



Presentation to

MWRA Advisory Board – WAC

Valve and Piping Replacements

Deer Island Treatment Plant
(MWRA Contract 7275)

January 9, 2015



Advisory Board Briefing - Agenda

- **Contract Overview**
- **Off Island Activities During North System Shutdowns**
 - **Proposed Field Monitoring**
 - **Modeling Results**
- **Notifications**



Contract 7275 Summary

- **Contractor:** Carlin Construction Company
- **Contract Price:** \$16,960,425
- **Contract Duration:** 1,095 days, Notice to Proceed June 23, 2014



Contract 7275 Summary - Scope

- **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)



What is this contract trying to correct?

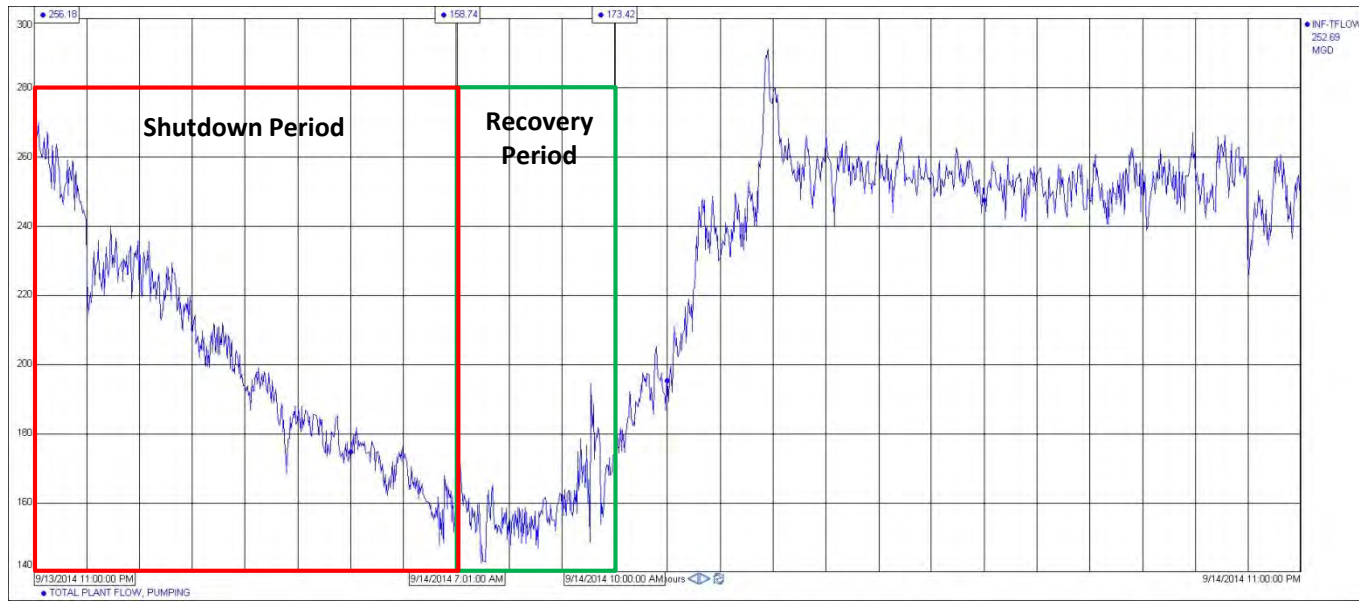
- **Problem:**
 - Many existing valves at North Main Pump Station & Winthrop Terminal Headworks do NOT provide complete isolation – equipment can't be properly maintained **safely**.
- **Resolution:**
 - Requires replacement of isolation valves. This will require shutdowns of the entire North Pumping System on DITP to complete work.
 - North Main Pump Station
 - Winthrop Terminal Facility



When will the shutdowns occur?

- **NS Shutdowns scheduled between 11PM-7AM**
 - When flow conditions allow
 - All work Weather dependent

- **First Shutdown – Scheduled May or June (dewatering system install)**





First Contract Shutdown – What will occur?

- NMPS & WT are connected to two (2) 138-inch Force Mains that convey the raw wastewater to the North System Grit Facility.
- Partial dewatering of force main is required to safely complete valve work.
 - Contractor will furnish, install and operate dewatering system
 - Lower NS hydraulic grade line by 40 feet
 - Dewatering volume ~ 600,000 gallons
 - 2 hrs estimated for dewatering
 - 6 hrs estimated for valve work



