Environmental Protection

Combined Sewer Overflow Long Term Control Plans

Annual Citywide Public Meeting

CUNY School of Law Auditorium

November 15, 2017

Agenda

	Topic	Speaker
1	New York City Wastewater Infrastructure	Vincent Sapienza
2	Green Infrastructure and Integrated Water Management	Angela Licata
3	Grey Infrastructure Status Update	Jim Mueller
4	Affordability	Angela Licata
5	Panel of DEP Senior Staff	All
6	Public Participation	Michael DeLoach

New York City Wastewater Infrastructure

Vincent Sapienza, PE
Commissioner
DEP

About NYC DEP

WATER SUPPLY

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

WASTEWATER TREATMENT

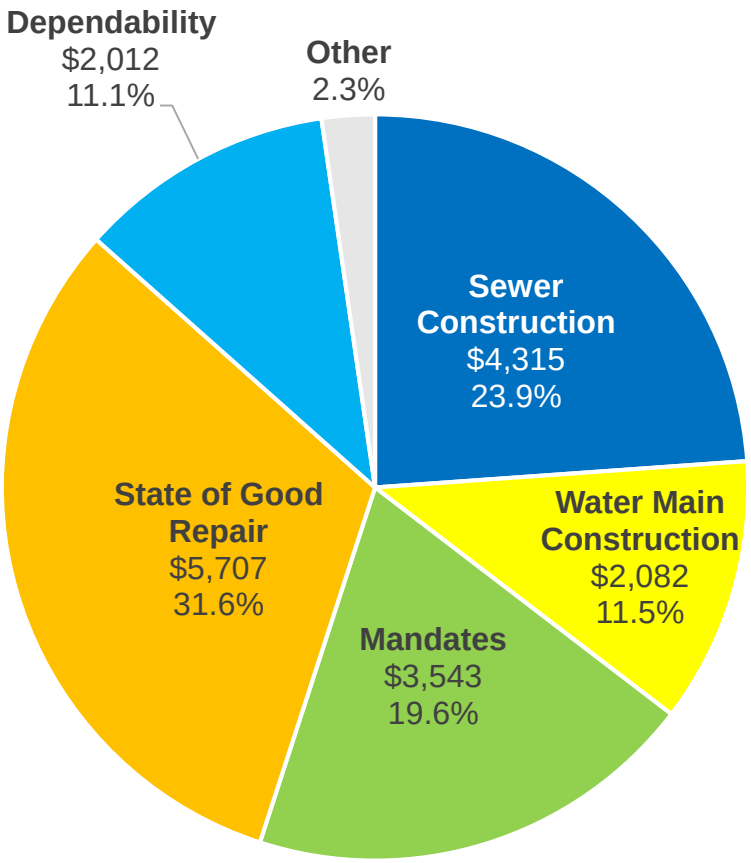
- Treat 1.3 billion gallons of wastewater each day
- Operate and maintain 14 plants, 96 pumping stations, and 7,500 miles of sewers

AIR, NOISE, AND HAZARDOUS WASTE

- Update and enforce the Air Code to reduce local emissions, and regulate hazardous waste and noise pollution

10 Year Capital Plan

FY 2018 – FY 2027
(in millions)



Total: $18.1 Billion

Note: Dollar amounts from FY18-FY27 TYP

NYC Poverty Rates

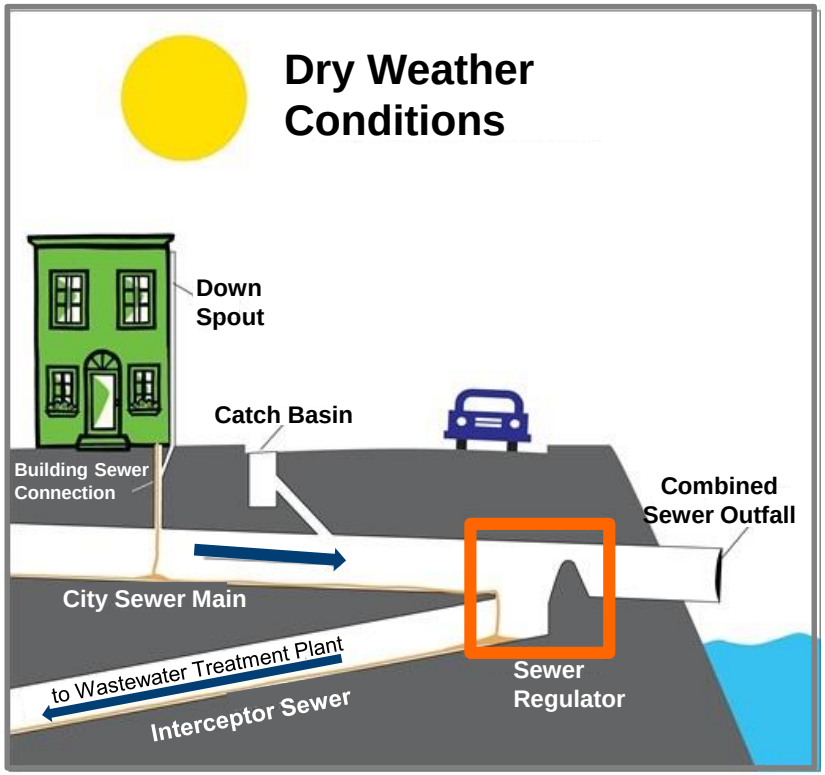
	% of individuals living below federal poverty level (2012)
US	**15.9%**
NYC	**21.2%**
Bronx	31%
Brooklyn	24.3%
Manhattan	17.8%
Queens	16.2%
Staten Island	11.6%

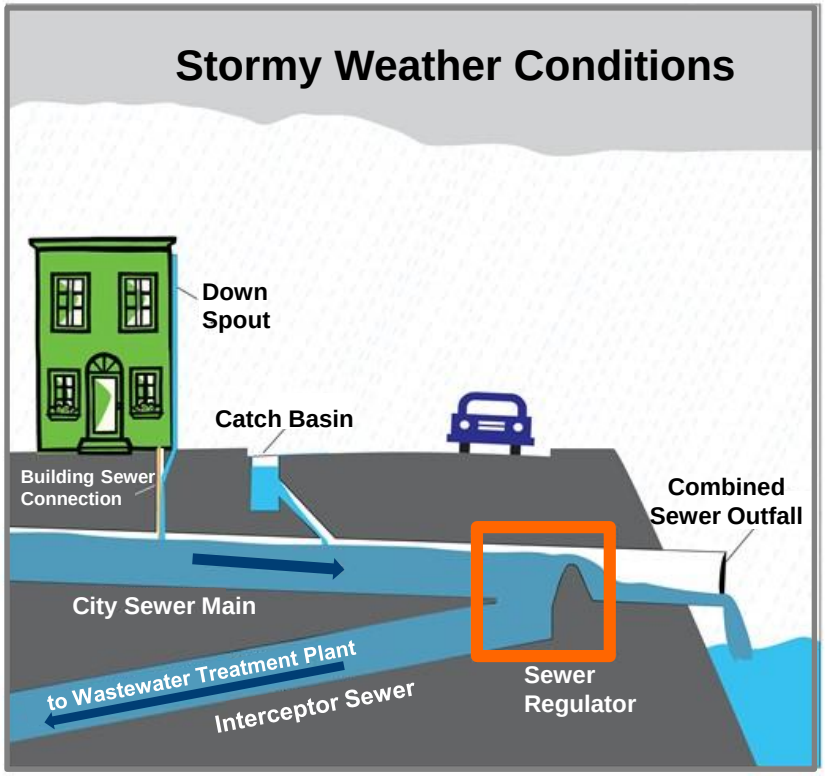
In addition:

- Currently, ~20% of households pay more than 4.5% of income on water and wastewater services
- Given current rate of investment, DEP projects that this percentage of households could increase to 30% by 2027

What is a Combined Sewer Overflow (CSO)?

- NYC's sewer system is approximately 60% combined, which means it is used to **convey both sanitary and storm flows**.





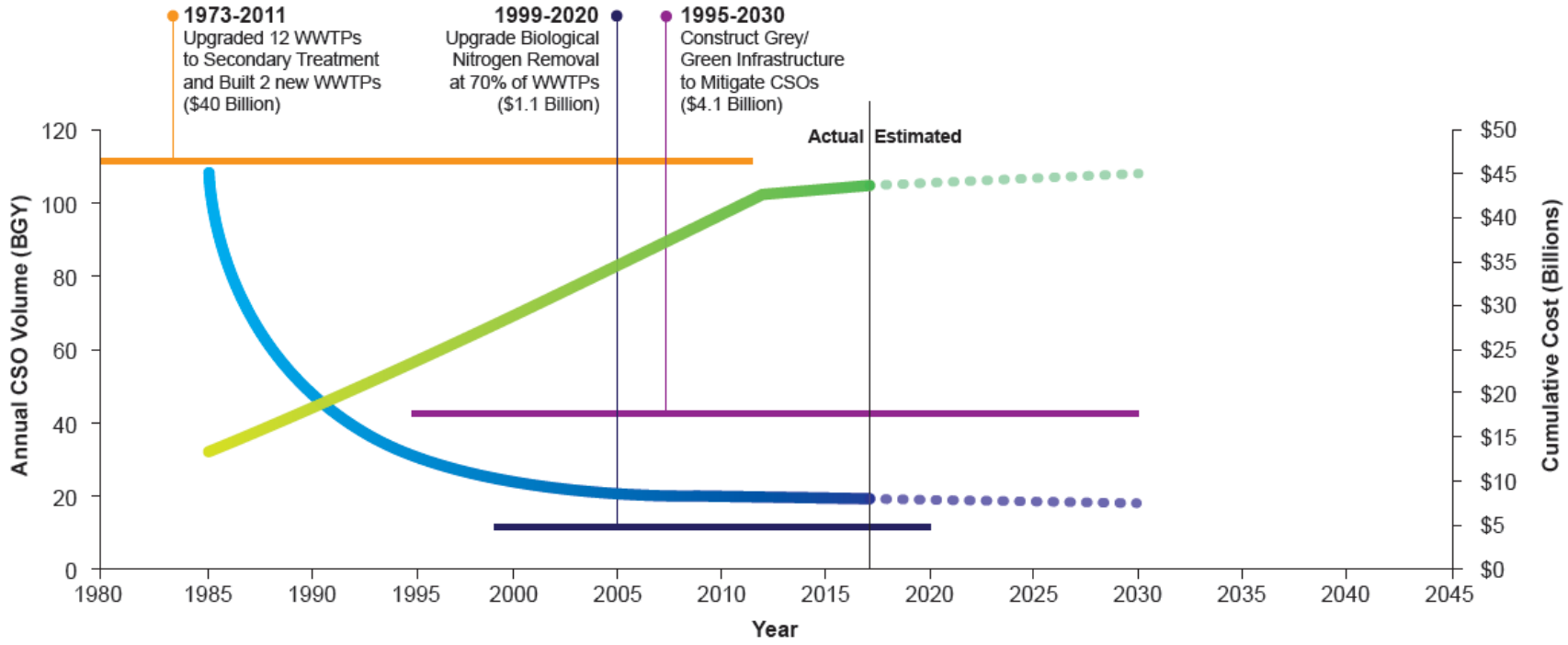
- When the sewer system is at full capacity, a diluted mixture of rain water and sewage may be released into local waterways. This is called a combined sewer overflow (CSO).
- 65% to 90% of **combined** sanitary & storm flow is captured at treatment plants.

Historical Investment and CSO Reduction Over Time

Annual CSO Volume (BGY)

Cumulative Cost (Billions)

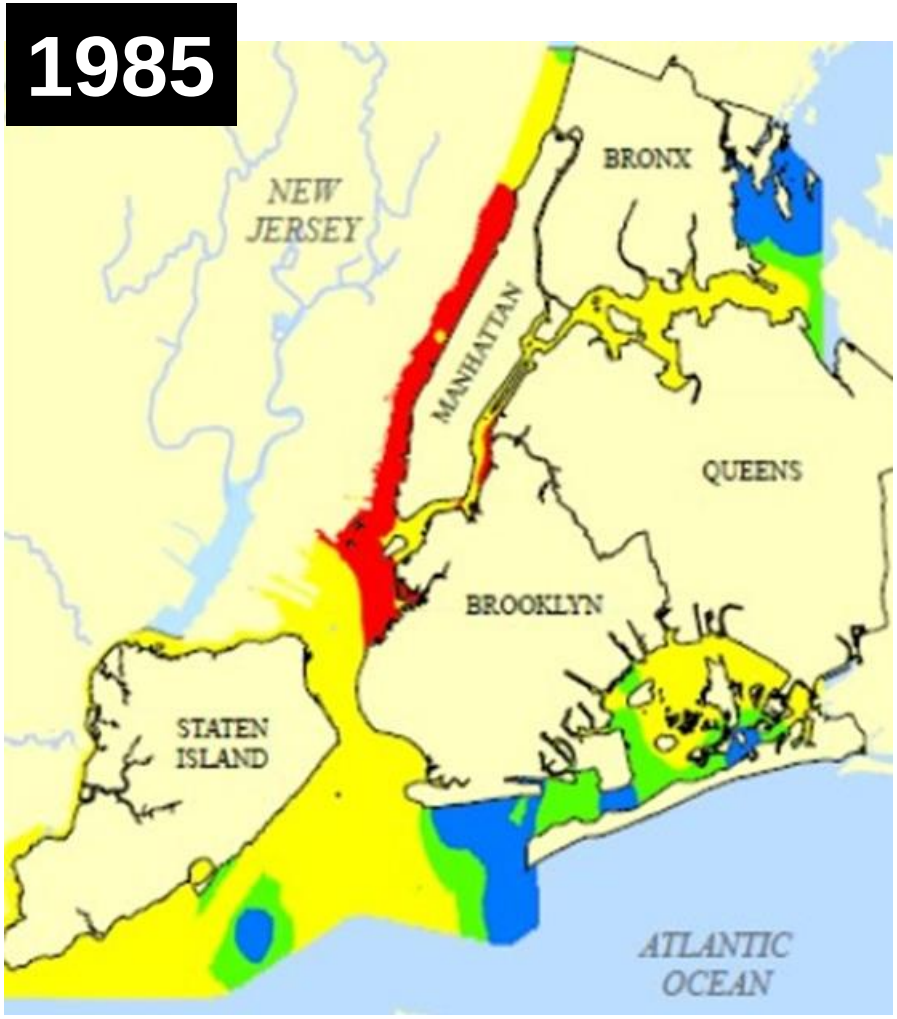
CSO Capture:
Projection with Existing Projects = 82%[1]



1) 2030 LTCP Baseline Scenario for Grey & Green Infrastructure Estimate

NYC Water Quality Improvement Program

Billions of dollars of investment has yielded the highest water quality observed in the NYC Harbor in over 100 years.



