

Water Eco-Security 2015

New York City Water and Wastewater Systems: Improving Resiliency

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December 4, 2015

New York City DEP Overview





DEP is the largest water and wastewater utility in the U.S., with 5,800 employees and an annual budget of more than US\$4 billion.

Water Supply

- Deliver one billion gallons a day of drinking water to nine million New Yorkers through 7,000 miles of water mains.
- Protect a 2,000 square mile watershed, including 19 reservoirs and three controlled lakes.



- Treat 1.3 billion gallons of wastewater each day.
- Operate and maintain 14 treatment plants, 96 pumping stations, and 7,400 miles of sewers.

Air and Noise

- Reduce local air emissions.
- Enforce NYC Air and Noise Codes.

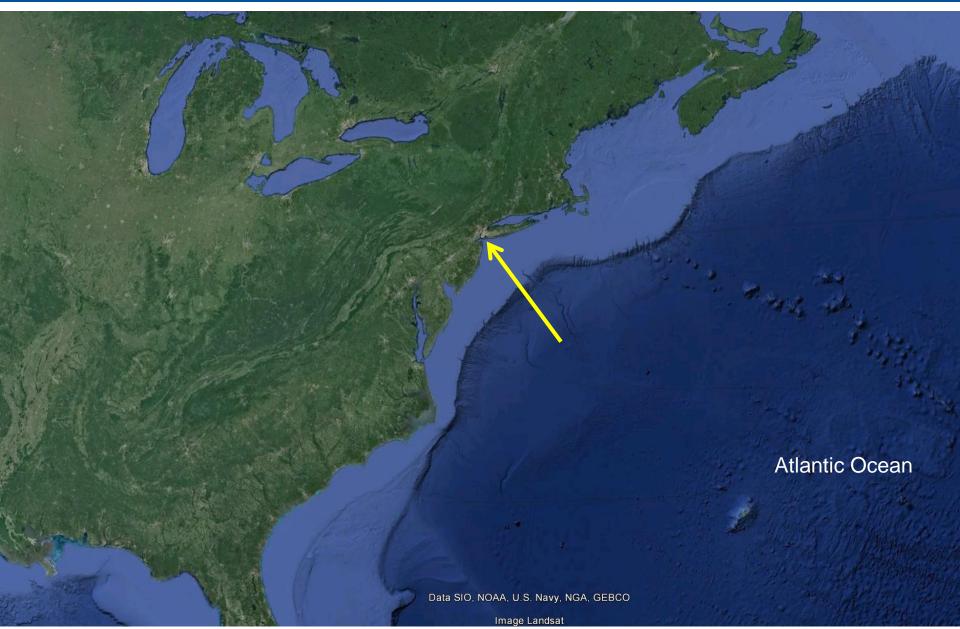






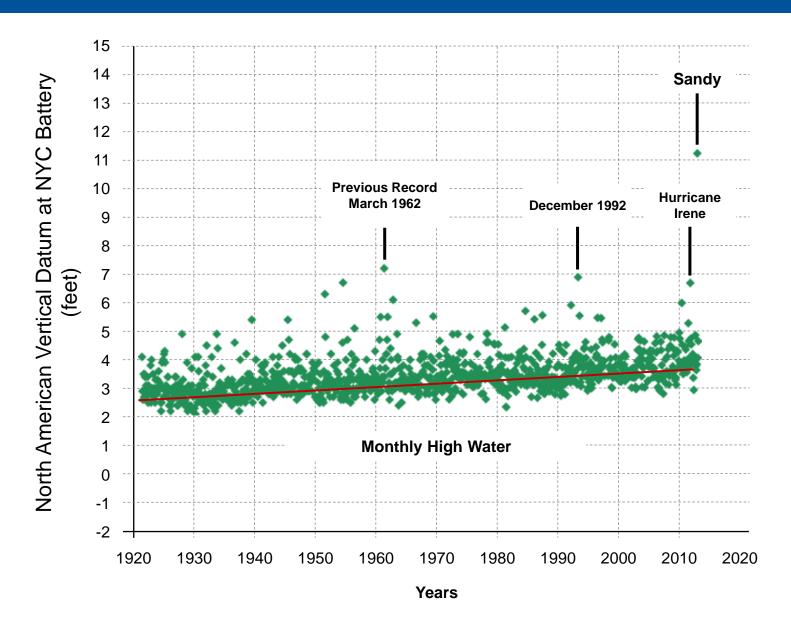
Coastal City





Sea-Level Rise





Rainfall Intensity (Cloudbursts)





