



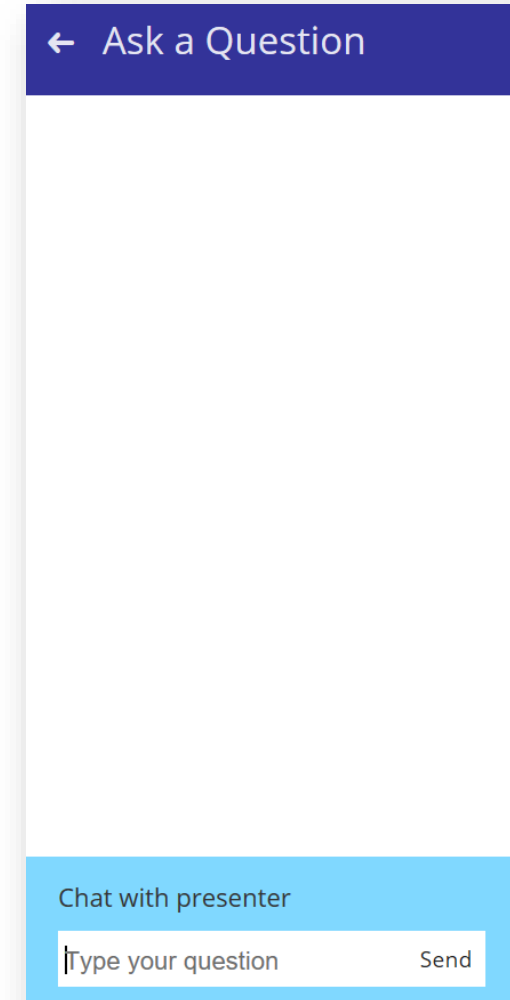
Water Recycling and Wet Weather Management

April 12, 2018



A Few Notes Before We Start...

- Today's webcast will be 60 minutes.
- There is 1 Professional Development Hours (PDH) available for this webcast.
- A PDF of today's presentation can be downloaded when you complete the survey at the conclusion of this webcast.
- If you have questions for the presenters please send a message by typing it into the chat box located on the panel on the left side of your screen.



← Ask a Question

Chat with presenter

Type your question Send

Today's Presenters



Zach F. Gallagher, PE, LEED-AP
Natural Systems Utilities



Alan Cohn
NYC Department of
Environmental Protection

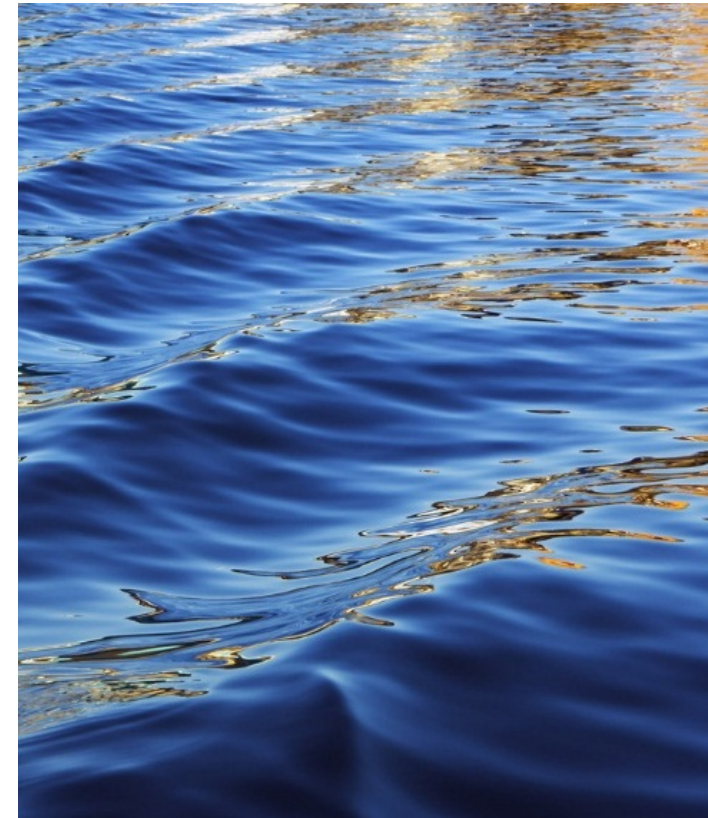


Steve Curtis
American Water





Zach F. Gallagher, PE, LEED-AP
Natural Systems Utilities



Water Reuse Drivers & Today's Focus



Sustainability & Resiliency

Imbalance of Water Supply & Demand

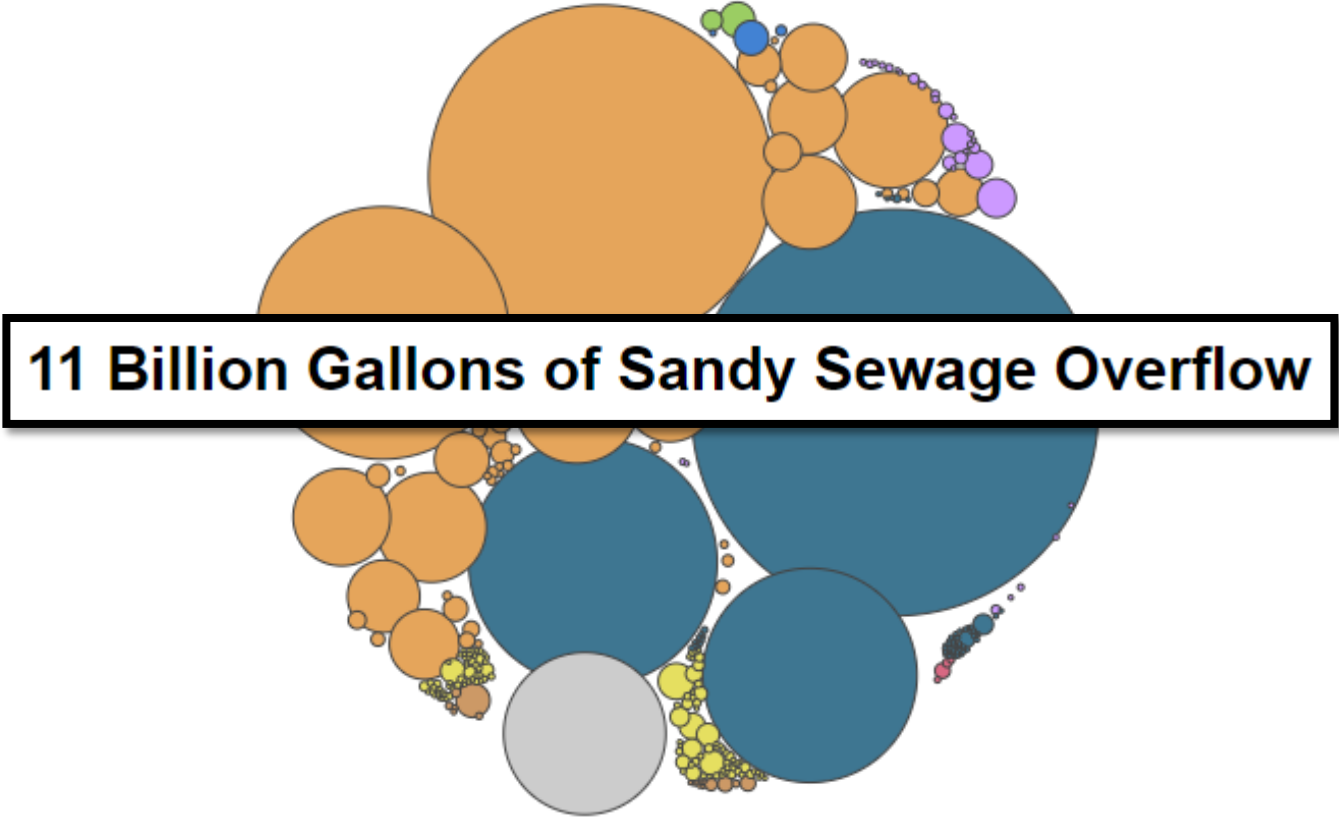


Rising Costs

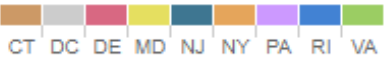
Aging Infrastructure



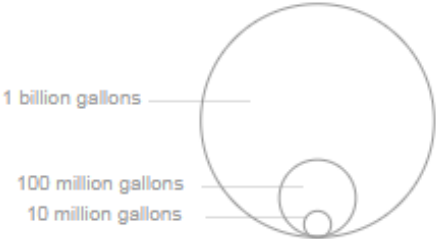
Centralized & Decentralized: Hurricane Lessons



Legend: Circles are color-coded by state sized according to the volume of overflow in gallons.