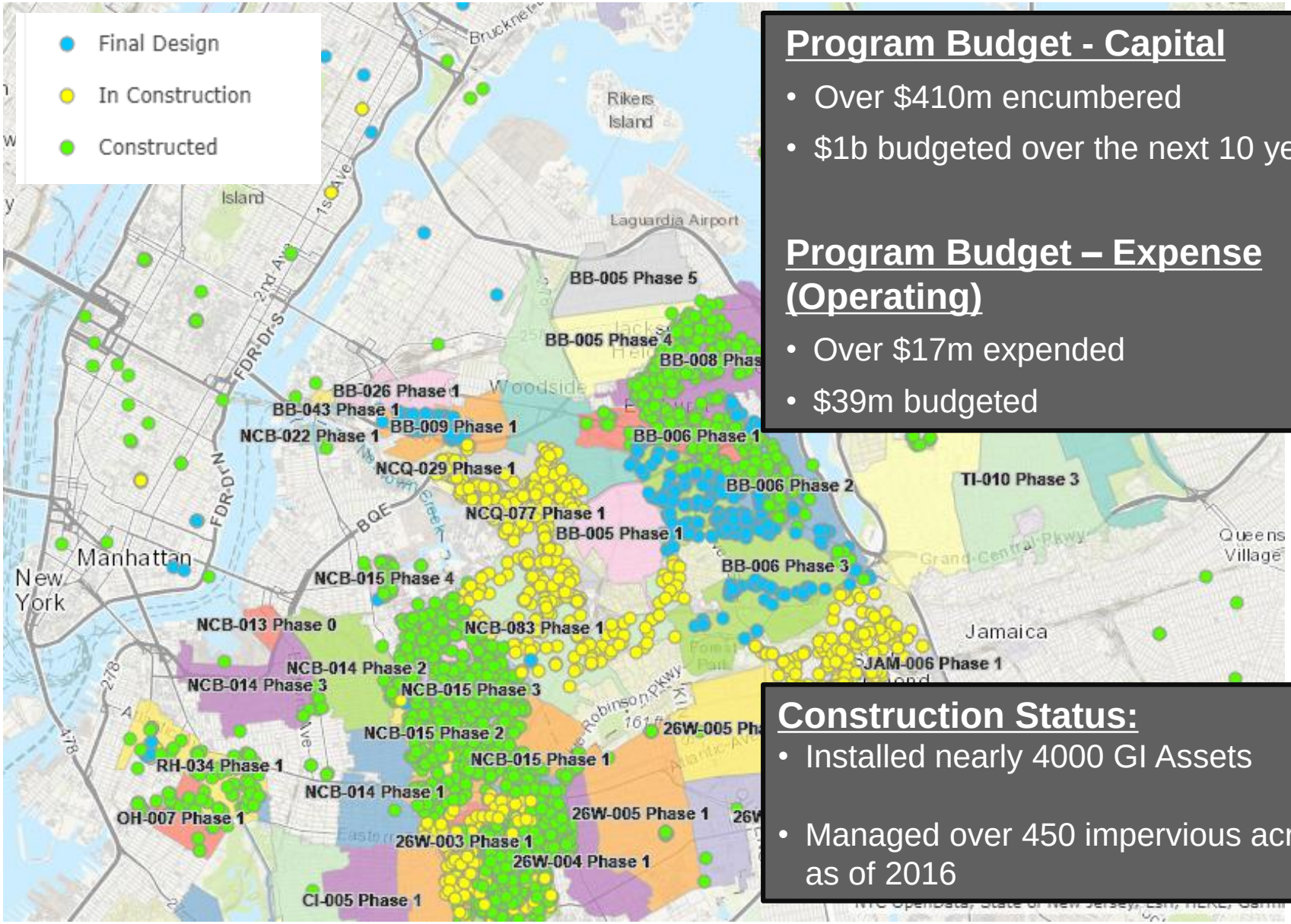
Fecal Coliform Bacteria: < 100 cfu/100 mL | 100 – 200 | 201 – 2,000 | >2,000

Data from Harbor Survey Program.

Green Infrastructure and Integrated Water Management

Angela Licata
Deputy Commissioner
DEP

Scaling up Green Infrastructure



Program Budget - Capital

- Over $410m encumbered
- $1b budgeted over the next 10 years

Program Budget – Expense (Operating)

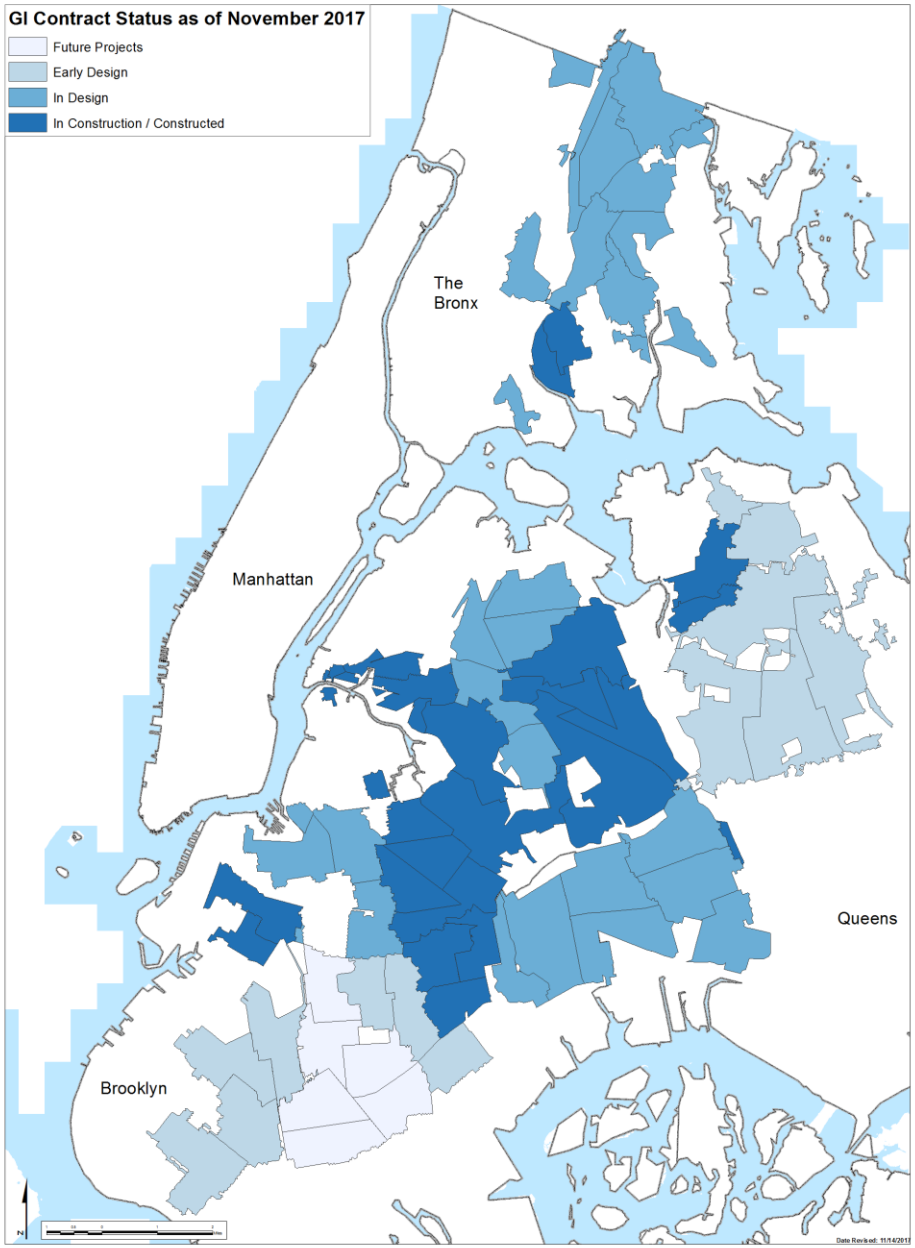
- Over $17m expended
- $39m budgeted

Construction Status:

- Installed nearly 4000 GI Assets
- Managed over 450 impervious acres as of 2016

Right of Way Program Status

Green Infrastructure Program Area-Wide Contracts



Right of Way GI Maintenance

- DEP maintains all green infrastructure in the public right-of-way
- 50+ green jobs; growing annually
- Crews visit locations regularly to
  - Remove litter
  - Clear inlets/outlets
  - Remove sediment
  - Prune shrubs and trees
  - Perform corrective maintenance as needed
- DEP coordinates with the Department of Sanitation on dumping issues

Public Property Retrofits - Agency Partners

Key partnerships:

- NYC Housing Authority
- NYC Parks
- NYC Department of Education
- NYC School Construction Authority
- NYC Cultural Affairs and Libraries
- FDNY, NYPD, TLC, and others

Public Parks

Public Schools

Public Housing

Public Property Retrofits

Project Status	Parks / Playgrounds	Public Schools	NYCHA Housing Developments	Total
Constructed	33	12	3	48
In Construction	22	0	2	24
In Design	16	13	1	30
Schematic	29	6	1	36
Preliminary	48	51	28	127
Potential	146	130	33	309
Total	**265**	**212**	**68**	**574**

- This table includes all active contracts engaged in on-site design
- Three new RFPs for over 300 schools, parks, and public housing sites will begin in early 2018

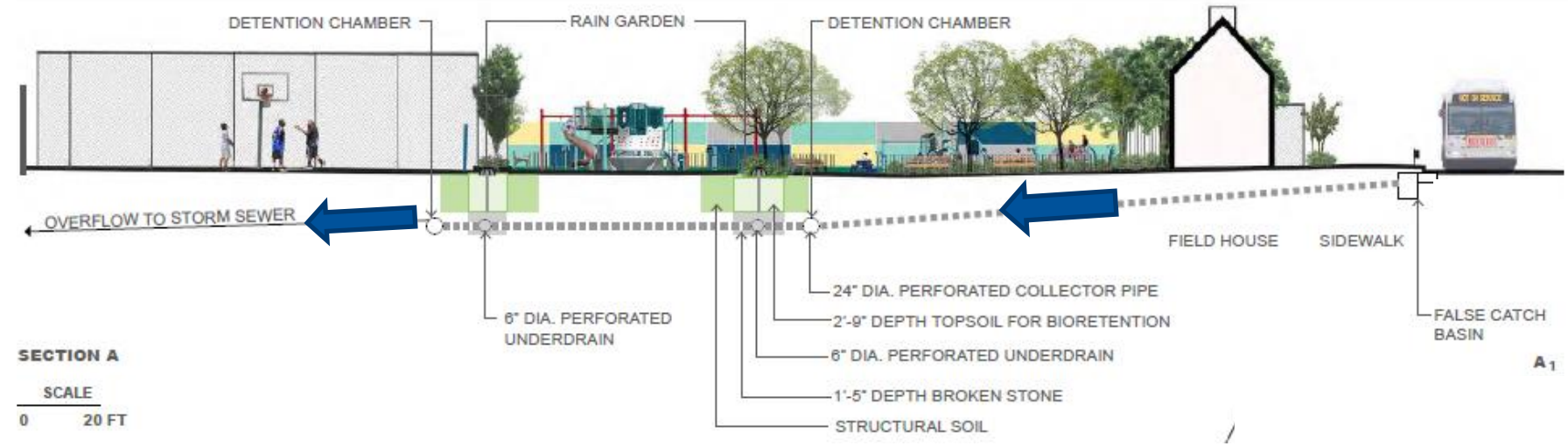
Trust for Public Land with DOE/SCA

- DEP and TPL have completed 11 green school yards to date, with 10 in design and planning stages
- TPL funds design and handles all school design coordination
- DEP funds all green infrastructure related costs
- Provides educational opportunity for students and community

