



Combined Sewer Overflow Long Term Control Plan

Citywide/Open Waters LTCP **Recommended Plan Public Meeting**

January 29, 2020

Agenda

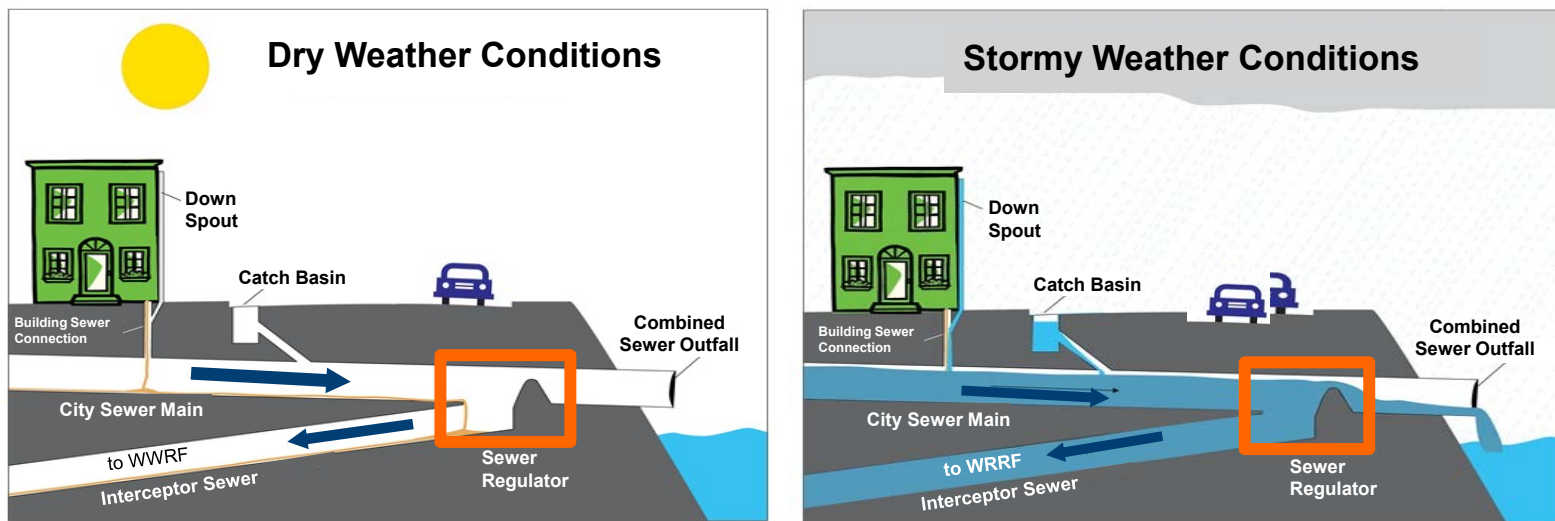
	Topic	Speaker
1	Welcome and Introduction	Mikelle Adgate
2	Investments and Spending Priorities	Angela Licata
2	Overview of Baseline Conditions	Pinar Balci
3	Overview of Recommended Plan	Keith Mahoney
4	City-wide Integrated Floatables Program	Pinar Balci
6	Next Steps	Mikelle Adgate

Welcome and Introduction

Mikelle Adgate
DEP

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**.



- 65% to 90% of **combined** sanitary and storm flow is captured at wastewater resource recovery facilities (WRRFs).
- When the sewer system is at full capacity, a diluted mixture of rainwater and sewage may be released into local waterways. This is called a combined sewer overflow (CSO).

What is a LTCP and CSO Consent Order?

Long Term Control Plan (LTCP)

identifies appropriate CSO controls to achieve applicable water quality standards

consistent with the Federal CSO Policy and Clean Water Act

CSO Consent Order

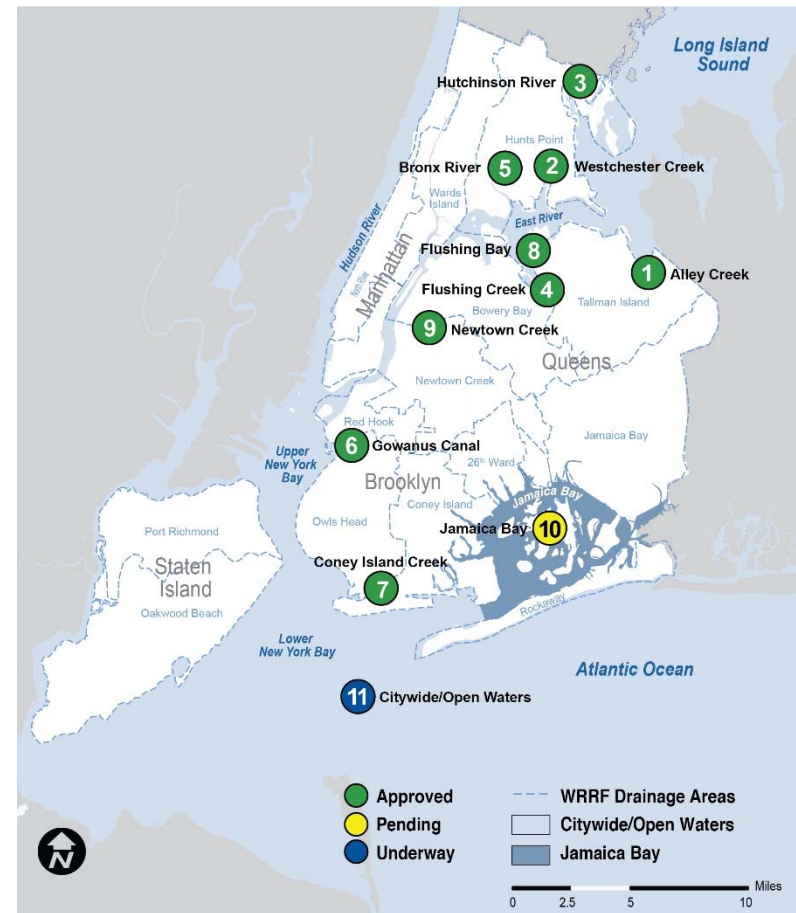
an agreement between NYC and DEC that settles past legal disputes without prolonged litigation

