Maximo Upgrade Project
Contract 7287, Amendment 2

January 17, 2018
- Upgrading Maximo to the latest software version
- Installing additional add-on modules such as Spatial Asset Management and Maximo Anywhere
- Incorporating a variety of disparate MWRA asset databases
- Replacing the existing MIS helpdesk with IBM Control Desk
- Schedule was 26 months from NTP
- Cost not to exceed $2,625,904
Accomplishments and Benefits To Date

• Core Asset & Maintenance Management Module Upgrade Substantially Complete 1/30/2017
  – Start Center Configurations
  – VMM – Scheduling of Pool Vehicles
  – Laboratory Asset Tracking
  – Property Pass
  – Tool Tracking

• Spatial Asset Management and Maximo Anywhere Implementation Substantially Compete 5/1/2017

• Interface Enhancements (Lawson, PI, Fuel Master, Gas Boy, GIS) Substantially Complete 5/1/2017

• IBM Control Desk (ICD)
  – Discovered Installation Sequencing Issues, MWRA Demand for Corrective Action 8/2/2017
  – Completed testing of ICD Module 1/8/2018
  – In progress installing ICD Module on Production Environment 1/22/2018
Facility Asset Management Program (FAMP)

Manages Life Cycle and maintenance activities for 139,000+ Assets throughout MWRA:
- Process approximately 66,000 Work Orders annually
- Tracks Total Asset Life Cycle costs (acquisition to disposition) with total value of Assets in excess of $5 billion
- Ensure reliable plant operation
- Cost effectively replace components at the appropriate time
- Preserve value of ratepayer investment
- Prolong asset life cycle
- Control large budget spending spikes
Start Centers

- Graphical Start Centers Display:
  - Configured toward the User’s job function
  - Are configurable by the User
  - PM/PdM Completion Rates
  - Open Service Requests and Work Orders
  - Quick links to favorite Applications
Maximo Anywhere

- Asset Audit application
  - Perform Asset/Tool Audits
- Work Execution application
  - Enter Labor Actuals and Failure Reporting
GIS Integration

- Asset Location Program
- SSO Field Data Collection
- Cathodic Protection
- Meters
- Valves
Spatial Asset Management

• One or more map “layers” can be displayed within Maximo with the ability to zoom in or out to display:
  – Work Orders current and/or historical
  – Assets Active, Abandoned in-place, Decommissioned, Type, etc.

• Data allows MWRA to find “hot spots” with high failure rates assisting with developing CEB and CIP Asset replacement budgets
Contract 7287 Amendment 1

- 180 Day Extension of Time to correct installation Sequencing of add on Modules
  - Total Resources Management acknowledged responsibility
  - Additional time was required to properly sequence and install Control Desk, migrate data and redeploy the add-on modules to production

- Amendment 1 also authorized the reallocation of $109,222.56 of the unexpended funds to the allowance for Special Support Services which provides for enhancements and additional features not included in the original scope

- In September 2017, the Executive Director approved Amendment 1, under delegated authority, to extend Contract 7287 180 days, to February 3, 2018, with no increase in contract price

- The work to correct the installation sequencing and redeploy the upgraded system has taken longer than anticipated and is scheduled to be complete as of January 22, 2018
Staff request that Contract 7287 be amended to extend the term 328 days, from February 4, 2018 to December 28, 2018 with no increase in contract price:

- ICD Configuration, Testing and Implementation (140 days)
- Special Support Services Tasks (98 days)
- 90 Day Warranty Period
<table>
<thead>
<tr>
<th></th>
<th>AMOUNT</th>
<th>TIME</th>
<th>DATED</th>
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<tbody>
<tr>
<td>Original Contract</td>
<td>$2,625,904</td>
<td>792 Days</td>
<td>06/08/2015</td>
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<tr>
<td>Amendment 1*</td>
<td>$0</td>
<td>180 Days</td>
<td>09/08/2017</td>
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<tr>
<td>Proposed Amendment 2</td>
<td>$0</td>
<td>328 Days</td>
<td>Pending</td>
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<td>Adjusted Contract</td>
<td>$2,625,904</td>
<td>1,300 Days</td>
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*Approved under delegated authority
DeLauri Pump Station Screens and Security Upgrades, Contract 7361

January 17, 2018
DeLauri Pump Station – System Map
Pump Station Overview

60” Ø Influent Sewer
- Combined sewer flows from Cambridge, Boston and Somerville

