



MWRA's Climate Change Strategy:
*Adapting to the Impacts of Climate Change
and Sea Level Rise*

December 14, 2016



Water System Not Threatened

- All MWRA dams, dikes, spillways and appurtenances are inspected routinely by licensed dam safety engineers and are in good condition
- Since 2006, MWRA has spent over \$21 million on dam safety projects
- Quabbin and Wachusett spillways have been improved to be able to discharge the probable maximum flood (1 in 1000 years)
- All drinking water pump stations and storage tanks above flooding elevation



Examples of Dam Improvements: Wachusett Spillway



Wachusett Spillway capacity increased by lowering it 2 feet



Examples of Dam Improvements: Wachusett New Crest Gate



Installation of a crest gate greatly enhances discharge operations



Examples of Dam Improvements: Wachusett Auxiliary Spillway

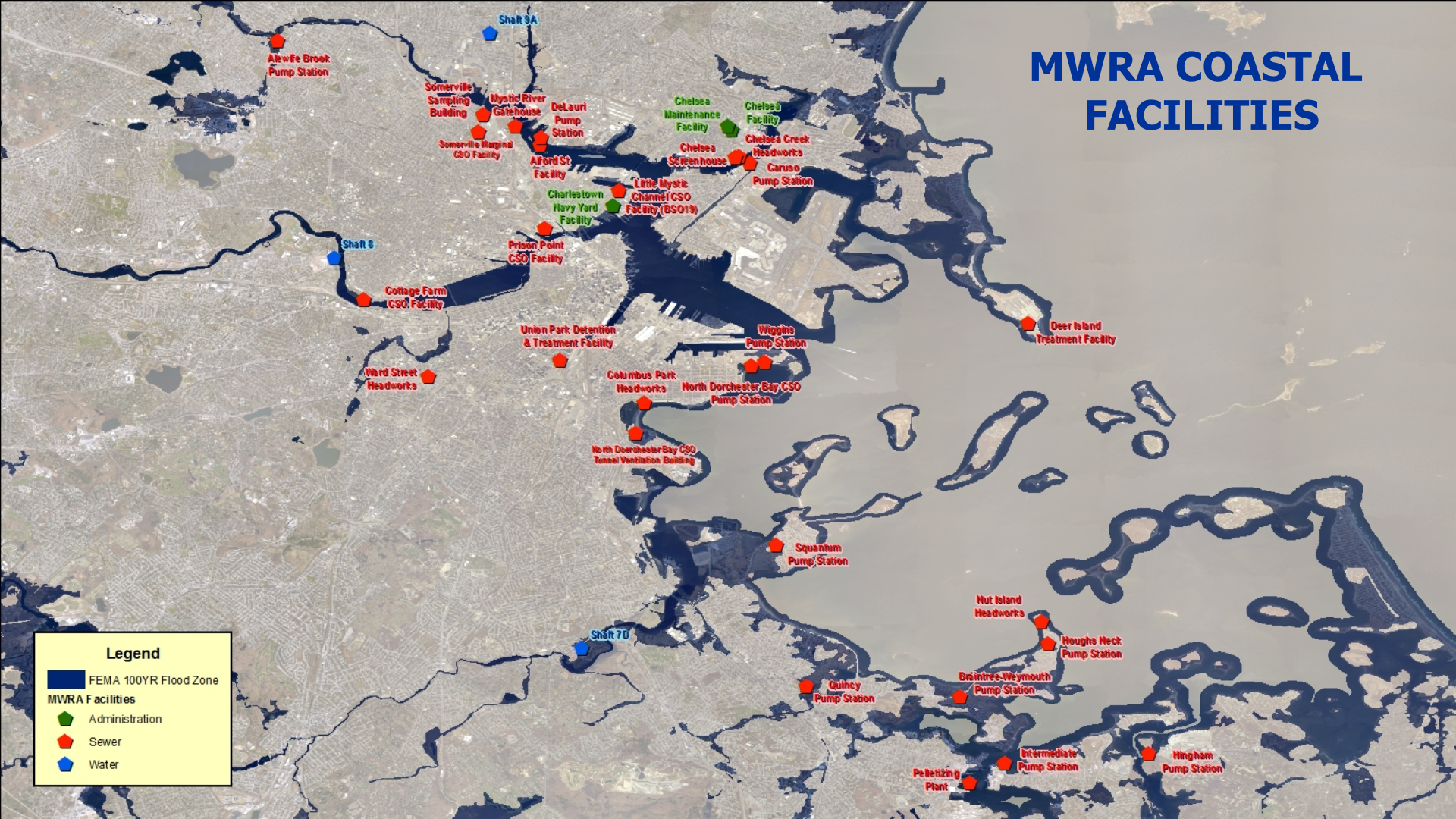


New Wachusett Auxiliary Spillway constructed to pass flood discharge

MWRA COASTAL FACILITIES

Legend

- FEMA 100YR Flood Zone
- MWRA Facilities
 - Administration
 - Sewer
 - Water





Benchmarks For Evaluating Facilities

- 100 year flood as determined by FEMA (current regulatory requirement)
- 100 year flood + 2.5ft (NYC DEP, BHA)
- Hurricane flooding levels as determined by FEMA's SLOSH model (current evacuation planning recommendation) were reviewed
- Wave action (for facilities adjacent to FEMA Hazard Zone VE) was reviewed



How Do Facilities Measure Up?

