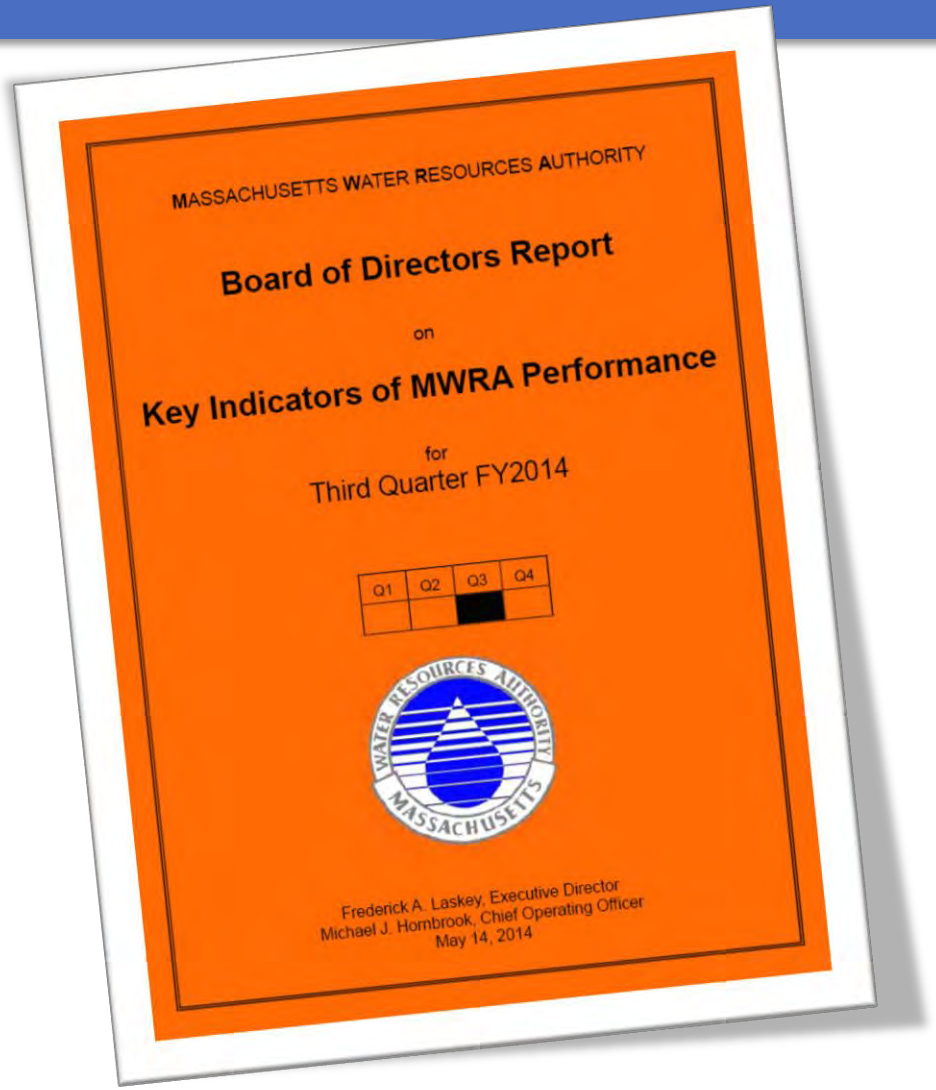
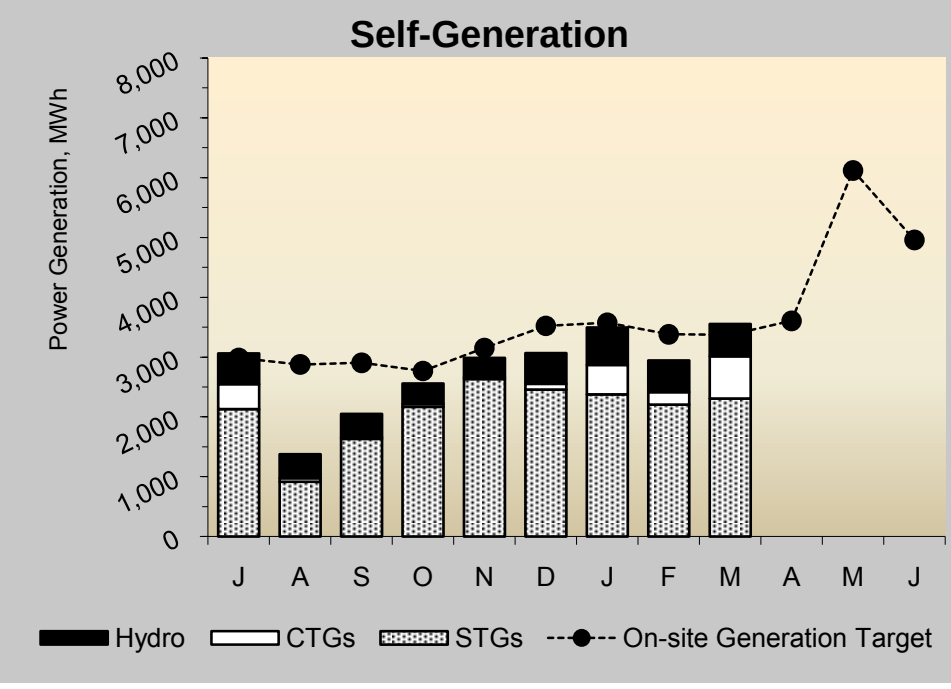
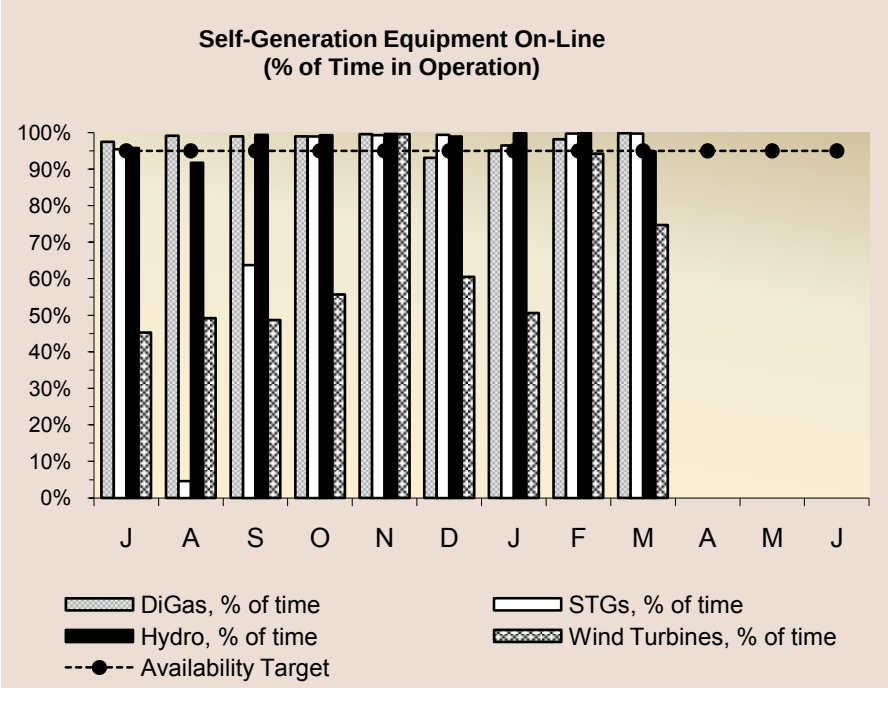
Massachusetts Water Resources Authority