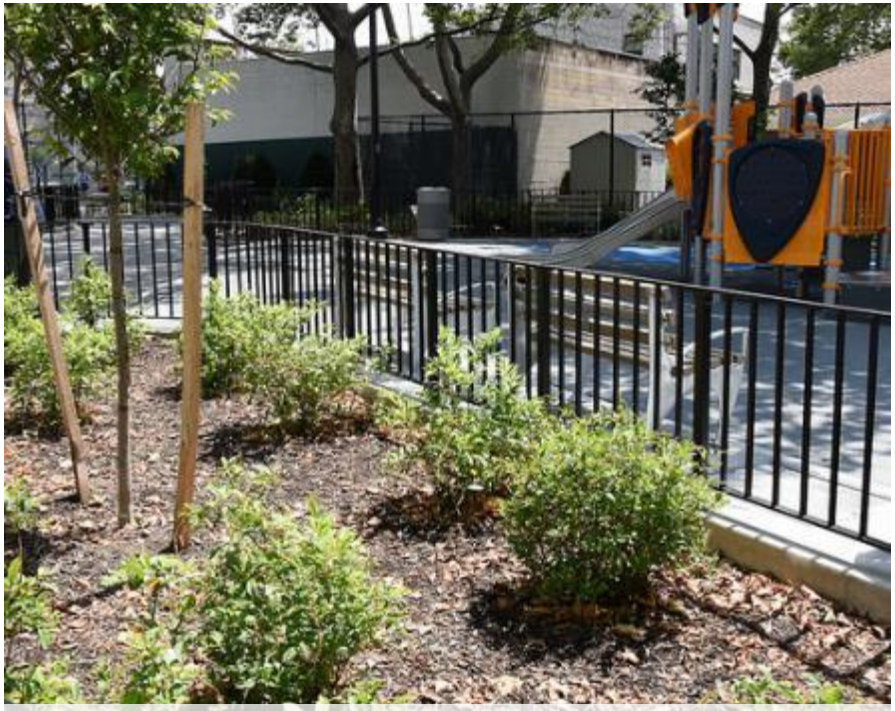
J.H.S. 218K Before

J.H.S. 218K After

Community Parks Initiative with DPR



Van Alst Playground



First CPI Project Completed

Private Property Programs

Green Infrastructure Grant Program

- More than $15 million committed to date to 34 private property owners
- 4 projects completed, 2 projects started in 2016

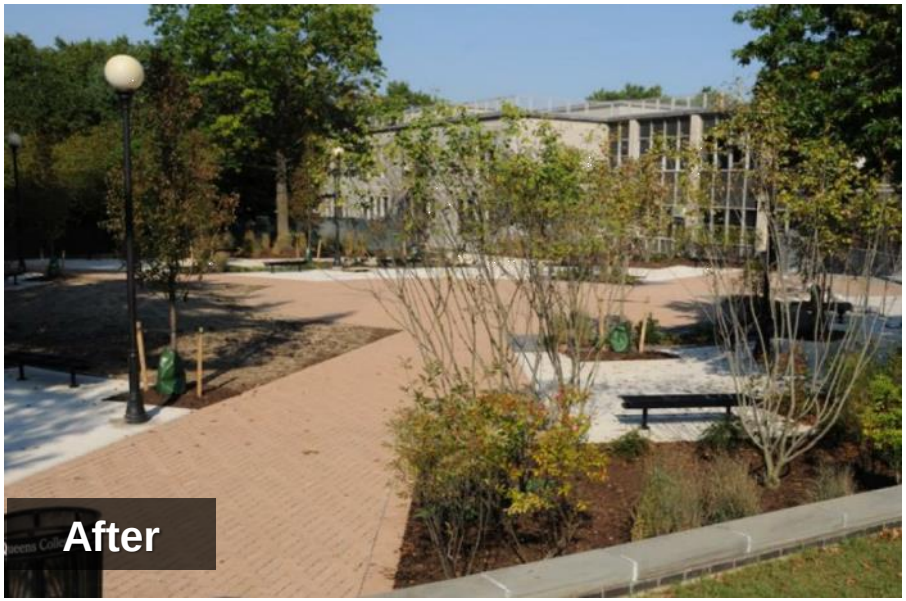
New Private Incentives Program Development

- Incentive program in partnership with targeted for larger sites
- RFP in development, planning to release in 2018
- Funding request in process

NYC Housing and Preservation Department Partnership

- Establishing on-going funding source for GI as part of HPD new affordable housing development
- 1 project in FY18, up to 5 projects in FY19 as initial investment

Queens College, Kiely Hall Plaza

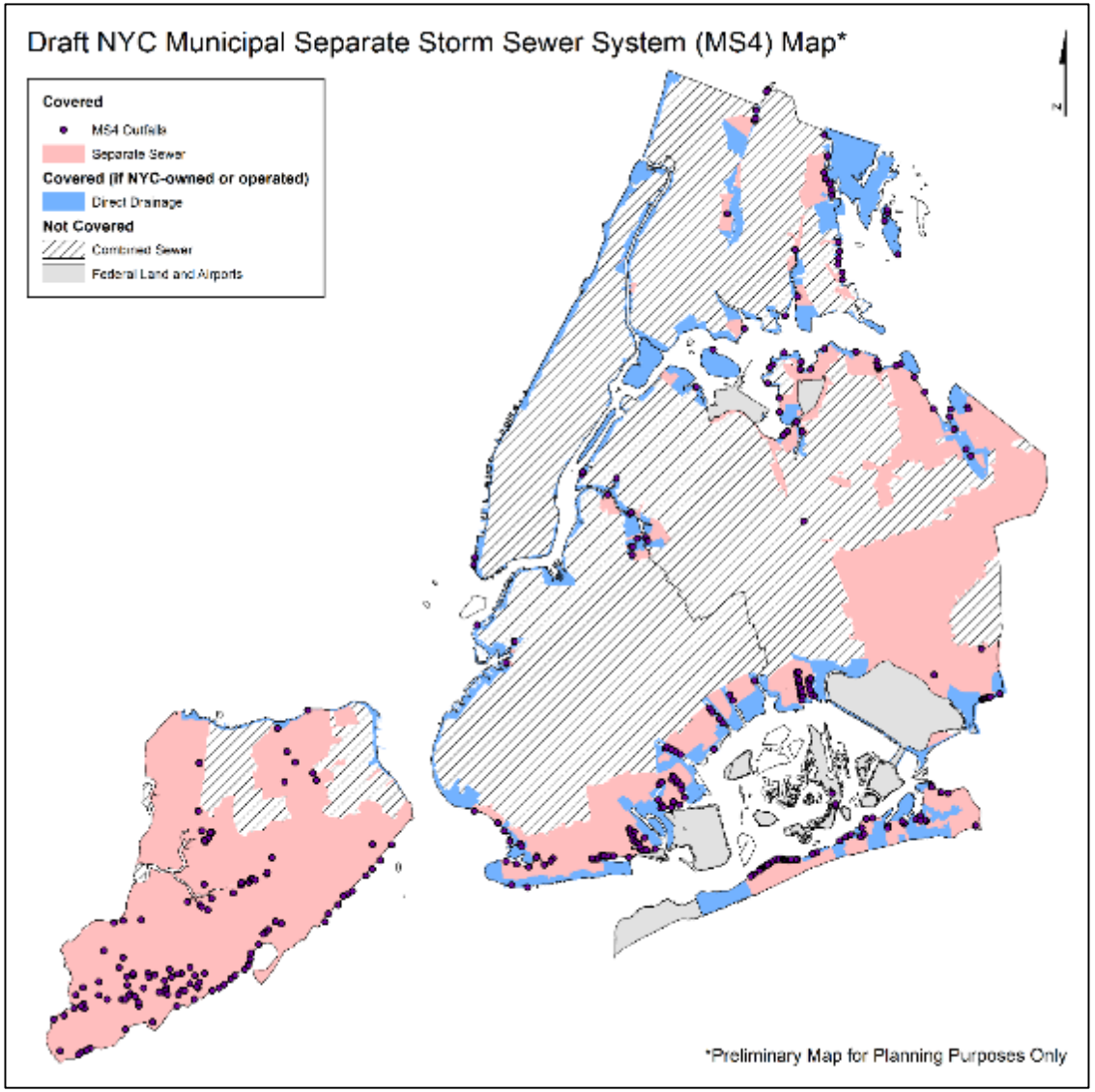


MS4 Program Overview

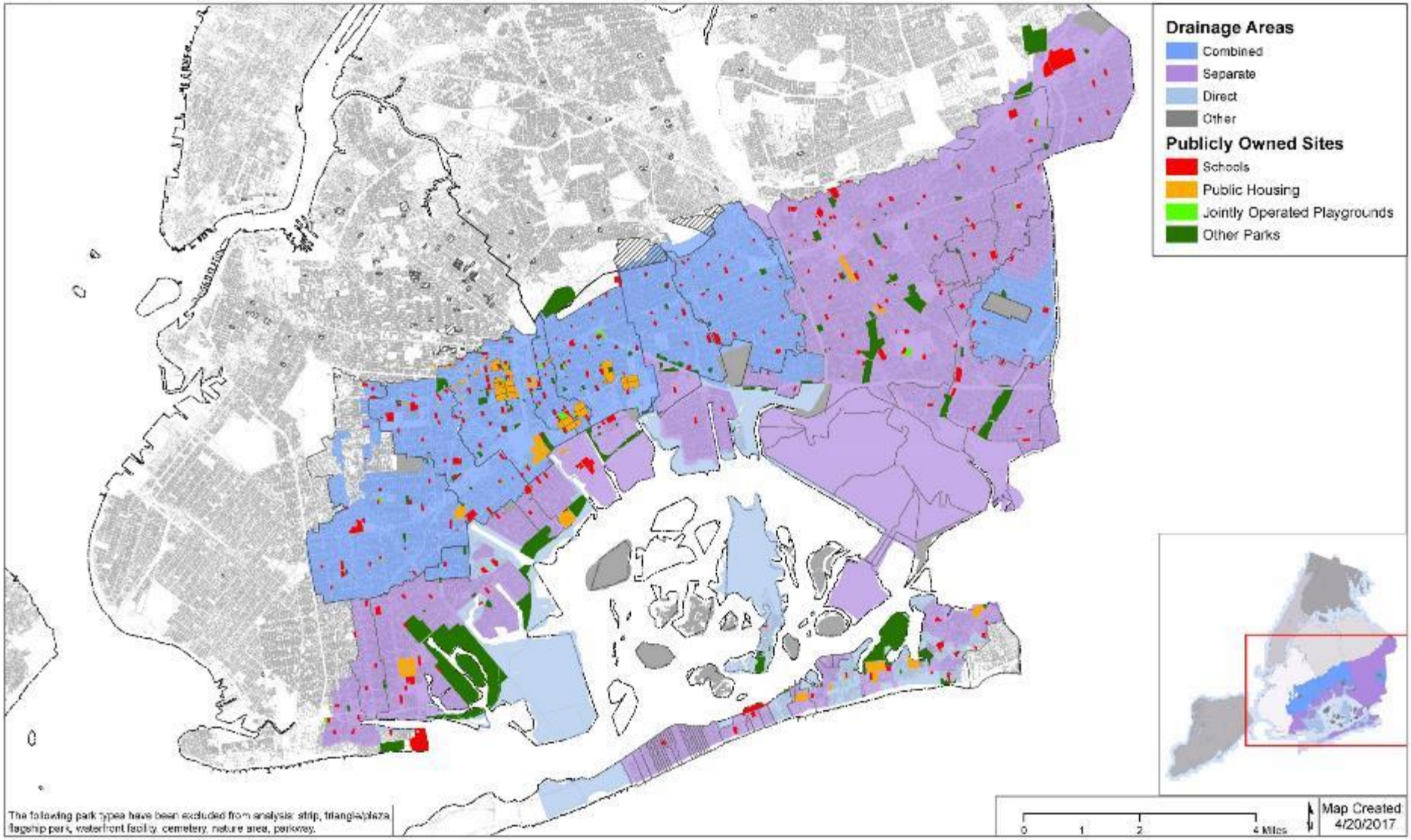
In August 2015 the State issued the City a Municipal Separate Storm Sewer System (MS4) Permit which seeks to manage urban sources of stormwater runoff to protect overall water quality and improve water quality in impaired waters.

In response, the City is developing a **Stormwater Management Program (SWMP).**

The MS4 Permit covers private and city owned property in the **separate** areas and city-owned property in the **direct drainage** areas.



Integrated Watershed Management

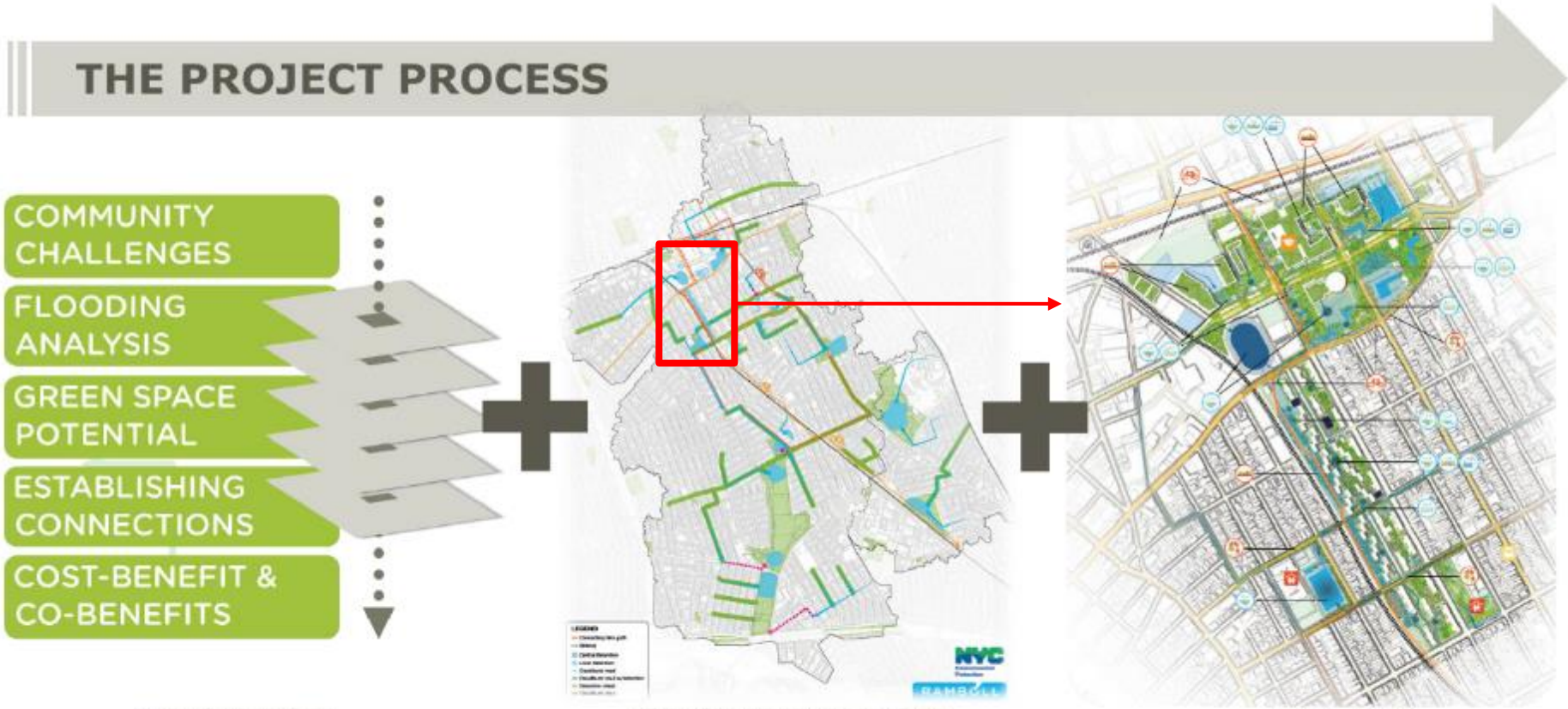


Cloudburst Planning

A September 2004 storm flooded 9th Street in Brooklyn.