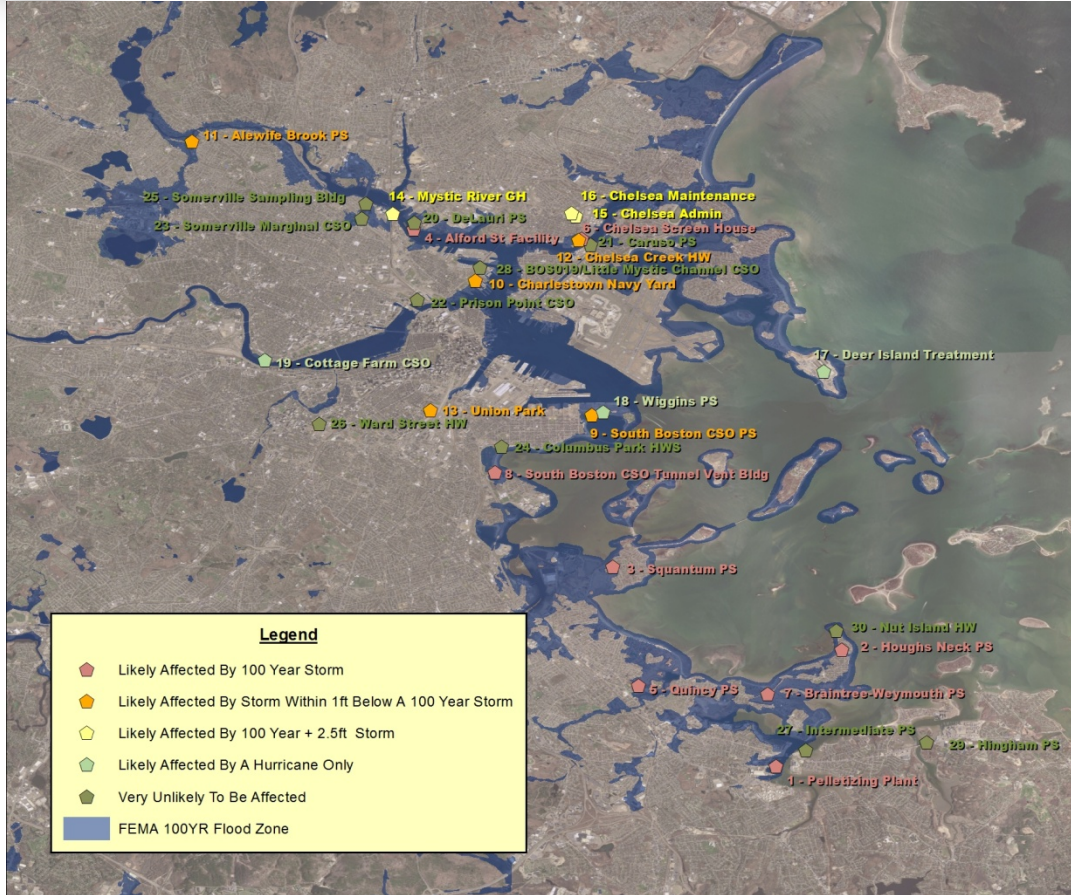
	Rank	Facility Name	Mitigation Actions Comments
Likely Affected By 100 Yr Storm	1	PELLETIZING PLANT	Barrier around backup generator and transformers erected. (*)
	2	HOUGHS NECK PUMP STATION	Stop plank barriers installed in entryways. (*)
	3	SQUANTUM PUMP STATION	Stop plank barriers installed in entryways. (*)
	4	ALFORD ST FACILITY	Sand bags will be used for flood protection. Future work under review.
	5	QUINCY PUMP STATION	Stop plank barriers installed in entryways. (*)
	6	CHELSEA CREEK SCREENHOUSE	Installed retaining wall to protect generator and main power panel; stop log barriers at all doors and roll-up doors; sump pumps inside building; two isolation gates to protect facility; raised ventilation louver above required elevation; led panels to protect all windows to required elevation; all new electrical installed above required elevation where feasible
	7	BRAINTREE-WEYMOUTH PUMP STATION	Stop plank barriers installed in entryways. (*)
	8	SOUTH BOSTON CSO TUNNEL VENTILATION BLDG	Flood protection plan drafted, flood protection specs designed, requisition for materials purchase submitted.
Likely Affected By Storm Within 1 ft below a 100 Yr Storm	9	SOUTH BOSTON CSO PUMP STATION	Flood protection design specs from vendor being reviewed in-house.
	10	CHARLESTOWN NAVY YARD FACILITY	MIS equipment and staff moved to upper floors.
	11	ALEWIFE BROOK PUMP STATION	Contractor installing flood protection system. Moving most critical equipment above flood level.
	12	CHELSEA CREEK HEADWORKS	Construction contract in progress to add stop log barriers at all doors including overhead coiling doors. Openings in façade being filled and moved above EL 119. Escape hatches, loading hatch and shaft opening being protected to EL 119. Valves being added to ductwork on mezzanine to isolate shafts upstream of influent gates.
