



Presentation to

MWRA Board of Directors

***Thermal and Hydro Power Plant Maintenance
Deer Island Treatment Plant***

March 12, 2014



On-Site Thermal/Power Plant



- Built in 1998
- Provides Electrical Generation, Process and Facility Heat at Deer Island WWTP
- Two (2) High Pressure Steam Boilers fired on Digester Gas, No. 2 Fuel Oil or Combo
- Main Steam 590psig at 750deg F
- Two (2) Steam Turbine Generators:
 - 18-megawatt Main STG
 - 1.2-megawatt Back Pressure STG



Hydroelectric Power Plant



- Built in 2001
- Provides Electrical Generation from Treated Wastewater prior to discharge into 9.5 Mile Effluent Outfall Tunnel
- Two (2) 1.1-Megawatt Kaplan Hydroelectric Turbine Generators
- Electrical Output varies based on Plant Flow and Tunnel Shaft Level (Ocean Tides and Tunnel Headloss)



Contract Summary

- O'Connor Corporation - \$3,273,607
- Contract Duration: 730 days
- Scope:
 - 1) Perform Scheduled Maintenance and Inspection Services at each Facility;
 - 2) Provide Emergency and Non-Emergency Repair Services at each Facility;
 - 3) Install Steam Bypass Line at Thermal/Power Plant;
 - 4) Demo Abandoned Cooling Water Lines at Thermal/Power Plant;
 - 5) Replace Various Pumps at Thermal/Power Plant



Two High Pressure Steam Boilers





18-Megawatt Steam Turbine Generator





1.2-Megawatt Back Pressure Steam Turbine Generator





Hydroelectric Turbine Generator







Presentation to

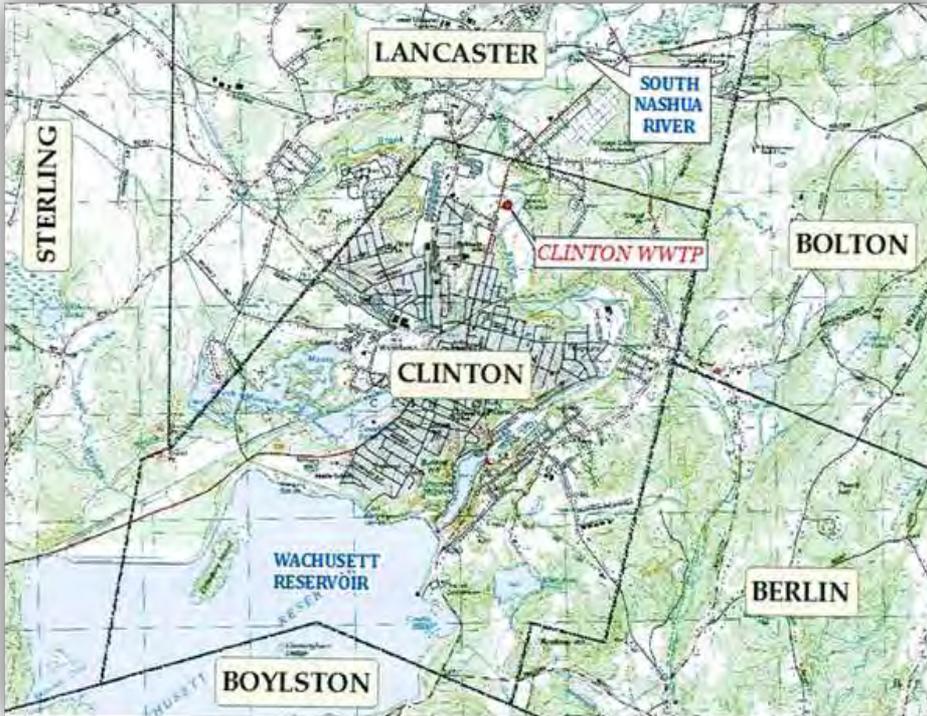
MWRA Board of Directors

***Rehabilitation of Anaerobic Digesters,
Primary Clarifiers and New Influent Gates
at Clinton AWWTP***

March 12, 2014



Clinton AWWTP Overview



- Built in 1995
- Advanced wastewater treatment services to the Town of Clinton and Lancaster
- Design capacity:
 - Average: 2.5 MGD
 - Peak: 12 MGD
- Rehabbed in 1992