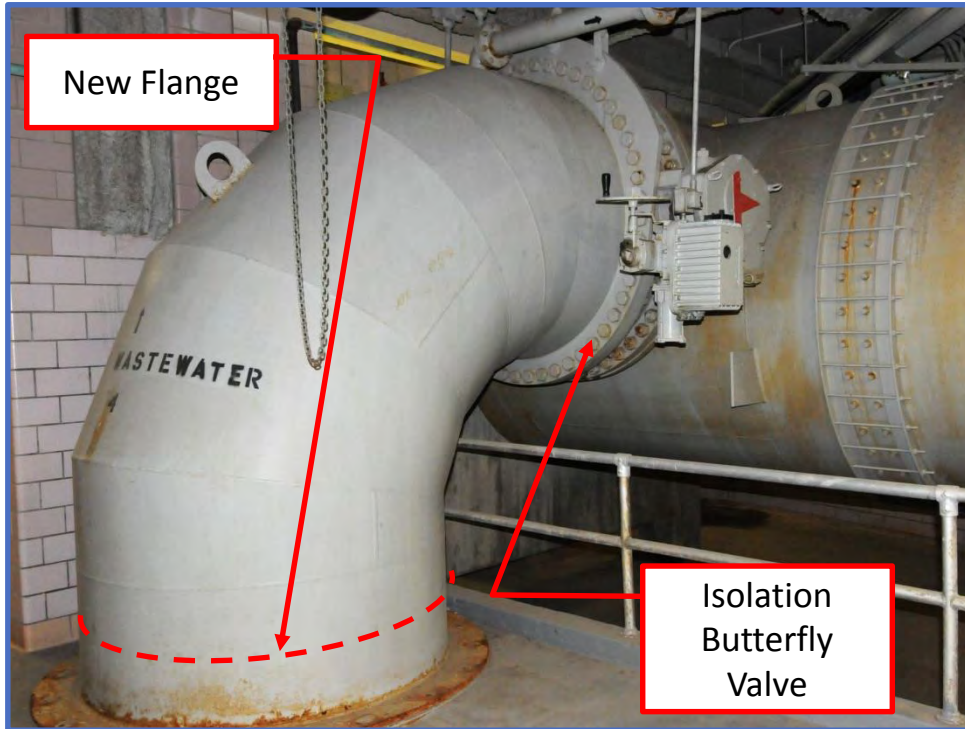
North Main Pump Station



- Receives North Sewer System Flow from:
 - Boston Main Drainage Tunnel
 - Ward Street Headworks
 - Columbus Park Headworks
 - North Metropolitan Relief Tunnel
 - Chelsea Creek Headworks
- Facility capacity is 788 MGD
 - Ten (10) 3,500hp Pumps
 - 110-150 MGD Capacity/Pump
- Most equipment 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

Other replacement activities that will not require shutdowns: 60" magnetic flow meter, 60" butterfly check valve