DEC requires DEP to develop LTCPs and mitigate CSOs

LTCP Milestone Status

ID	LTCP	Approved?
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 Tributaries ⁽¹⁾	Under DEC review
11	Citywide/Open Waters ⁽²⁾	LTCP in development Due to DEC March 2020

- (1) Jamaica Bay includes Thurston Basin, Bergen Basin, Hendrix Basin, Fresh Creek, Spring Creek, Paerdegat Basin and Jamaica Bay
- (2) Citywide/Open Waters LTCP includes East River, Lower Long Island Sound, Hudson River, Harlem River, Lower and Upper New York Bay, Arthur Kill and Kill Van Kull



Citywide/Open Waters LTCP

- Waterbody-specific CSO evaluation of Open Waters:
 - Harlem River
 - Hudson River
 - East River/Long Island Sound
 - Upper and Lower New York Bay
 - Arthur Kill and Kill Van Kull
- Citywide/Open Waters LTCP will be submitted to DEC in **March 2020**



Citywide/Open Waters LTCP Public Meetings



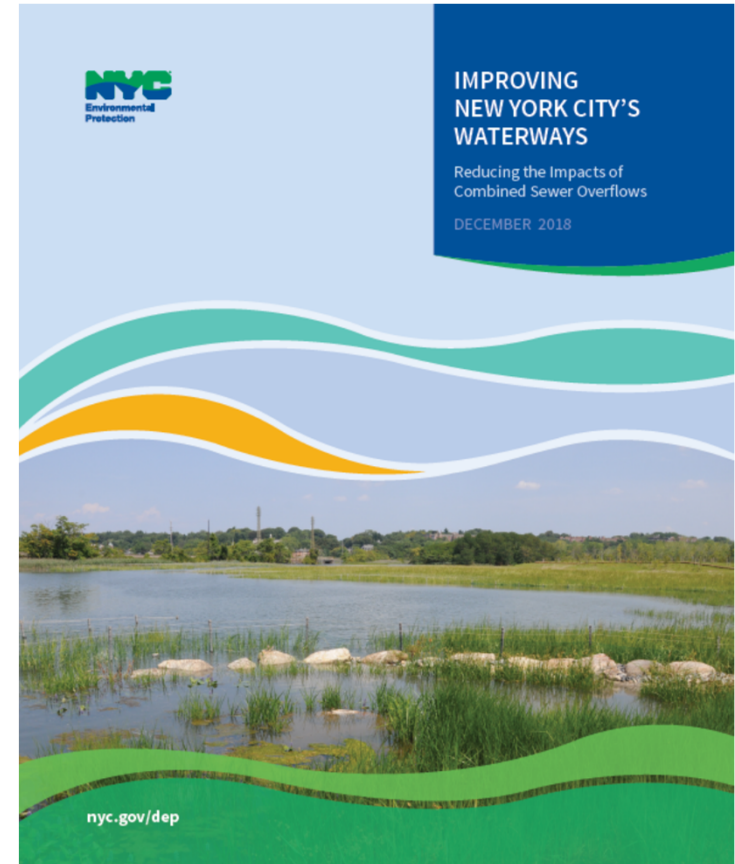
➤ Kickoff Meetings:

- ✓ Harlem River/Hudson River:
January 31, 2018
- ✓ Kill van Kull, Arthur Kill, New York Bay:
March 27, 2018
- ✓ East River/Long Island Sound Meeting:
May 10, 2018

➤ Update Meeting: April 16, 2019

➤ Retained Alternatives Meetings:

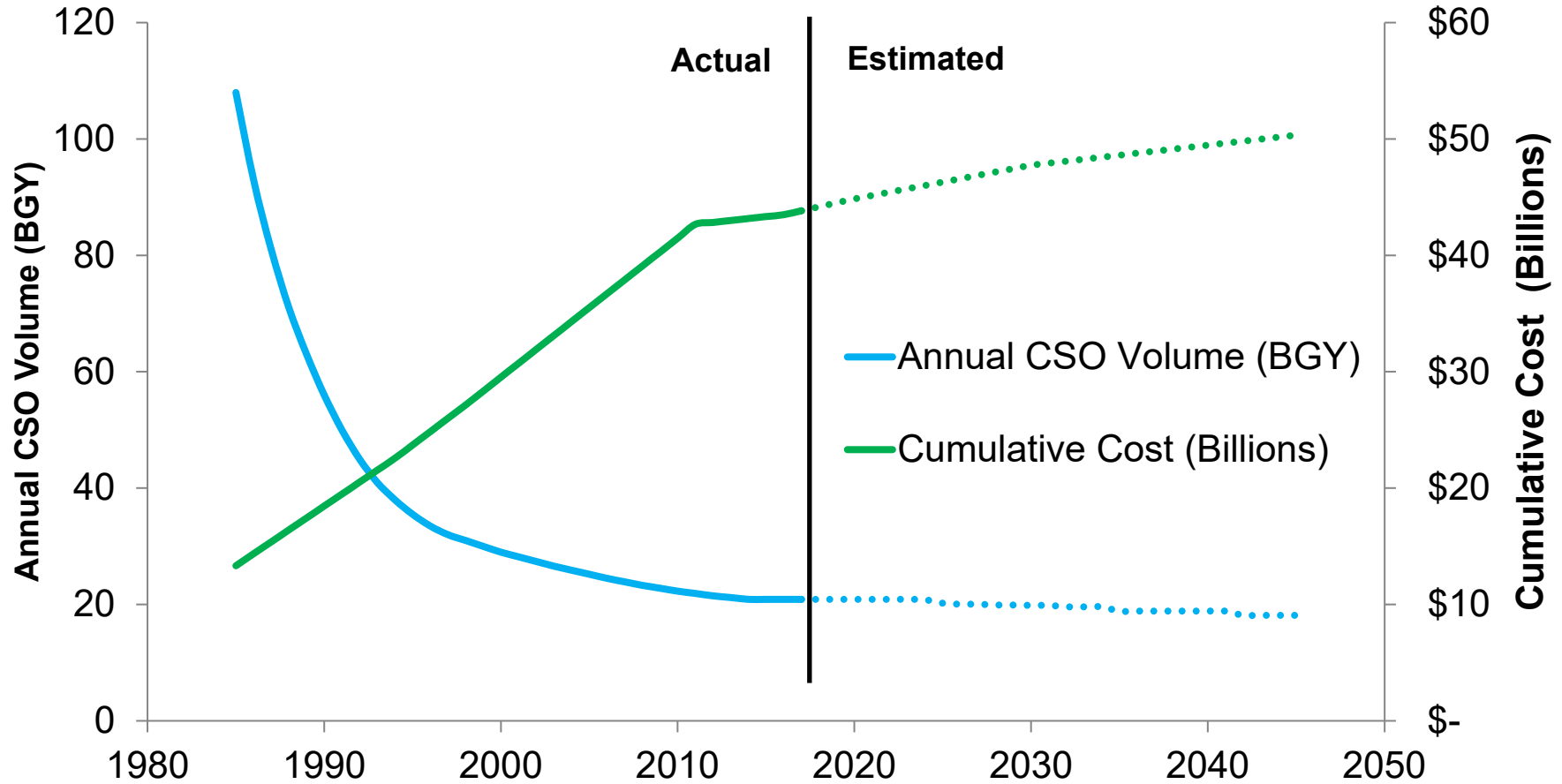
- ✓ Tibbetts Brook Meeting: October 2, 2019
- ✓ Retained Alternatives Meeting: October 15, 2019
- ✓ Staten Island Meeting: November 6, 2019