	13	UNION PARK DETENTION & TREATMENT FACILITY	Operating Contractor designing specs which call for using sand bags at entry ways and isolating facility if required.
Likely Affected By a 100yr+2.5ft	14	MYSTIC RIVER GATEHOUSE	No adverse impact if flooded.
	15	CHELSEA ADMINISTRATION FACILITY	Flood protection plan drafted, flood protection specs designed, material specs out on street for quote Flood protection design specs from Vendor being reviewed in-house and modified due to requirement changes.
	16	CHELSEA MAINTENANCE FACILITY	Flood protection plan drafted, flood protection specs designed, material specs out on street for quote Flood protection design specs from Vendor being reviewed in-house and modified due to requirement changes.
Likely Affected By a	17	DEER ISLAND TREATMENT FACILITY	Plant processes designed to withstand a Category 3 Hurricane to allow uninterrupted facility operation. Some support facilities and access may be impacted.
	18	WIGGINS PUMP STATION	Will include flood plain protection in upcoming capital replacement project.
	19	COTTAGE FARM CSO FACILITY	
Very Unlikely To be Affected	20	DELAURI PUMP STATION	
	21	CARUSO PUMP STATION	
	22	PRISON POINT CSO FACILITY	
	23	SOMERVILLE MARGINAL CSO FACILITY	
	24	COLUMBUS PARK HEADWORKS	
	25	SOMERVILLE SAMPLING BUILDING	
	26	WARD STREET HEADWORKS	
	27	INTERMEDIATE PUMP STATION	
	28	LITTLE MYSTIC CHANNEL CSO FACILITY	
	29	HINGHAM PUMP STATION	
	30	NUT ISLAND HEADWORKS	

Projects have been prioritized from the top of the chart (most immediate risk) down through the rankings.

* In some cases specifications are being revised due to more recent updates to the FEMA flood maps. Future modifications to protection measures will be made as necessary.