Winthrop Terminal Facility



Receives North Sewer System Flow from North Metropolitan Trunk Sewer

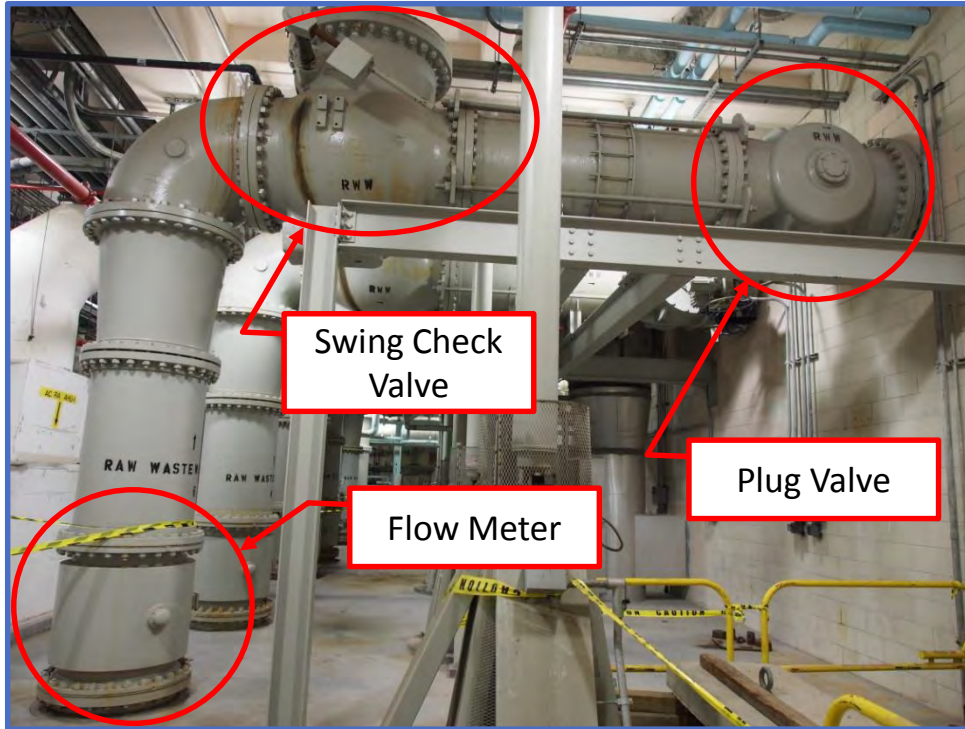
Facility capacity is 125 MGD

Six (6) 600hp Raw Wastewater Pumps rated at 32 MGD each

Pumps, Piping and Valves Installed during Boston Harbor Project in 1995



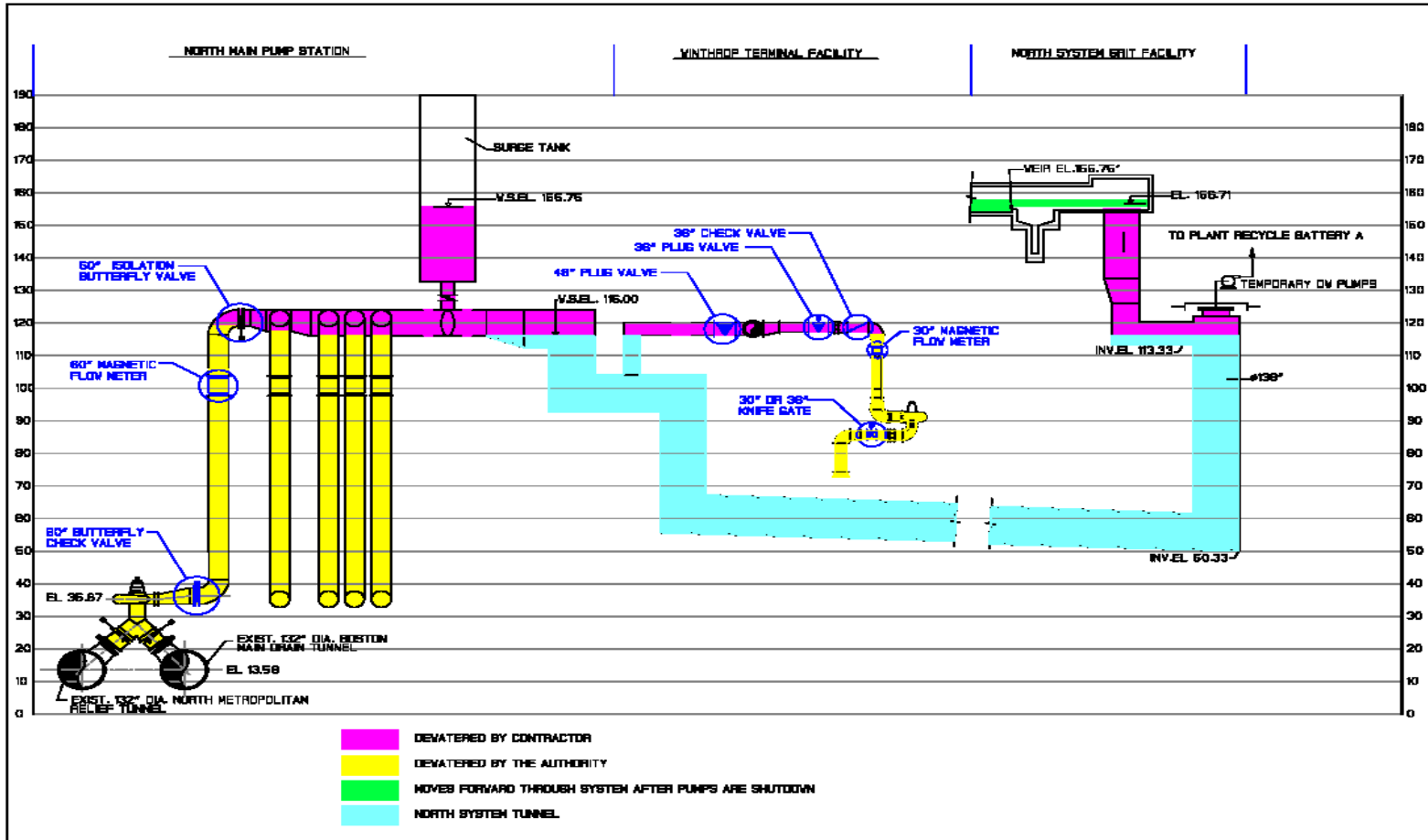
Winthrop Terminal Facility: Pump Discharge



