
- History of Leaks at the Project Location Since 1969.
- Most Recently Leaks Repaired in March of 2016.



Section 80 Weston - Pipe Inspection May 2016





Contract 7532 Section 80 Repair - Procurement

- Bids Opened October 20, 2016.
- Six Bids Received.
- Lowest Responsible Bidder: P. Caliacco Corp. **\$1,828,409**

Bidding Results

| Bidder | Bid Price |
|------------------------------------|--------------------|
| Revised Engineer's Estimate | \$1,726,164 |
| P. Caliacco Corp. | \$1,828,409 |
| P. Gioioso & Sons, Inc. | \$1,879,000 |
| Albanese D&S, Inc. | \$1,963,984 |
| RJV Construction Corp. | \$1,975,370 |
| Albanese Bros., Inc. | \$1,996,294 |
| R. Zoppo Corp. | \$2,096,000 |

Staff Recommend Award of Contract 7532, Section 80 Repair to
P. Caliacco Corp. for the Amount of **\$1,828,409**



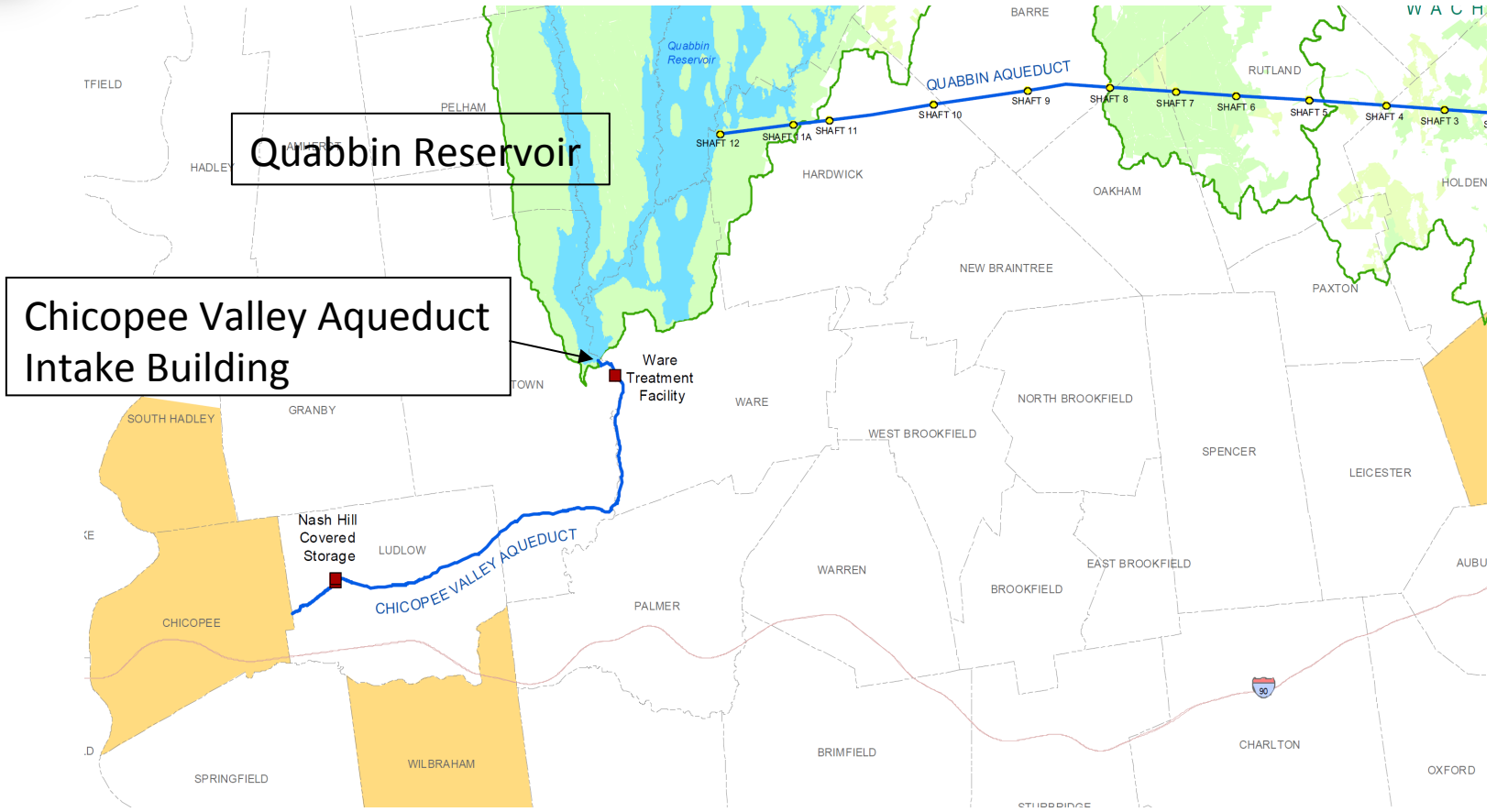


**Chicopee Valley Aqueduct Intake
Traveling Screen Replacement
Contract 7488**

November 16, 2016



Chicopee Valley Aqueduct Intake Building Location Plan





Chicopee Valley Aqueduct Intake Building





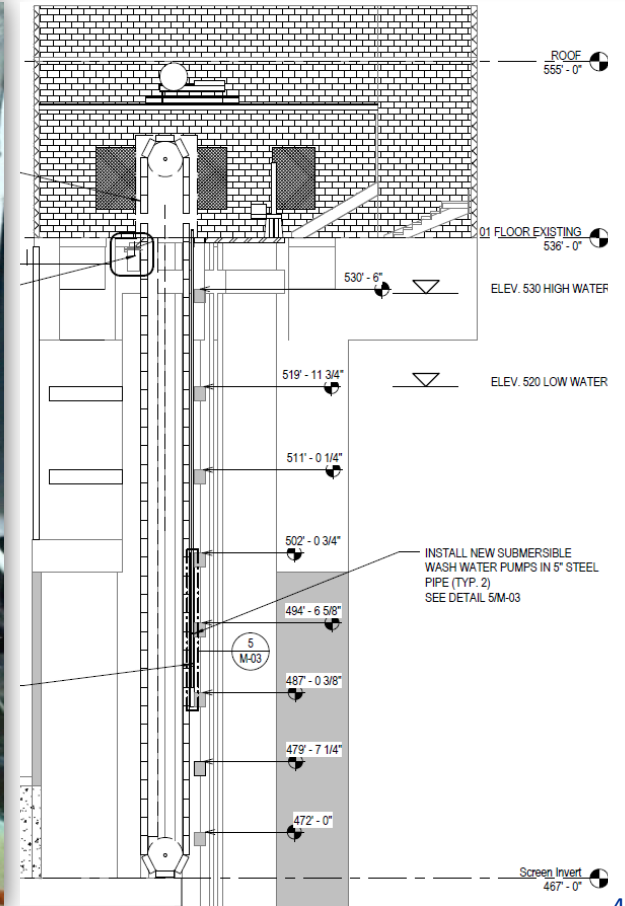
CVA Intake Building Traveling Screens





CVA Intake Traveling Screens

- Purpose: to screen raw water from the Quabbin Reservoir prior to flowing into the Chicopee Valley Aqueduct
- This contract: to replace the 44 year old screens, one of which has failed and the other that is in poor condition





CVA Intake Traveling Screens Procurement Process

General bids were received and opened on October 13, 2016 as shown below:

| Bidders | Bid Amount |
|--|--------------------|
| <i>Engineer's Estimate</i> | <i>\$1,005,000</i> |
| W.M. Schultz Construction, Inc. | \$1,049,000 |
| Waterline Industries Corp. | \$1,127,677 |





MWRA's Climate Change Strategy: Energy Initiatives

November 16, 2016



MWRA's Efforts To Prepare For Climate Change

- The treatment and transport of water and wastewater involves significant energy resources, and the use of fossil fuels can contribute to carbon dioxide (CO₂) and other green house gas emissions
- This presentation focuses on our efforts to utilize renewable energy, improve energy efficiency and reduce our green house gas emissions
- At the December meeting, staff will present a detailed report on MWRA's efforts to adapt to the effects of Climate Change and Sea Level Rise