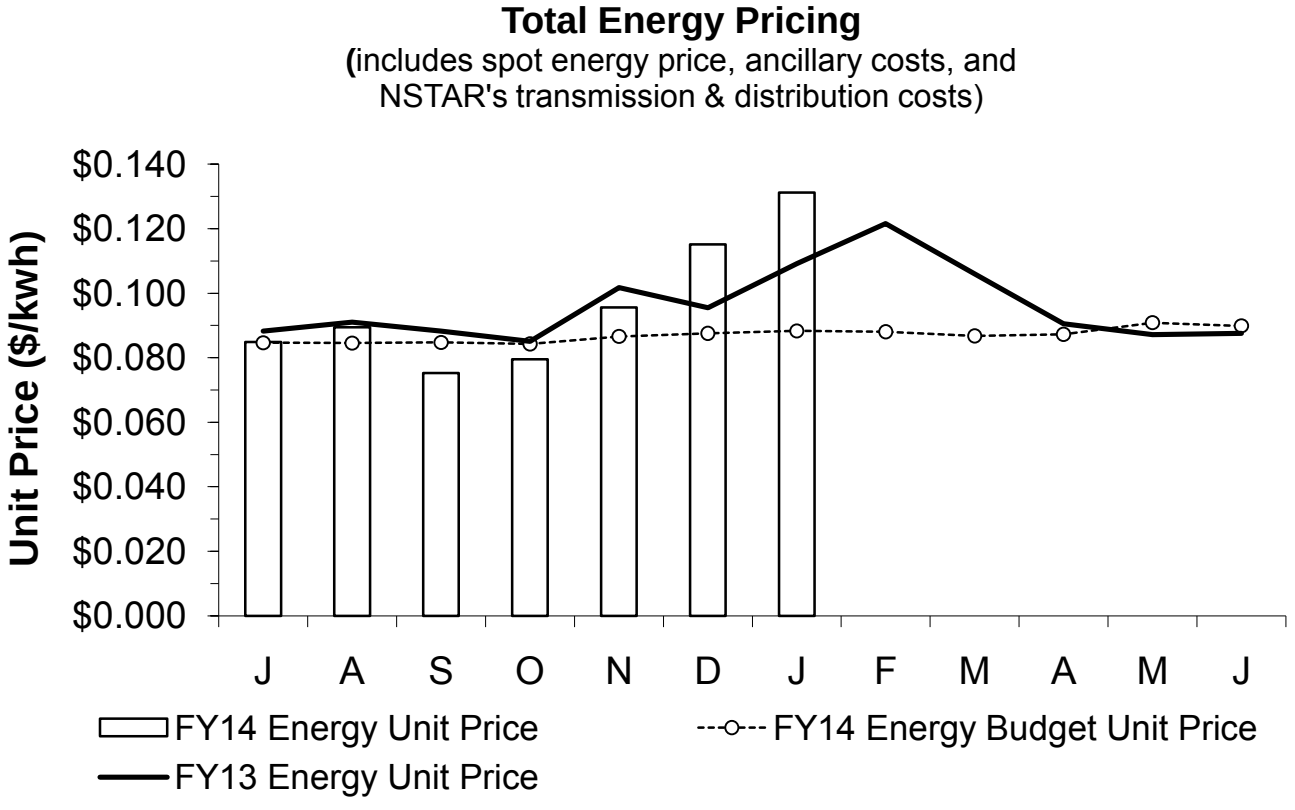


Deer Island Operations

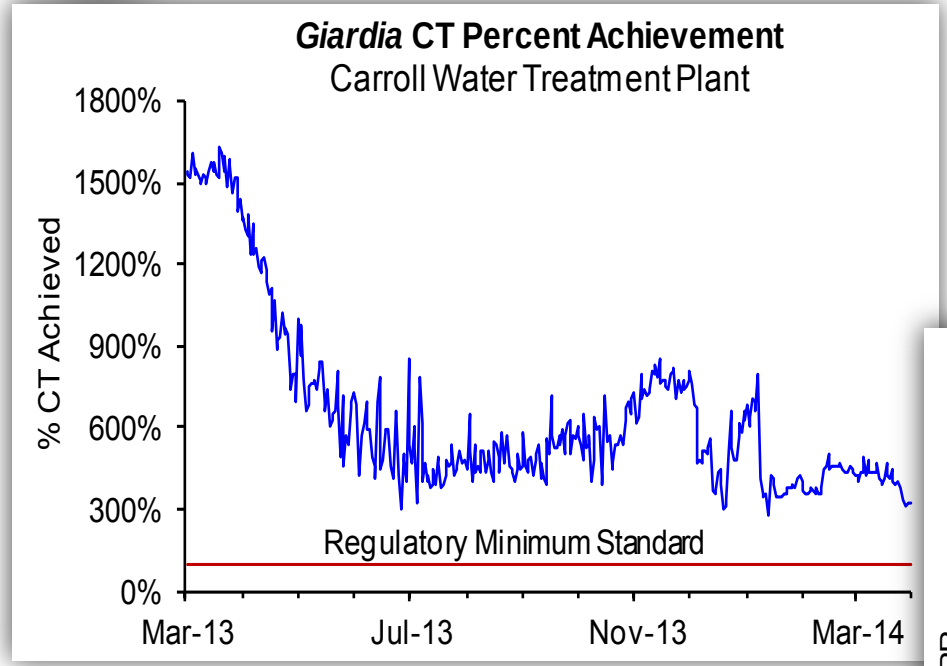


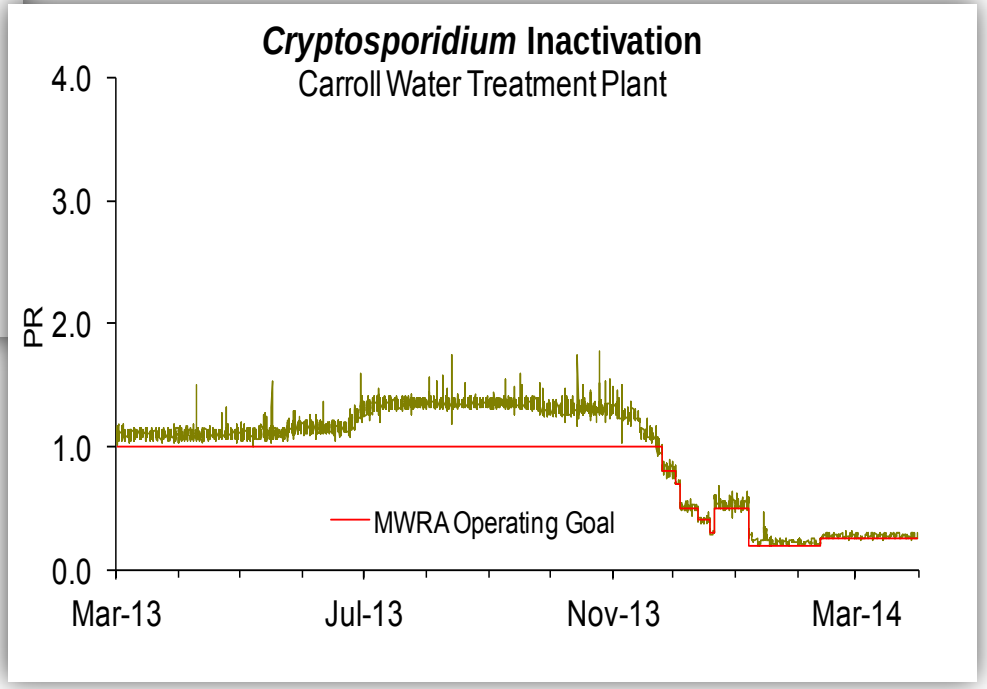


Deer Island Energy

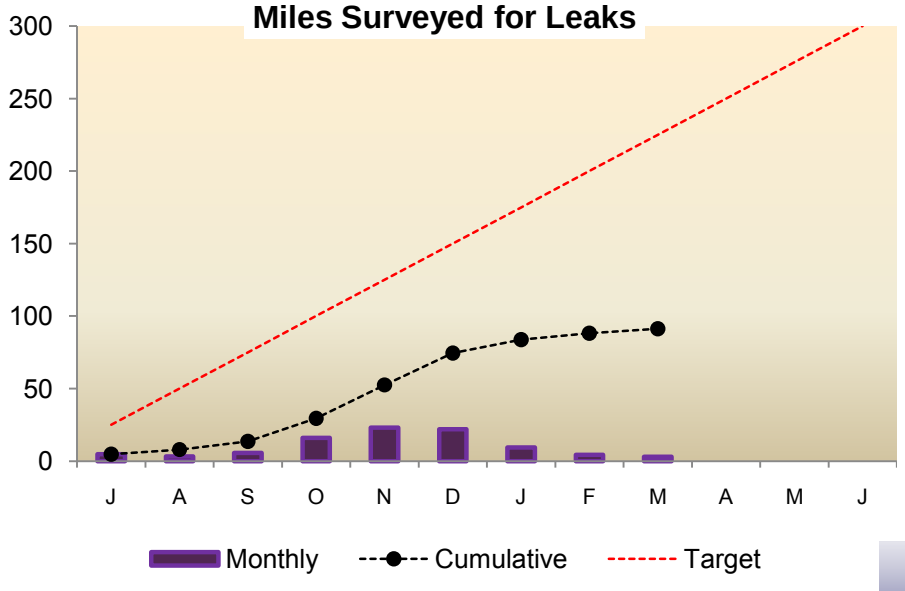


Treated Water – Disinfection Effectiveness
Giardia CT and *Cryptosporidium* Inactivation





Water Distribution System Pipelines



Water Distribution System

Month	J	A	S	O	N	D	J	F	M	A	M	J
Leaks Detected	2	1	0	8	5	6	3	1	3			
Leaks Repaired	0	1	2	5	4	5	4	4	2			
Backlog	2	2	0	3	4	5	4	1	2			
Avg. Lag Time	1.0	20.0	27.3	13.7	15.3	16.4	20.0	22.0	21.9			


WATER RESOURCES AUTHORITY
MASSACHUSETTS

Presentation to

MWRA Board of Directors

Update on the Operation and Maintenance of the Pelletizing Plant

David Duest
Director, Deer Island

May 14, 2014

Pellet Plant – Contract O&M Since 1991

- Process 103 Dry Tons/Day
  - Receive Digested Sludge
  - Dewater with Centrifuges
  - Dry with Thermal Dryers
  - Produce Class A Fertilizer Pellet
- Develop and Maintain Diverse Markets for beneficial reuse
  - Land Application
  - Fertilizer Blenders
  - Alternate Fuels
- Maintain Facility and Equipment

Pellet Plant – Contract Renewal Preparation Step 1

Condition Assessment Findings

Study conducted by AECOM

- Facility is in excellent condition
  - 20-year life remaining
    (with continued maintenance)

- Some Electrical Equipment Outdated
  - NEFCo replaced all but one PLC
  - NEFCo replaced every centrifuge control panel

Pellet Plant – Contract Renewal Preparation Step 2

Technology Options Assessment

Study conducted by CDM Smith

(Recommendations impacting Pellet Plant)

- Several Pilot Scale Evaluations Recommended at DITP
  - Co-Digestion
  - Secondary Sludge Pre-Treatment
    - Using Open-Cel Technology
  - Struvite Mining

Pellet Plant – Contract Renewal Preparation Step 2 (cont.)

Pellet Plant Recommendations

- Same Process
  - Consider larger, more efficient Dryer Trains