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

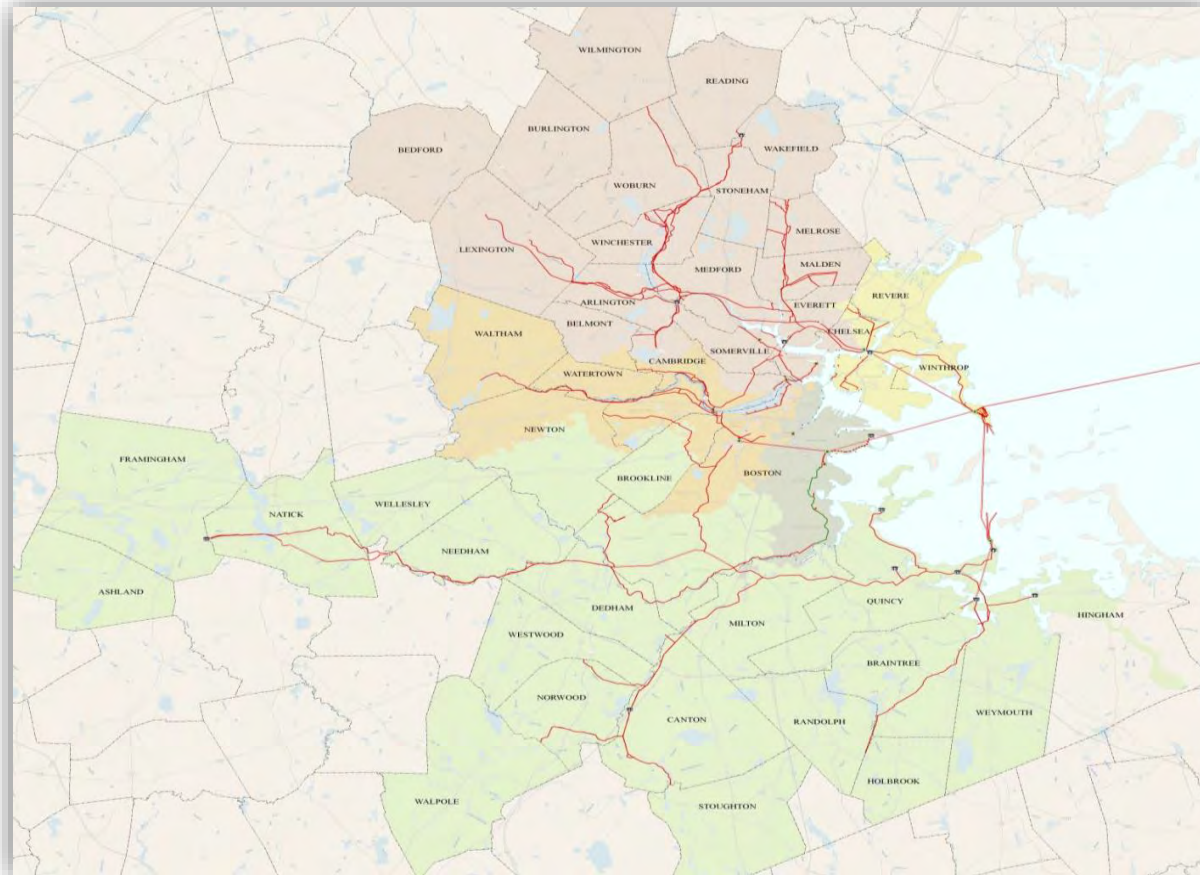


Plant Shutdowns and Temporary Dewatering System





MWRA Collection System – only North impacted





Modeling Analysis to Date

1. With Typical DWF in Model (207 MGD), the total Storage Requirement during and 8.5 hr period (10:45PM to 7:15 AM) is approx. 64MG
 - Winthrop Terminal 4.7 MG
 - WSHW 19.2 MG
 - CPHW 10.4 MG
 - CCHW 29.5 MG
2. Performed Multiple Hydraulic Model Simulations to determine what Wastewater Pump Stations to shut down and which to remain operational (Delauri – Off, All Others Remain Running)
3. Simulations of 8.5 hr predicted **No** CSO or SSO Events. Evaluating Impact to Community Collection Systems (LIDAR Ground Surface Evaluation).
4. For Contingency Purposes and to Help Focus Field Monitoring Plan, Staff Performed 12.5 hr Shutdown Simulation
 - Several Untreated CSOs Predicted Mostly in CPHW Tributary Area and CHE004
 - Prison Point Predicted to Discharge.
 - SSO at Sec. 107 predicted
 - May be able to delay CSO and SSO discharges with Cottage Farm Activation and Shutting down Alewife.