Facility Map



Historical Pump Station, original

Sludge Holding Tank

Anaerobic Digesters recently rehabbed

Gravity Thickeners (2)

Sludge Dewatering Building

Primary Clarifiers recently rehabbed

Final Clarifiers (3)

Aeration Tanks

80' Diameter Trickling Filters (2)

60' Diameter Trickling Filters (2) with new distribution arms



Contract Summary

- Contract #7277A
- Lowest Bidder: R. H. White Construction Co. - \$4,347,571
- Contract Duration - 730 days
- Scope:
 - 1) Replace existing Primary Clarifier scum/Sludge collection Equipment and concrete remediation;
 - 2) Rehabilitation of two digester tank covers;
 - 3) Replacement of various digested sludge pumps piping and valves;
 - 4) Replacement of Digester mixing system;
 - 5) Add isolation gates to protect the plant in the event of catastrophic flooding



Primary Clarifier Concrete Restoration





Primary Clarifier Walkway Concrete Restoration





Digester Sludge Transfer Pump





Digester Floating Cover (Steel)





Digester Fixed Concrete Cover





Primary Clarifiers







Massachusetts Water Resources Authority

Presentation to

Board of Directors

***Remote Headworks Upgrade
Amendment 3***

March 12, 2014



Remote Headworks Facilities – Location Plan





Amendment 3 Summary – New Scope Items

- **Relocation of Odor Control Equipment**
 - Original layout on north side of facility
 - New layout on south side of facility
- **Additional Design Items**
 - Conversion to natural gas to reduce heating costs
 - Individual electric actuators for sluice gates
 - Connection to City of Chelsea water system
- **Flood Protection**
 - Protect facility from 100-year storm plus 2.5 feet
 - Integrated building solutions for exterior protection from floods
 - Interior improvements to isolate facility from influent
- **MA Contingency Plan Reporting Requirements**
 - Phase II Report and Risk Assessment
 - Revised Activity and Use Limitation (AUL)



Odor Control Equipment Alignments





Views of Odor Control Equipment



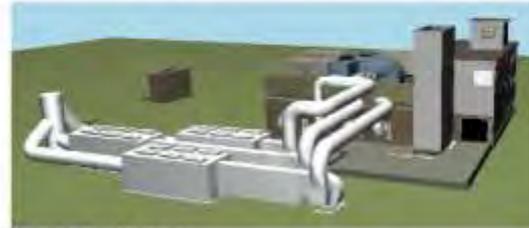
South Side - Existing View



North Side - Existing View



View at 60% Design –
Odor control units over conduits between Headworks and Screen House



View at 60% Design –
Odor control units over conduits between Headworks and Screen House