- Evaluate impacts of pilot programs at DITP
- Given long remaining life of facility, any capital expense decisions must rely on payback
- Suggested next long-term bid package – 20 years
- Recommended 5-year extension to quantify impacts of pilots and new dryer ops

Pellet Plant – Existing Contract with NEFCo

Current Contract Cost Structure

- Fixed Fee first 90 dtpd (~$400/ton)
- Variable Fee >90 dtpd (~$280/ton)

- Fixed yearly capital dollar value (pre-determined)
- No pass-throughs for utilities
  - Includes adjustments for inflation

- FY13 Avg - ~$380/ton

Pellet Plant – Contract Options

- Competitive Bid, 20-year
- Competitive Bid 5-year
  - Followed by a competitive bid 20-year contract
- 5-year extension to NEFCo contract
  - Followed by a competitive bid 20-year contract


WATER RESOURCES AUTHORITY
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Presentation to

MWRA Board of Directors

Power Outage at MWRA Pelletizing Plant May 7, 2014

David Duest
Director, Deer Island

May 14, 2014

May 7 , 2014 Power Outage

- Initiated by truck accident

May 7 , 2014 Power Outage

- Unique outage:
  - Power went out and came back on several times in a 15-minute window

- Equipment Damage:
  - Four centrifuge 300 hp variable frequency drives damaged

- All Impacted Equipment Repaired within 5 days
  - One unit repaired, three units replaced under warranty

- No long term operational impacts
  - Short term disruption at Pellet Plant, no impacts to DITP Operation

Equipment Status Before Outage

Centrifuge # *	Dryer Train # *	Status Before Outage
1	1	Offline but available
2		Offline but available
3	**2**	**Out for maintenance**
4		
5	3	In operation
6		In operation
7	4	In operation
8		In operation
9	**5**	**Dryer out for maintenance (bearing failure) Centrifuges available**
10		
11	6	In operation.
12		In operation.

* 3 Dryer trains (6 centrifuges) required for normal operation.