Olympic-size swimming pool
660,000 gallons



Source: climatecentral.org

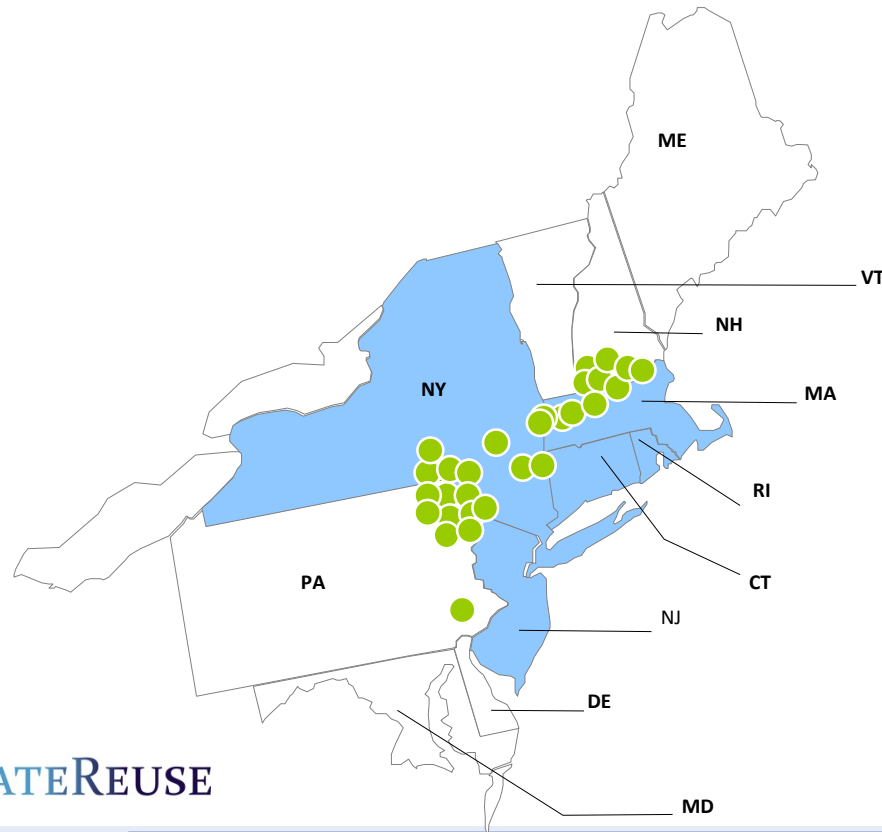
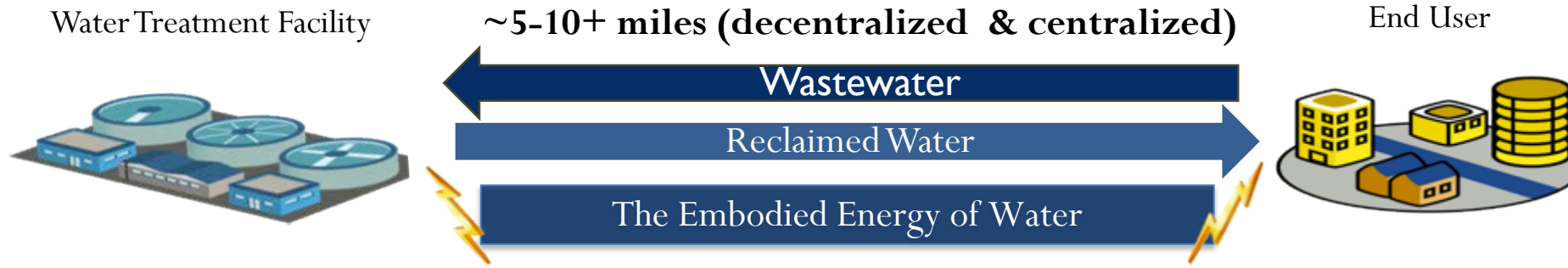
Centralized & Decentralized: Hurricane Lessons

- At least 80 sewage spills reported across Texas from Harvey
- At least 50 water systems and 34 wastewater systems were still offline weeks after Harvey made landfall in Texas



Source: usatoday.com

Centralized & Decentralized: Hurricane Lessons



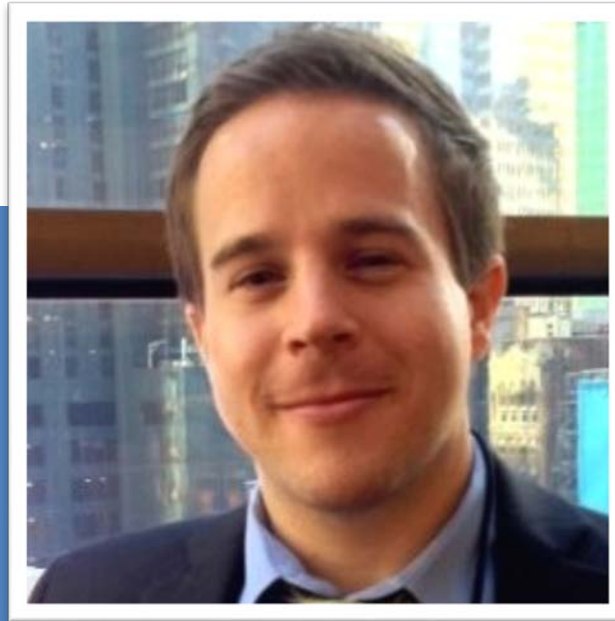
- ~100 onsite systems currently managed by NSU in the Northeast, 80 within those areas directly impacted by **Super-Storm Sandy**.
- **ZERO** NSU onsite facilities exceeded effluent permit requirements while many centralized facilities were down for weeks or longer.

Centralized & Decentralized: An Integrated Model

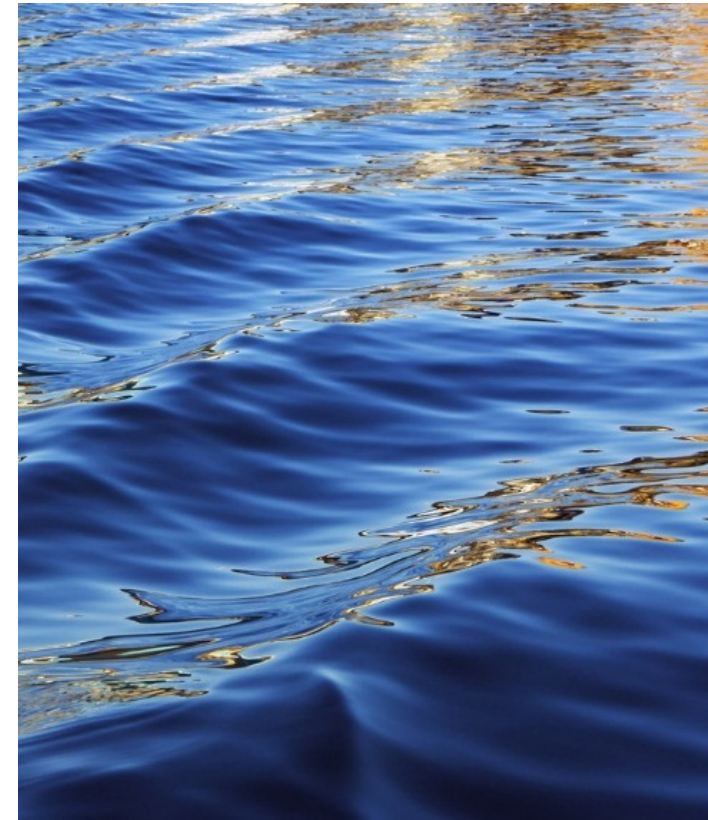


Battery Park, NYC

- **Six (6)** in-building water reuse systems sized at 15,000 to 40,000 gallons per day (GPD) serving eight (8) buildings in Battery Park.
- **15 years** of operating data. **ZERO** permit exceedances and **ZERO** user complaints/public health concerns
- System automatically controlled/monitored with alarms. Licensed Operator **On-Site 2 days/wk** less than 4 hours per day (8 hours / wk)
- Achieving **>55%** Water Use Reduction
- Achieving **>65%** Sewer Discharge Reduction
- **100%** Reclaimed Water For Cooling Tower Make-up
- Reduced strain on municipal/centralized infrastructure
- Existing systems being retrofitted & new systems being developed with thermal energy recovery for **net zero/net positive energy** water reuse