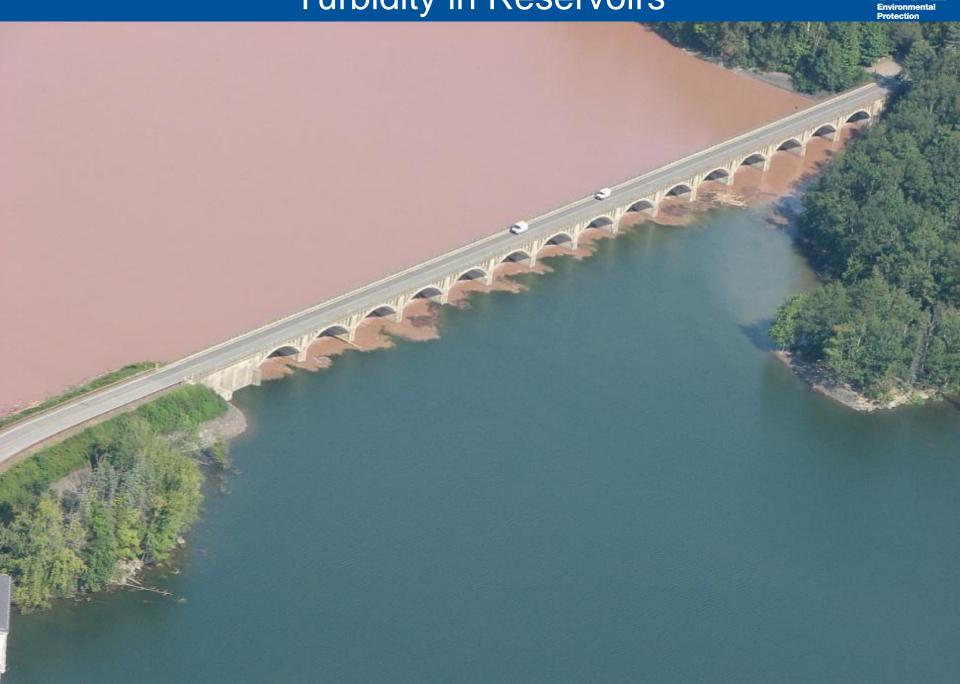
Protecting Subway Openings





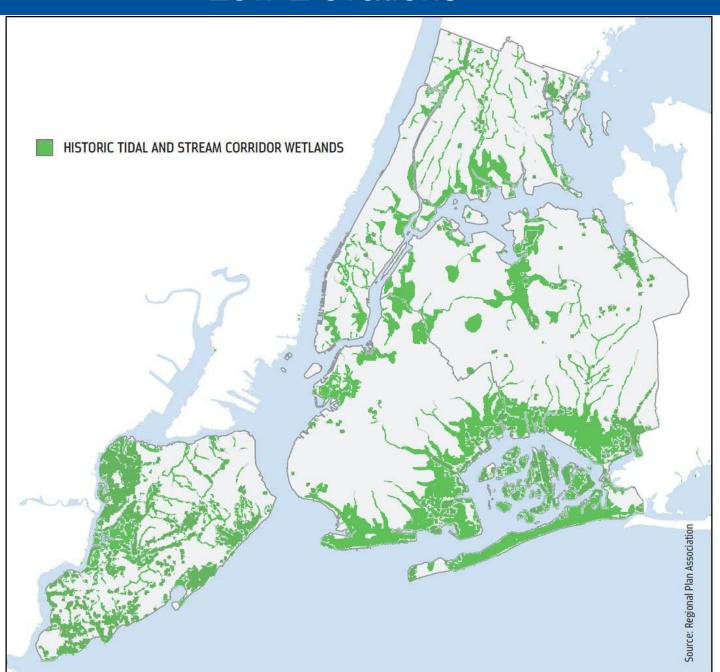
Turbidity in Reservoirs





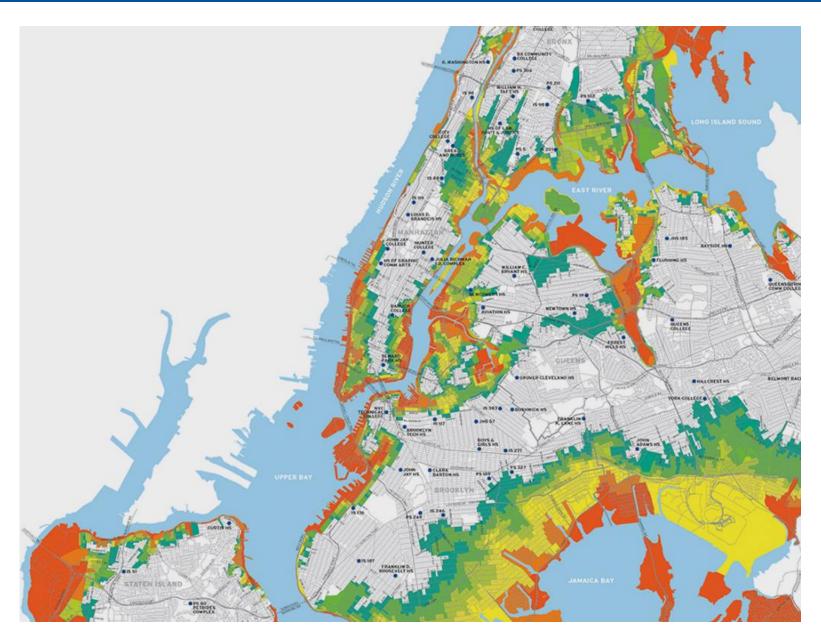
Low Elevations