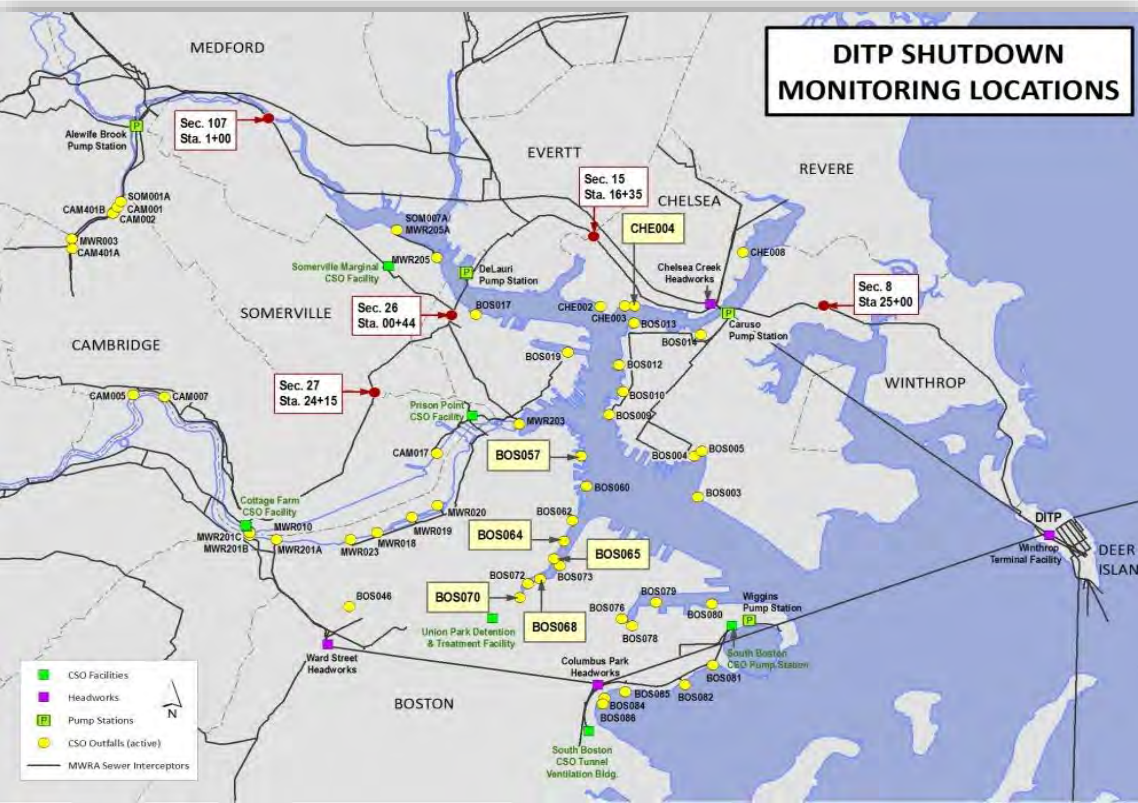


Proposed Trial Shutdown

1. Will Perform Trial Shutdowns One Headworks at a Time
2. Additional Support Staff and Contractors (Hydraulic Contractor) will be at each Headworks to address unforeseen issues.
3. Field Staff will monitor identified locations and report measurements to the EOC.
4. EOC Staff will compare field measurement and existing facility and interceptor measurements against updated (current DWF) model predictions.
5. Trial Partial Shutdowns (Headworks Specific)
6. Entire North System Trial Shutdown for 6 - 8 hr period to follow depending on Trial Shutdowns.