View with relocation of odor control equipment to Congress Avenue Extension



View with relocation of odor control equipment to Congress Avenue Extension



Flood Protection – Existing Exterior

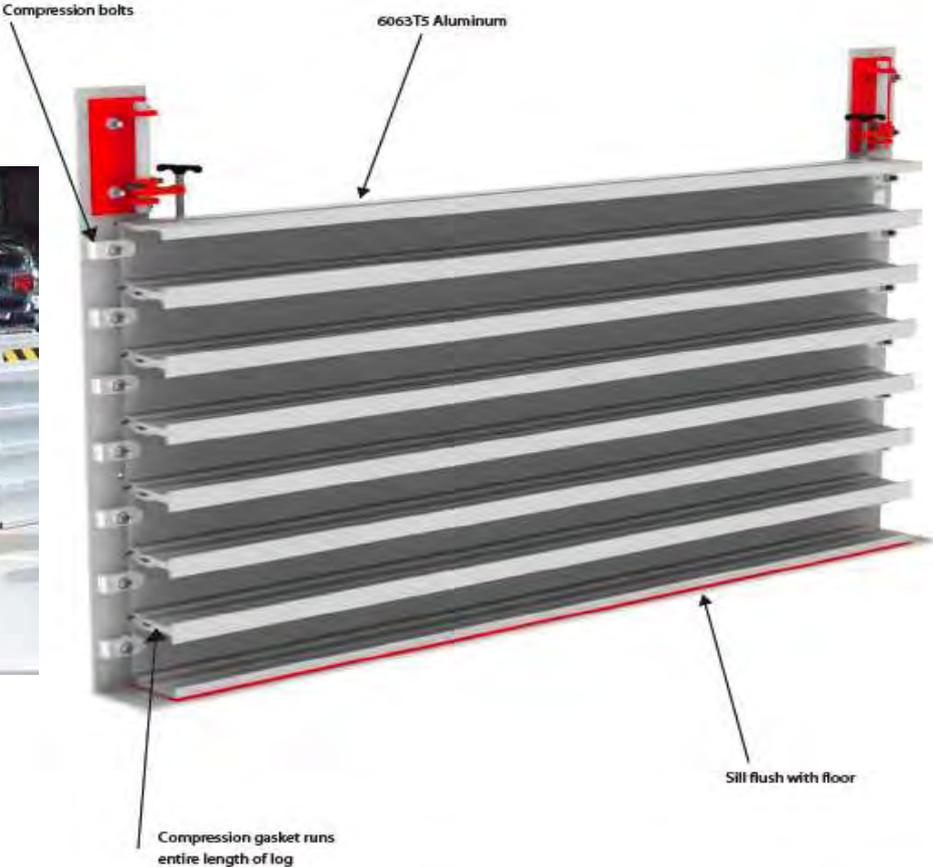


— Elevation 119
— Elevation 116.5





Flood Protection Barriers







***2014 Update on
Local Pipeline
Financial Assistance Program***

March 12, 2014



Unlined Water Mains Need to be Replaced



Old unlined cast iron pipe needs to be replaced or cleaned and lined to prevent tuberculation (rust build up), loss of disinfectant residual and potential bacteria growth



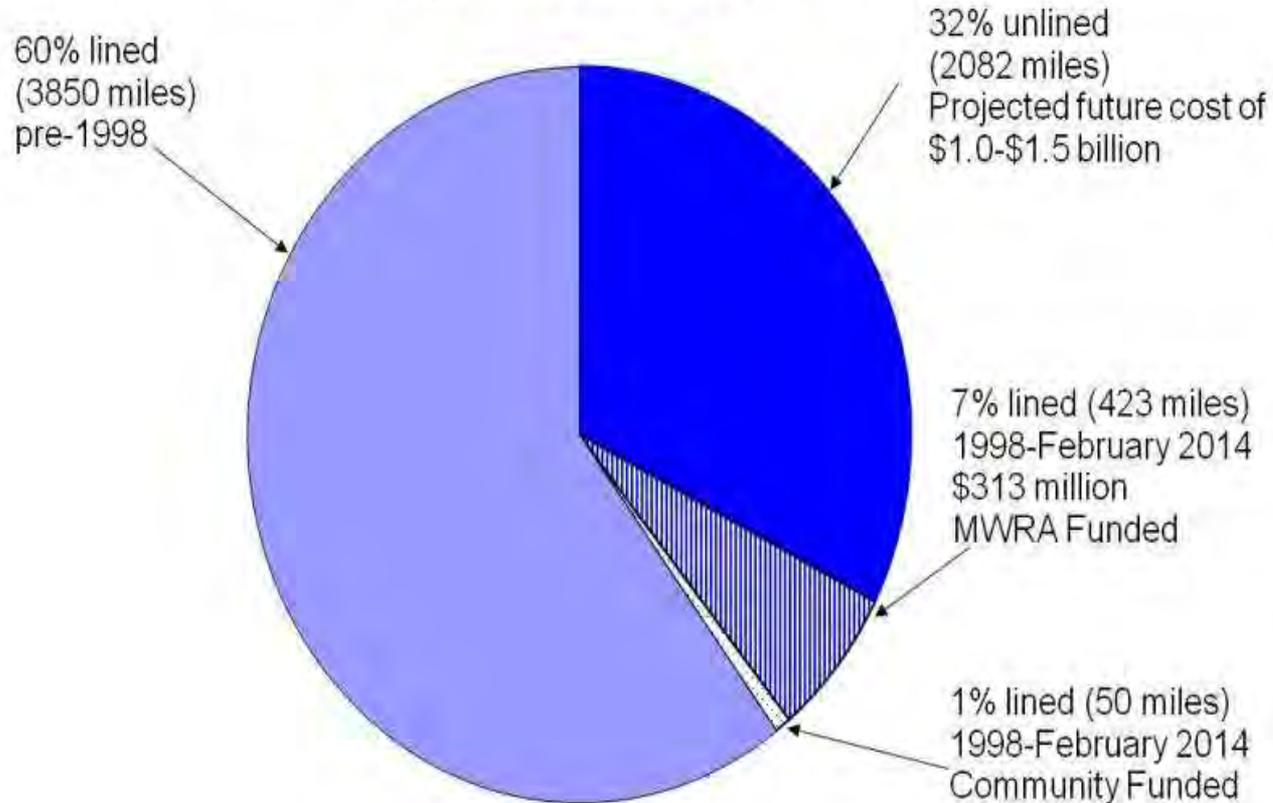
Water Financial Assistance Program - Summary