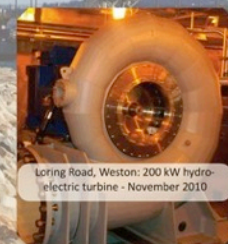
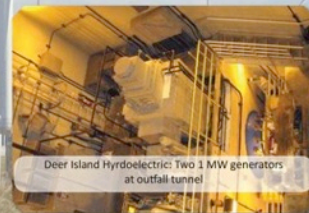
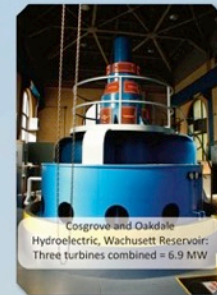
Water And Sewer Is An Energy Intensive Business

- MWRA's total annual energy costs for FY16
 - Electricity \$14.4 million
 - Diesel \$1.4 million
 - Gas \$414 thousand

- MWRA total annual energy purchased (equivalent of > 12,000 homes)
 - Electricity 147million kWh
 - Diesel 1.0 million gallons
 - Gas 490k therms

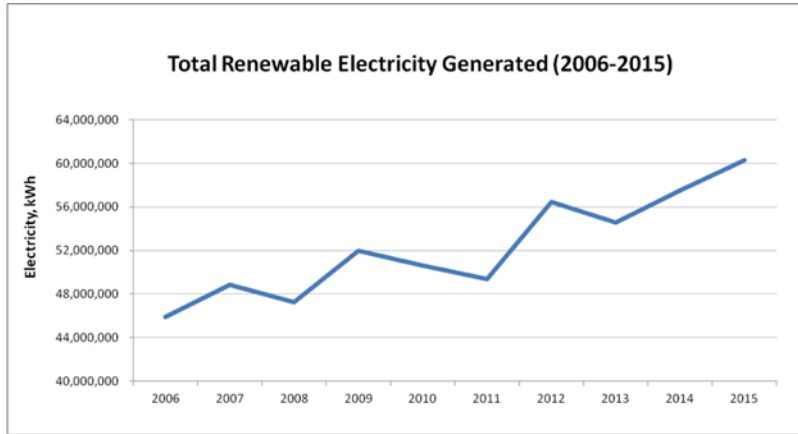


Renewable Energy at MWRA



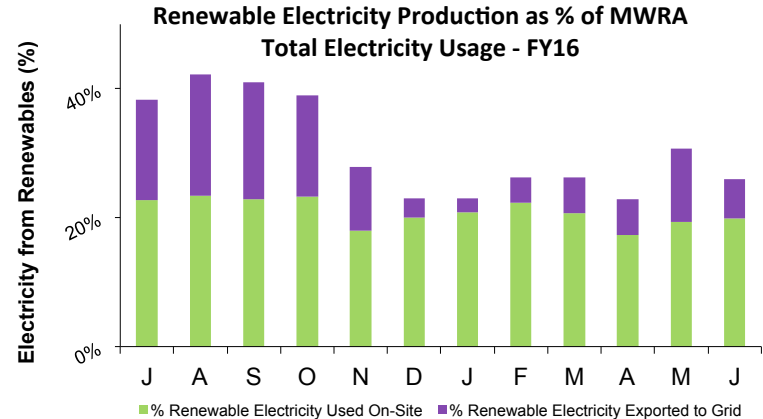


Renewable Energy at MWRA



Renewable generation increased from 45.9 M kWh in 2006 to 60.3 M kWh in 2015, an increase of 31.3 %

Renewable generation in FY16 = 31 % of total MWRA total electricity usage





Deer Island Treatment Plant

- Deer Island is one of the largest electricity users in the Northeast
- Deer Island currently self-generates 28% of its electricity needs
- Over 60% of the plant's energy demand is provided by on-site, renewable generation (heat and electricity)