Credit: Seth Wenig/The New York Times

Cloudburst Planning



Stormwater Management: Pilot Projects

NYC Environmental Protection

South Jamaica Houses – Today

Stormwater Management: Pilot Projects

NYC Environmental Protection

South Jamaica Houses – Future Concept

Stormwater Management: Pilot Projects

NYC Environmental Protection

South Jamaica Houses – Future Concept

Grey Infrastructure Status Update

Jim Mueller, PE
Acting Deputy Commissioner of the Bureau of Engineering, Design & Construction
DEP

Status of CSO LTCP Reports

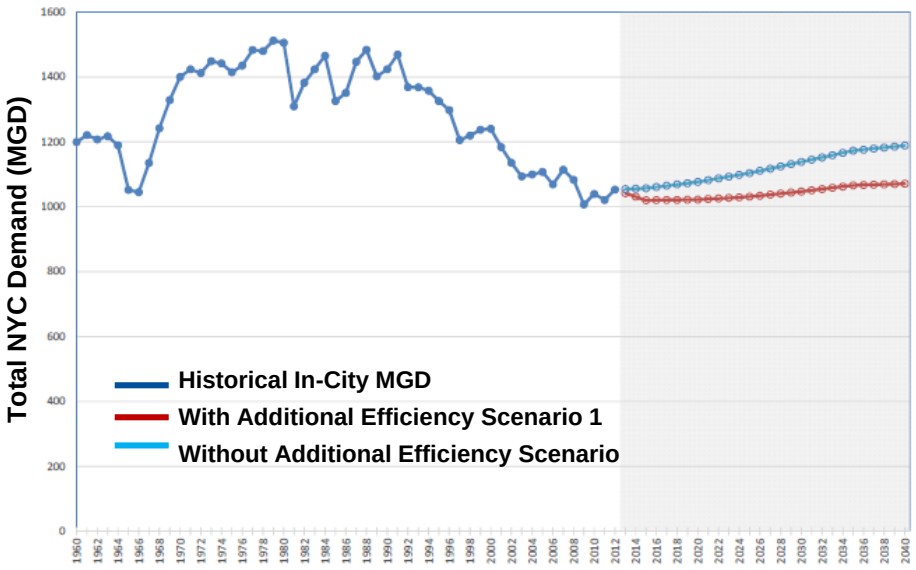
ID	Waterbody/LTCP	Approved	Submitted	To be Submitted
1	Alley Creek	✓		
2	Westchester Creek	✓		
3	Hutchinson River	✓		
4	Flushing Creek	✓		
5	Bronx River	✓		
6	Gowanus Canal	✓		
7	Coney Island Creek		✓	
8	Flushing Bay	✓		
9	Newtown Creek		✓	
10	Jamaica Bay and Tribs(1)			✓
11	East River/Open Waters with Citywide(2)			✓

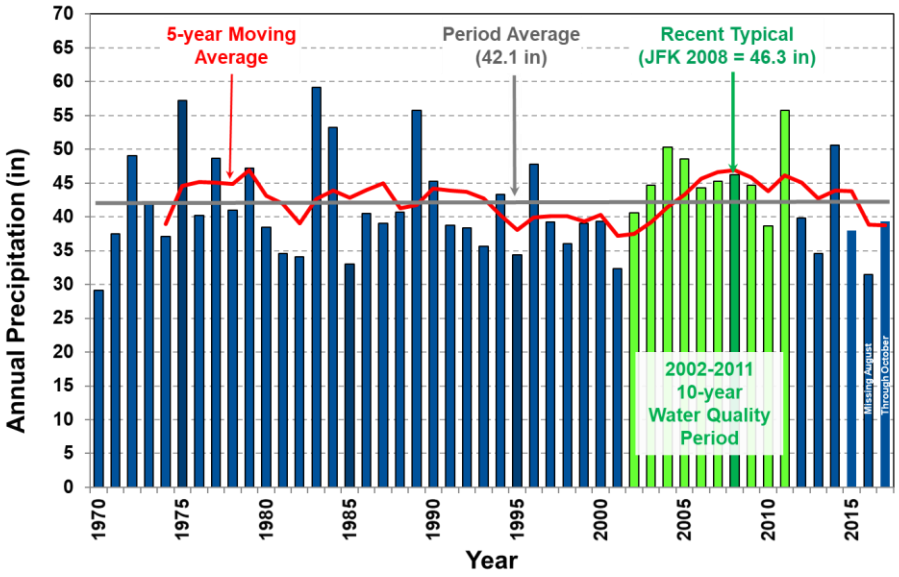
(1) Jamaica Bay includes Thurston Basin, Bergen Basin, Hendrix Basin, Fresh Creek, Spring Creek, Paerdegat Basin and Jamaica Bay

(2) Citywide LTCP includes East River, Harlem River, Hudson River, Lower and Upper New York Bay, Arthur Kill and Kill Van Kull

LTCP Baseline Conditions

- Baseline CSO Projects (**Grey** & **Green**)
- 2040 Projected Sanitary Flows that account for water conservation trends
- Satellite Flyover Impervious Data in conjunction with flow metering to characterize runoff coefficients
- Selection of 2008 as Typical Rainfall Year based on extensive assessment of historical data:
  - 42 years of rainfall data analyzed from 4 NOAA Gauges
  - JFK 2008 best representation of annual rainfall volume including projected climate change
  - For recommended LTCP plan, 10 years of data used to further assess bacteria attainment (2002-2011)
  - 2008 Typical Rainfall Year used for all NYC LTCPs





Summary of CSO Projects

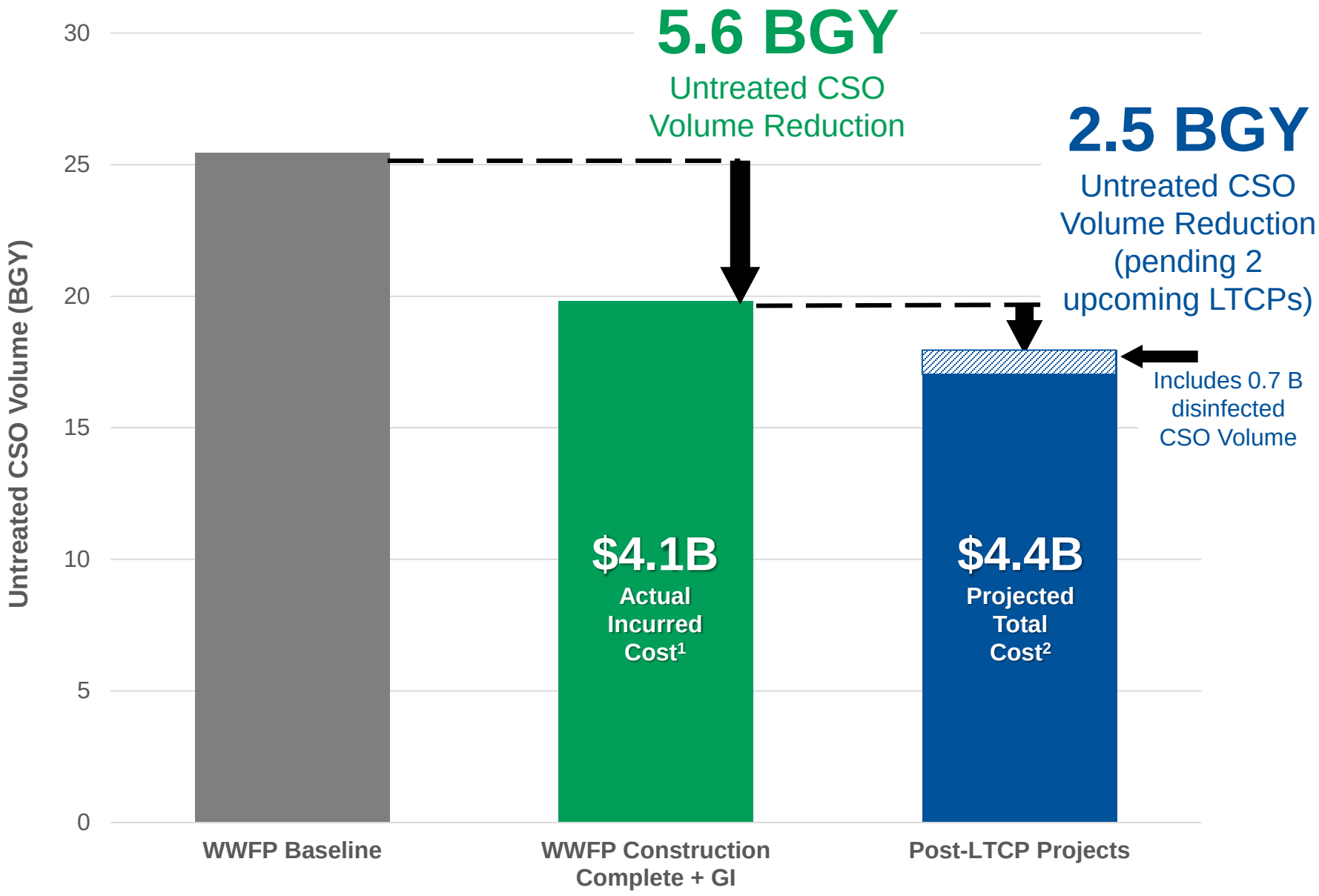
Waterbody	Waterbody Watershed Facility Plan and LTCP Elements			Type of Reduction		Post Construction Monitoring
	Storage	Disinfection	Sewer System and Other Improvements	Volume	Bacteria Load	
Alley Creek	✓	✓	✓	✓	✓ ✓	✓ ✓
Westchester Creek[1]			✓	✓	✓	✓
Hutchinson River		✓	✓ ✓	✓	✓ ✓	✓
Flushing Creek	✓	✓	✓	✓	✓ ✓	✓ ✓
Bronx River			✓ ✓	✓ ✓	✓ ✓	✓ ✓
Gowanus Canal[2]	✓		✓	✓ ✓	✓ ✓	✓ ✓
Coney Island Creek[1]			✓	✓	✓	✓
Flushing Bay	✓		✓	✓ ✓	✓ ✓	✓ ✓
Newtown Creek	✓		✓ ✓	✓ ✓	✓ ✓	✓ ✓
Jamaica Bay and Tributaries[3]	✓		✓	✓	✓	✓
East River/Open Waters[3]			✓	✓	✓	

(1) No additional CSO Control implementation
(2) Superfund Requirement to construct storage tanks
(3) LTCP in development