Pump Station
- (3x) 45 MGD Pumps
- (2x) 93 MGD Screens

Generator Building

60” Ø Sewer Force Main
Scope of Work Included in Contract 7361

• Replace Catenary Bar Screens at Inlet Channel
  – Removal and Installation of Catenary Bar Screens, Electrical Conduit, Control and Instrumentation
  – Concrete Repair Work
  – Start-up and Testing

• Security Upgrades
  – Card Readers (All Doors Used to Enter Pump Station and Generator Building)
  – Door Switches (All Roll-Up Doors)
  – Motion Detectors (Throughout)
  – Conduit and Ductbank Installation
  – Start-up and Testing
Replace Catenary Bar Screens

Sluice Gate Closed

Channel Dry for Bar Screen Replacement

Damaged Bar Screens

Broken Bar Screens
Security System Upgrades
Bids Opened December 27, 2017
Two Bids Were Received
Lowest Responsible Bidder: Daniel O’Connell’s Sons, Inc. $1,330,000

<table>
<thead>
<tr>
<th>Bidder</th>
<th>Bid Price</th>
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<tbody>
<tr>
<td>Daniel O’Connell’s Sons, Inc.</td>
<td>$1,330,000</td>
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<tr>
<td>Engineer’s Estimate</td>
<td>$1,430,000</td>
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<tr>
<td>WES Construction Corp.</td>
<td>$2,123,000</td>
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Prison Point CSO Facility Improvements Design, Construction Administration and Resident Engineering Services

Contract 7359, Amendment 1

January 17, 2018
Scope of Services Includes:

- Mechanical Bar Screens to be Replaced
- Replacement of Conveyor System
Scope of Services Includes:

- Dry Weather and Dewatering Pumps to be Replaced
- Replacement of Leaking Chemical Tanks
Amendment 1 Work Includes:

- Storm Pump Engine to be Replaced
- Relocation of Electrical Room
Amendment 1 Work Includes:

- Interior Lining of Wet Weather Discharge Piping
- Replacement of Lightning Protection on Chemical Building
Amendment 1 Work Includes:

Generator to be Replaced
Amendment 1 – Engineering Work Summary

Time extension of three months for the following additional work:

<table>
<thead>
<tr>
<th>Work Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Additional Diesel Engines for Storm Pumps</td>
<td>$105,000</td>
</tr>
<tr>
<td>Automatic Transfer Switch and Standby Generator</td>
<td>$45,100</td>
</tr>
<tr>
<td>Lining of Discharge Pipe</td>
<td>$45,000</td>
</tr>
<tr>
<td>Final Design of Electrical Room</td>
<td>$28,064</td>
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<tr>
<td>Lightning Protection</td>
<td>$19,900</td>
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<tr>
<td>Project Administration</td>
<td>$16,500</td>
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<tr>
<td>Bidding Services</td>
<td>$13,000</td>
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<tr>
<td>Construction Administration and Resident Engineering Services</td>
<td>$6,125</td>
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<tr>
<td>Escalation</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$302,189</strong></td>
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</tbody>
</table>
Alewife Brook Pump Station Rehabilitation Design, Construction Administration and Resident Engineering Services Contract 7034, Amendment 4

January 17, 2018
Bypass Pumping Arrangement
Extension of Bypass Chamber and Demolition of Boilers
PCB Abatement
Demolition of Screens
Connecting Screen Room to Hatch Area
Additional Time
• Extension of 194 days to align with construction contract

Additional Budget
• Indirect Cost Rates Changes and Labor Escalation $125,949.78
• Contract Admin, Onsite Inspections + Reporting $39,545.79
• Hazardous Materials Oversight $20,000.00
• Shop Test Witnessing $10,000.00

$195,495.57
Chelsea Creek Headworks Upgrade
Contract 7161 - Change Order 7

January 17, 2018
Chelsea Headworks Upgrade: Corroded Plumbing Systems
Chelsea Headworks Upgrade: Corroded Plumbing Systems

![Image of corroded plumbing systems]
Chelsea Headworks Upgrade: Asbestos Tar Paper Abatement
Chelsea Creek Headworks: Exterior Brick and Panel Removal
Chelsea Headworks Upgrade: Channel 1 Demolition
Chelsea Headworks Upgrade: New Electrical Service
Chelsea Headworks Upgrade: Floor Coatings
Chelsea Headworks Upgrade: Pile Driving
Report on 2017 Water Use Trends and Reservoir Status