Equipment Status After Outage

Centrifuge # *	Dryer Train # *	Status Before Outage	Impact due to Outage	Current Status
1	1	Offline but available	None	In operation within one hour of trip
2		Offline but available	None	
3	**2**	**Out for maintenance**	**None**	**Out for maintenance**
4			**None**	
5	3	In operation	Tripped; No damage	In operation within three hours of trip
6		In operation	Tripped; No damage	
7	4	In operation	Tripped; **VFD damage**	VFD replaced 5/12; Available
8		In operation	Tripped; **VFD damage**	VFD replaced; Available
9	**5**	**Dryer Out for Maintenance; Centrifuges available**	None	Dryer bearing repaired; Train available if needed 5/12
10			None	
11	6	In operation	Tripped; **VFD damage**	Repaired 28 hours after trip; On-line
12		In operation	Tripped; **Minor VFD damage**	Repaired 24 hours after trip; On-line

* 3 Dryer trains (6 centrifuges) required for normal operation.

Scorching Visible on House of Damaged VFDs

Centrifuge No. 11 VFD

Damage to Centrifuge Panel No. 7

Outcome

Lessons Learned

- Pelletizing Plant susceptible to damage from major power failures
- NEFCo is working with OEM to prevent issue from reoccurring

Impacts

- No DITP Operational Impacts
- Minor impacts to NEFCo operating schedule over weekend
- Zero financial impact –equipment warranty covered expenses


WATER RESOURCES AUTHORITY
MASSACHUSETTS

Presentation to

MWRA Board of Directors

Valve and Piping Replacements
Various Facilities
Deer Island Treatment Plant

Richard Adams
Manager, Engineering Services

May 14, 2014

Contract 7275 Summary

Contractor:	Carlin Construction Company
Contract Price:	$16,960,425
Contract Duration:	1,095 days

- Scope: Replace Valves and Piping at the following Deer Island facilities:
  1. North Main Pump Station: Butterfly Valves (20) and Flow Meters (10)
  2. Winthrop Terminal Facility: Knife Gates(6), Plug Valves(9), Check Valves(6) & Flow Meters(6)
  3. South System Pump Station: Dashpots on Slanting Disc Check Valves (8)
  4. Primary Clarifiers & Gravity Thickener Complex: Sludge Piping (6,500 lf), Scum Piping (2,000 lf) and Valves (107)
  5. Secondary Clarifiers: RSL Plug Valves (81), WSL Plug Valves(3)

North Sewer System Shutdowns and Temporary Dewatering System

- Several existing valves do NOT provide complete isolation

- Up to 50 shutdowns of the North Sewer System required to replace the valves at both the North Main Pump Station and Winthrop Terminal Facility:

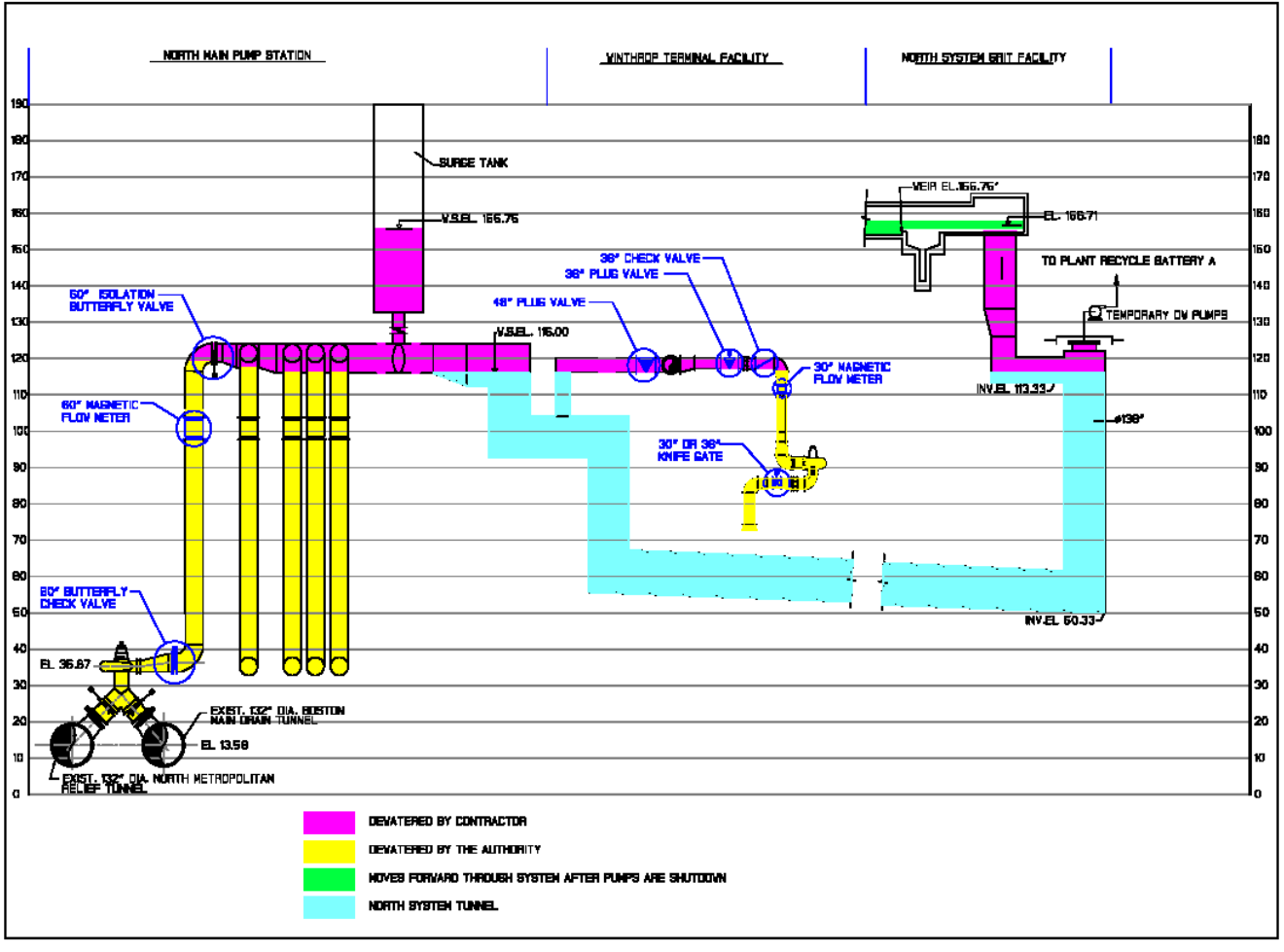
  - North Main Pump Station (30 shutdowns)
  - Winthrop Terminal Facility (18 shutdowns)
  - Installation and Removal of temporary dewatering system (2 shutdowns) on Deer Island

North Sewer System Shutdowns and Temporary Dewatering System

- North Sewer System shutdowns will be scheduled during night time hours (11PM-7AM) and only when conditions allow