- \$30M Pilot Program in FY98-FY99
- \$222M Phase 1 Program FY01-FY13
- \$210M Phase 2 Program FY11-FY20 (\$61M distributed)
- 100 percent interest-free loan repaid over 10 years
- All Loans Repaid to MWRA
- 38 Communities Have Participated – 328 Projects Funded during Phases 1 and 2



Status of Regional Water System

**Regional Water System Lined and Unlined Pipe
About 6400 Miles of Community Water Mains
Updated February 2014**





Water Financial Assistance Program - Results

- \$313 million invested in community water projects
- 270 miles water main replaced with new cement lined pipe
- 153 miles existing water main cleaned and lined
- 4,600 lead service connection replacements
- Additional system improvements include valves, hydrants, storage tanks, booster pump stations, and meter projects



Examples of Tuberculated Pipe





New Cement Lined Ductile Iron Pipe





Typical Replacement Project – West Roxbury





Typical Cleaning and Lining Project - Norwood





Reading Water Quality Pipeline Issues

- Board Authorized Early Distribution to Reading January 2013
- \$4,012,000 Distributed August 2013
- Replacement of 15,500 LF and Cleaning and Lining of 16,200 LF
- Design Complete, Construction bidding for Spring 2014



Local Projects Coordinated with MWRA Projects

- Cost Savings Achieved through Economy of Scale
 - Saugus - \$450,000 for Design to Replace 6,000 LF Project Bid under MWRA Lynnfield Pipeline Contract
 - Milton - \$750,000 for Construction to Replace 9,200 LF Project Bid under MWRA Southern Spine Contract





Milton Pipe Bursting Project

- Pipe Bursting Construction Method Utilized to Avoid Wetland Impacts





Lead Service Replacement Projects



- Arlington – 210
- Everett – 300
- Malden – 1200
- Medford – 150
- Melrose – 200
- Norwood – 110
- Somerville - 450



Canton Water Quality Issues at Local Water Storage Tanks



- \$1.1 million demolition/replacement of 0.7 MG Tolman Street Standpipe
- \$0.5 Million cleaning and rehabilitation of 0.6 MG Ponkapoag Standpipe
- \$410,000 replacement of faulty hydrants and gate valves