✓ Waterbody Watershed Facility Plan Project

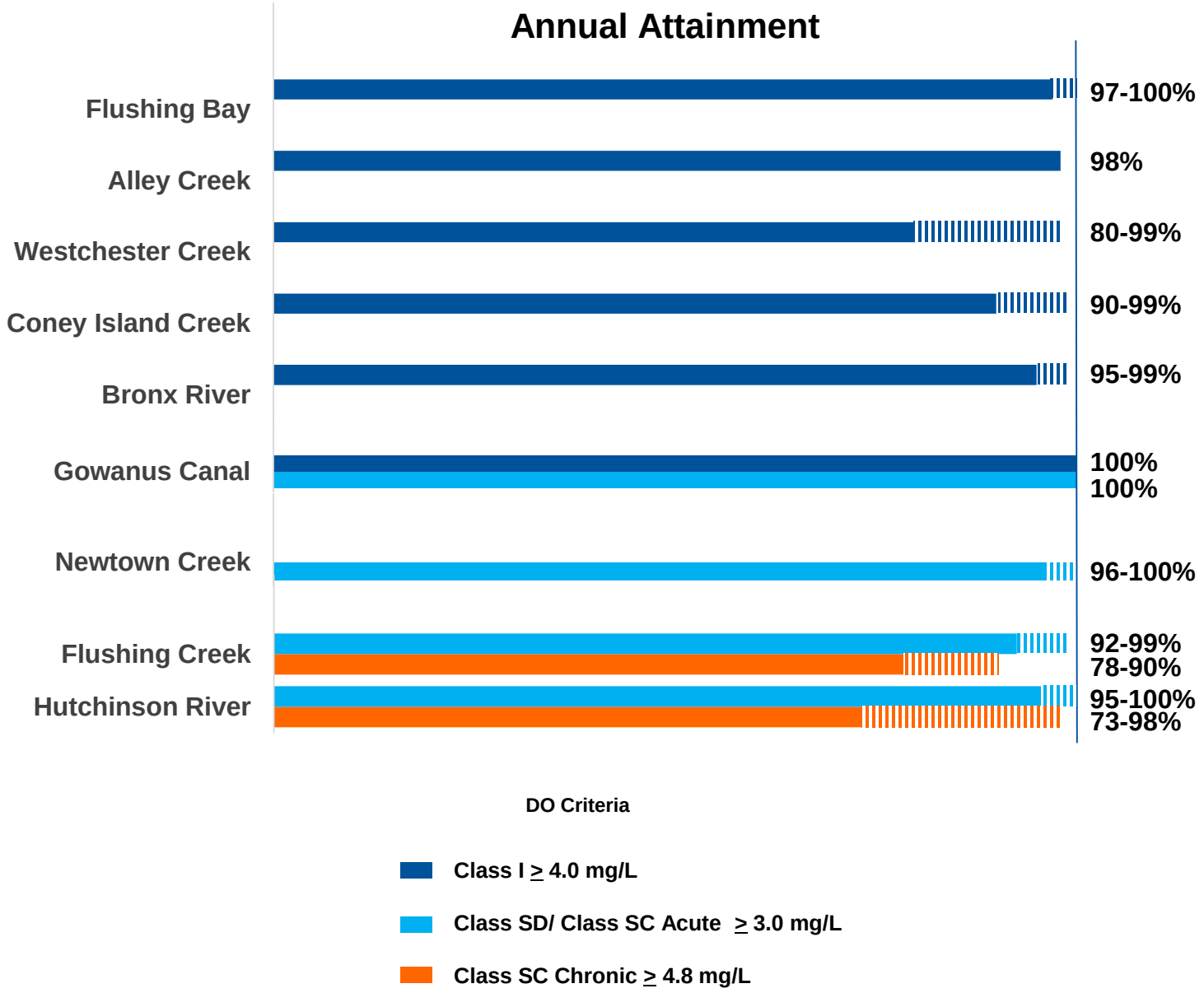
✓ LTCP Project

Untreated CSO Volume Reduction

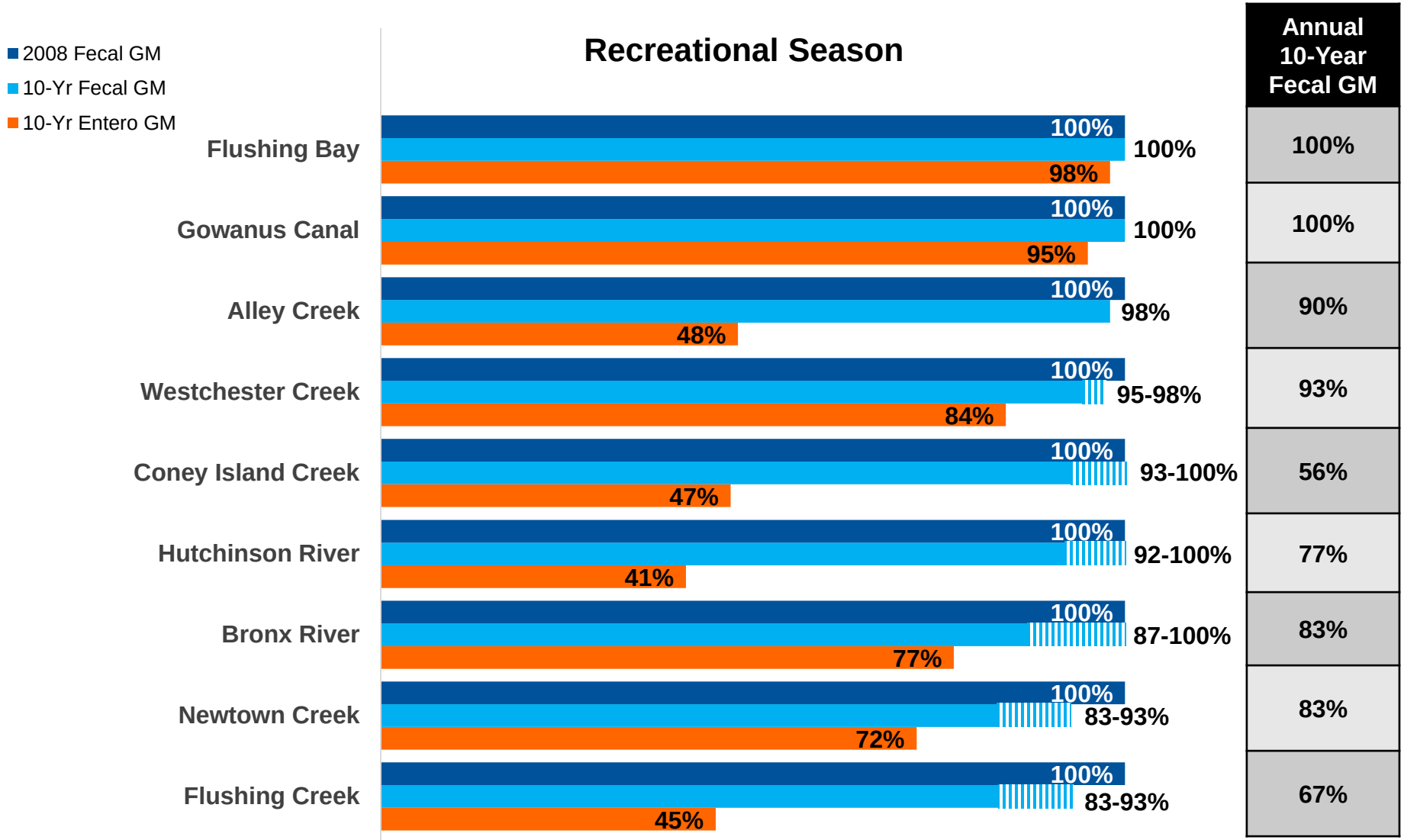


1) Actual Incurred Costs includes $2.6B Grey Infrastructure and $1.5B Green Infrastructure
2) Project Total Costs includes design/DSDC escalated to mid-point of design and construction/CM escalated to mid-point of construction.

Dissolved Oxygen

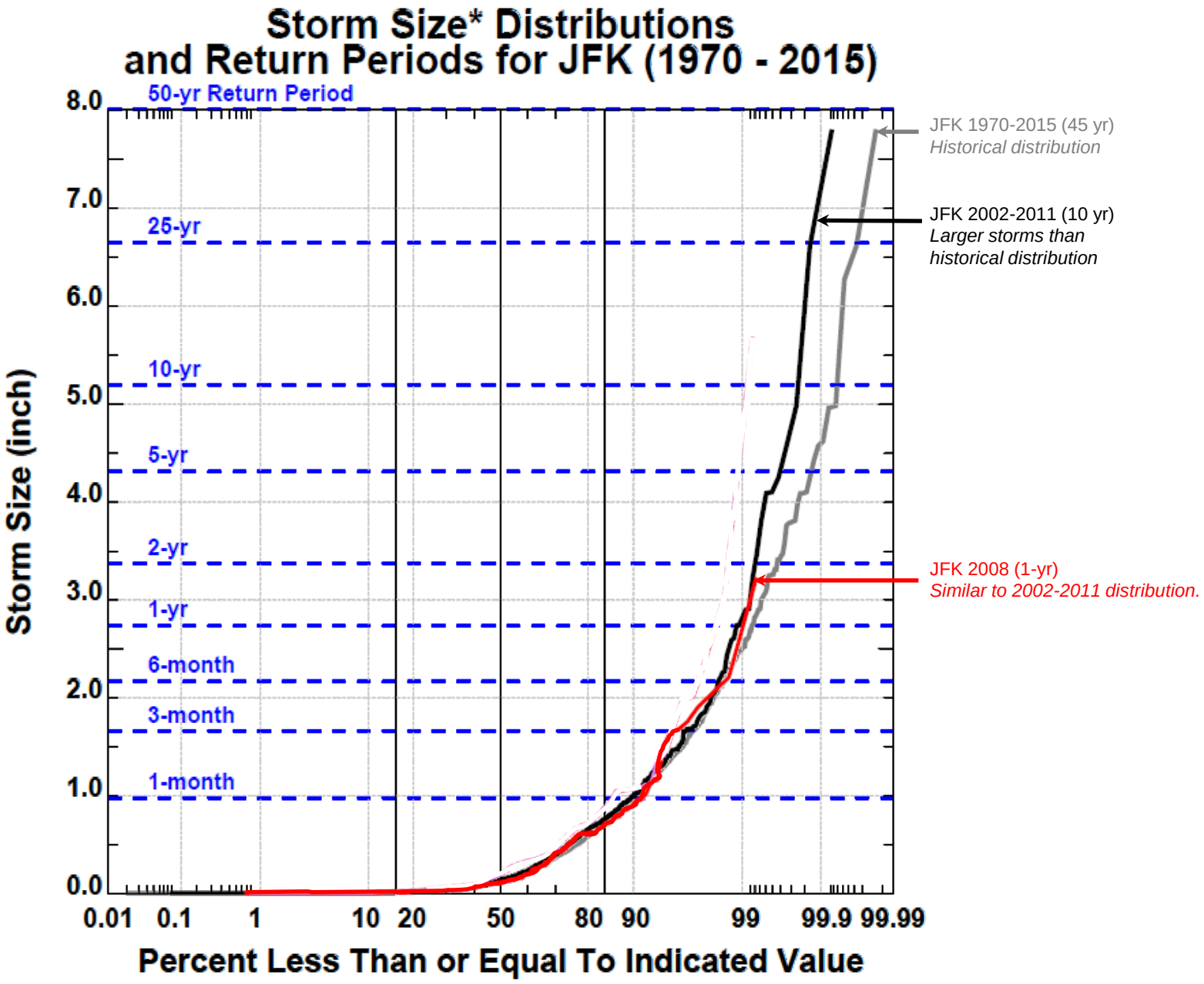


Model Projected Post-LTCP Attainment



NOTE: The attainment displayed for Entero only represents part of the RWQC Entero Standard. Attainment is significantly lower when considering both components of the RWQC standard.

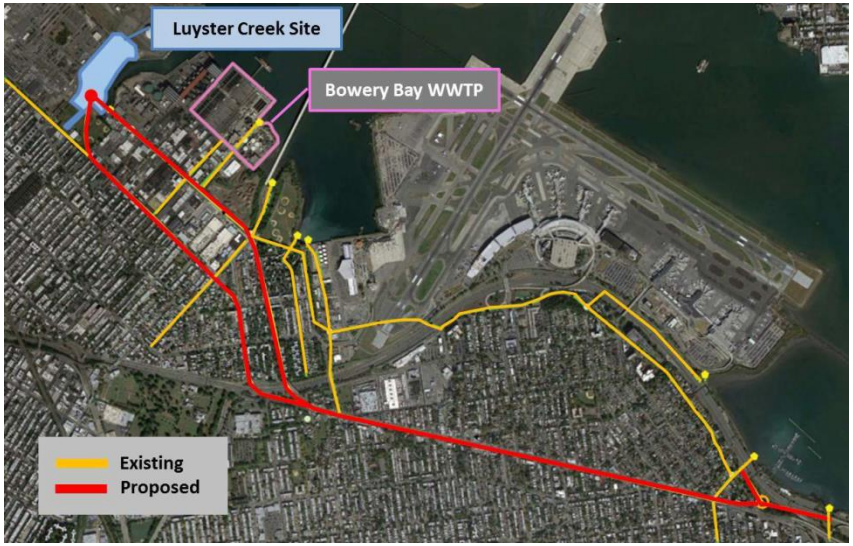
Storm Size Distribution



LTCP Projects: Flushing Bay and Creek

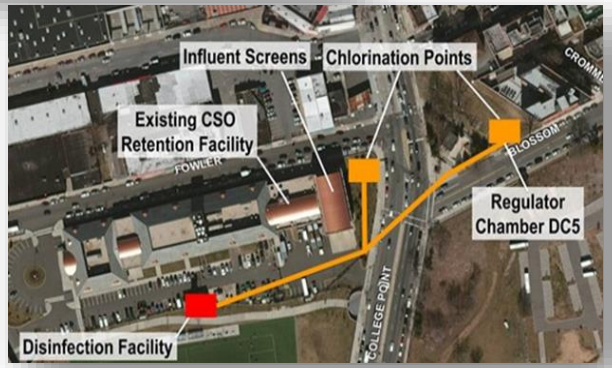
Flushing Bay
DEC Approval – March 7, 2017

Approved LTCP Project:	50% Capture 25 MG Tunnel	$1,616M Escalated Costs
WWFP Projects:	• Divert Low Lying Sewers / Raise BB-02 Weir • Dredging • Regulator Modifications to HL Interceptor	$69M Actual Costs
Total Cost:		$1,685M