- Contractor will only be allowed to work on one pump at a time

Plant Shutdowns and Temporary Dewatering System



North Main Pump Station

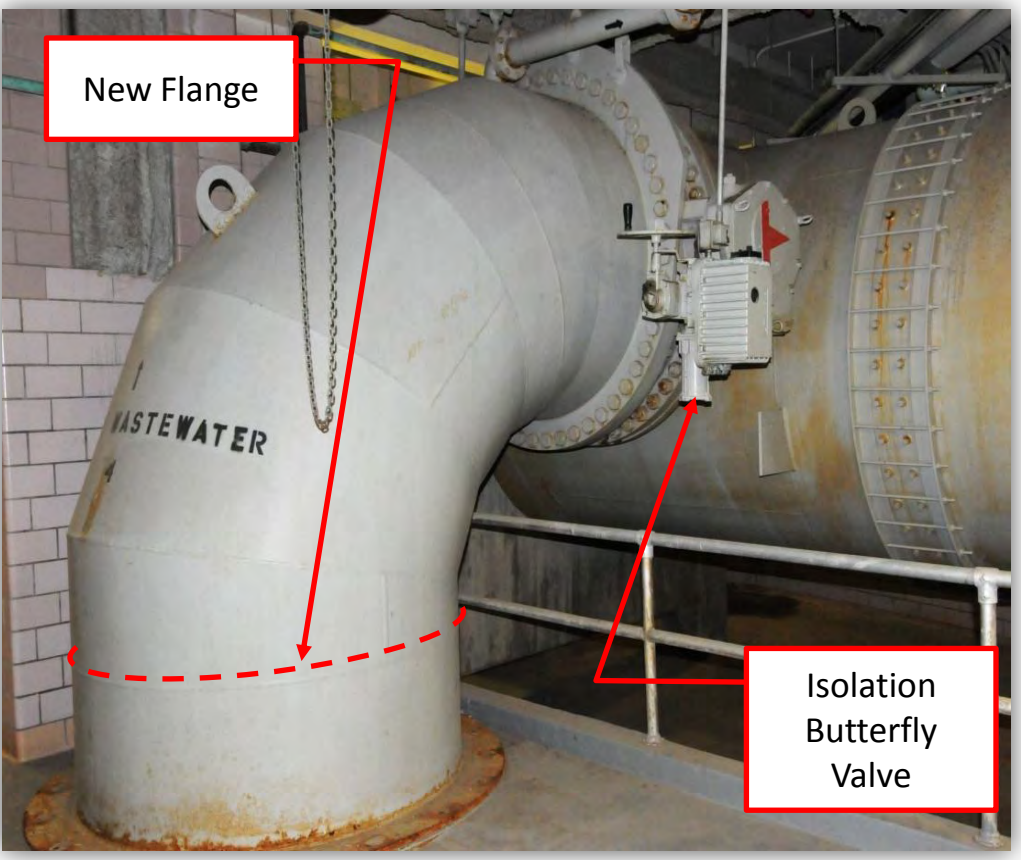
Receives the North Sewer System Flow from Boston Main Drainage Tunnel and North Metropolitan Relief Tunnel

Facility capacity is 788 MGD

Ten 3,500 hp Raw Wastewater Pumps rated at 110-150 MGD each

RWW Pumps, Piping and Valves installed during Boston Harbor Project in 1995

North Main Pump Station: Isolation Butterfly Valves



- Ten 60-inch Isolation Butterfly Valves and flanges located at Level B1
- These valves isolate each pump riser from the 96-inch RWW header which connects to the North System Tunnels
- Electrically Operated Valves

North Main Pump Station: Magnetic Flow Meters

- Ten 60-inch Magnetic Flow Meters located at Level B2
- Existing electronics for these flow meters are now obsolete

North Main Pump Station: Butterfly Check Valves

- Ten 60-inch Butterfly Check Valves located on pump discharge at Level B5
- These valves will be replaced while the 96-inch RWW header is isolated with a blind flange

Winthrop Terminal Facility

Receives North Sewer System Flow from North Metropolitan Trunk Sewer

Facility capacity is 125 MGD

Six 600 hp Raw Wastewater Pumps rated at 32 MGD each

RWW Pumps, Piping and Valves installed during Boston Harbor Project in 1995

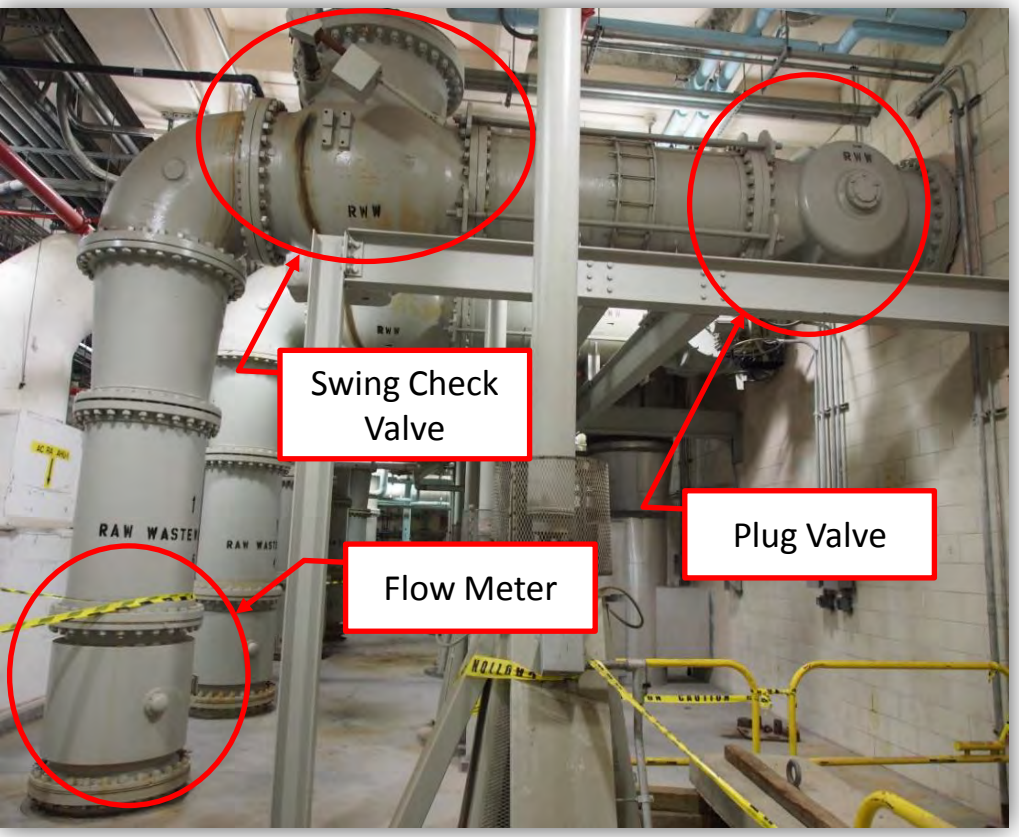
Winthrop Terminal Facility: Force Mains

- Three 48-inch Electrically Operated Plug Valves on WTF Force Mains
- Valves do not provide positive shutoff preventing safe isolation at facility