Facilities Impact Summary



- 8 Sewer Facilities Likely Affected by a 100 Year Event
- 4 Sewer and 1 Administration Facilities Within One foot of a 100 Year Event
- 3 Sewer Facilities Affected by 100 plus 2.5 ft Event
- 3 Sewer Facilities Likely Affected by Hurricane Flooding
- 11 Sewer Facilities Unlikely Affected
- **No Water Facility At Risk of Service Disruption**



Flood Elevations At Chelsea Creek Headworks





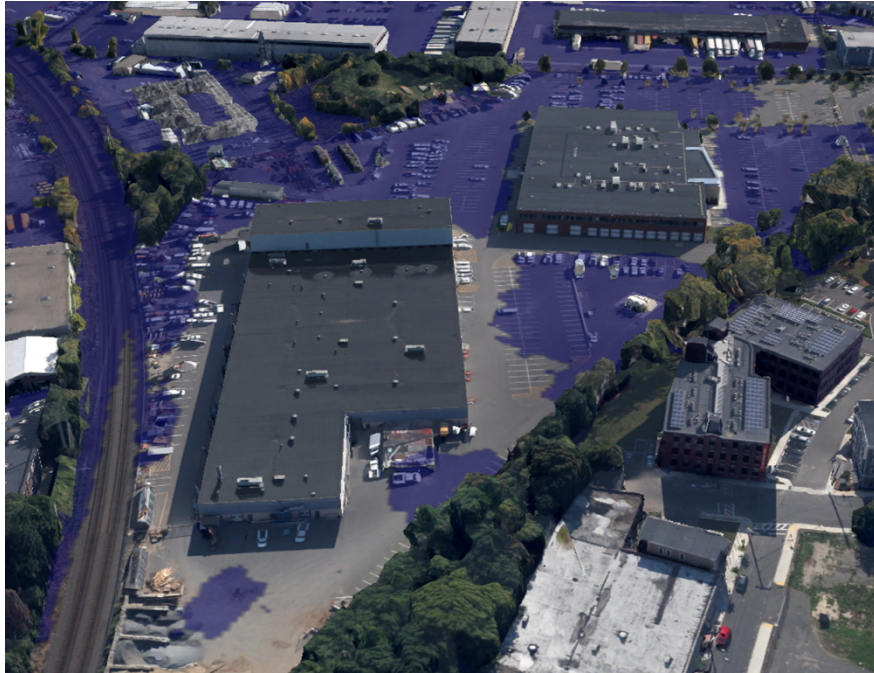
Braintree-Weymouth Replacement Pump Station High Tide