Collection System Monitoring Locations



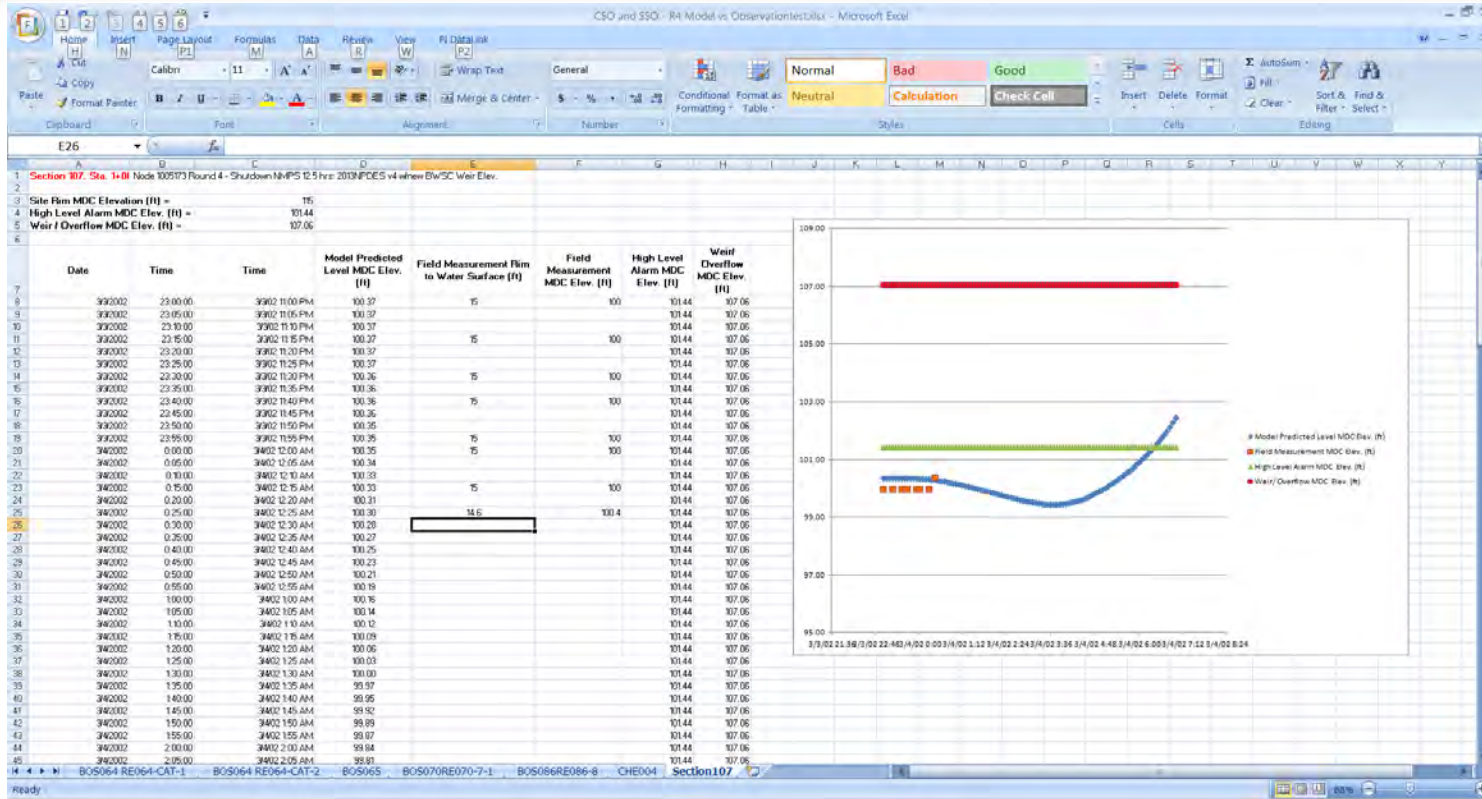
Critical locations will be monitored

Staff will be recording elevations every 15 minutes

Immediately notify the EOC when the elevation reaches a pre-determined elevation at each station



Elevation readings at the monitoring locations



Staff will be recording elevations every 15 minutes throughout shutdown. Staff in the EOC will be plotting results to compare field observations against model simulated system response.



Field Monitoring Plan

1. Confirming CSO Weir Elevations to determine final monitoring locations.
2. All Field Staff will be provided with detailed site specific monitoring plan (as follows).
3. EOC will receive data and compare against model predictions.
4. Facilities will be reactivated if trigger elevations are reached.

BOS068-1a
#237 ALBANY STREET
BOSTON

BOS068-1a

Manhole Location: # 237 Albany Street, Boston

Manhole Depth (Rim to Invert): 15.2 ft.

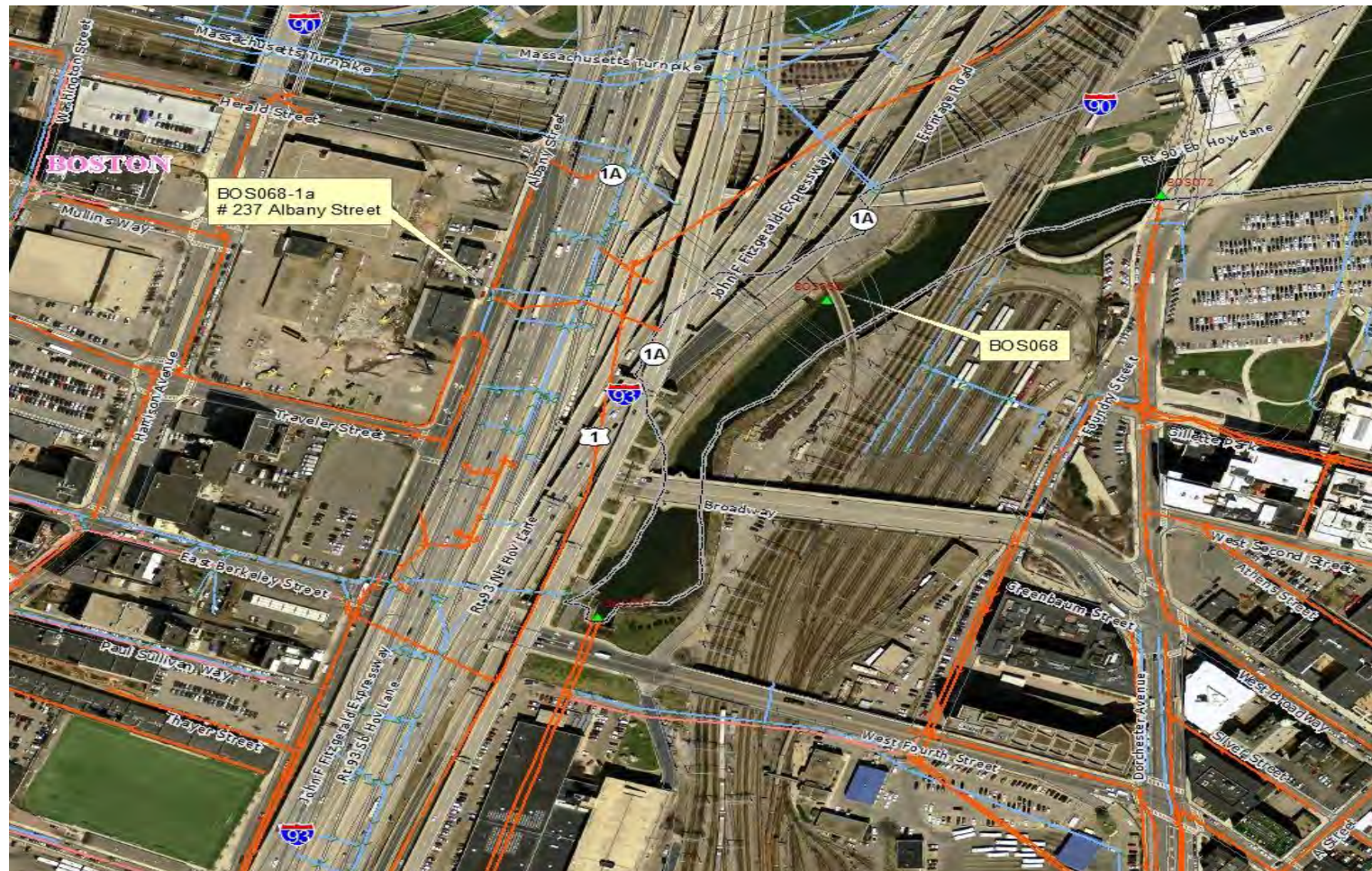
Invert Elevation: 99.77 ft.