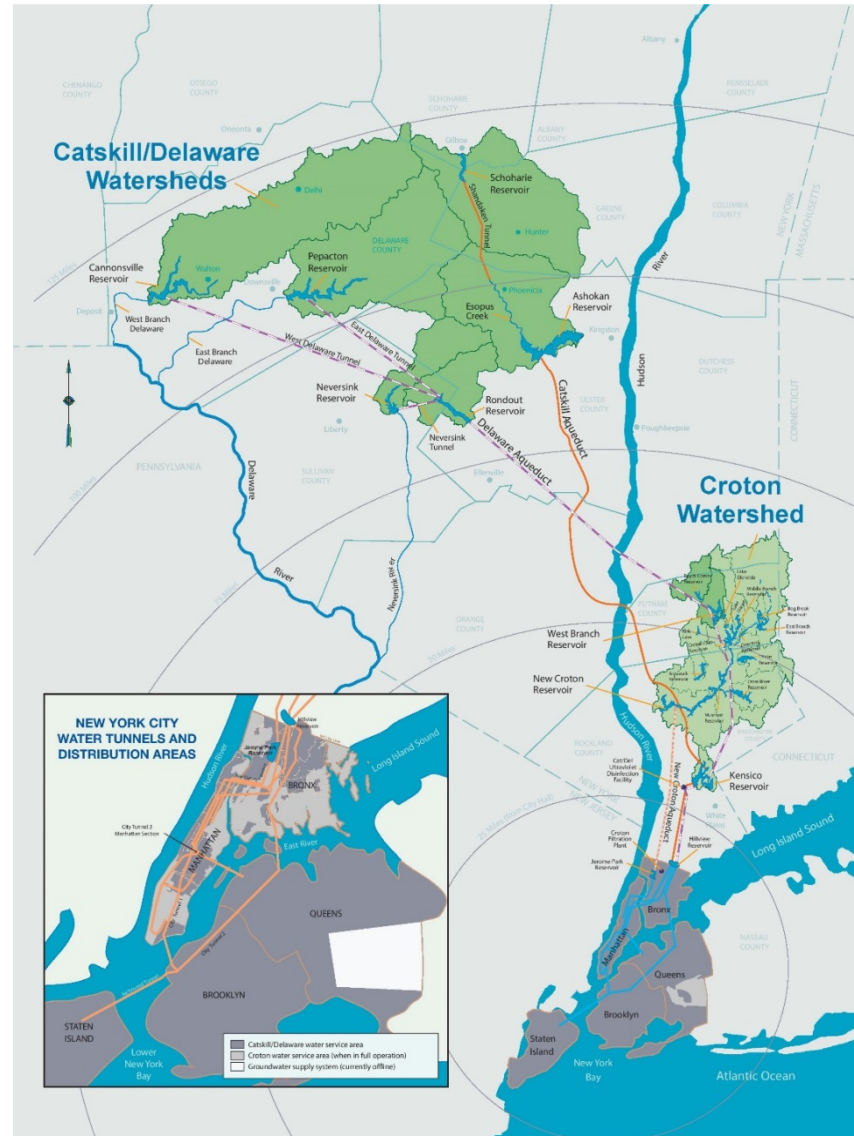


Alan Cohn
NYC Department of Environmental Protection

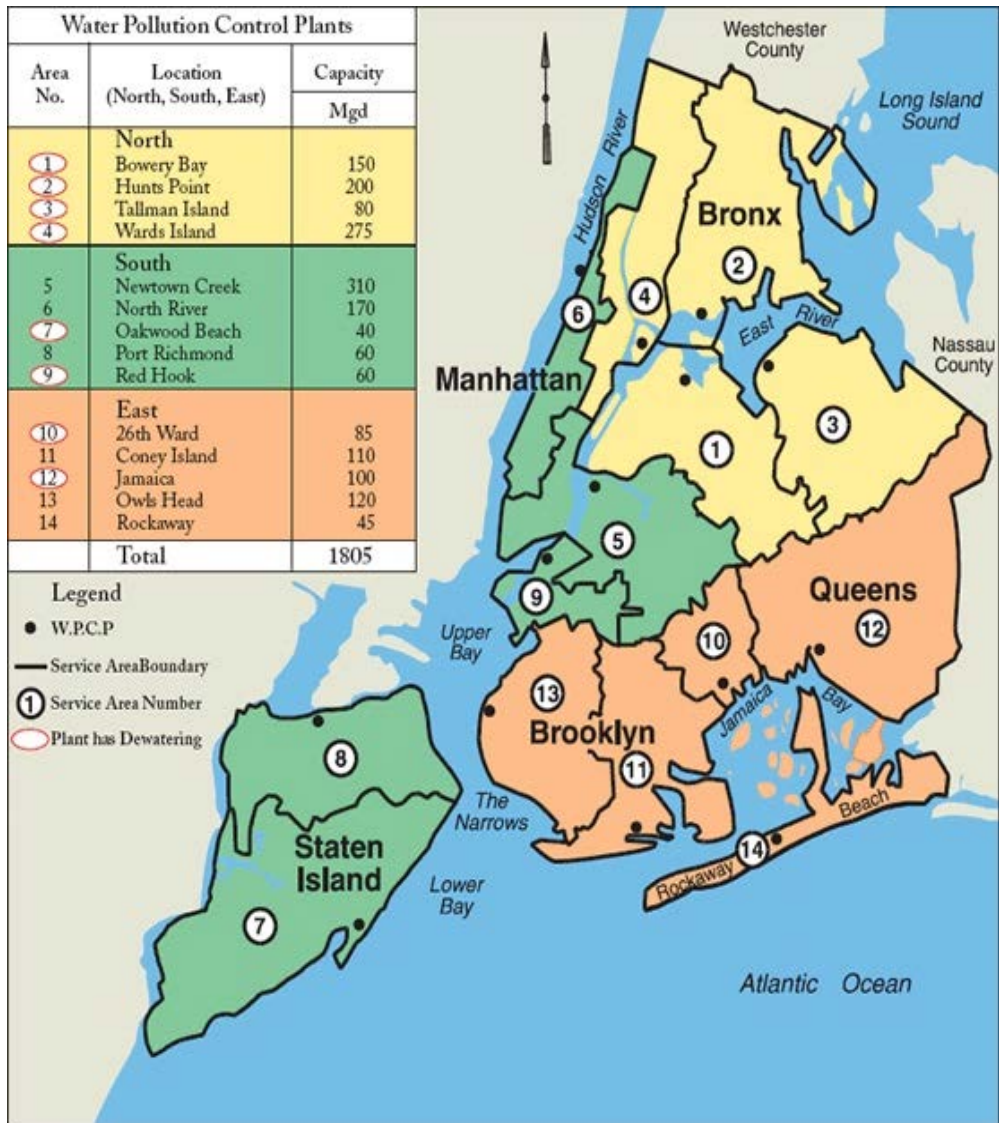


NYC's Water Supply System

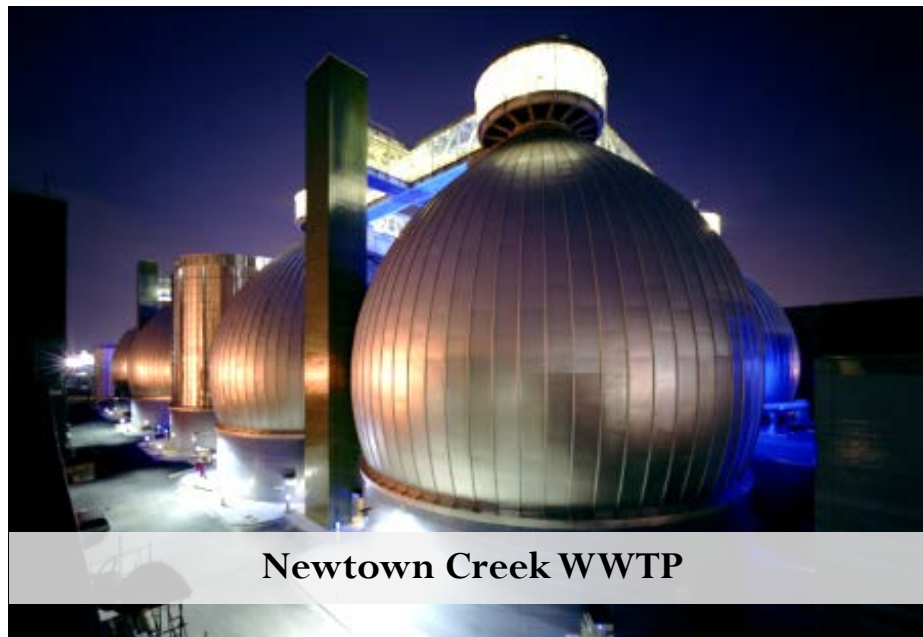
- 2,000 square mile watershed with 19 reservoirs and 3 controlled lakes
- Serves 9 million people (almost 50% of NY State)
- Deliver approximately 1 billion gallons of water per day



NYC's Wastewater System



- 14 wastewater treatment plants, 96 pumping stations, and over 7,500 miles of sewers
- Treat almost 1.3 billion gallons of wastewater each day



Preparing for Extremes: Drought



*December 2001: Drought conditions at the Cannonsville Reservoir,
Delaware County, NY*

Preparing for Extremes: Heavy Rain



September 2004: Flooding after a downpour on 9th Street, Brooklyn, NY

(Credit: Seth Wenig/The New York Times)

Preparing for Extremes: Heavy Rain



August 2011: Water spills over the Gilboa Dam following Tropical Storm Irene, Gilboa, NY

Preparing for Extremes: Coastal Flooding



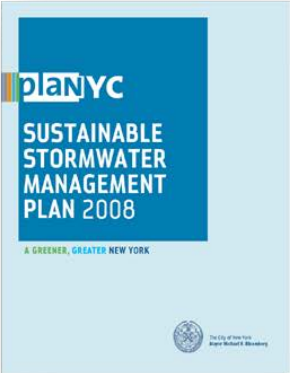
October 2012: A boat washed onto the premises of the Coney Island WWTP after Superstorm Sandy, Brooklyn, NY

NYC Sustainable Water Management

New York City is proactively reducing greenhouse gas emissions, stormwater runoff, and drinking water demand, and preparing for the impacts of extreme weather to drinking water and wastewater infrastructure.



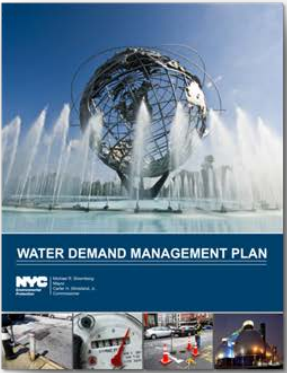
2007



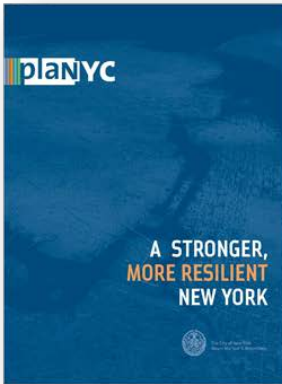
2008



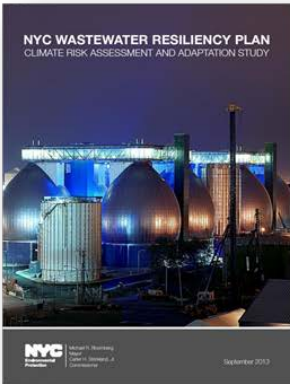
2010



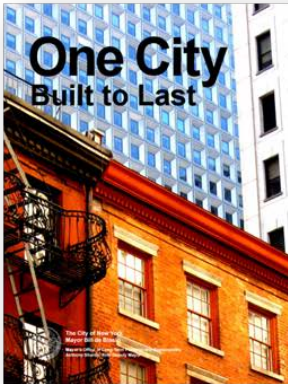
2013



2013



2013



2014



2015

Enhancing Resiliency By Saving Water

NYC's Demand Management Program has reduced almost 10 MGD since 2013, with an additional 10 MGD planned by 2023.