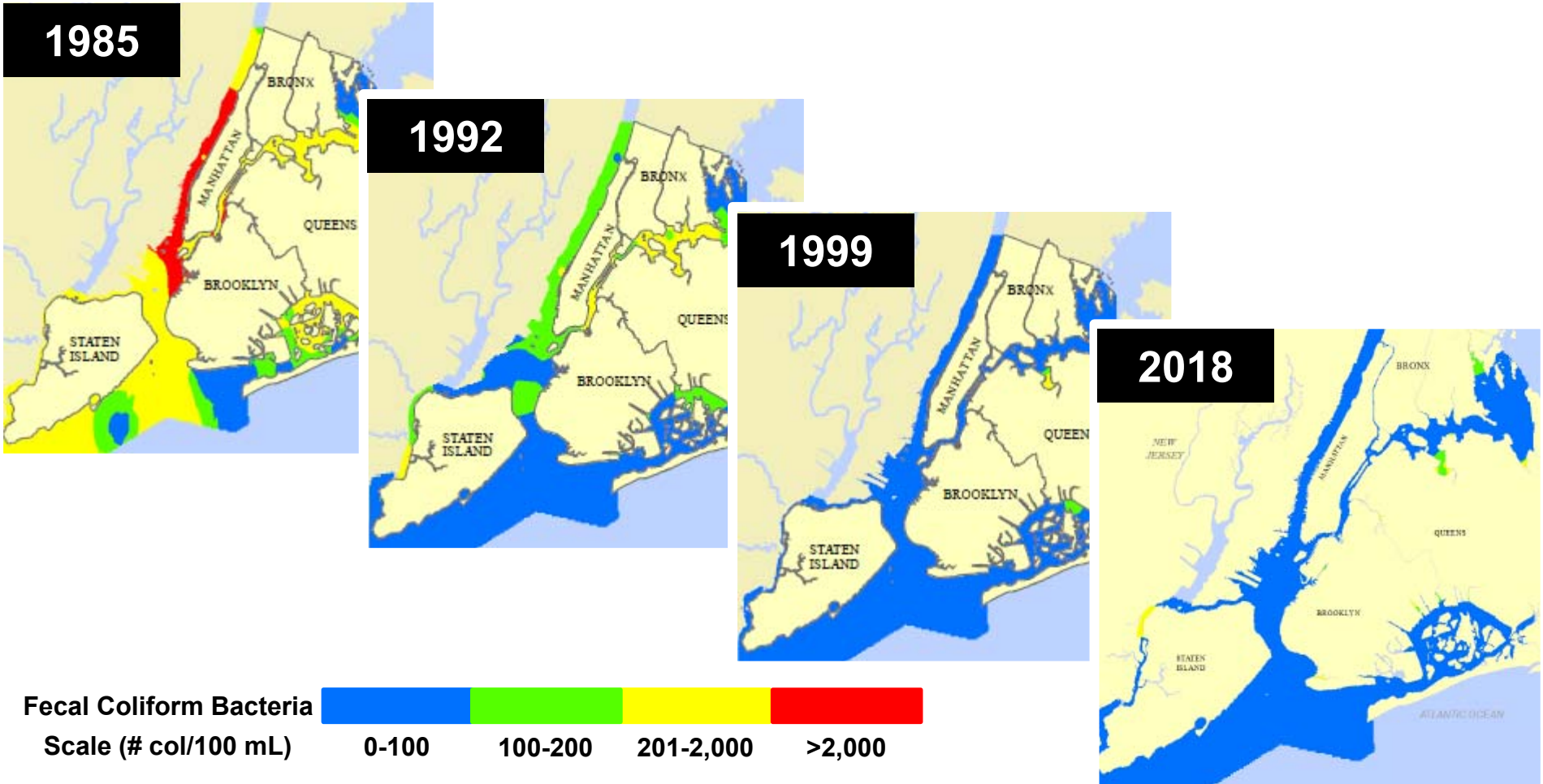
Investments and Spending Priorities

Angela Licata
DEP

DEP Investments and CSO Reduction

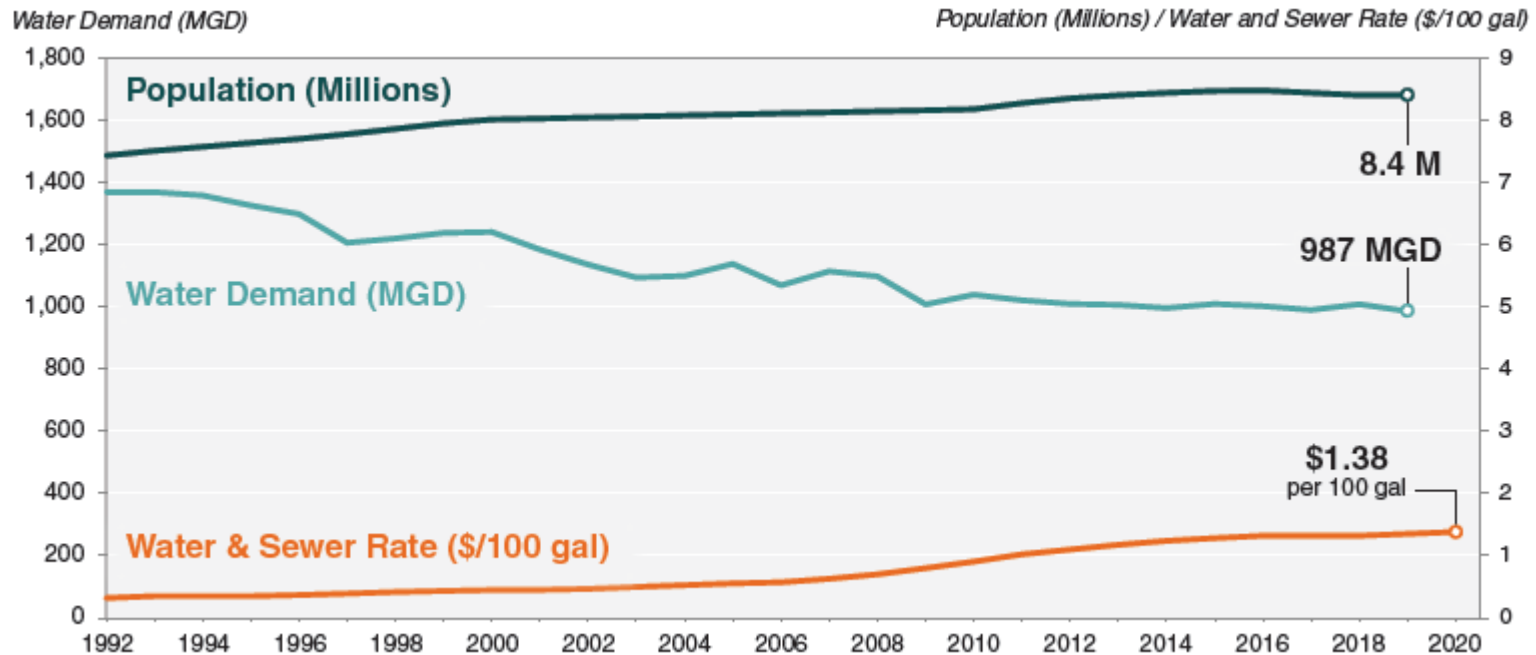


Water Quality Improvements



Enterococci GM and STV WQS adopted for Class SA and coastal Class SB waters by DEC in June 2019 with an effective date of Nov 1, 2019. Applies to following NYC waters evaluated under this OW LTCP – Long Island