Flushing Creek
DEC Approval – March 7, 2017

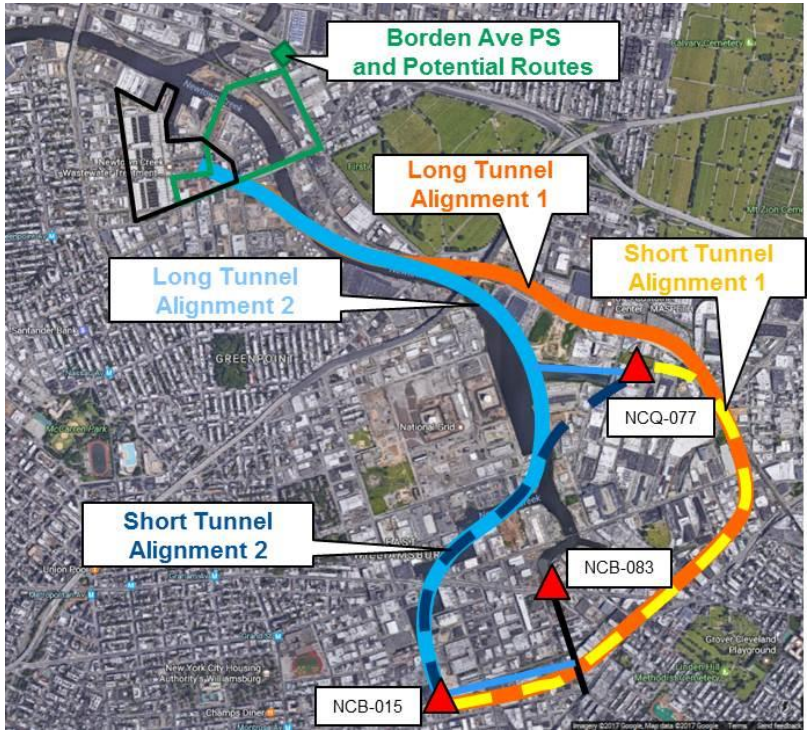
Approved LTCP Project:	Seasonal Disinfection with Dechlorination and Floatables Control	$18M Escalated Costs
WWFP Projects :	• CSO Facility • Vortex Facilities	$363M Actual Costs
Total Cost:		$381M



LTCP Project: Newtown Creek Storage

Newtown Creek: LTCP Pending Approval

Selected Alternative:	**62.5% Capture 39 MG Tunnel**	$1,335M Escalated Costs
WWFP Projects:	• Enhanced Aeration • Floatables Control • Bending Weirs • Plant Expansion	$259M Actual Costs



Storage Tunnel Facts:

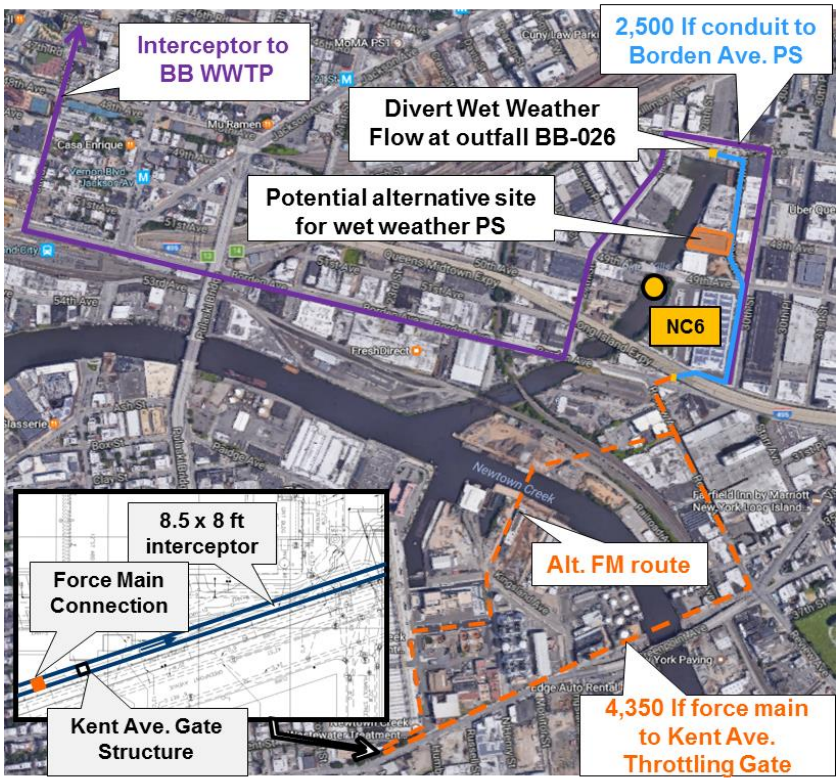
- Provides for both conveyance and storage of CSO
- Contents of tunnel pumped to WWTP for treatment after storm event
- Requires less permanent above-ground property than storage tanks
- Minimizes surface construction impacts

LTCP Project: Newtown Creek Conveyance Improvements

Newtown Creek: LTCP Pending Approval

Selected Alternative:	**75% Capture Borden Ave PS Expansion**	$87M Escalated Costs
Total Investments:	• 75% Capture Borden Ave PS Expansion • 62.5% Capture 39 MG Tunnel • WWFP	$1,681M

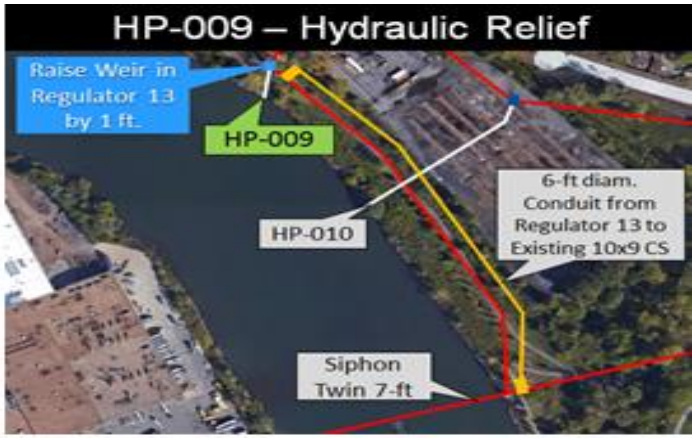
- Borden Ave PS expansion will result in an overall 110 MGY reduction into Newtown Creek with a 30 MGY increase to Newtown Creek WWTP
- During large infrequent storms remaining 80 MGY may be discharged at East River outfalls that have floatables control (NCB-014, NCB-013 and NCB-006)
- Additional CSO reductions into East River will be evaluated under the Citywide/Open Waters LTCP due to DEC in December 2018



LTCP Project: Bronx River Conveyance Improvements

Bronx River: DEC Approval – March 7, 2017

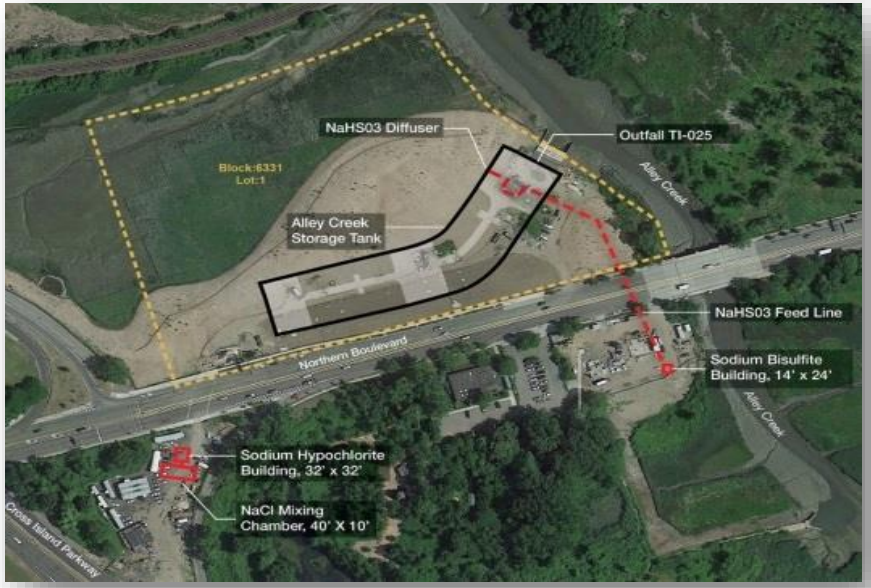
Approved LTCP Project:	**Hydraulic Relief at HP-007 (2,700-ft long; 5-ft diameter)** **Hydraulic Relief at HP-009 (1,130-ft long; 6-ft diameter)** **Floatables Control at HP-011**	$185M Escalated Costs
WWFP Projects:	• Maximize Flow to WWTP • Floatables Control	$46M Actual Costs
Total Costs:		$231



LTCP Projects: Disinfection

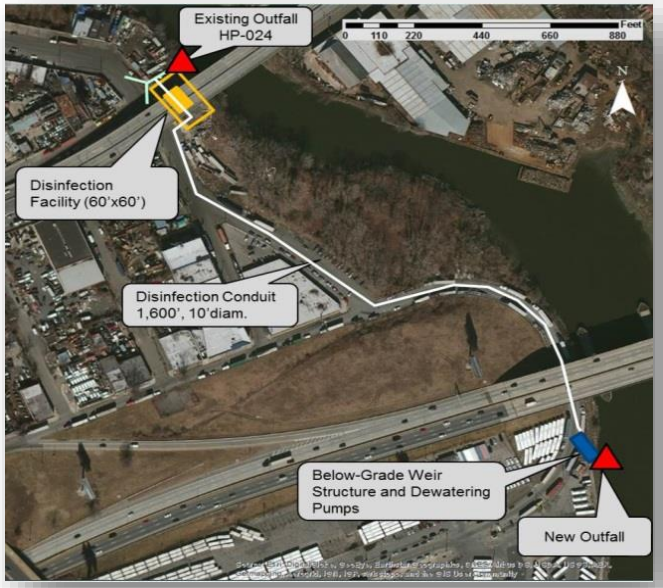
Alley Creek
DEC Approval – March 7, 2017

Approved LTCP Project:	**Seasonal Disinfection with Dechlorination of discharge from Existing CSO Storage Tank**	$12 M Escalated Costs
WWFP Projects:	• CSO Storage Facility • Other Sewer Improvements	$139 M Actual Costs
Total:		$151M



Hutchinson River
DEC Approval – March 7, 2017

Approved LTCP Project:	**Seasonal Disinfection with Dechlorination and Floatables Control**	$167M Escalated Costs
WWFP Projects:	Hunts Point WWTP Headworks	$3M Actual Costs
Total:		$170M



CSO Disinfection

Disinfection Facts:

- Disinfection consists of chlorination and dechlorination to both effectively kill bacteria and then remove excess chlorine.
- Disinfection is a commonly used treatment of water and wastewater throughout U.S.
- Disinfection with sodium hypochlorite (high strength household bleach) is widely practiced nationwide
- Liquid Chlorine is effective against a wide range of pathogens, best suited for intermittent and variable character of CSO discharges
- Chlorination is most widely used for CSO treatment
- DEP has extensive experience in safely storing, handling, and applying at water and wastewater facilities

An Environmental Assessment Statement (EAS) will be performed during Facility Planning to evaluate the environmental significance of the project

Liquid Chlorine System

Chlorine Contact Tanks

Additional Investments

Coney Island Creek
LTCP Pending Approval

- ➢ WWFP: Avenue V Pump Station Expansion + Wet Weather Force Main
- ➢ $197M Actual Costs
- ✓ Flow monitoring at Avenue V Pump Station
- ✓ Ongoing illicit trackdown
- ✓ MS4 Priority Waterbody

Gowanus Canal
DEC Approval: March 29, 2017

- ➢ WWFP: Flushing Tunnel + Gowanus Pump Station Reconstruction
- ➢ $194 M Actual Costs
- ✓ Implementation of a project to mitigate foam generated from the Flushing Tunnel
- ✓ $932M for Superfund Program: 4 MG (Outfall OH-007) and 8 MG (Outfall RH-034) Storage Tanks

Westchester Creek
DEC Approval: Aug. 1, 2017

- ➢ WWFP: Weir Modifications + Pugsley Creek Parallel Sewer
- ➢ $124M Actual Costs
- ✓ Conduct a Post Construction Compliance Monitoring Program to Assess Efficacy of Controls

LTCPs In Development

Jamaica Bay and Tribs
(Selected Alternative: TBD)

Prior Investments		
Paedergat Basin :	• CSO Facility • Dredging	$394M Actual Costs
Other Jamaica Bay Tribs	• Sewer Improvements in 26W + 26W HLSS • Hendrix Creek Canal Dredging • Shellbank Destratification • Spring Creek AWCP Upgrade • 26 Ward Wet Weather Improvements • Warnerville Pumping Station and Force Main • Bending Weirs • Parallel Interceptor • Lateral Sewer	$631M Actual Costs