Weir Wall Elevation: 105.07 ft.

Rim Elevation: 114.97 ft.

Trigger Elevation: 102.97 ft.

Monitoring Staff will take readings in 15 minute intervals, from the Rim to the Water surface and call or radio them into the EOC.



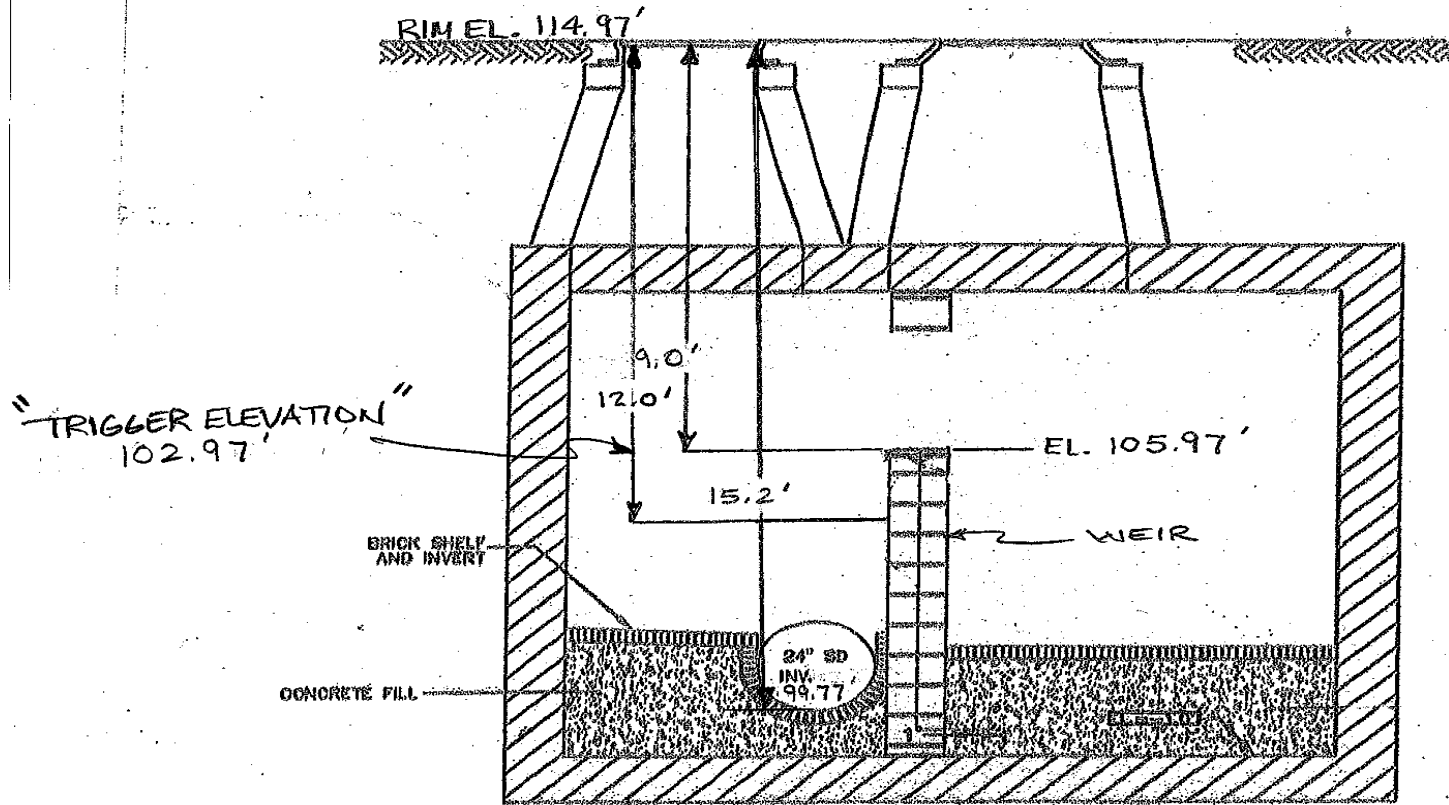
MONITORING MANHOLE





FLOW

Weir Elev. 105.97'