Sound, Upper New York Bay and portion of Lower New York Bay. Attainment with Enterococci WQS discussed later in presentation.

Population, Water Demand, and Rates

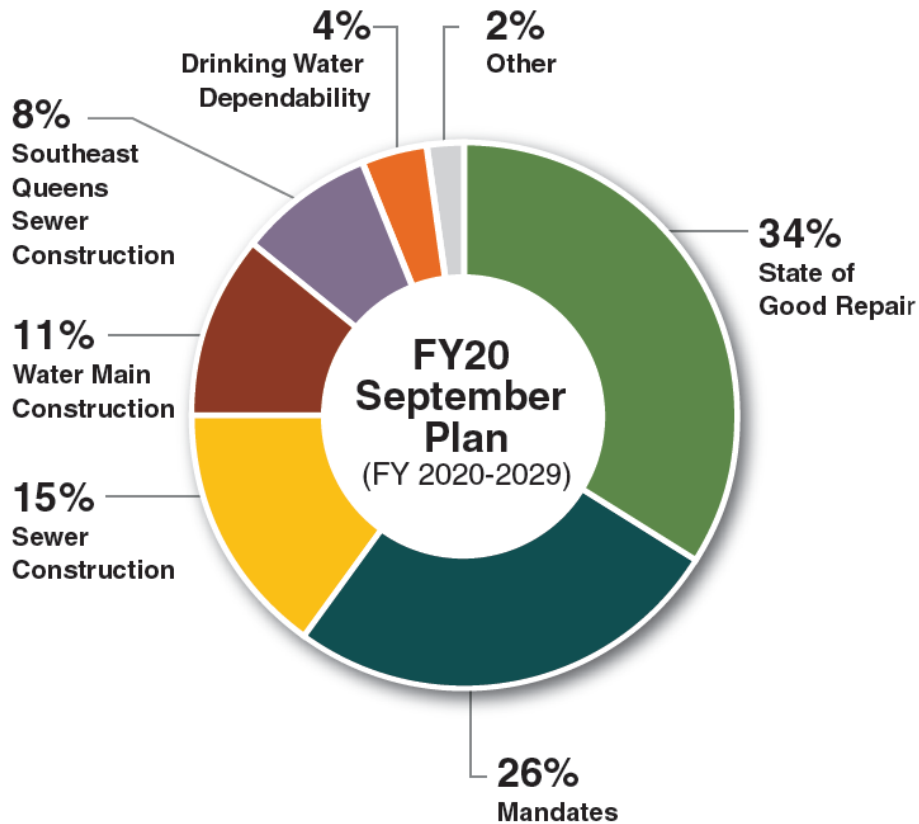


- Water demand has declined more than 40% since 1990
- Population increased by more than one million people
- Rates have more than doubled (adjusted for inflation) since 2000 to meet the increasing cost of service