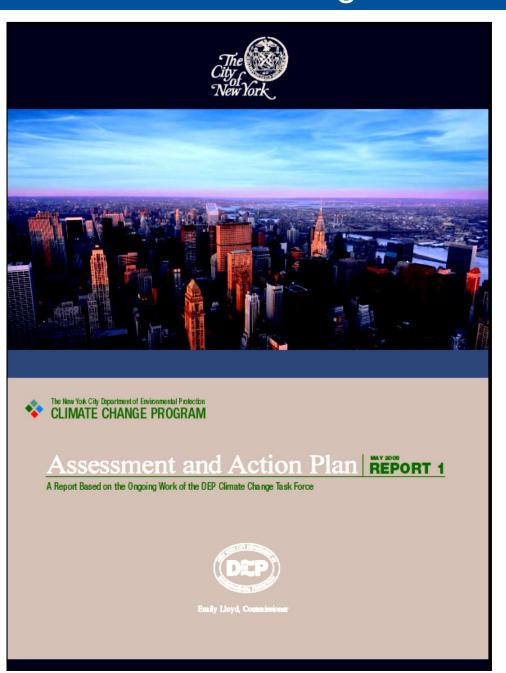
Emergency Management: Storm Surge Zones





2008 NYC DEP Climate Change Task Force





Hurricane Sandy: October 29, 2012





Major Citywide Impacts











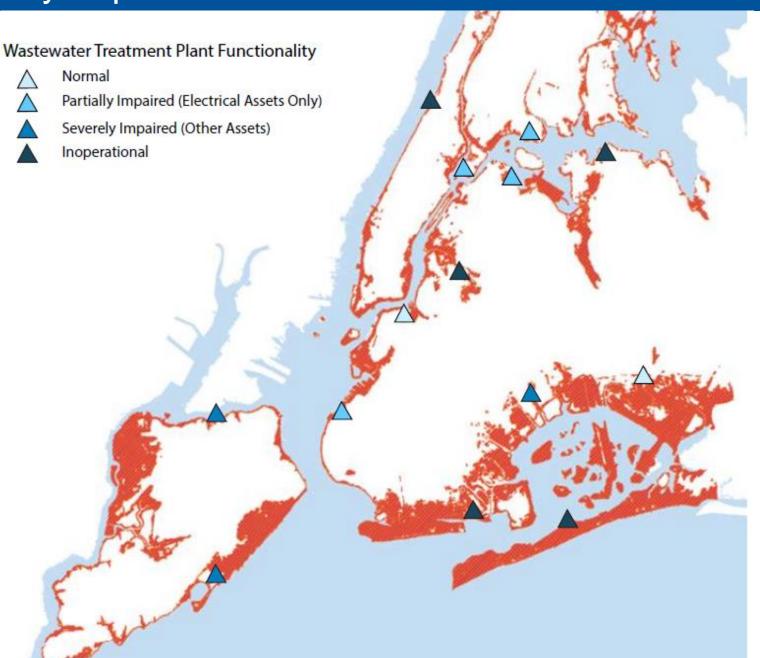