RE 068-1a

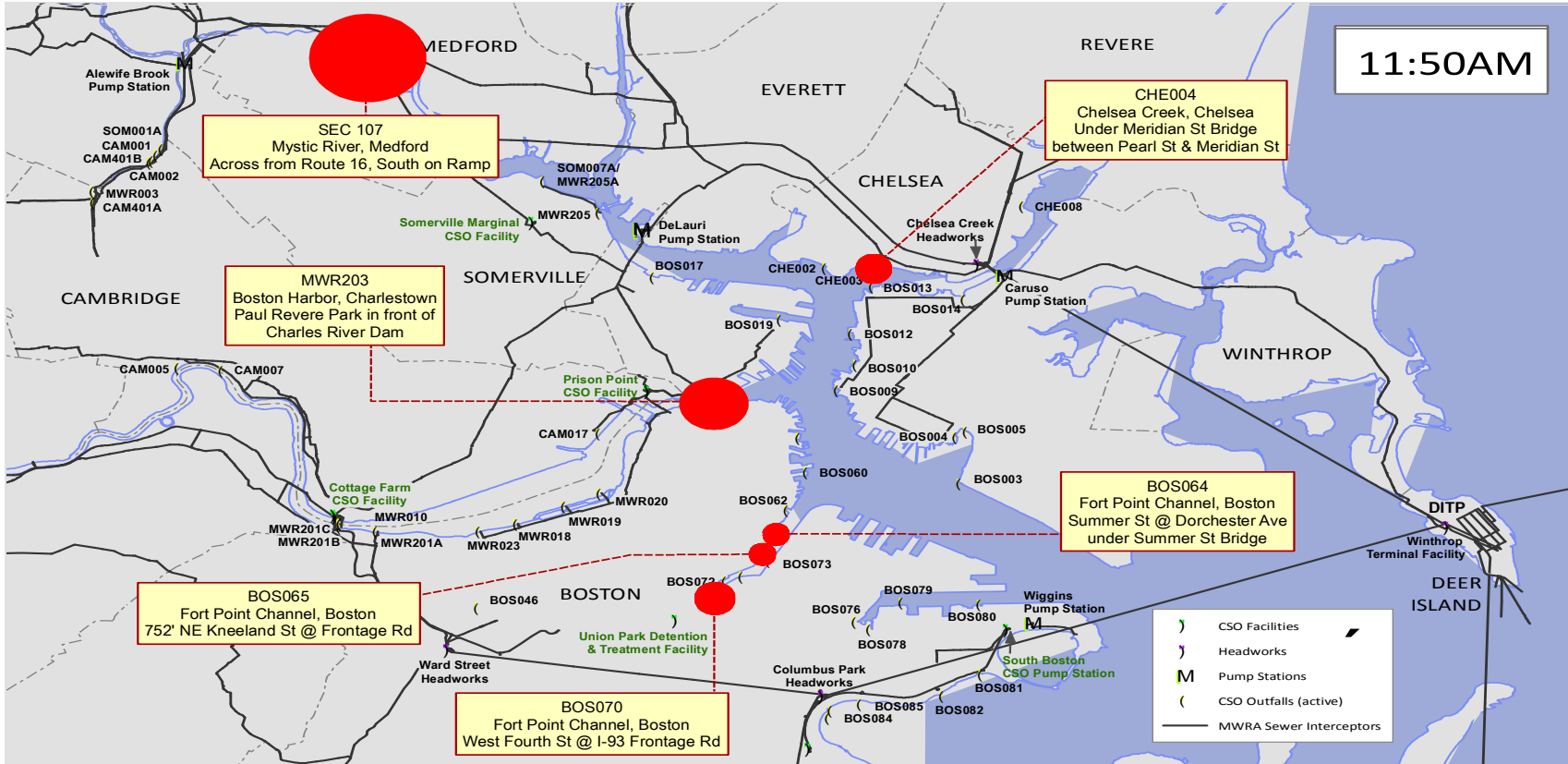
DATE _____
CREW _____

DITP SHUTDOWN
MONITORING FORM

SECTION/IDENTIFICATION # <u>BOS068-1a</u>						
STATION # <u>3 + 50.00</u>						
LOCATION <u># 237 Albany Street, Boston</u>						
RIM to INV. <u>15.2'</u>						
RIM to WEIR <u>9.0'</u>						
TRIGGER ELEV. <u>TBD</u>						
TIME (AM/PM)	RIM to flow (FT.)	TIME (AM/PM)	RIM to flow (FT.)	TIME (AM/PM)	RIM to flow (FT.)	Condition of Flow *
Flow Stream Condition: P- stream is flowing in a positive direction N- stream is flowing in a negative direction S - stream is not moving and is surcharging						



Worst Case Overflow Locations







Notifications

- **Regulatory Notice Issued to EPA & MaDEP - complete**
- **Advisory Board Announcement – complete / on-going**
- **Community Briefing Blast – prior to first shutdown**
- **Advance Notice – Day Before**
- **Notice After Recovery**