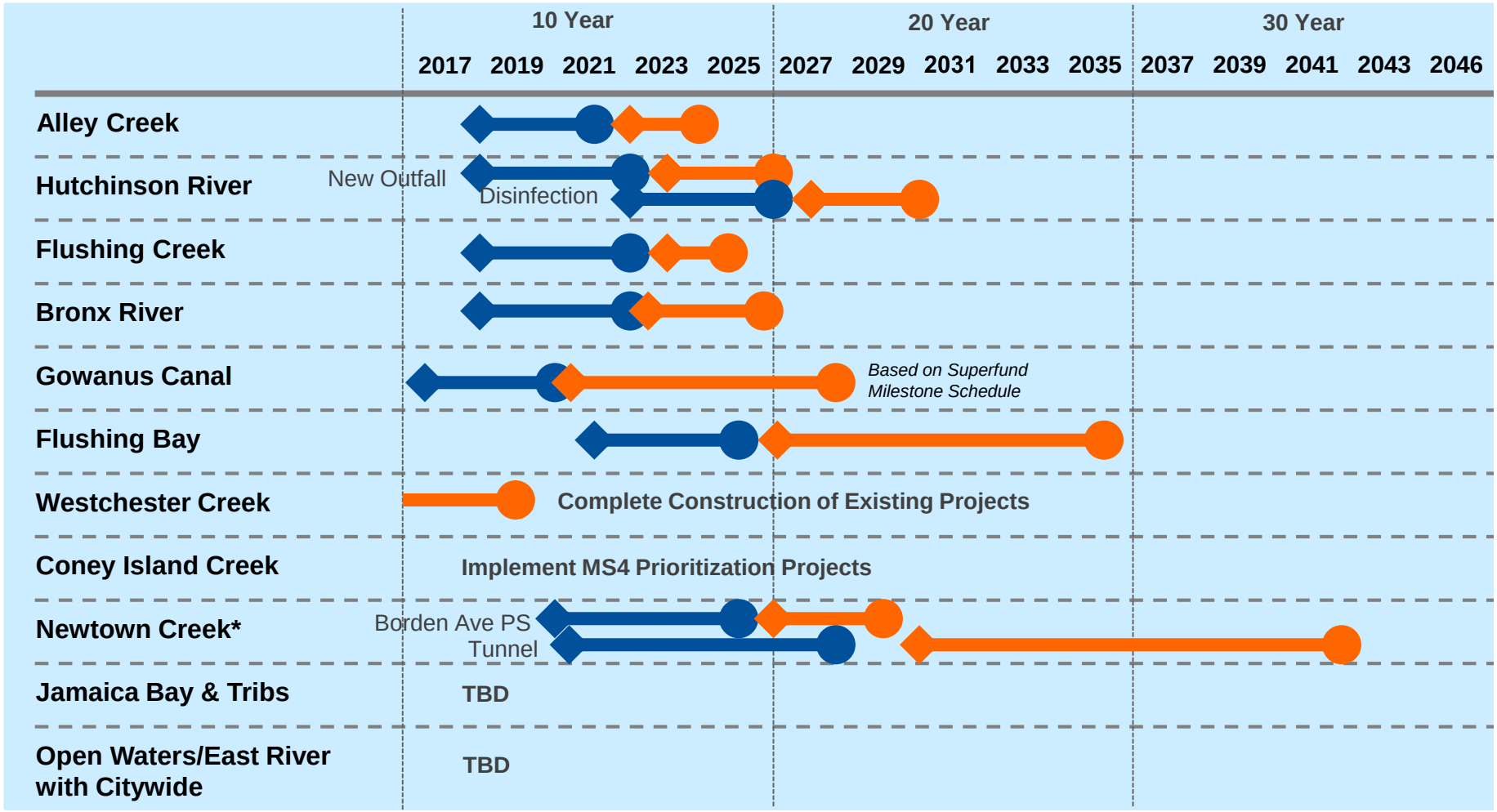
East River/Open Waters with Citywide
(Selected Alternative: TBD)

Prior Investments		
WWFP Projects	• Bowery Bay Headworks • Port Richmond Throttling Facility • Tallman Island Conveyance Improvements • Outer Harbor CSO Regulator Improvements	$196M Actual Costs

DEC Approved Schedule

Steps

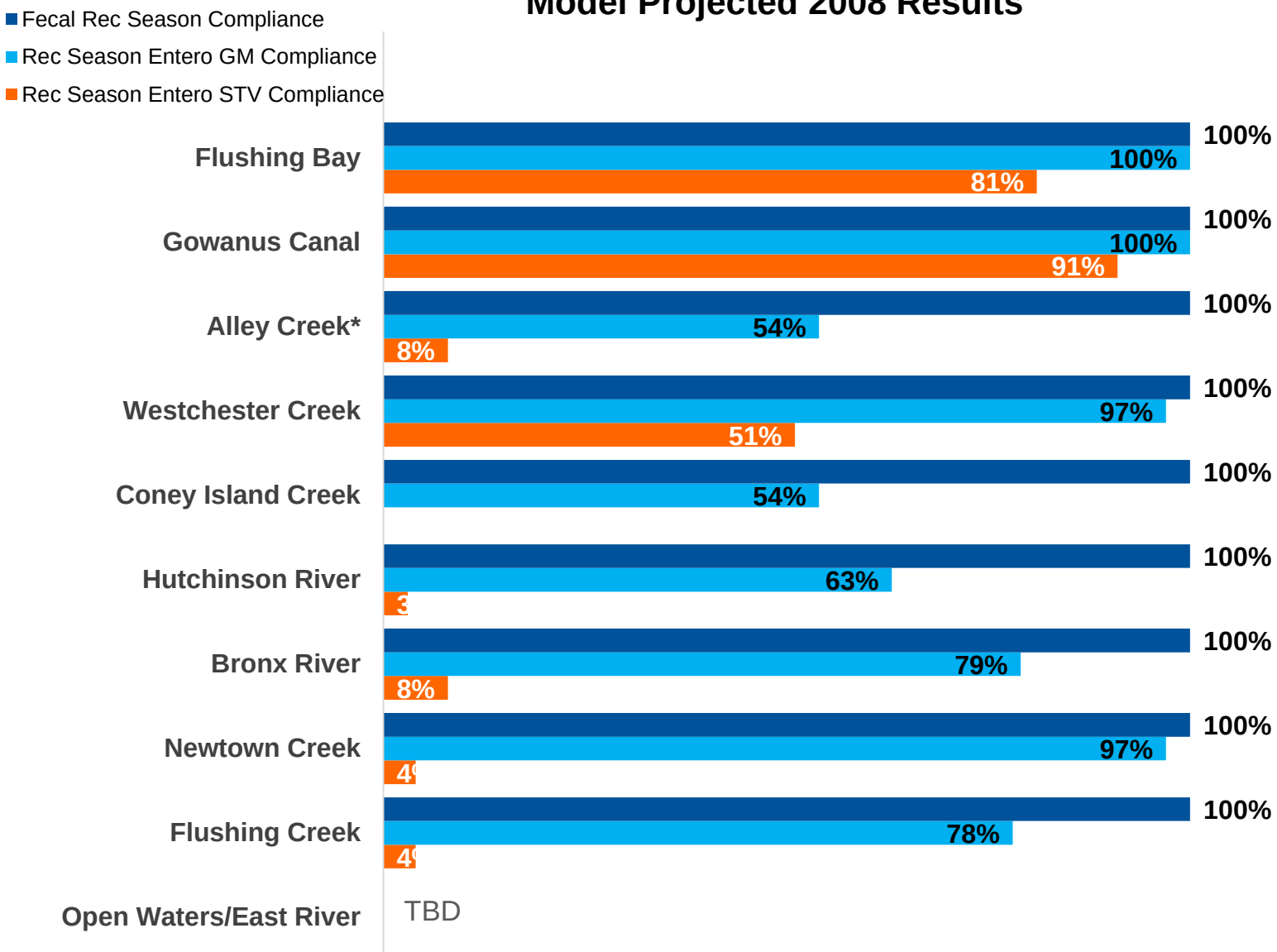
- Facility Planning, EAS, Land Acquisition, Design (30%, 60%, 90%)
- Construction, Construction close-out



*Newtown Creek dates are based on obtaining DEC approval by June 2018

Attainment and Costs of 100% CSO Control

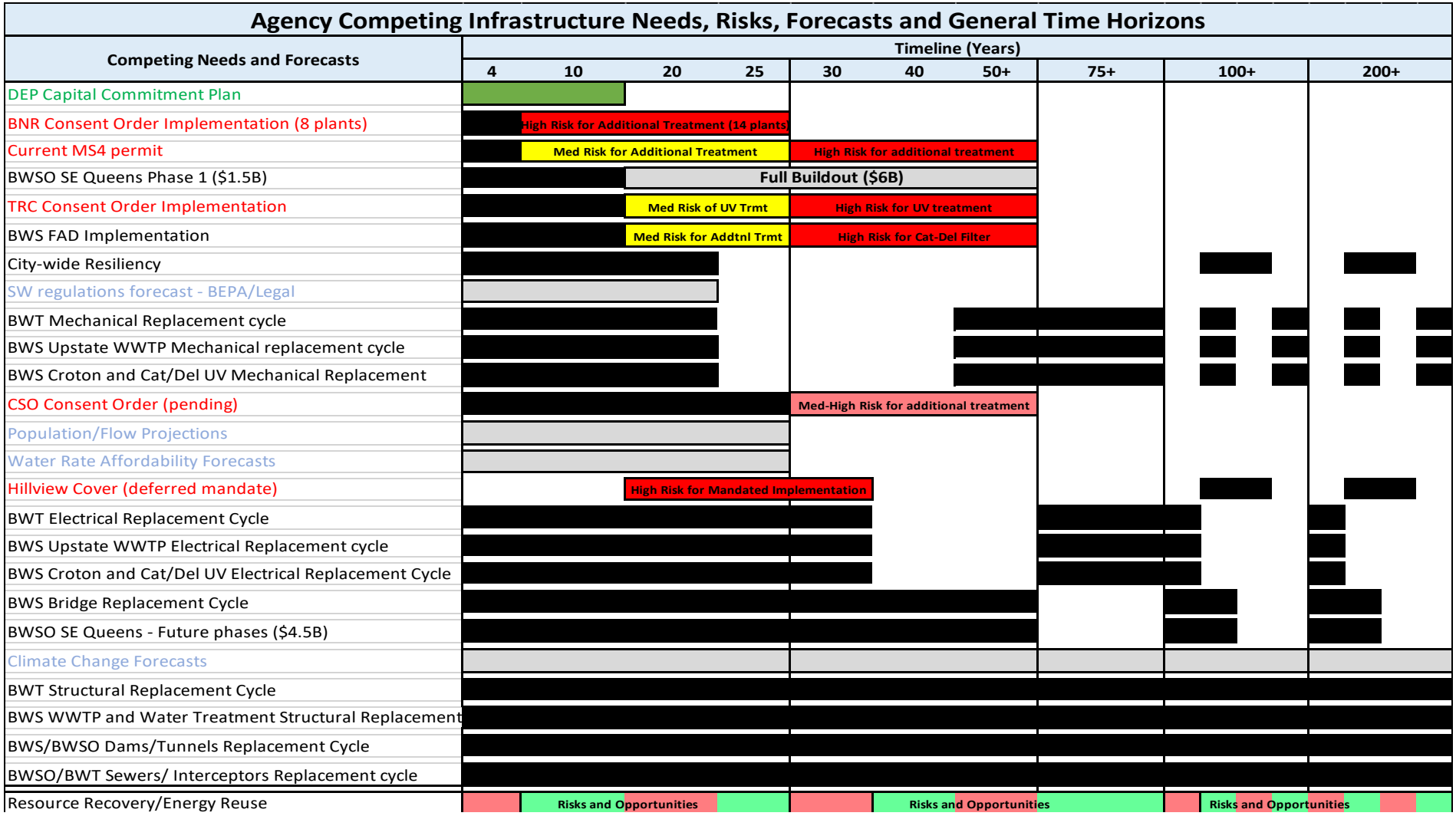
Model Projected 2008 Results



Escalated Capital Costs ($B)
$9.8
N/A
$1.6
$2.1
$0.6
$2.3
$2.0
$4.6
$5.0
Total $28 B

*10-year Fecal Annual Compliance shown for Alley Creek

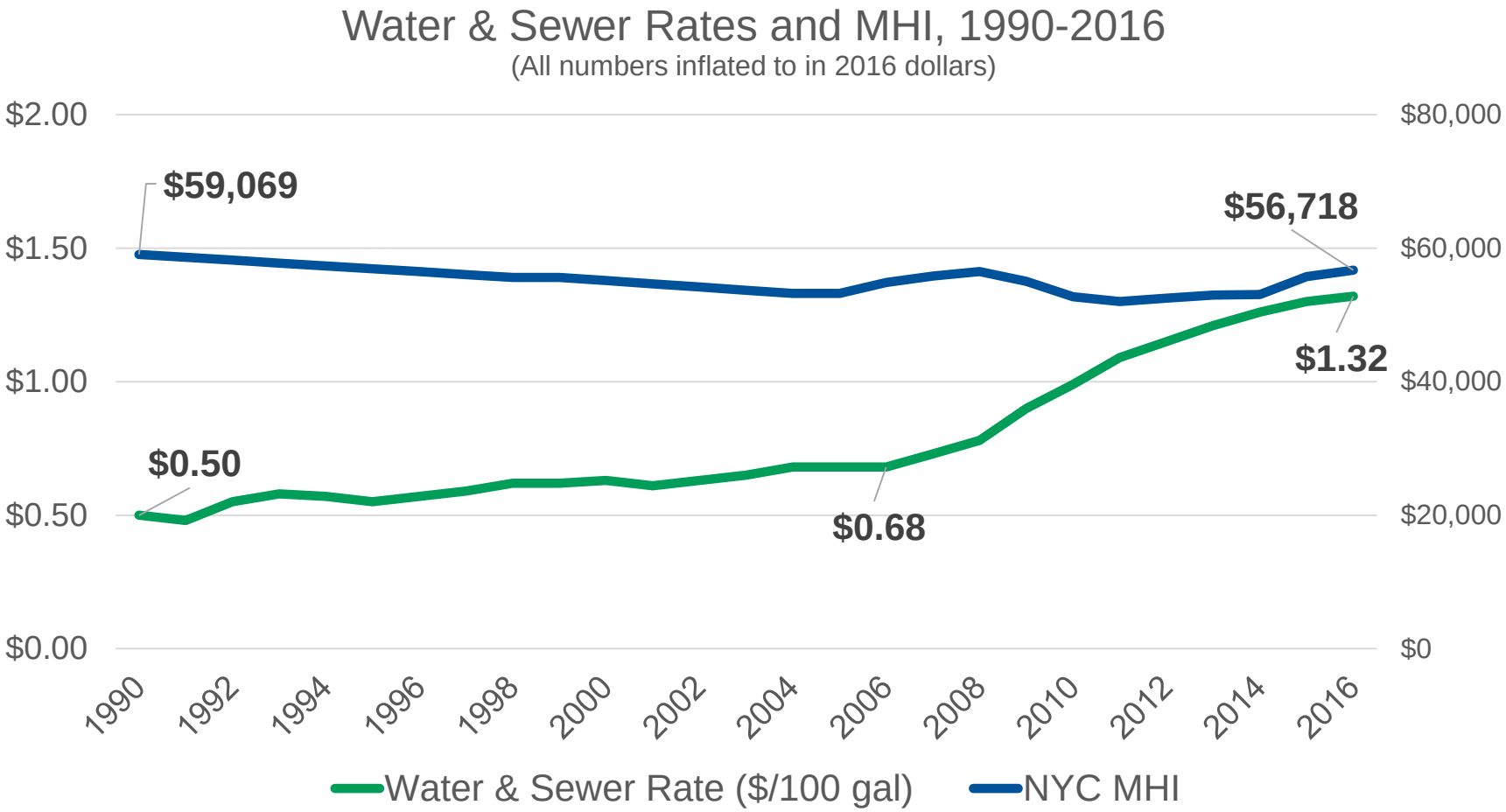
Competing Needs and Risks



CSO Program and Affordability

Angela Licata
Deputy Commissioner
DEP

Rates and HH Incomes



- NYC MHI declined by over $2,200/year, adjusted for inflation
- Rates rose 160%, adjusted for inflation
- At the same time, income inequality increased and may continue to grow