Damage to Wastewater Infrastructure





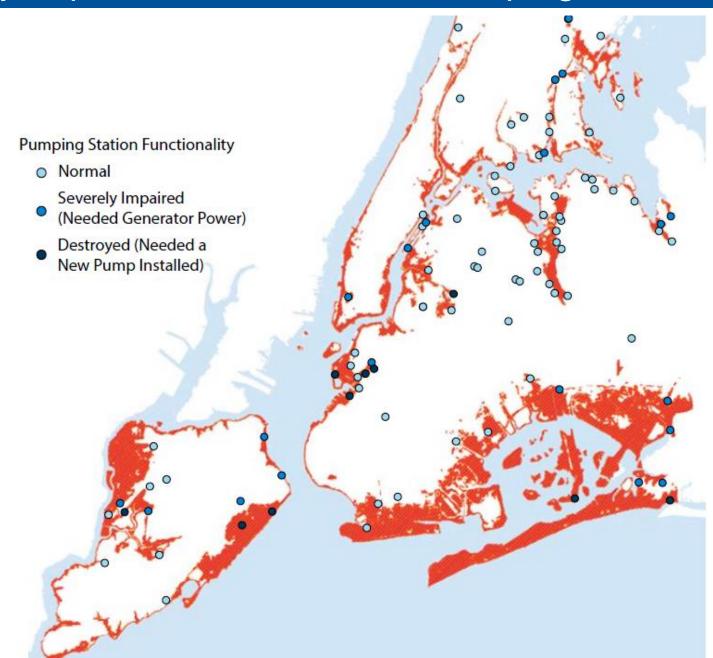
Sandy Impacts on Wastewater Treatment Plants





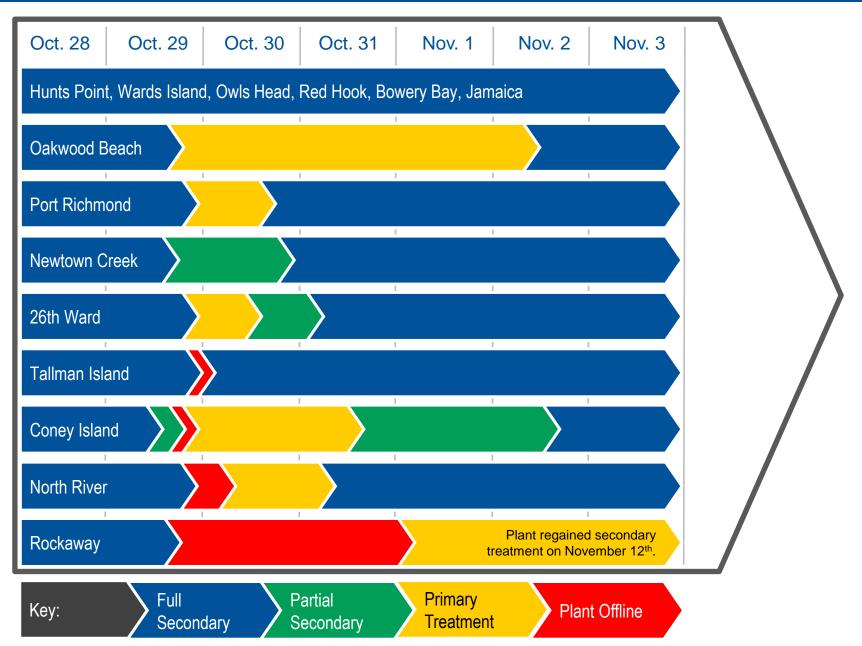
Sandy Impacts on Wastewater Pumping Stations