Winthrop Terminal Facility: Pump Suction

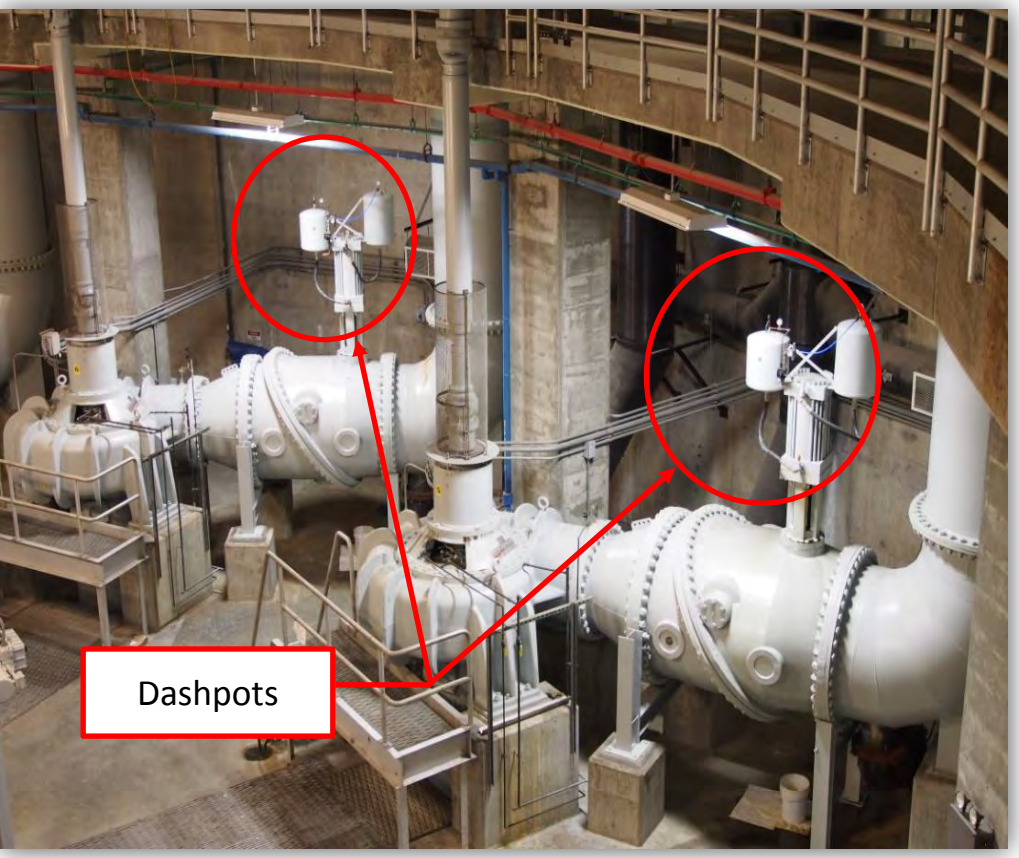
- Six electrically operated Knife Gates and Piping on RWW Pump Suction
  - Two 36-inch (#2&5)
  - Four 30-inch (#1,3,4,6)

Winthrop Terminal Facility: Pump Discharge



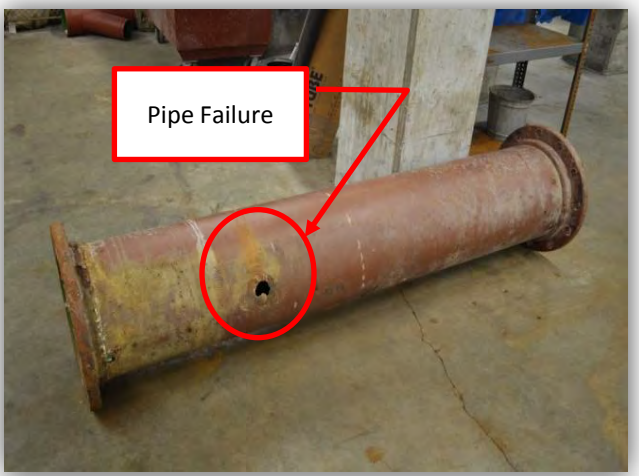
- Each of the six Pump Discharge Lines Include:
  - 30-inch Magnetic Flow Meter
  - Existing electronics for these flow meters are now obsolete

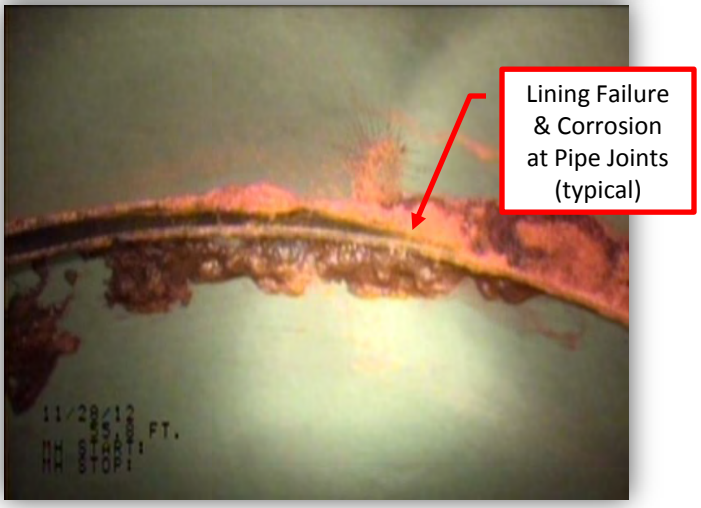
South System Pump Station: Dashpot Replacement



- Replace eight hydraulic dashpots on Slanting Disc Check Valves on RWW Pump Discharge
- Existing Dashpots are worn and require replacement
- Does not require shutdown of South System Pump Station
- One pump at a time will be isolated

Primary Sludge and Scum Piping Replacement





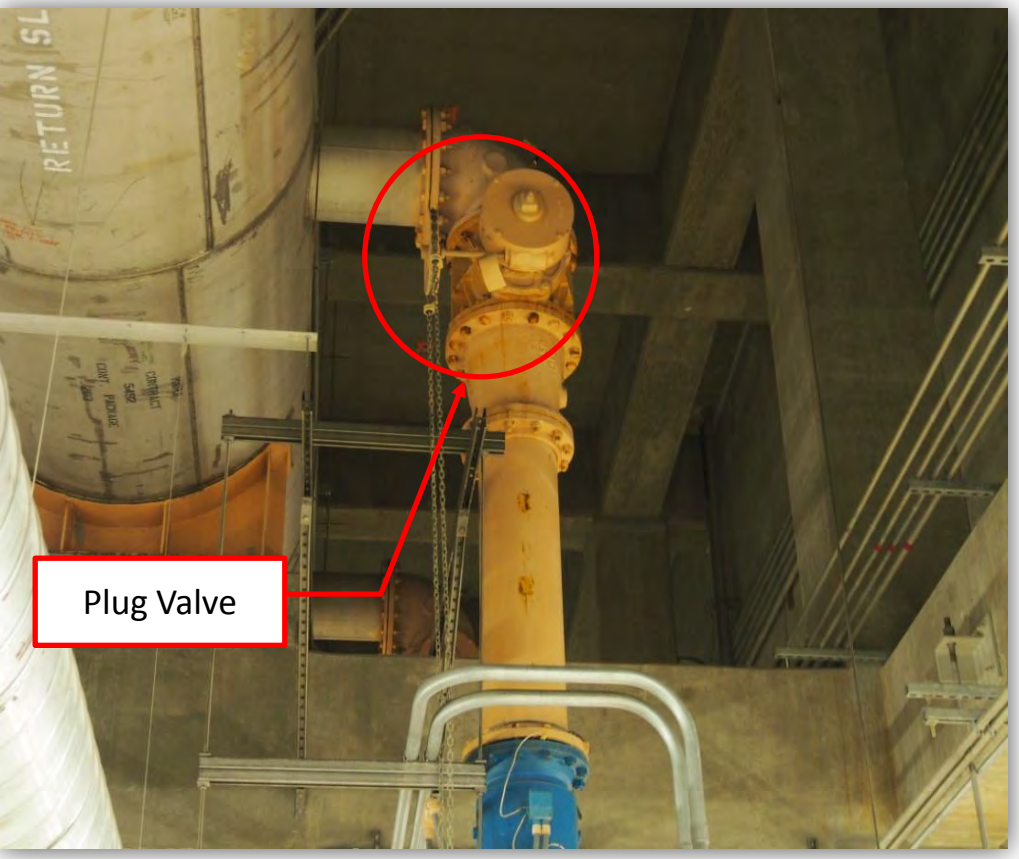
- Existing Primary Sludge and Primary Scum lines are leaking due to failed glass lining and pipe corrosion
- Pipes were televised and revealed glass lining failures and significant corrosion at pipe joints and along the crown throughout the entire system