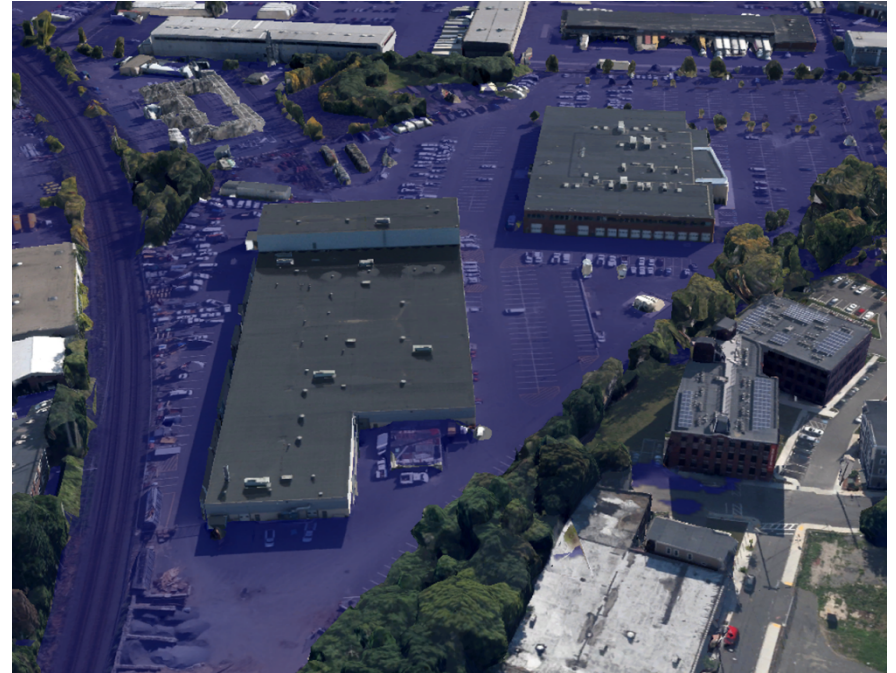


Chelsea Administration and Maintenance Facilities

FEMA 100 Year Flood Elevation

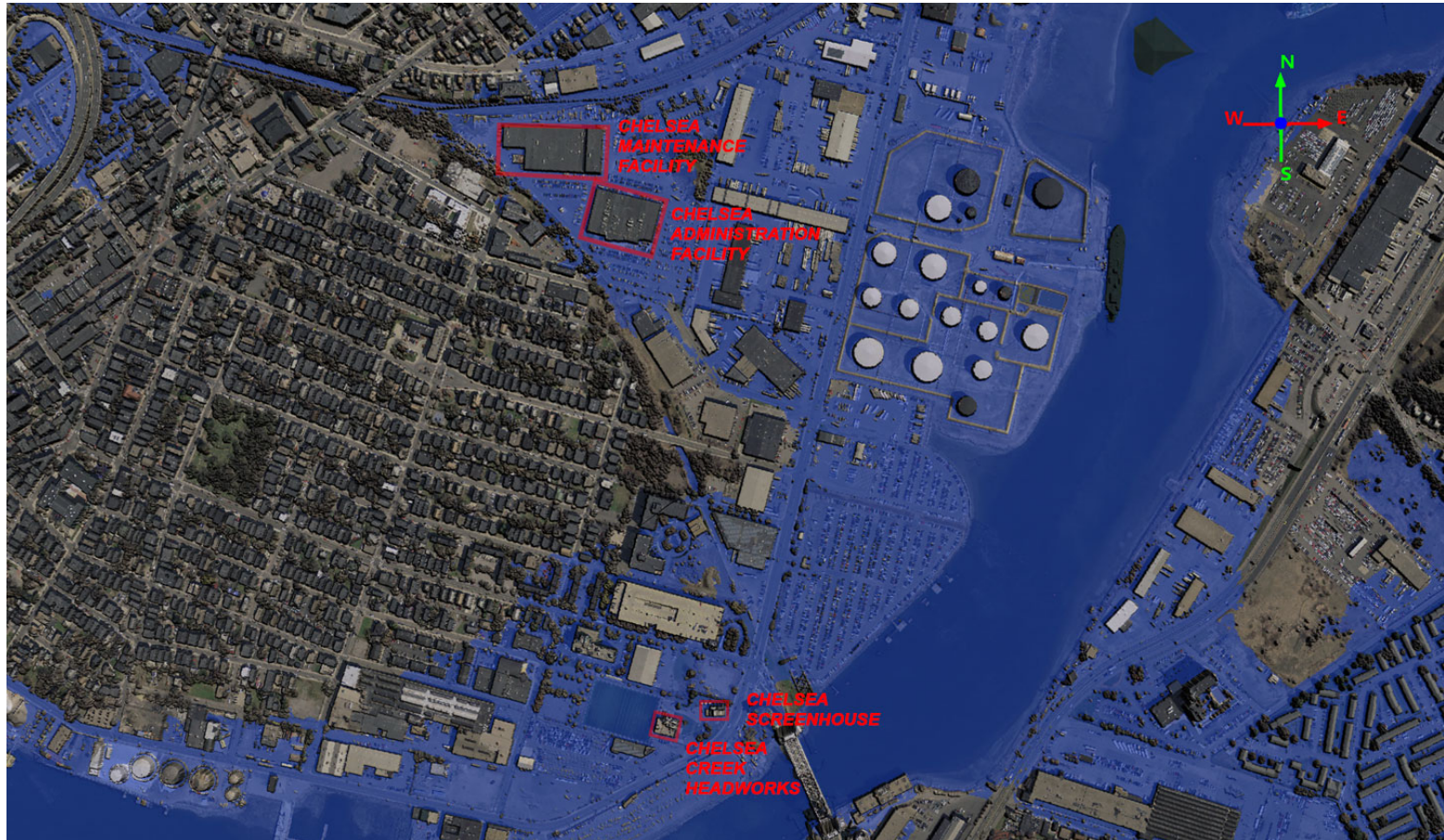


FEMA 100 Year Flood Elevation + 2.5ft





LiDAR Based Simulated Inundation of the Chelsea Area at 100 Year Plus 2.5 Feet Flood Level





Past Practice

- Low-lying facilities are protected with sandbags and pumps
- Mobile generators are deployed in advance of storms
- Increased staffing





Created SOPs To Redeploy Staff And Equipment To Higher Ground

- Staff and equipment redeployed to pre-determined locations in advance of storms
- Back-up water and wastewater operations control center created at Carroll Treatment Plant in Marlborough.





MWRA is a Partner in the Metro Mayors Climate Mitigation Commitment