January 17, 2018
Total Consumption by MWRA Communities (1980 to 2017)

2017 -- 183.3 mgd
Daily System Demand

Max Day - 274.65 mgd

Xmas - 151.2 mgd
Boston Water Use (1900 to 2017)

2017 average = 63 mgd
Fully Supplied Communities Demand (2000 to 2017)

- **Seasonal demand**
- **Base (or indoor) demand**
Fully Supplied Communities Annual Base and Outdoor Demand

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent of Total</th>
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<tbody>
<tr>
<td>2000</td>
<td>12.6</td>
</tr>
<tr>
<td>2002</td>
<td>18.7</td>
</tr>
<tr>
<td>2004</td>
<td>17.2</td>
</tr>
<tr>
<td>2006</td>
<td>18.2</td>
</tr>
<tr>
<td>2008</td>
<td>18.4</td>
</tr>
<tr>
<td>2010</td>
<td>20.1</td>
</tr>
<tr>
<td>2012</td>
<td>18.5</td>
</tr>
<tr>
<td>2014</td>
<td>14.8</td>
</tr>
<tr>
<td>2016</td>
<td>18.6</td>
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<tr>
<td>2018</td>
<td>18.6</td>
</tr>
<tr>
<td>2020</td>
<td>25.7</td>
</tr>
<tr>
<td>2022</td>
<td>24.5</td>
</tr>
<tr>
<td>2024</td>
<td>13.5</td>
</tr>
</tbody>
</table>
Fully Supplied Communities (Annual Base and Outdoor Use)
Partially Supplied Communities

Annual demands shown as barplots, while daily is shown as a linegraph on this composite plot.
Reservoir Withdrawals – 5 Year Running Average

5-year average withdrawal = 203.3 mgd
Quabbin Reservoir Volume

Crossed into Normal on 6/11/2017

Crossed higher than 2016 on 7/17/2017

24 Billion Gallons higher on 12/31/2017

% Full

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

80

Below Normal

Warning

Normal
Wachusett Reservoir Railroad

January 17, 2018
• 23.7 miles of track which runs from Ayer to Worcester
Tracks Located Near/Over Wachusett Reservoir
Condition of Tracks within the Wachusett Watershed

- Tracks maintained to Federal Railroad Administration Class I standards
• Breakdown of 4,352 derailments reported to the Federal Railroad Administration reported in the Journal of the Transportation Research Board
January 2017 Derailment within the Wachusett Watershed
January 2017 Derailment within the Wachusett Watershed
• Estimated cost to improve the condition of the track in the watershed from its current condition to FRA Class IV

<table>
<thead>
<tr>
<th>Improvement</th>
<th>MassDOT</th>
<th>PanAm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track Improvement 7.6 Miles (136 lb Rail and new ties)</td>
<td>$13,857,588</td>
<td>$7,053,950</td>
</tr>
<tr>
<td>Drainage and Tree/Brush Removal</td>
<td>$1,490,000</td>
<td>$1,938,750</td>
</tr>
<tr>
<td>Train and Track Condition Monitors</td>
<td>$2,550,000</td>
<td>$1,520,276</td>
</tr>
<tr>
<td>Grade Crossing Improvements (6 crossings)</td>
<td>$1,427,199</td>
<td>$1,535,408</td>
</tr>
<tr>
<td>Estimated Cost before Contingency</td>
<td>$19,324,787</td>
<td>$12,048,384</td>
</tr>
<tr>
<td>Contingency</td>
<td>$3,557,040</td>
<td>$2,409,677</td>
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<tr>
<td>Total Estimated Cost for Improvements</td>
<td>$22,881,827</td>
<td>$14,458,061</td>
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</table>

* Based on cost estimate provided to MassDOT from Jacobs Engineering Group June 2015. PanAm estimate based on numbers as of January 2016.

• Improvements to the two 3-mile approach zones could range from $6 to $8 million.
• MWRA would require PanAm to maintain the tracks to the higher track standard.
• After improvements track speed within the watershed would be restricted to 10 mph.
MWRA’s section includes the 7.6 miles in the watershed and two 3-mile approach zones on either side of the reservoir.

Best mechanism to protect MWRA’s potential investment in the track structure:
- Ownership of the line by MWRA, MassDOT or MBTA
- Formal agreement with PanAm