Primary Sludge and Scum Piping and Valve Replacement

- Replace ~6,500 linear feet of Primary Sludge Piping and 96 plug valves from Primary Clarifiers to Gravity Thickener Distribution Box (4” -14”)

- Replace ~2,000 linear feet of Scum Piping and eleven plug valves in Residuals Connecting Gallery (10” - 12”)

Return Sludge Plug Valve Replacement



- Replace 81 16-inch manual operated RSL Plug Valves and 3 16-inch WSL Plug Valve on RSL header (28 valves per battery)
- Each Secondary Battery must be taken out of service one at a time to complete this work.
- Contractor is allowed up to 7 days per battery to complete this work


WATER RESOURCES AUTHORITY
MASSACHUSETTS

Presentation to

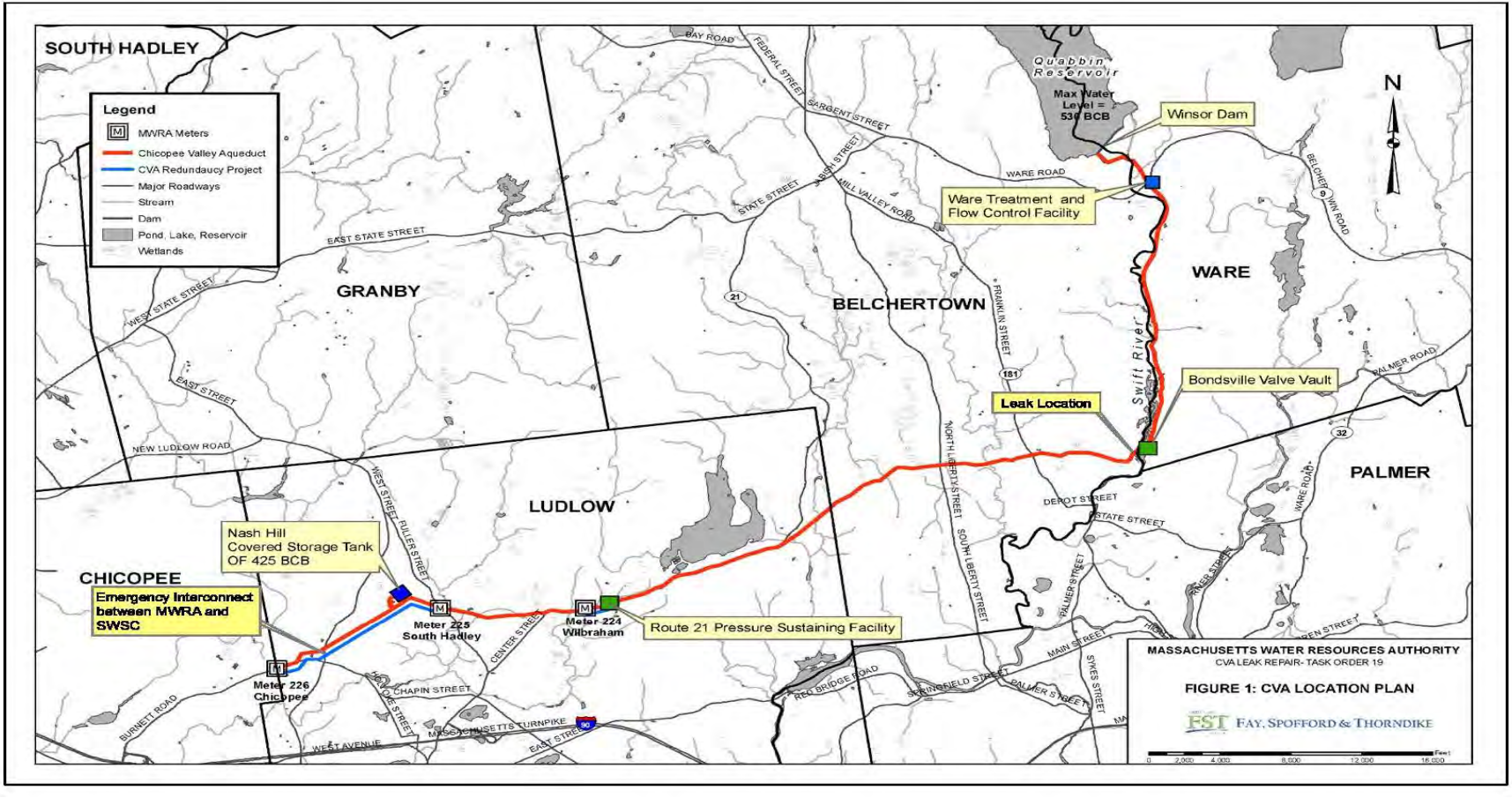
MWRA Board of Directors

CVA Leak Repairs
Shea Avenue, Belchertown