Municipal: Retrofit and replace water fixtures in public facilities

Residential: Replace inefficient fixtures in multi-family buildings



Non-Residential: Create voluntary conservation programs and provide cost sharing incentives

System Optimization: Continue leak detection, pressure management and metering



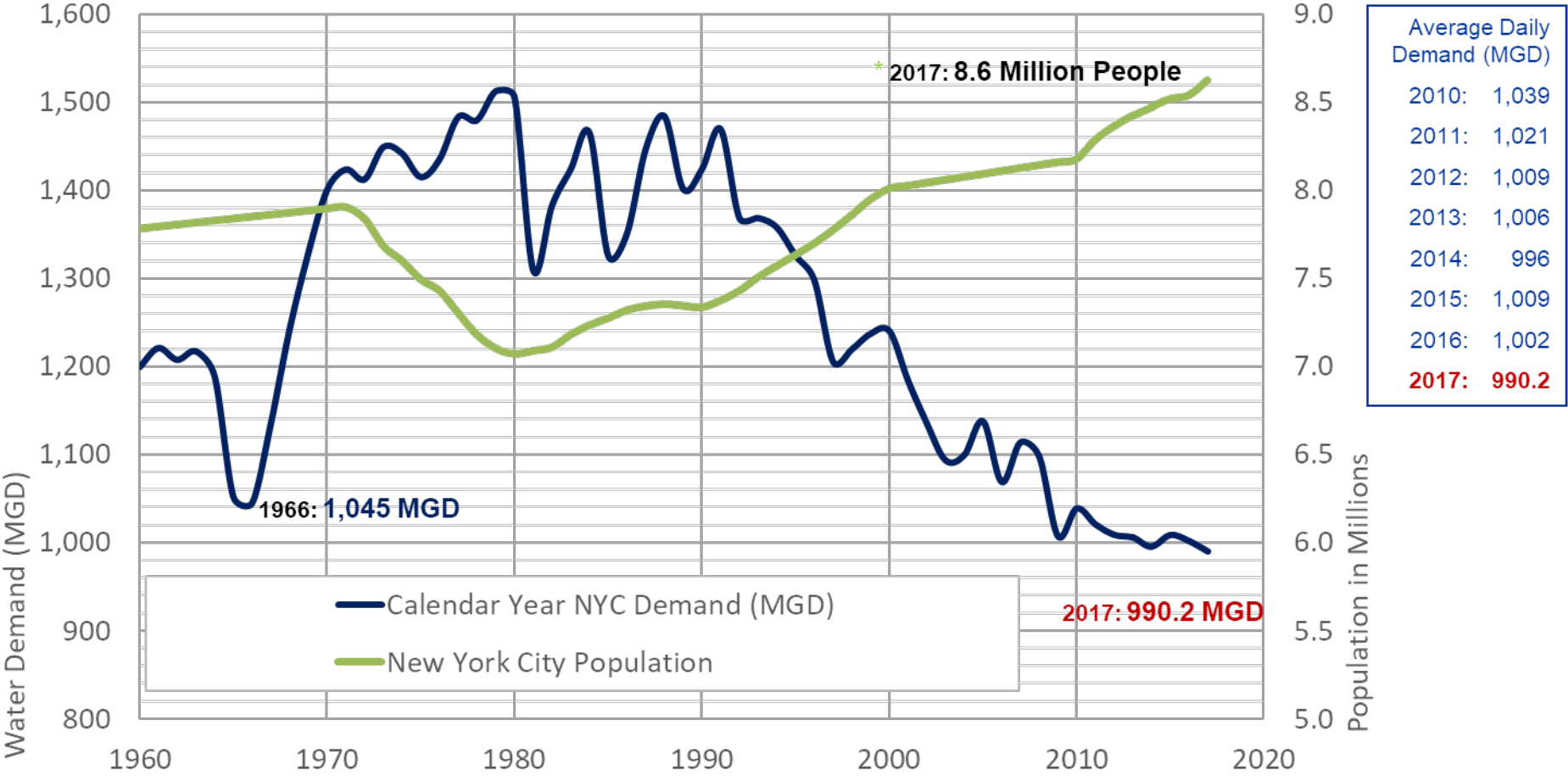
Water Supply Management: Adopt Water Shortage Emergency Rules

Wholesale Customers: Develop and implement demand management plans for 10 wholesale customers



Enhancing Resiliency By Saving Water

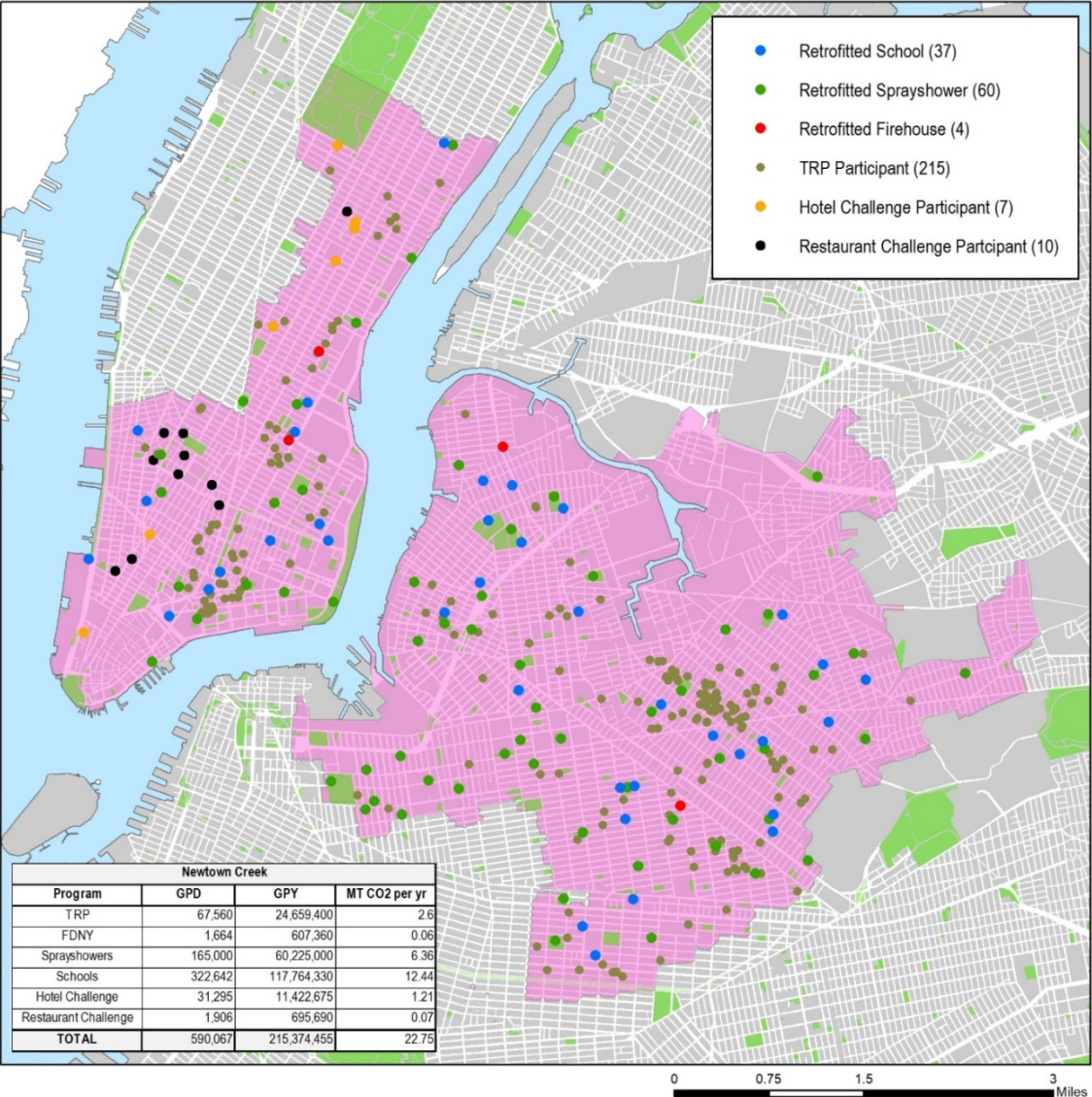
Demand is lower than it has been in at least the last 50 years, even as population hits new record highs.



* Official 2017 New York City Department of City Planning Estimate.

Enhancing Resiliency By Saving Water

Newtown Creek WWTP - Demand Management Projects

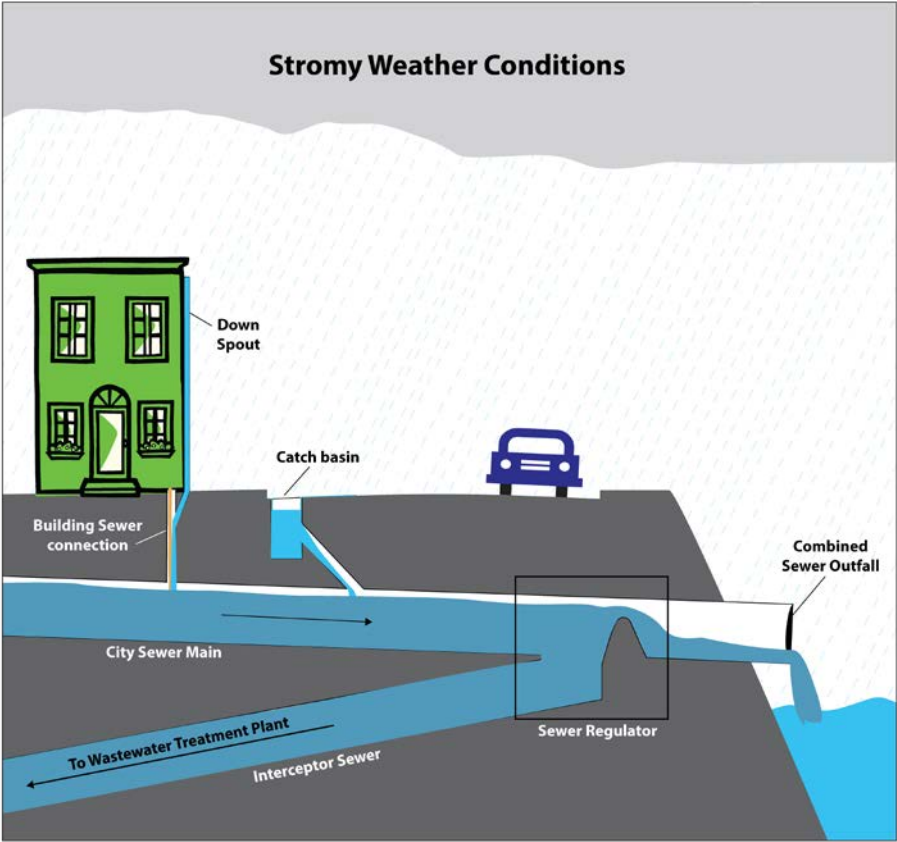


Demand management has reduced flow to Newtown Creek WWTP by over 200 million gallons per year.