Canton Ponkapoag Standpipe Rehabilitation







***Update on
Co-Digestion***

March 12, 2014



Bench Scale Set-up





Project Site Before Demolition





After Demolition With New Equipment Pads





Thickened Sludge Pump





Food Waste Truck







Presentation to

MWRA Board of Directors

***Spot Pond Covered Storage Project
Update***

March 12, 2014

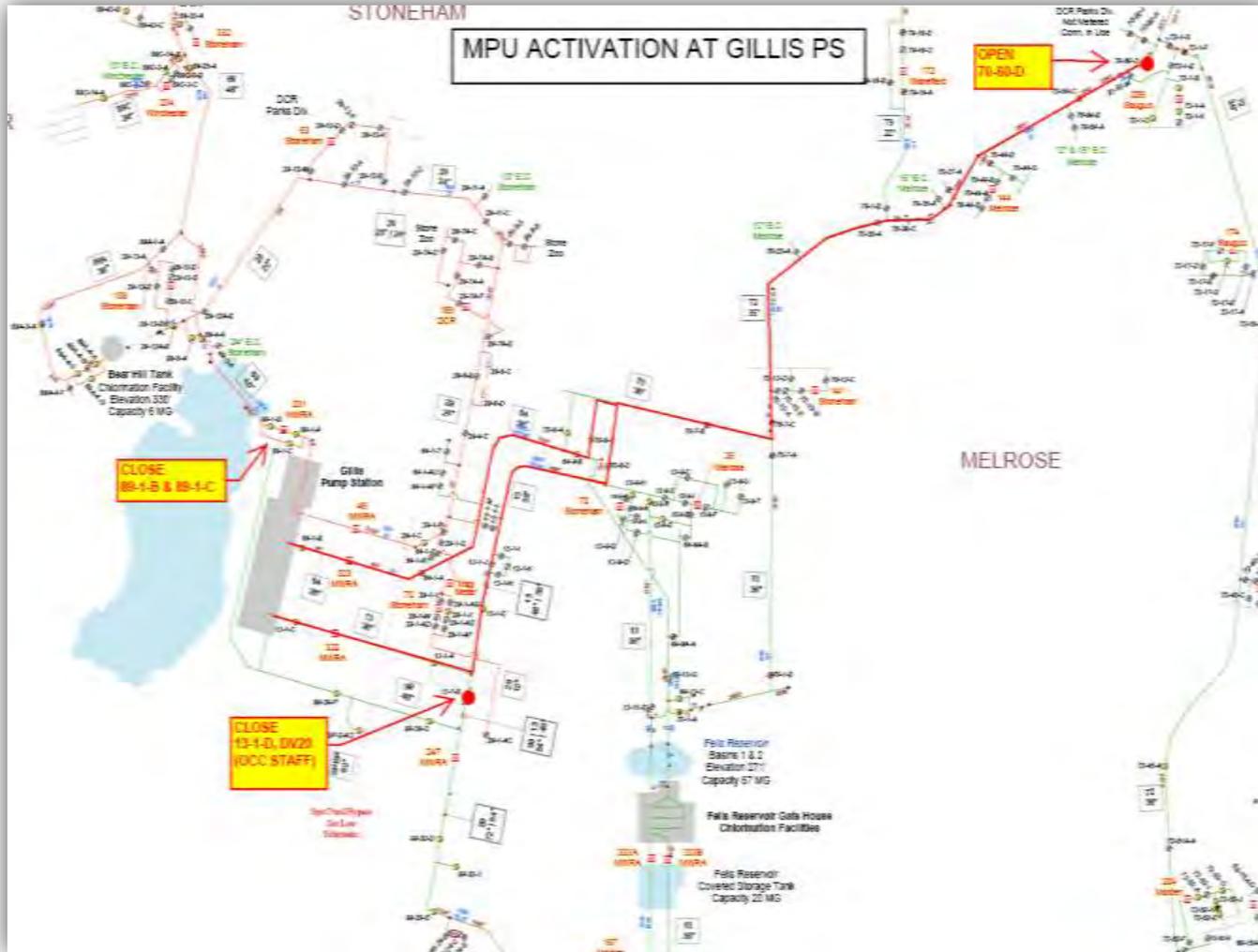


Covered Storage Tank Overflow Pipe





Section 99 Isolation





Mobile Pumping Units Deployed





Overflow Pipe Jacking Pit



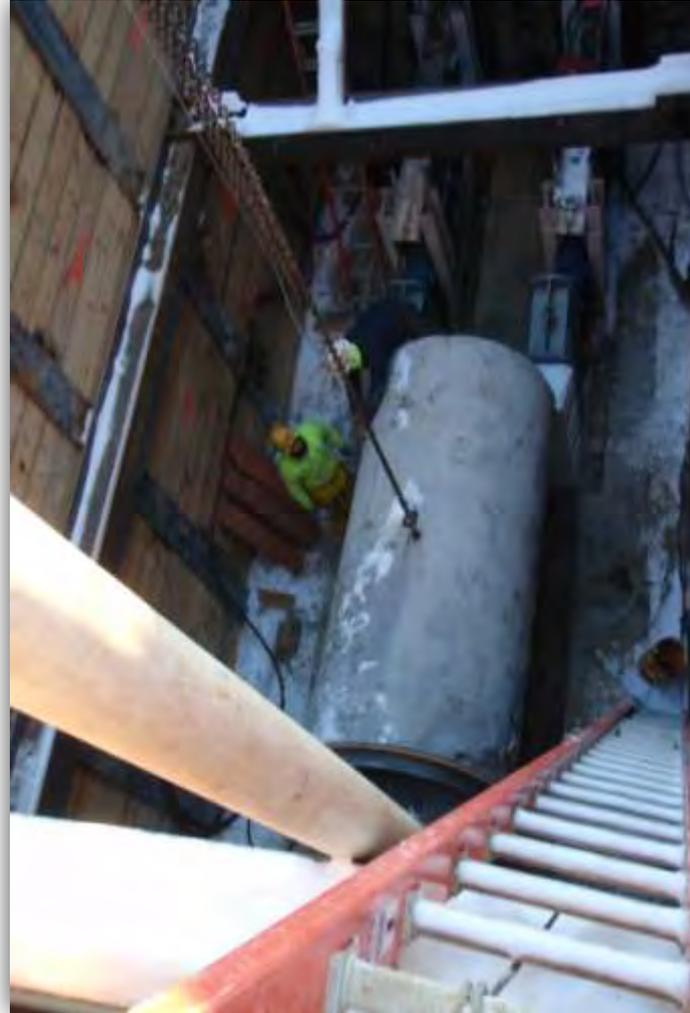