DEP Capital Commitments



DEP's \$20B 10-Year Capital Plan



Liner for Del Aqueduct Bypass Tunnel



Storm Sewer, Southeast Queens

Balancing Investments



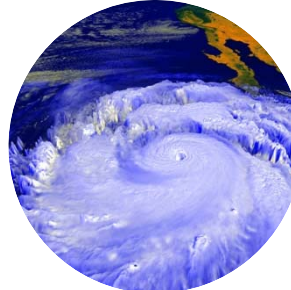
**Protecting
public health**



**Supporting
economic growth**



**Affordable & sustainable
rates and customer
assistance programs**



**Climate actions &
energy recovery**



**Environmental
justice**



**Ecosystem restoration
& species protection**



**Improving drinking
water quality &
receiving water
protection**

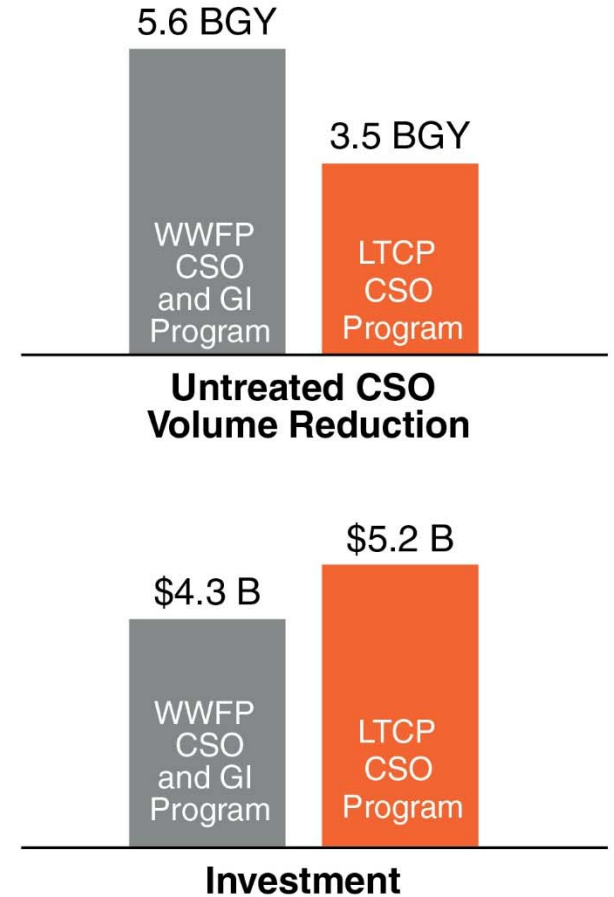
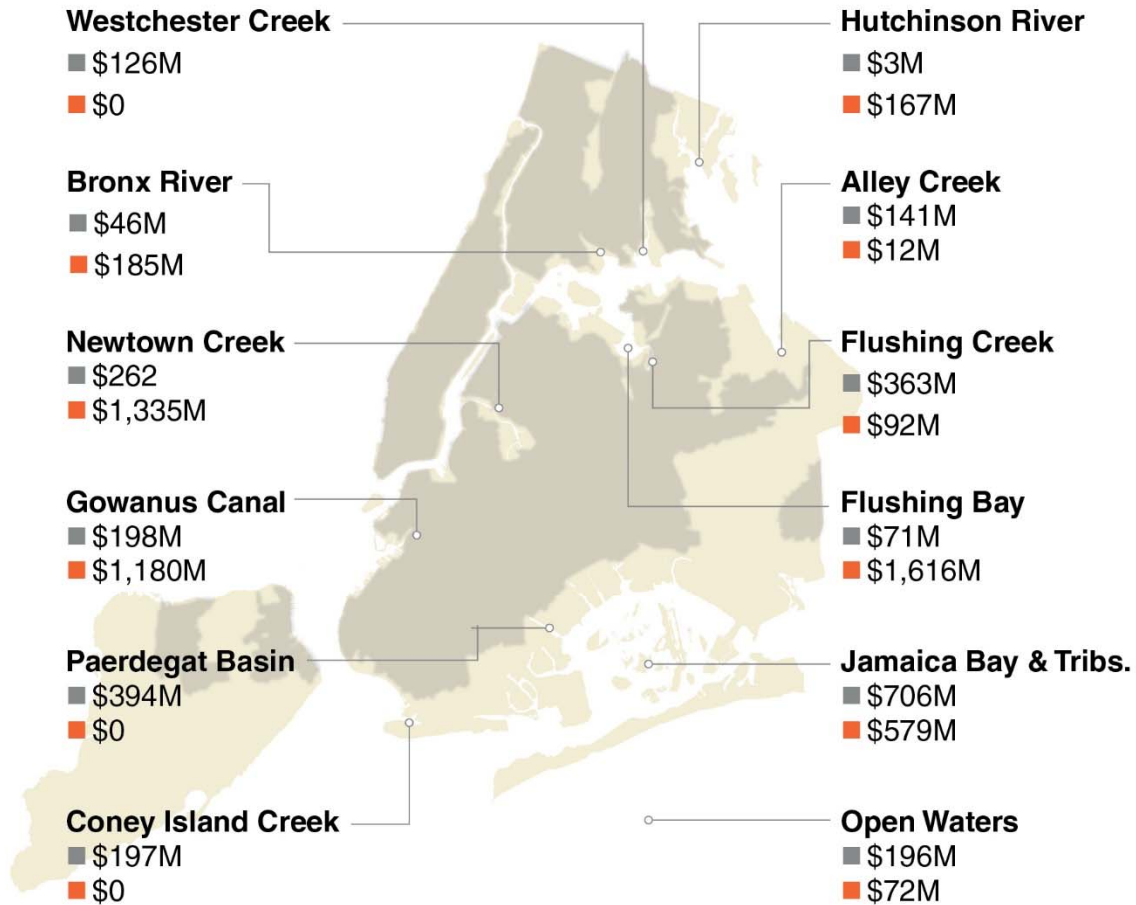