That's over 22 metric tons of CO₂ saved each year.

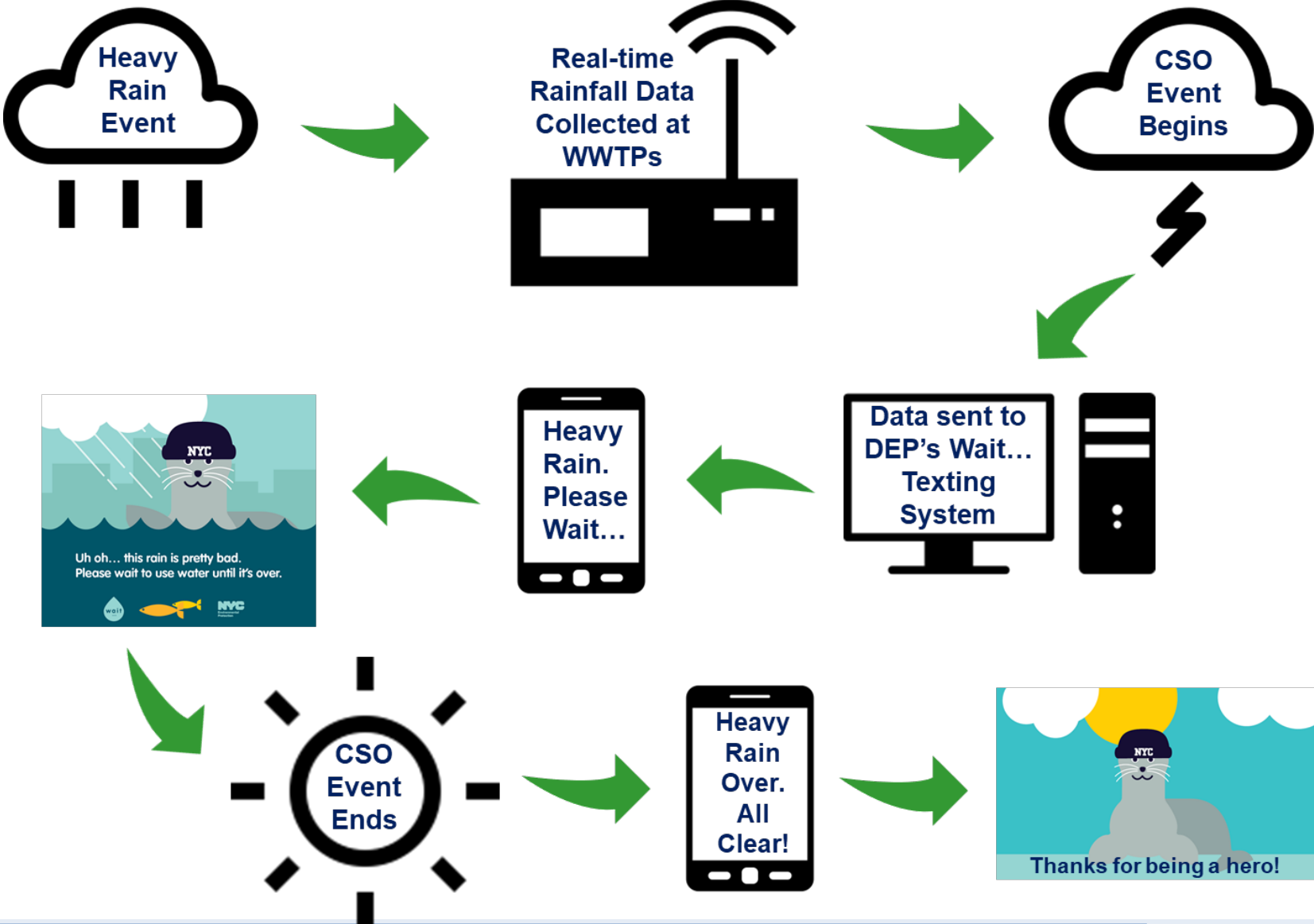
Enhancing Resiliency By Saving Water

Heavy rain can cause combined sewer overflow (CSO). Demand management and green infrastructure help reduce CSO at the source.



Enhancing Resiliency By Saving Water

“Wait...” Pilot Program



Water Reuse in NYC

Municipal Water Reuse Projects
Comprehensive Water Reuse Program
On-site Water Reuse Grant Program




Municipal Water Reuse



Comprehensive Water Reuse Program

The Comprehensive Water Reuse Program provides a 25% water and wastewater fee discount to customers who install water reuse systems that reduce the building's water consumption by at least 25%.


Bill de Blasio Mayor Vincent Sapienza, P.E. Commissioner

Comprehensive Water Reuse Program
Application and Instructions

Property Borough: _____	Block: _____	Lot: _____
Property Address: _____		
Owner Name: _____		
Owner Address: _____		
Owner City/State/Zip: _____		
Owner Phone: _____	Owner Email: _____	
Contact Person: _____		
Contact Address: _____		
Contact City/State/Zip: _____		
Contact Phone: _____	Contact Email: _____	

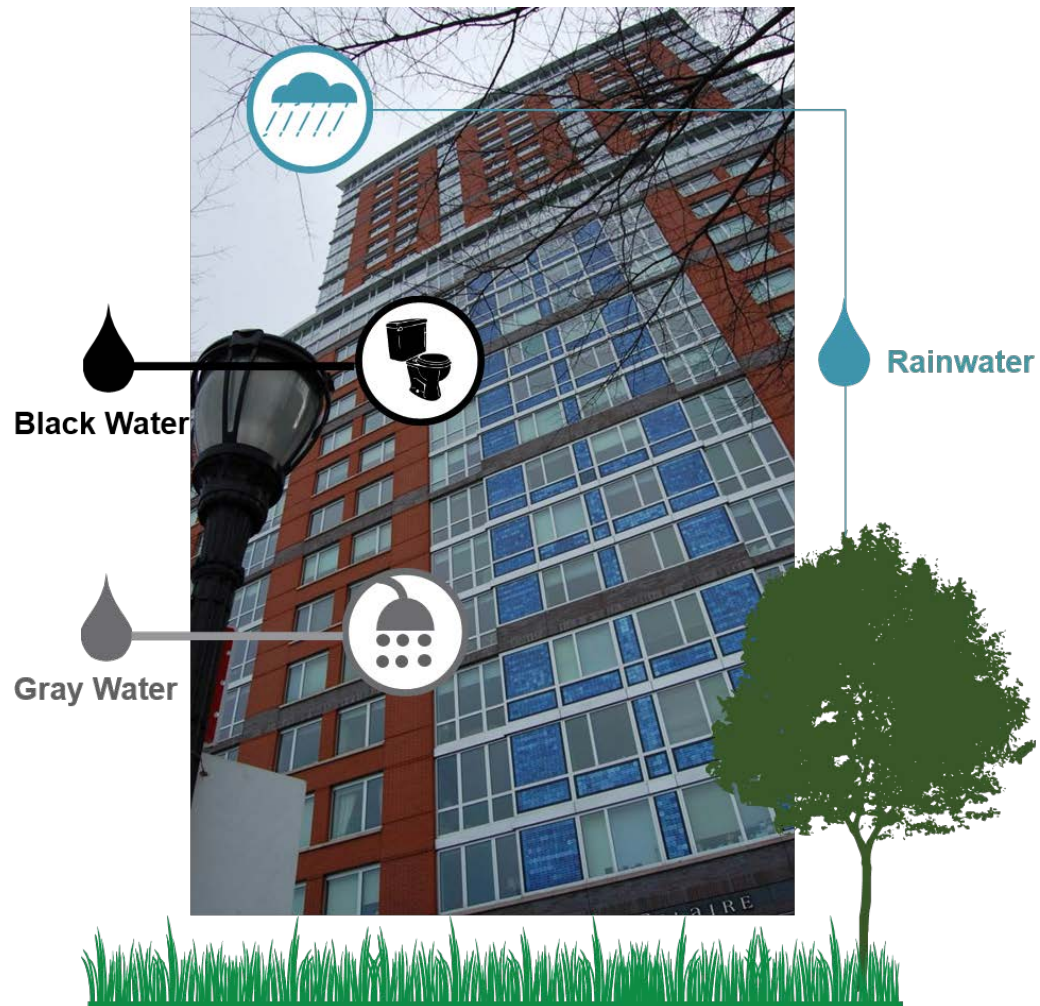
Summary of Requirements:

1. The building must have a water reuse system that results in a reduction in consumption of approximately 25% compared to a similar building without a water reuse system.
2. The building must have a system that captures and detains stormwater.
3. The water reuse and stormwater collection systems must meet the requirements of the New York City Department of Buildings, the New York City Department of Health, DEP, the New York State Department of Environmental Conservation and any other agencies having jurisdiction, as applicable.
4. All toilets shall operate at no more than 1.6 gallons per flush, all urinals shall flush at no more than 0.5 gallons per flush, all showerheads at no more than 2.5 gallons per minute and all clothes washers shall consume no more than 9.5 gallons per cubic foot. All faucets shall flow at no more than 2.5 gallons per minute except that lavatory faucets in non-residential occupancies shall flow at no more than 1 gallon per minute and shall be equipped with automatic controls which prevent flow for more than 15 seconds without repeated activation.

Detailed requirements are provided in Part VI Section 10 of the New York City Water Board's Water and Wastewater rate schedule.