Legal Mandates & Customer Impacts

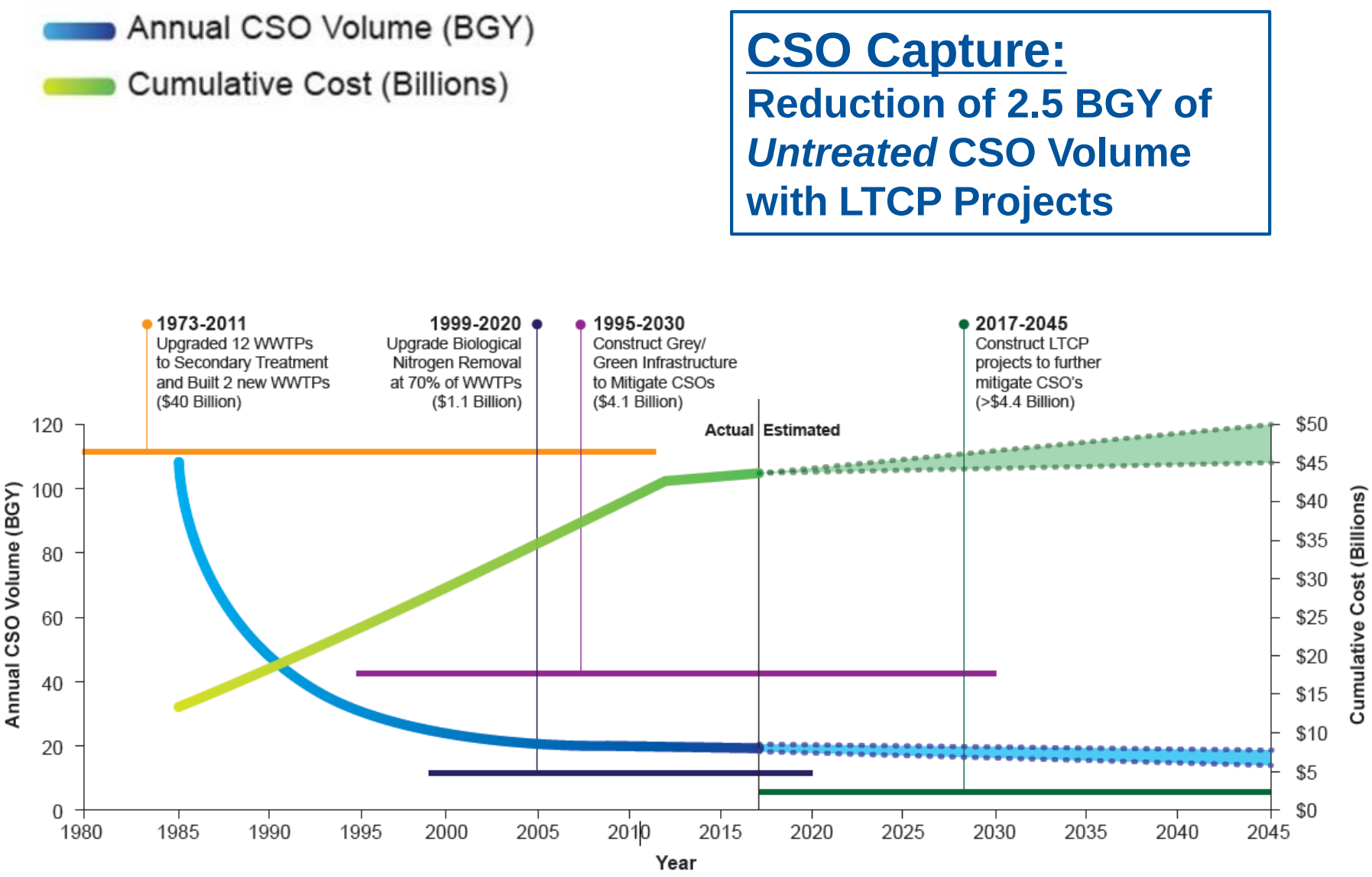
Controlling Customer Impacts

- DEP controls costs to minimize customer impacts
- DEP's revenue and debt structure ensure strong bond ratings and low borrowing costs
- Drinking water and wastewater cost a little over **¢1/gallon**

Legal Mandates

- FY2006-2017 $13b (48%) of capital investments were mandated
- Mandates cost average homeowners ~ $229 in FY17

Projected CSO Reduction with LTCP Projects



CSO Capture:

Reduction of 2.5 BGY of *Untreated* CSO Volume with LTCP Projects

Panel of DEP Senior Staff

Jim Mueller, PE
(Bureau of Engineering Design & Construction)

Keith Mahoney, PE
(Bureau of Engineering Design & Construction)

Angela Licata
(Bureau of Sustainability)

Pinar Balci, PhD.
(Bureau of Environmental Planning and Analysis)

Pam Elardo, PE
(Bureau of Wastewater Treatment)

Public Engagement

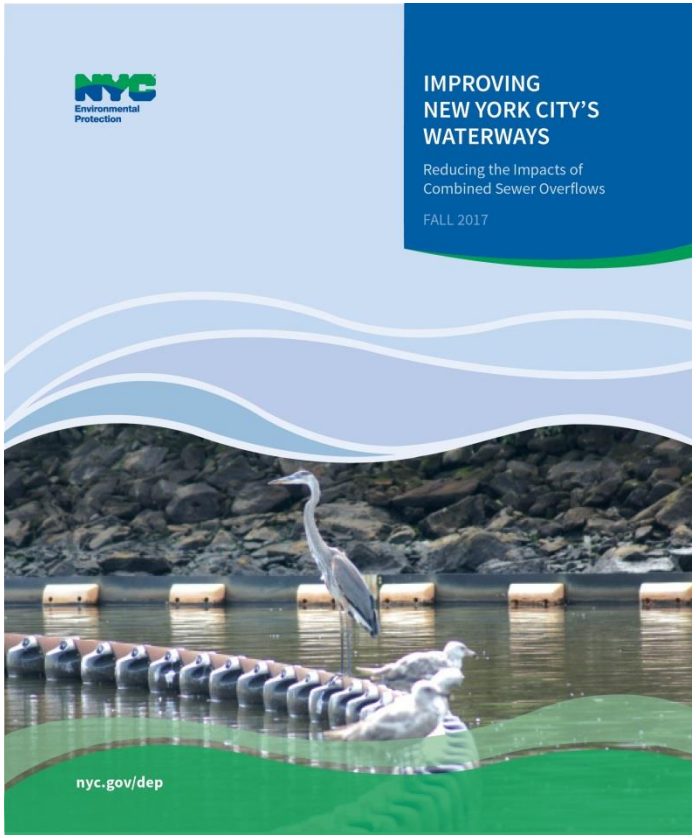
Michael DeLoach
Deputy Commissioner, Bureau of Public Affairs and Communications
DEP

Green Infrastructure Outreach

- **New** Brochures are carried by all field teams and are available in multiple languages
- DEP presents rain garden information to neighborhood organizations
- Maps and lists of locations are distributed before construction begins
- Community Construction Liaisons are available during construction process
- New GI hotline and improved 311 coordination
- **New** Rain Gardens website and email
  nyc.gov/raingardens
  raingardens@dep.nyc.gov
- All rain gardens will have decals and identified as DEP infrastructure

LTCP Public Participation: Website Updates

- Updated Waterbody Pages include:
  - All DEC Approval Letters
  - Responses to Comments for all Approved LTCPs
  - YouTube Videos of Public Meetings *when available*
  - Waterbody Fact Sheets
- New LTCP Brochure with descriptions of each of the submitted/approved LTCPs



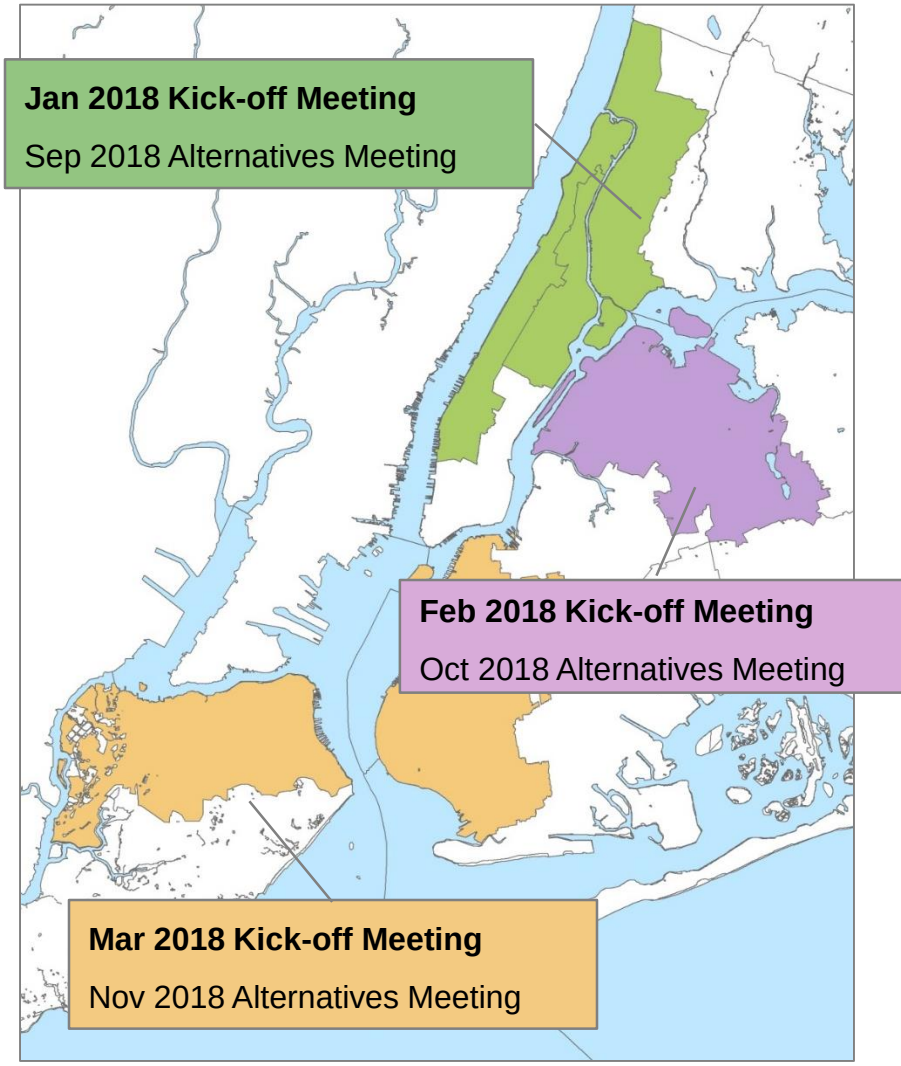
LTCP Public Participation: Stakeholder Feedback

- Since 2012, DEC has received regular stakeholder feedback about the public participation process

- DEP has continued to respond to that feedback and worked to improve engagement:
  - Dedicated Public Affairs Staffer
  - Simpler Meeting Invites (eventbrite etc.)
  - Coordinating meeting dates and venue locations with local Community Boards and environmental organizations
  - Improving presentations to make them more accessible to the general public
  - Additional meetings upon request or as-needed
  - Video footage of public meetings for the website
  - Updated informational materials

LTCP Public Participation: Next Steps

- DEP has reached out to DEC to discuss further improvements for the Jamaica Bay and Citywide&East River/Open Waters LTCP Submittals
- DEP will request six-month extensions for both LTCPs to allow for enhanced public engagement
- This additional time will include:
  - A *Final Draft LTCP* submittal to the public
  - "Recommend Plan" Public Meetings where DEP will present the final recommendations
  - A public comment period for the *Final Draft LTCP*
  - DEP responses (and potential changes to the *Final Draft*) prior to the LTCP submittal to DEC
  - Multiple Kickoff Meetings, Alternatives Meetings, and Recommended Plan meeting for Citywide&ER/OW



Thank You!

www.nyc.gov/dep/ltcp

www.nyc.gov/raingardens