Overflow Pipe in Jacking Pit





Overflow Pipe in Jacking Pit





Muck Removal





Muck Removal



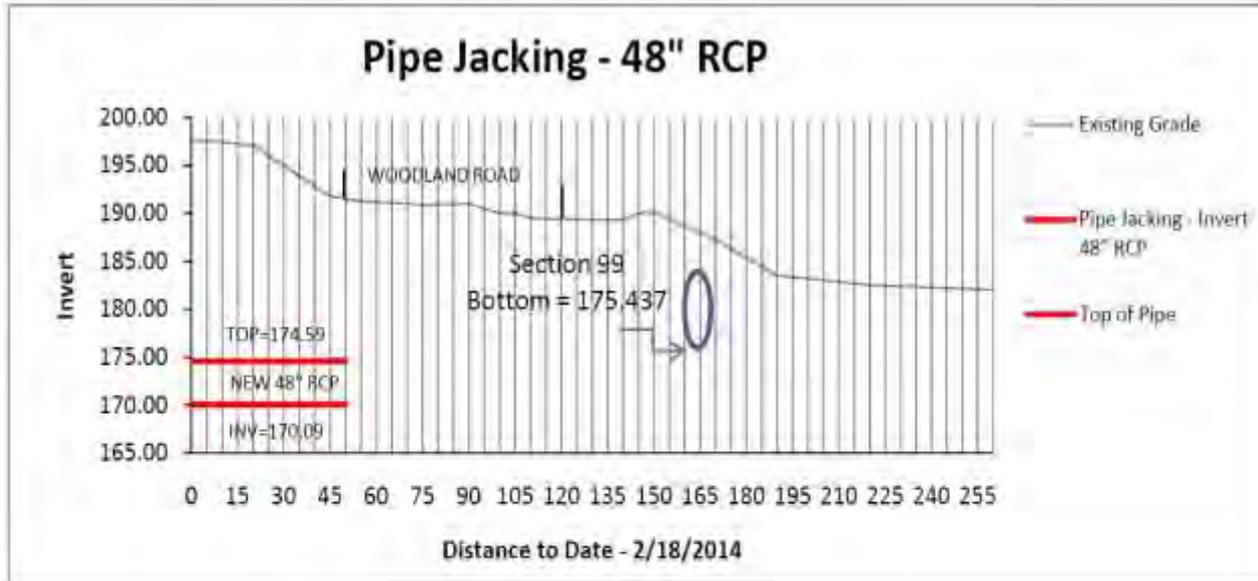


Clearing for Receiving Pit





Tracking of Pipe Jacking



Date	Daily Length	Length to Date (LF)
2/06/2014	0	0
2/07/2014	7	7
2/10/2014	6	13
2/11/2014	7	20
2/12/2014	8	28
2/13/2014	6	34
2/14/2014	9	43
2/18/2014	8	51

Work Days Remaining
to Section 99 (Center-Line)
15.2



Pump Station and Tank Wall





Pump Station and Tank Wall





Tank Wall





Concrete Pour





Rendering of Pump Station