On-site Water Reuse Grant

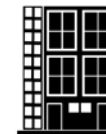
Eligible Technologies



Available Grants

Building-scale

- 100,000 square feet or more of commercial or residential occupancy
- 32,000 gallons per day or more of savings
- Up to \$250,000 in funding



District-scale

- Must include the sharing of water between two or more parcels
- 94,000 gallons per day or more of savings
- Up to \$500,000 in funding



Onsite Water Reuse Grant

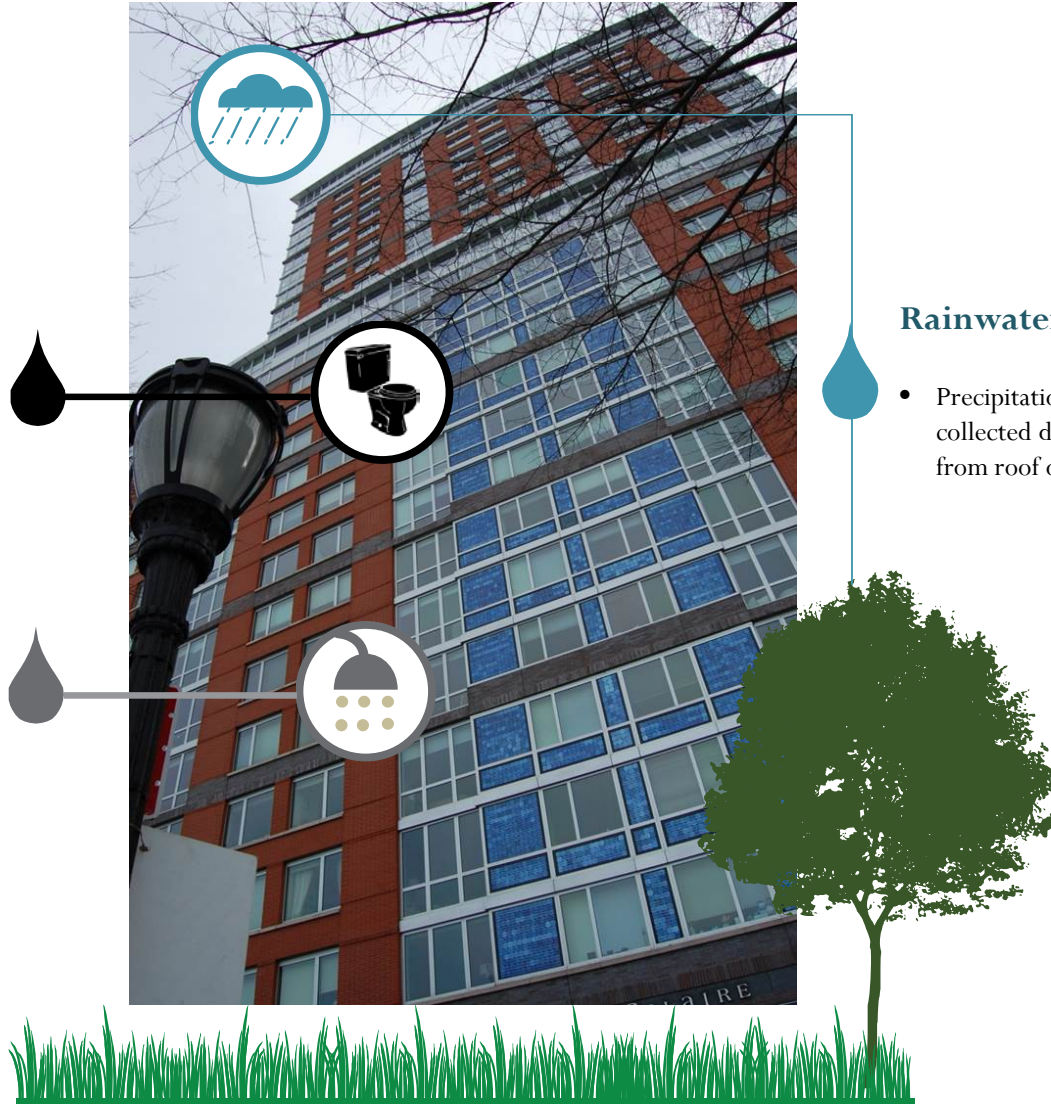
Treated water can be used for non-potable reuse including flushing, laundry, and cooling.

Black Water

- Toilets
- Showers
- Washers
- Cooling tower washdown/blowdown
- Any other fixtures discharging animal or vegetable matter

Gray Water

- Discharge from lavatories and condensate water



Rainwater

- Precipitation collected directly from roof or facade

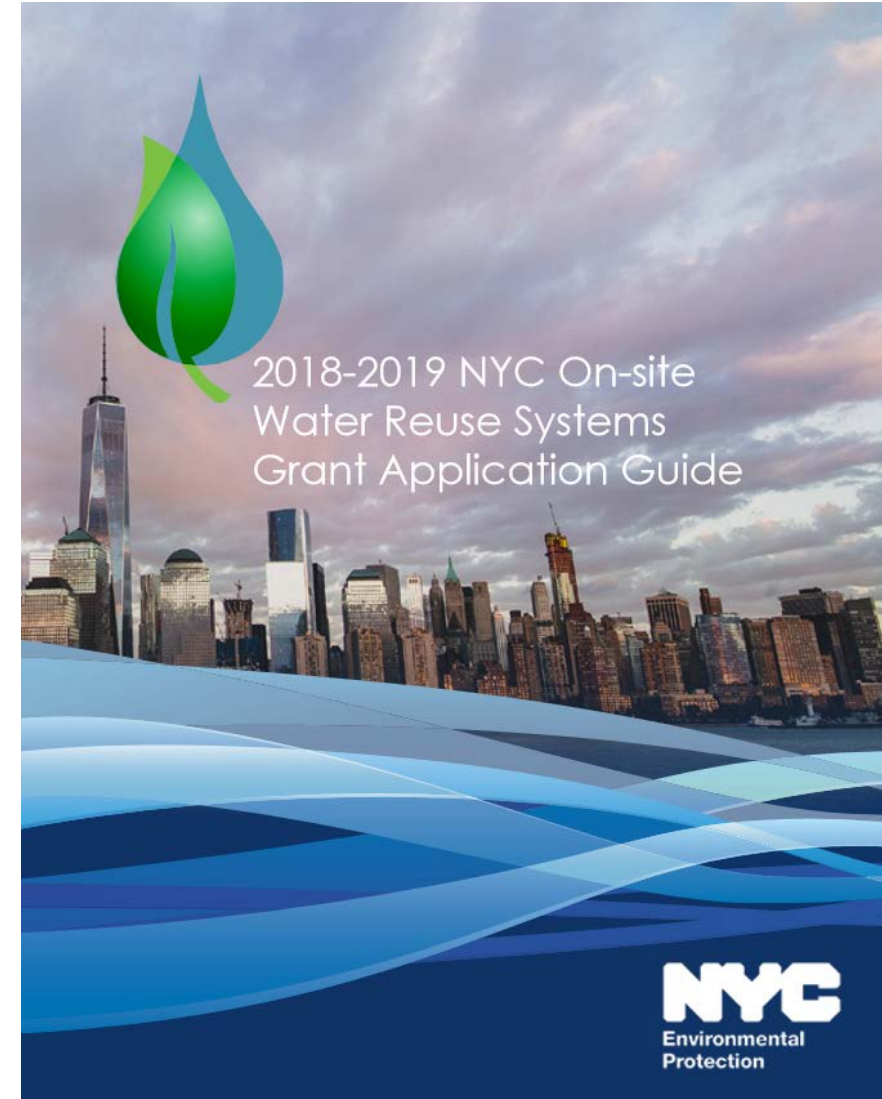
Onsite Water Reuse Grant

Requirements

- The project must be constructed within 4 years of the Funding Agreement approval date
- The proposed alternate water source system must be operational and achieve the target water savings for a minimum of 10 years
- The Applicant must comply with the Department of Buildings (DOB) Plumbing Code and Department of Health regulations

Timeline and Disbursement


- Upon approval of the Grantee Agreement, DEP issues up to 50% of the full grant amount
- The final disbursement of the remaining grant amount is processed after project completion and the DOB System Certification is submitted



On-Site Water Reuse Grant

Email: reusegrant@dep.nyc.gov | Website: nyc.gov/dep/reusegrant

NYC
NYC Resources 311 Office of the Mayor



GO

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 - Municipal Water Efficiency Program

On-Site Water Reuse Grant Program

The On-site Water Reuse Grant Program provides commercial, mixed-use, and multi-family residential property owners with incentives to install water reuse systems. This grant program builds on the [Comprehensive Water Reuse Program](#), which offers a 25% discount to customers who install successful water reuse systems.

Water reuse systems, sometimes called water recycling systems, make more efficient and safe use of rainwater, black water, or gray water when properly designed and operated. The grant program promotes the construction of these systems at both the building-scale and district-scale by covering a portion of efficiency technology capital costs.

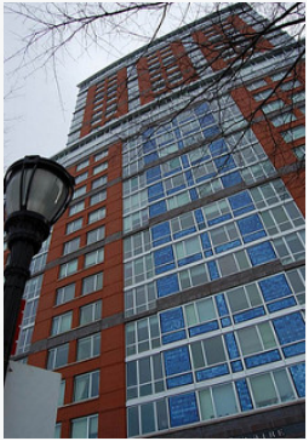



Photo Credit: Natural Systems Utilities

Available Grants

Grant Size	Eligibility Criteria	Target Water Savings	Funding Amount
Building-scale	Typically 100,000 square feet or more of residential or commercial space	32,000 gallons per day	Up to \$250,000
District-scale	Typically includes the sharing of water between two or more parcels	94,000 gallons per day	Up to \$500,000

A leaking toilet can waste **250** gallons of water per day. That is the equivalent of **50** water cooler bottles per month.