Loss of Treatment: Raw Sewage Released

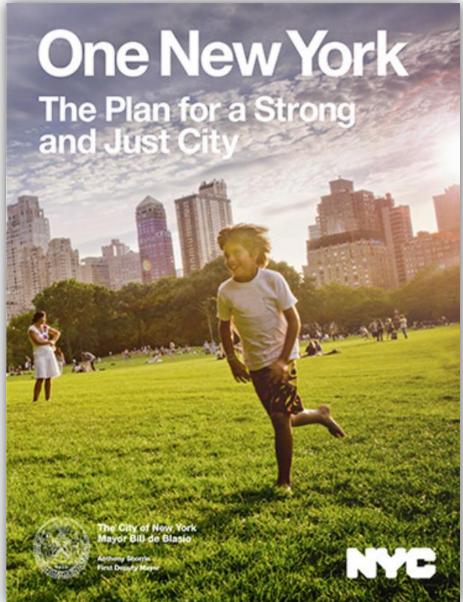




Comprehensive Sustainability Plans for NYC





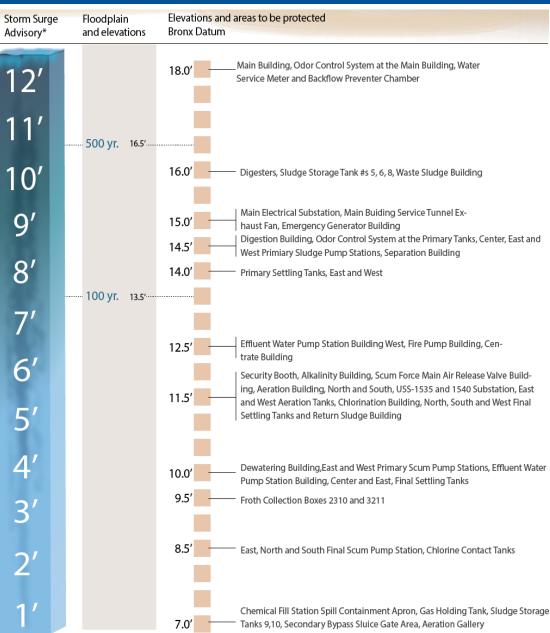


Wastewater Resiliency Work



Hunts Point Treatment Plant





Wastewater Resiliency Work



Table B: Hunts Point Adaptation Strategy Recommendations

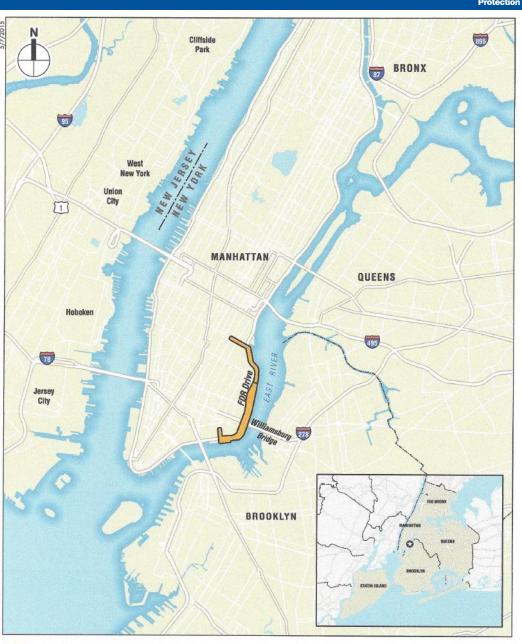
Location	Recommended Protective Measure	Cost of Protective Measures (\$M) ¹	Damage Cost for Critical Flood without Protection (\$M) ^{1,2}	Cumulative Risk Avoided Over 50 Years (\$M) ^{1,3}
Aeration Building – North	Seal Building	\$318,000	\$1,477,000	\$2,186,000
Aeration Building – South	Seal Building	\$318,000	\$1,273,000	\$1,887,000
Aeration Gallery	Flood-proof Equipment and Construct Barrier	\$745,000	\$9,168,000	\$44,980,000
Aeration Tank - East	Elevate Equipment	\$2,036,000	\$8,627,000	\$13,212,000
Aeration Tank - West	Elevate Equipment	\$4,363,000	\$18,251,000	\$28,295,000