**Addressing aging
infrastructure**

LTCP Program Commitments and Benefits



■ Existing Grey Infrastructure Projects/GI Areas ■ LTCP Projects





Questions

Overview of Baseline Conditions

Pinar Balci, PhD
DEP

Citywide/Open Waters LTCP Baseline Conditions

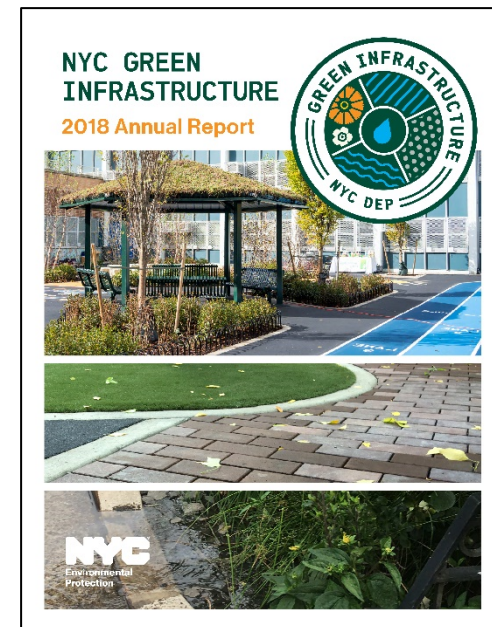
➤ Grey Infrastructure Projects

- WWFP Projects
- Tributary LTCPs

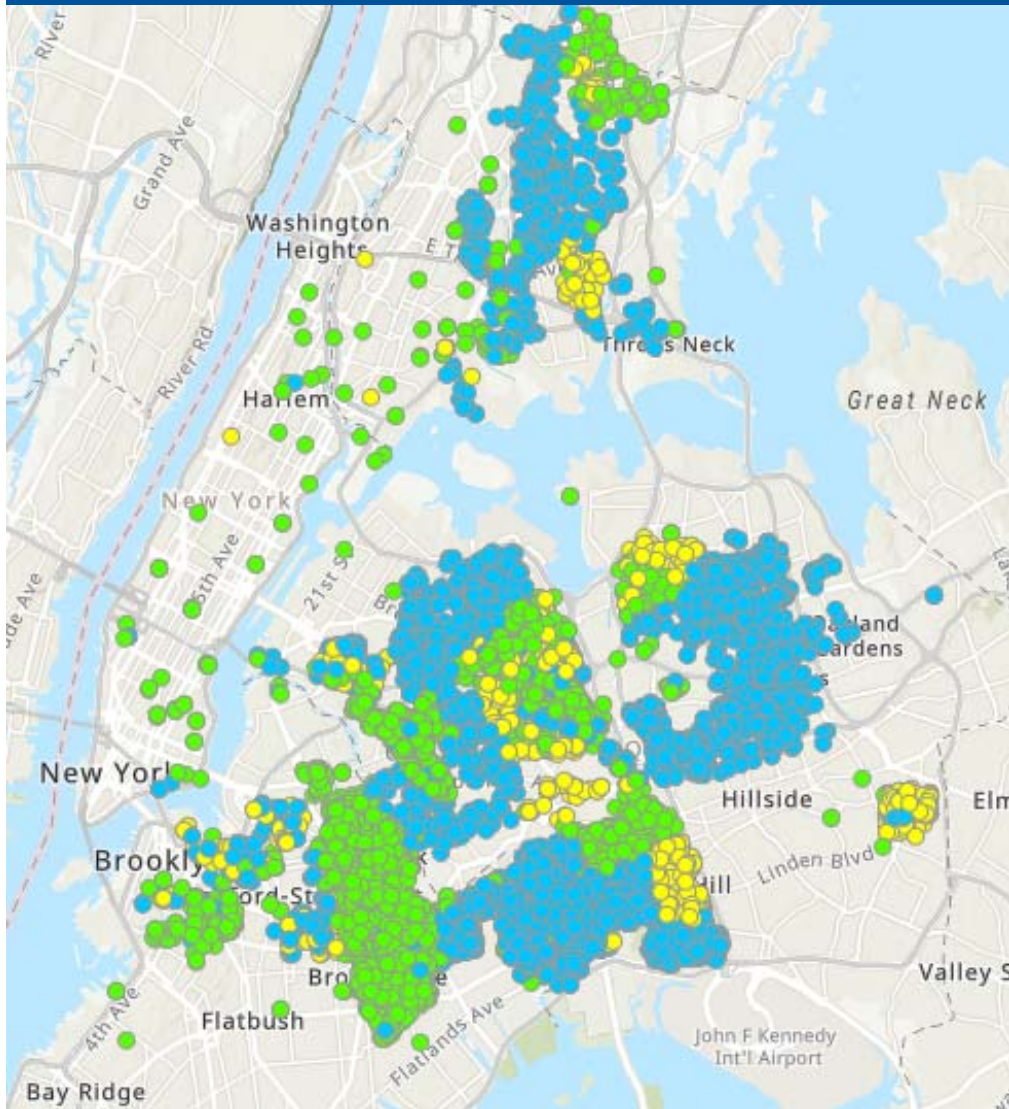


➤ Green Infrastructure Projects

- Right-of-way Green Infrastructure
- Public Property Retrofits
- Private Property Incentives
- Stormwater Rules
- Demand Management
- Tibbetts Brook Daylighting



Green Infrastructure Program Snapshot



- Installed over 4,500 assets
- Over 7,000 GI assets going into construction in 2019-2021