Source: Water Use It Wisely



Steve Curtis
American Water



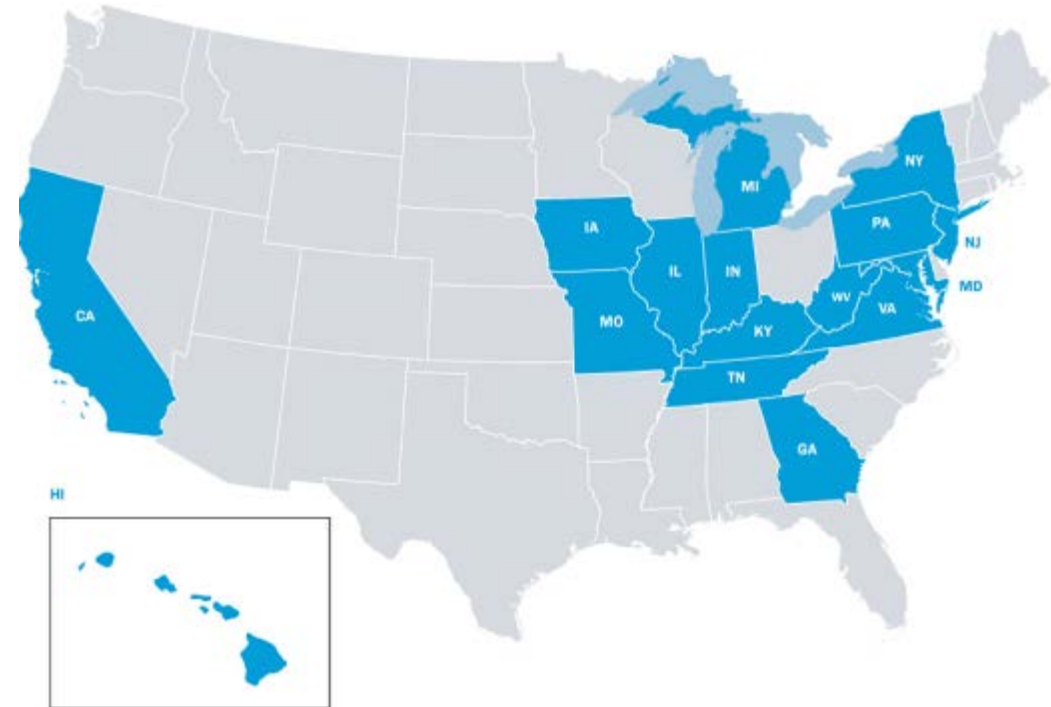
American Water's Regulated Business

We manage more than 370 individual water systems across the country.

Every day, we operate and manage:

- ★ More than **50,000** miles of distribution and collection mains
- ★ **72** surface water treatment plants
- ★ **527** groundwater treatment plants
- ★ Over **1,100** groundwater wells
- ★ **127** wastewater treatment facilities

American Water's Regulated Presence

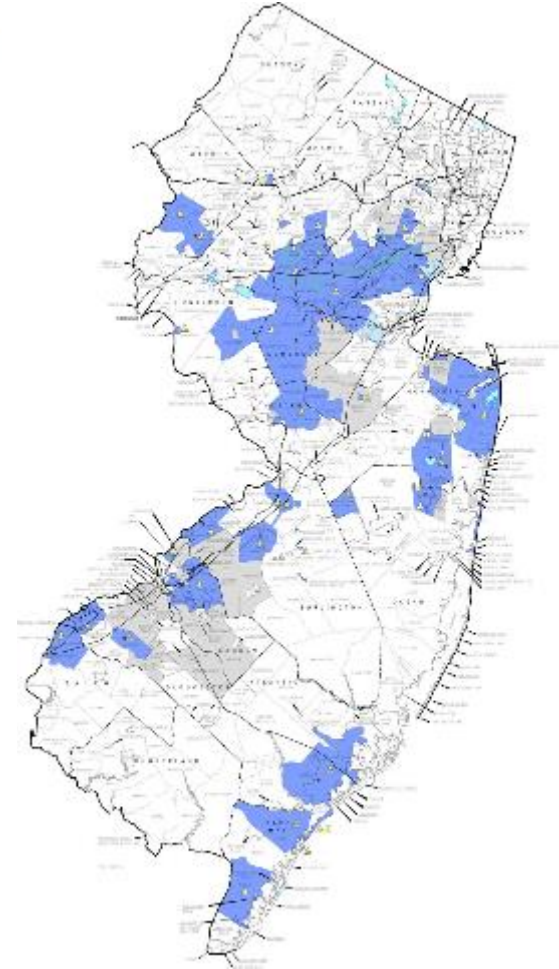
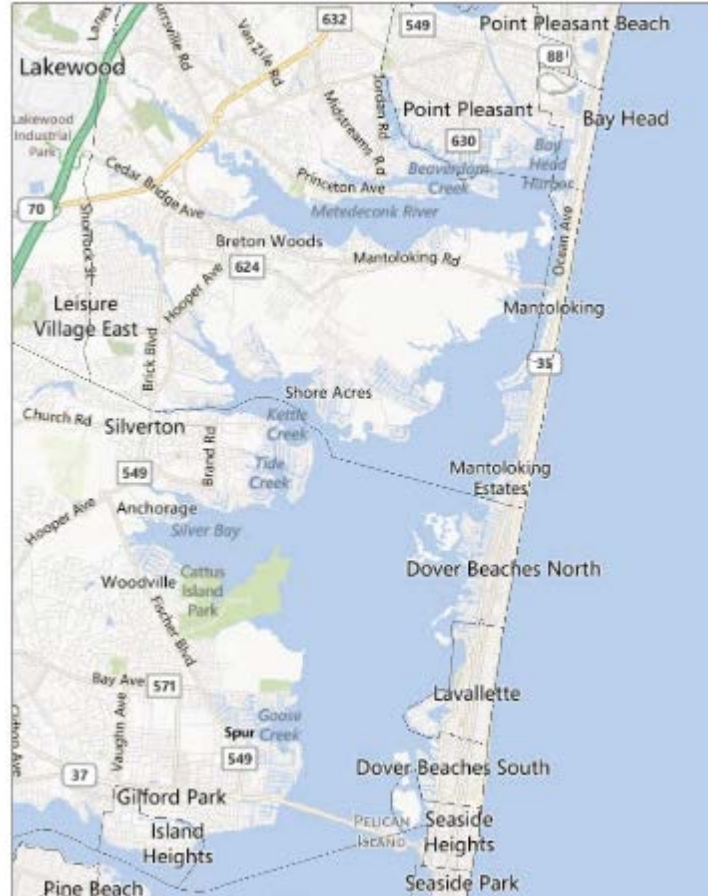


American Water's Experience in Hurricane Sandy



American Water's Experience in Hurricane Sandy

- Biggest impacts on barrier islands
- 10,000 homes without water, many destroyed
- Execution of emergency response plans
- Leveraging of broader company resources
- Capital investments for system recovery



Case Study: Fort Sill, Oklahoma

- Located in Lawton, OK
- Drought-prone area
- Existing WWTP treats 2MGD
- American Water, in partnership with the installation, secured a Category 2 reuse permit, and constructed a wastewater reuse system
- System used for irrigation, chillers, and other non-potable uses
- Environmental, economic and resiliency benefits