Alkalinity Building	Seal Control Room	\$299,000	\$5,398,000	\$7,323,000
Centrate Building	Sandbag	\$103,000	\$1,820,000	\$1,255,000
Chlorination Building	Elevate Equipment	\$1,636,000	\$2,359,000	\$4,045,000
Chlorine Contact Tank	Elevate Equipment	\$142,000	\$525,000	\$2,700,000
Dewatering Building	Seal Building	\$597,000	\$42,718,000	\$75,305,000
Digestion Building	Sandbag	\$103,000	\$6,674,000	\$2,434,000
Effluent Water Pump Station Building - Center	Elevate Equipment and Seal Building	\$594,000	\$1,413,000	\$4,508,000
Effluent Water Pump Station Building - East	Elevate Equipment and Construct Barrier	\$1,258,000	\$1,152,000	\$3,953,000

Coastal Protection for Lower Manhattan

Proposed Project Alignment



- High population density.
- Low elevation.
- High-Value Economic Assets.
- First Phase along the East Side will begin in 2016.



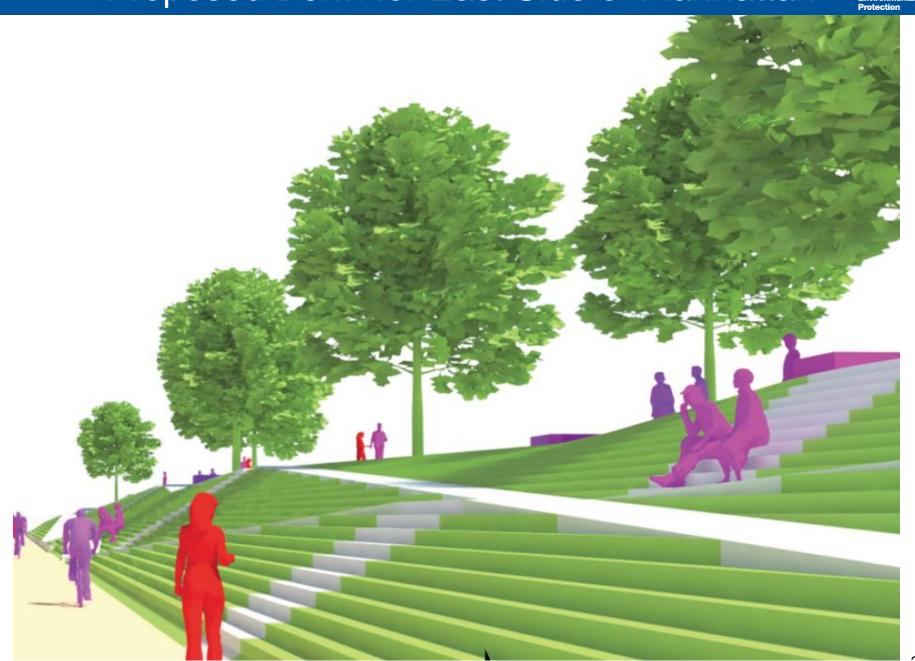
Coastal Protection: Walls and Terraced Berms





Proposed Berm for East Side of Manhattan





Terraced Berm Elevation View