Methane Utilization At Deer Island

- Deer Island utilizes 98% of the methane generated to power a steam turbine generator and backpressure turbine for plant heat and hot water
- Avoid purchase of about 5 million gallons in fuel oil annually
- Approximately 31 million kWh per year electricity production
- Approximately \$3.3 million per year electricity savings and revenue





Hydroelectric Power

- Deer Island, Oakdale, Cosgrove, Loring Road
- Over 8 MW capacity
- Approximately 20 kWh per year in electricity production
- Over \$1.4 million in annual savings and revenue





Solar Power - Deer Island Treatment Plant

- 736 kW capacity
- Over 890,000 kWh per year in electricity production
- Approximately \$207,000 in annual savings and revenue





Solar Power – Carroll Water Treatment Plant

- 496 kW capacity
- Approximately 580,000 kWh per year in electricity production
- Over \$120,000 in annual savings and revenue





Wind Power – Deer Island Treatment Plant

- Two 600 kW turbines
- 1.9 million kWh per year in electricity production
- Approximately \$225,000 in annual savings and revenue





Wind Power - Charlestown

- 1.5 MW capacity
- Over 2.2 million kWh per year in electricity production
- Approximately \$413,000 in annual savings and revenue





Facility Energy Efficiency Audits

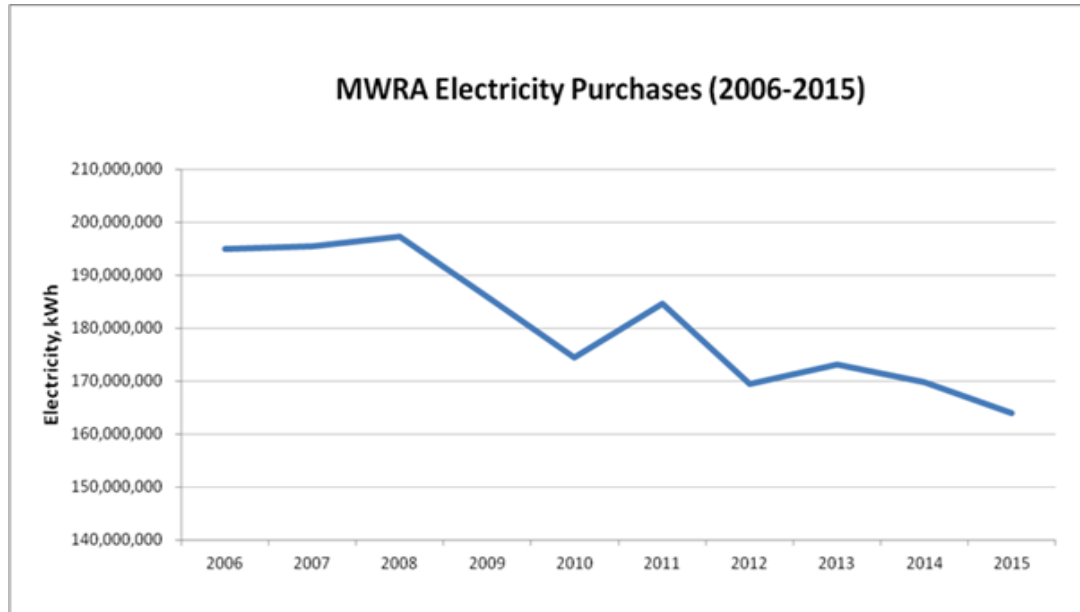
- MWRA has completed over 50 energy audits at most major facilities
- Implementation of audit recommendations and other process optimization efforts have saved over 25M kWh or \$2.5 million annually





Electrical Energy Purchases Have Decreased

- From 2006 to 2015, MWRA's purchases of electricity have been reduced by 16%, or 31.5 million KWh





- In 2015, MWRA undertook a comprehensive Green House Gas inventory to:
 - Calculate historical GHG emissions to identify major sources and reveal trends
 - Highlight successes to date regarding GHG emission reductions
 - Manage GHG risks
 - Identify emissions reduction opportunities



2006 to 2014 Changes in GHG Emissions

- From 2006 to 2014, Green House Gas emissions decreased by 29%