Fred Brandon
Assistant Director of Engineering

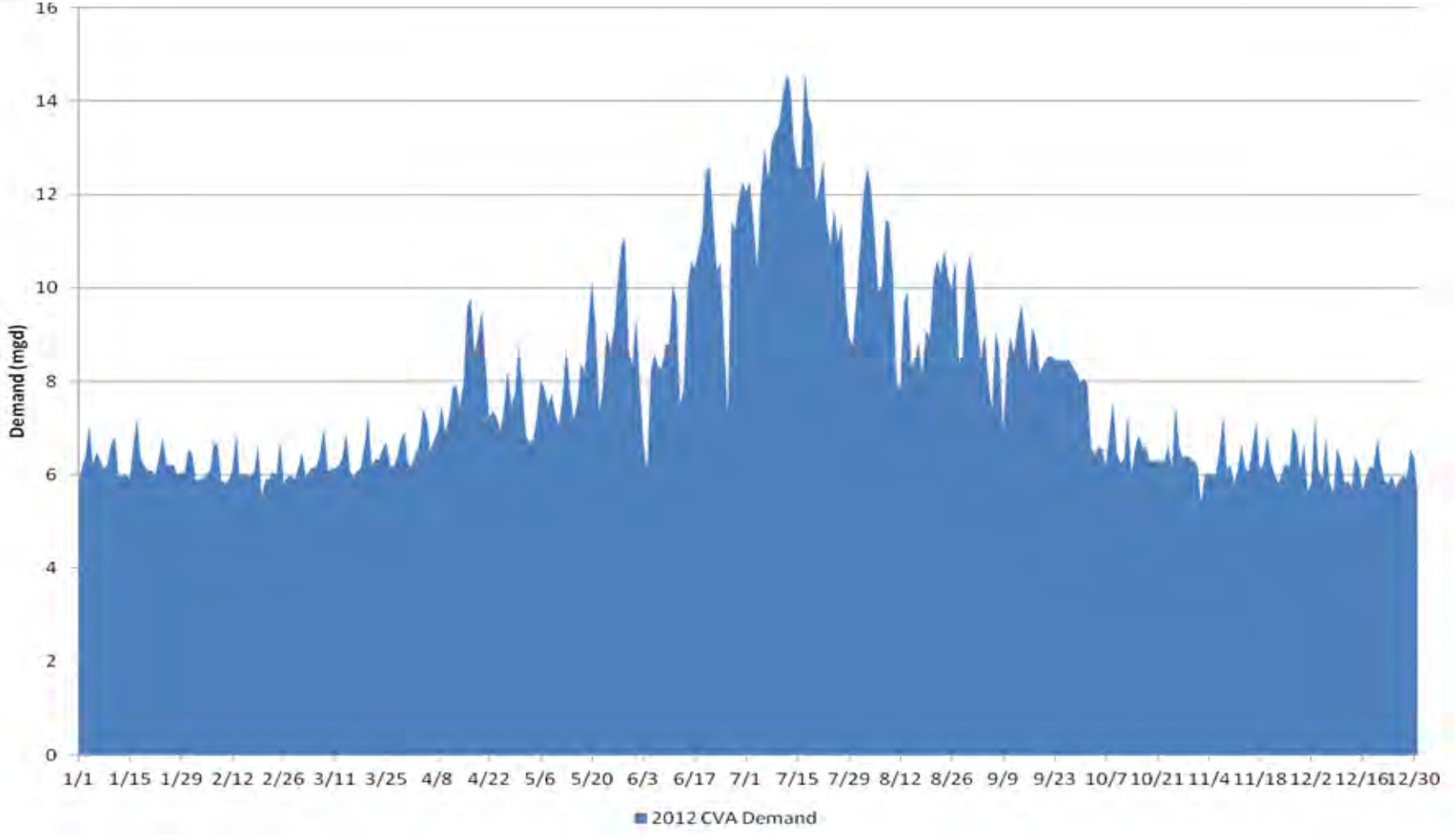
May 14, 2014

CVA Location Plan

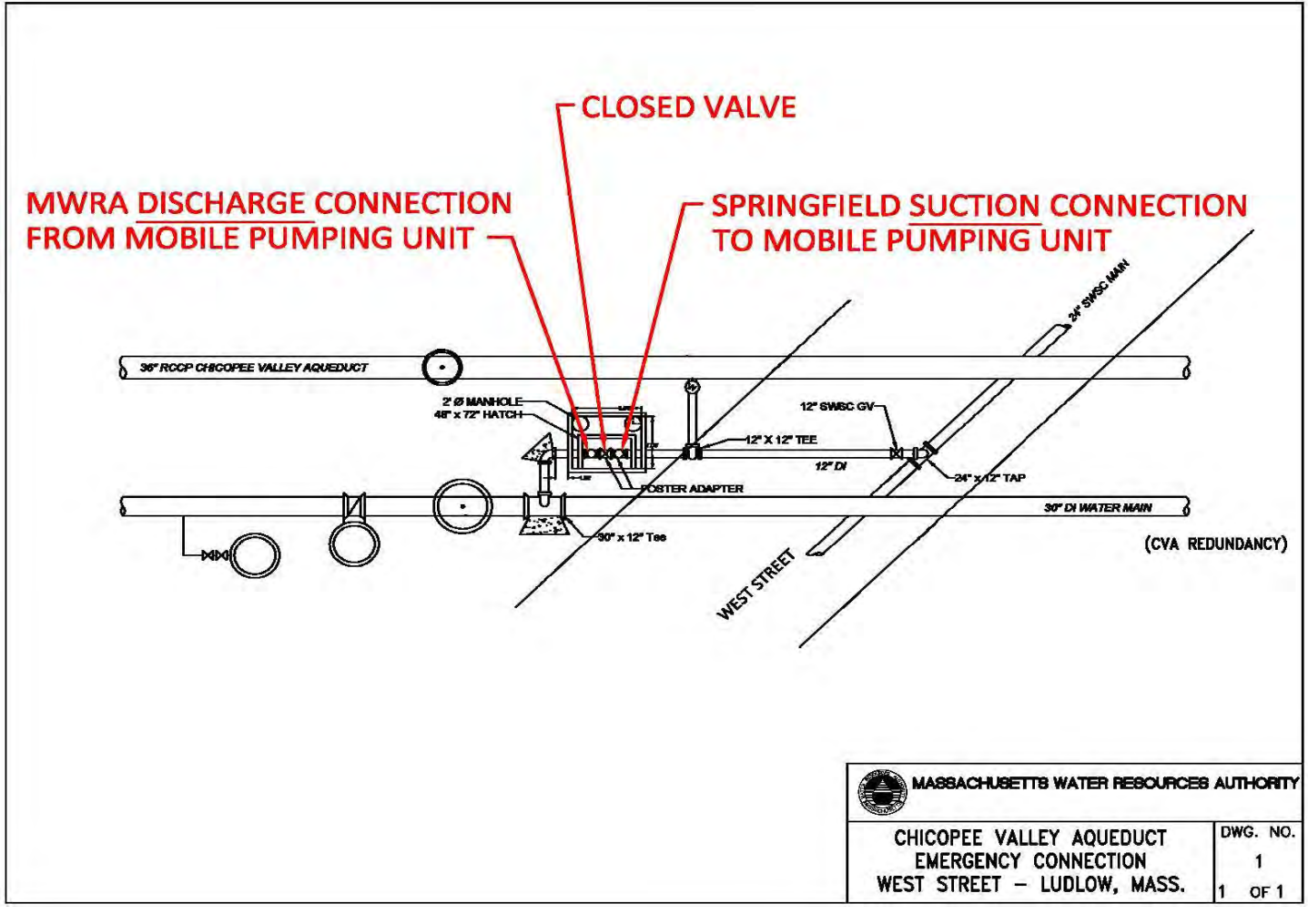


Leak Repair Schematic

2012 CVA Average Daily Demand



CVA Emergency Connection, West Street, Ludlow



CVA Emergency Connection, West Street, Ludlow

36-Inch Linestop And 24-Inch Bypass

Demolition Of Existing Valves And Fittings

How The Linestop Works

36” diameter folding head allows for insertion through 24” hole. When fully inserted the leafs fold completely out. The pressure side of the stopped main is behind the gasket and folding leafs making an even tighter seal.

Live side of main when deployed

36-Inch Bag Installation

12-Inch Outlet To Relieve Pressure On Bag

Leakage Control

Pouring Concrete Floor