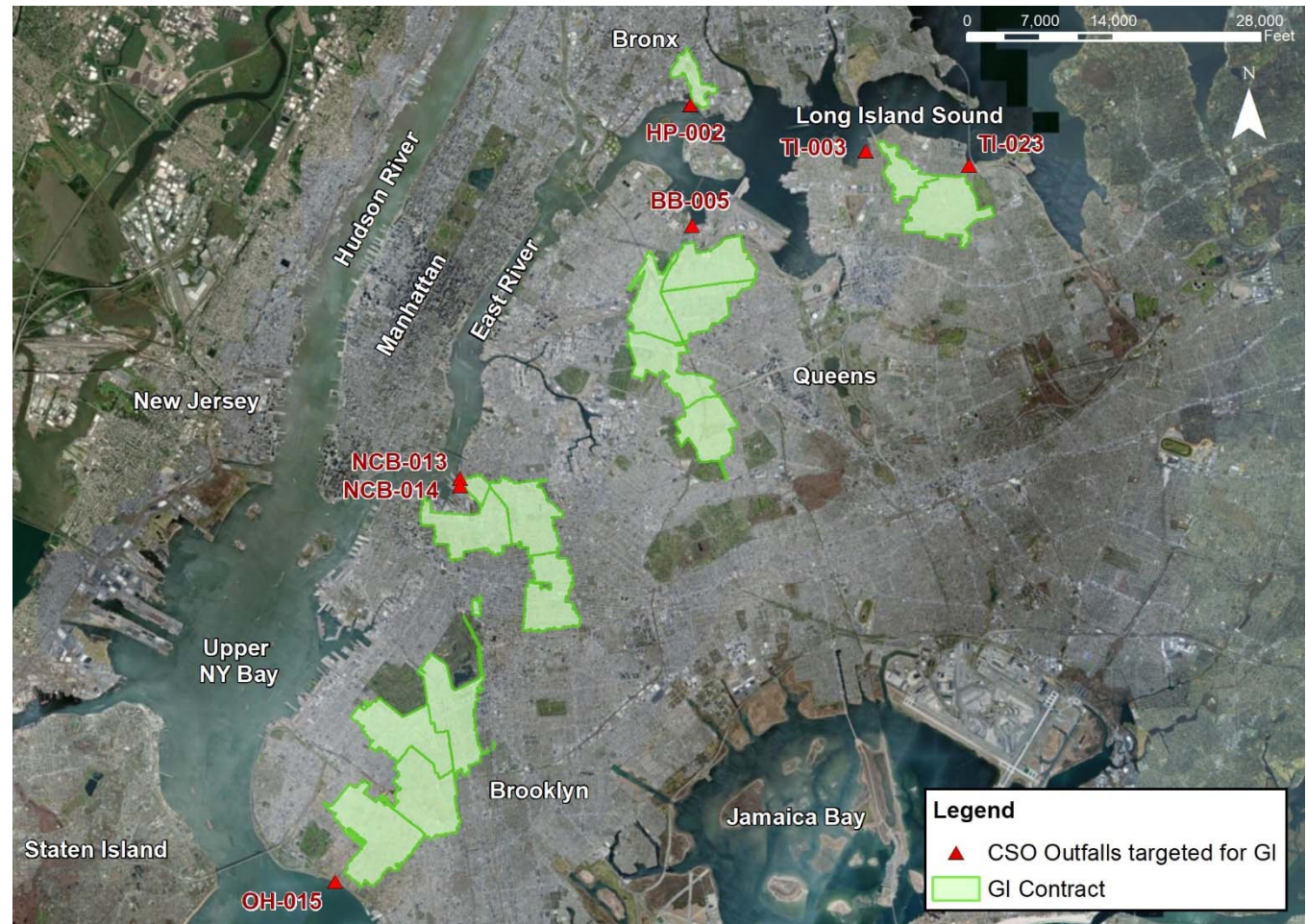
LEGEND

- Final Design
- In Construction
- Constructed

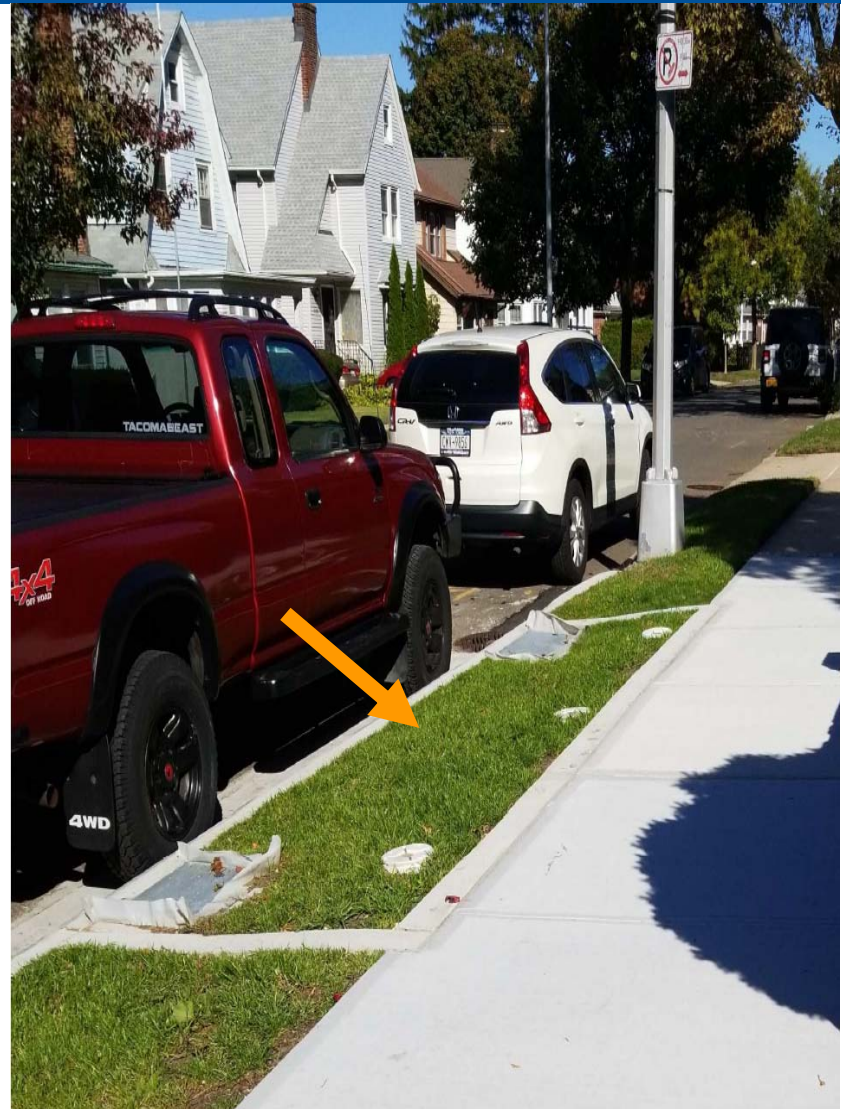
Source: DEP Green Infrastructure Program Map (publicly accessible)