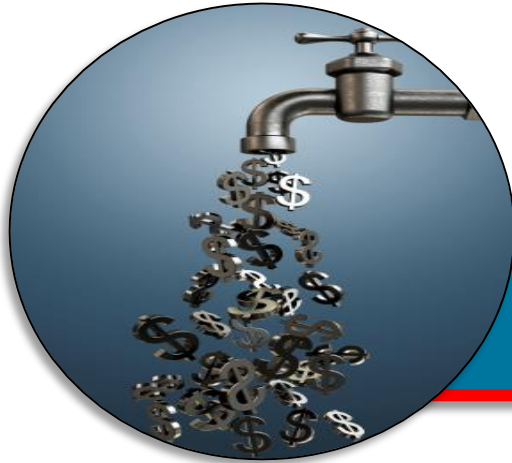


Water Reuse Drivers & Today's Focus



Sustainability & Resiliency

Imbalance of Water Supply & Demand



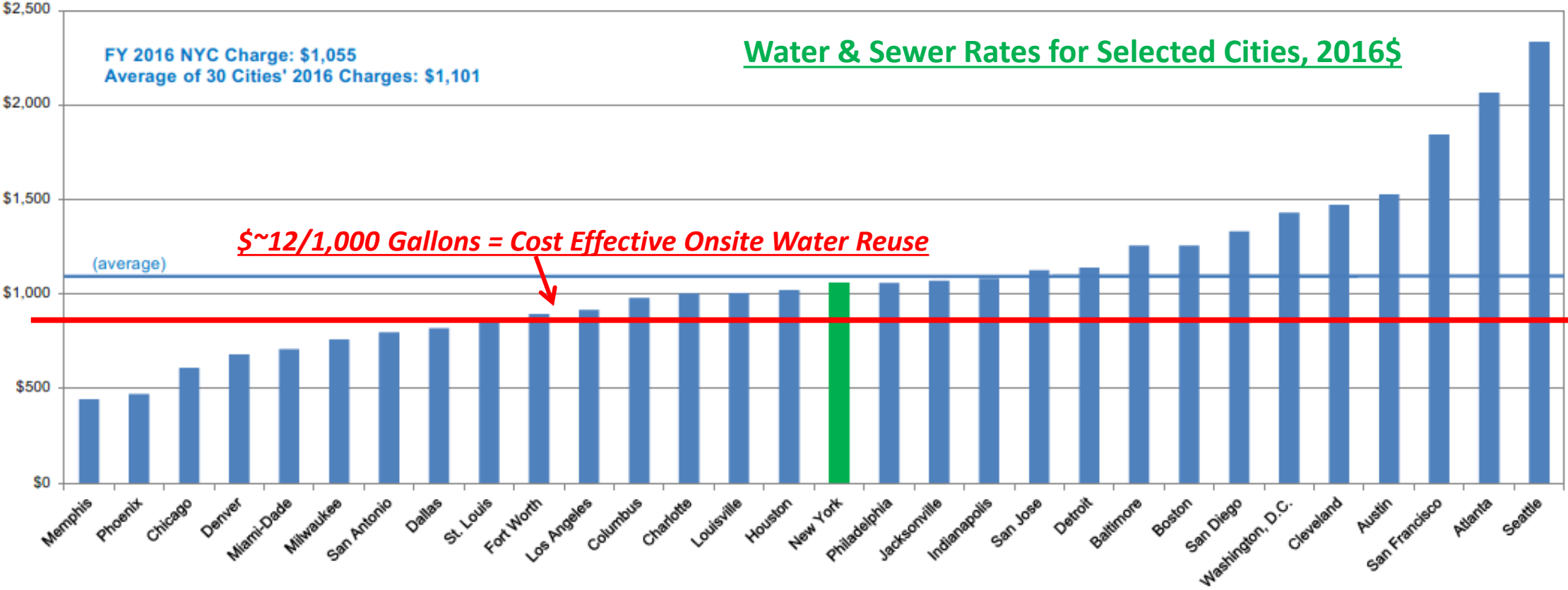
Rising Costs

Aging Infrastructure

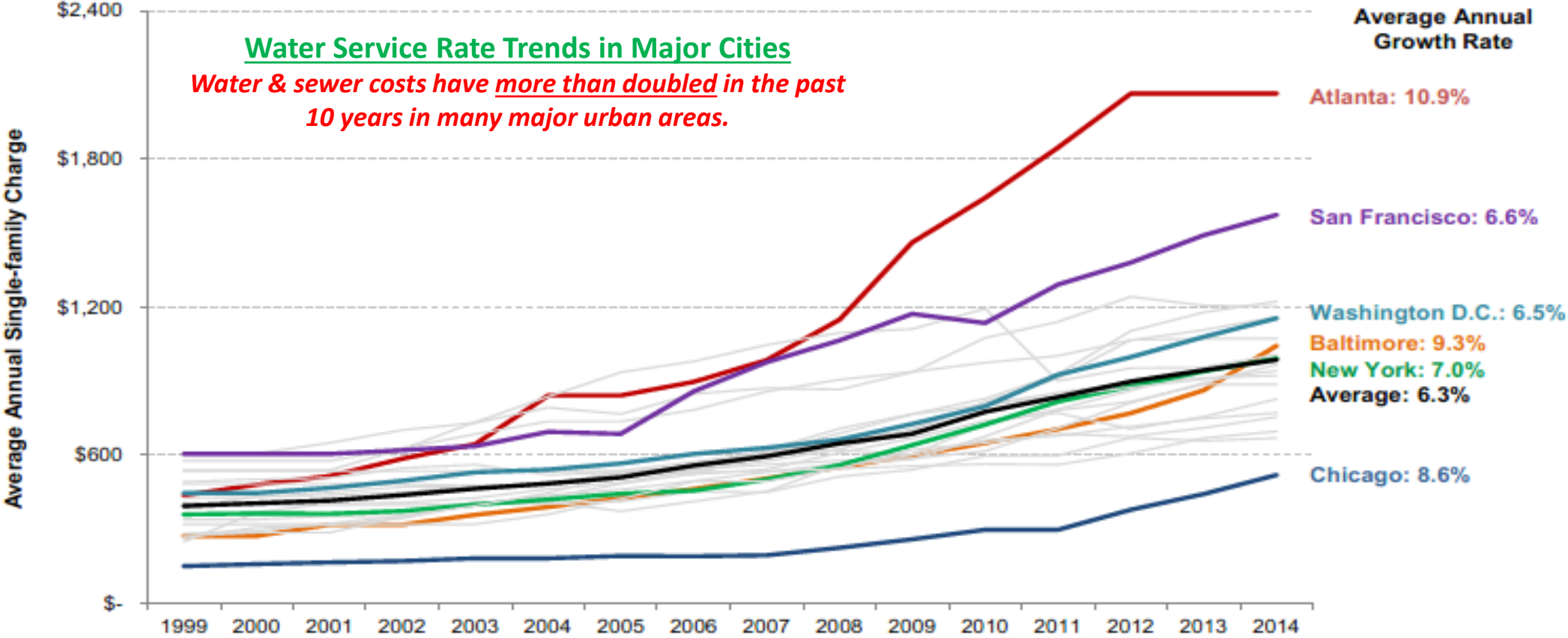


Increasing Water & Sewer Costs

ANNUAL RESIDENTIAL WATER/WASTEWATER FY 2016 CHARGES

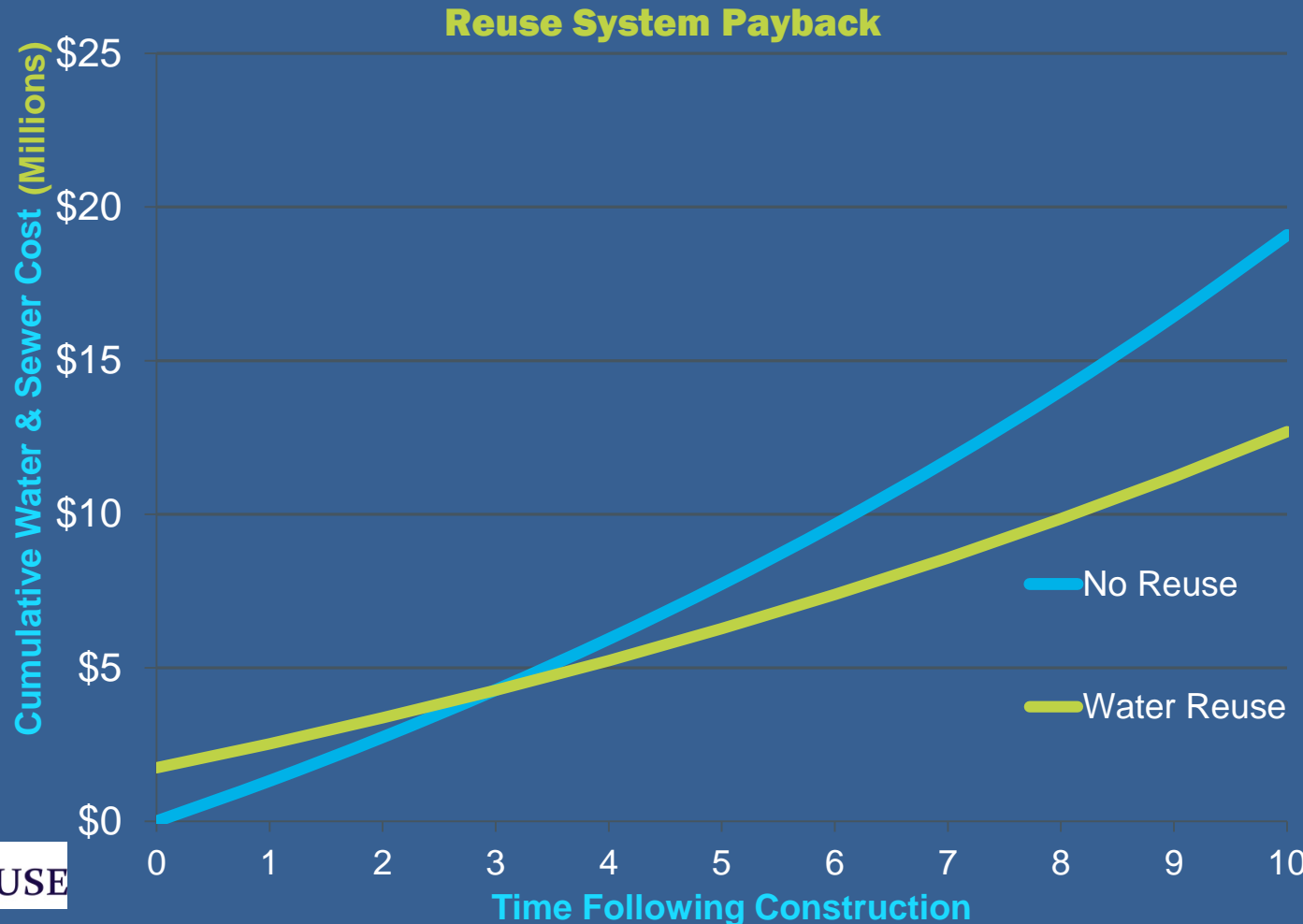


Increasing Water & Sewer Costs



Onsite Water Reuse Business Case

Year	0	1	2	3	4	5	6	7	8	9	10
Annual Savings From Base Case	(\$1,74M)	\$0.53M	\$0.58M	634,955	\$0.69M	\$0.76M	\$0.83M	\$0.90M	\$0.98M	\$1,07M	\$1,16M
Total Savings	(\$1,74M)	(\$1.2M)	(\$.63M)	\$0.06M	\$0.70M	\$1,46M	\$2,28M	\$3,18M	\$4,17M	\$5,24M	\$6,40M



Year 10 Savings
\$6.40M

Assumptions:

- Year 1 Rates are SFPUC Published 2017 Rates
- Water & Sewer rates increase @ 8%/yr

Centralized & Decentralized: Symbiosis

• Centralized Systems

- Deep resources and expertise
- Redundancy through interconnected systems
- Emergency response and “reach-back” capabilities
- Pricing advantages through economies of scale – small communities shielded from rate shock
- Capital availability



• Decentralized Systems

- Offset pressures from population growth and climate impacts
- Insulate customers from large system interruptions
- Provide resiliency and redundancy
- Smaller systems can be tailored to specific uses (“fit for purpose”)
- Maintains local water balance by keeping water closer to the source and point of use
- Allows for more efficient recovery and reuse of resources

Questions?



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