ROW Contract Areas in East River/Open Waters

- **435 Assets**
Constructed and
In-Construction
- **181 MGY**
of Stormwater
Managed
- **144 Equivalent
Greened Acres**



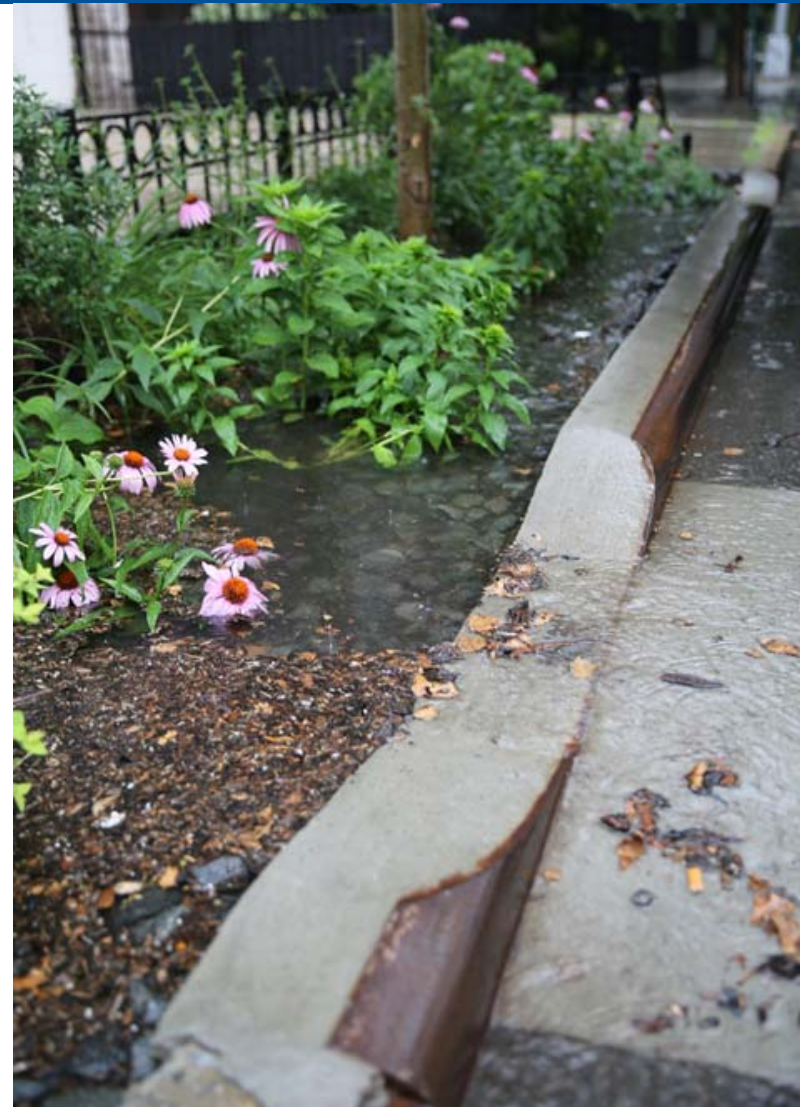
ROW – Infiltration Basins



ROW Cloudburst Swales & SW Greenstreets



ROW Rain Gardens



ROW Porous Concrete



ROW Large-Scale Projects

Existing



Concept



Public Property Retrofits

Key Partnerships:

- NYC Housing Authority
- NYC Parks
- NYC Department of Education
- DDC Public Buildings Portfolio (Library, Fire, Police, Other)



Public Property - TPL Partnership



THE TRUST FOR POST-PUBLIC LAND
I.S. 250 Robert F. Kennedy Middle School
25Q252 Queens School of Inquiry
P255Q District 7S
Community Playground
Flushing, Queens

Private Property Implementation Update

Green Infrastructure Grant Program

- More than \$13M committed to date to 32 projects
- New green roof incentive schedule released in 2018 – up to \$30/SF
- Shifting focus to green roof retrofits

Private Property Retrofit Program

- \$53M RFP released Nov 2018
- Program administrator selected in June 2019
- 200 Greened Acres in 5 years starting in 2020
- Properties > 50,000 SF

Unified Stormwater Rule

- Legislation introduced January 23rd, 2020
- Expands MS4 Requirements into CSO Areas
- New Rule currently being drafted
- Rule will update stormwater quantity and flow rates (superseding 2012 Performance Standard)
- Reduces construction/post-construction program threshold and adds requirements for infiltration
- Result will be a Citywide Stormwater Management Program

Demand Management Projects

Central Park Jackie Onassis Reservoir Recirculation Project

- 0.83 MGD of potable water savings
- CSO reduction of **about 4 MG/yr** to the East River



Prospect Park Valve Replacement Project

- 0.80 MGD of potable water savings
- CSO reduction of **about 12 MG/yr** to New York Bay

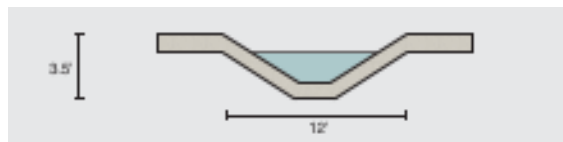


Tibbetts Brook Baseline Project

Daylighting Tibbett's Brook Base Flow plus additional storm flow, with Van Cortlandt Lake Improvements



Open Channel Cross Section

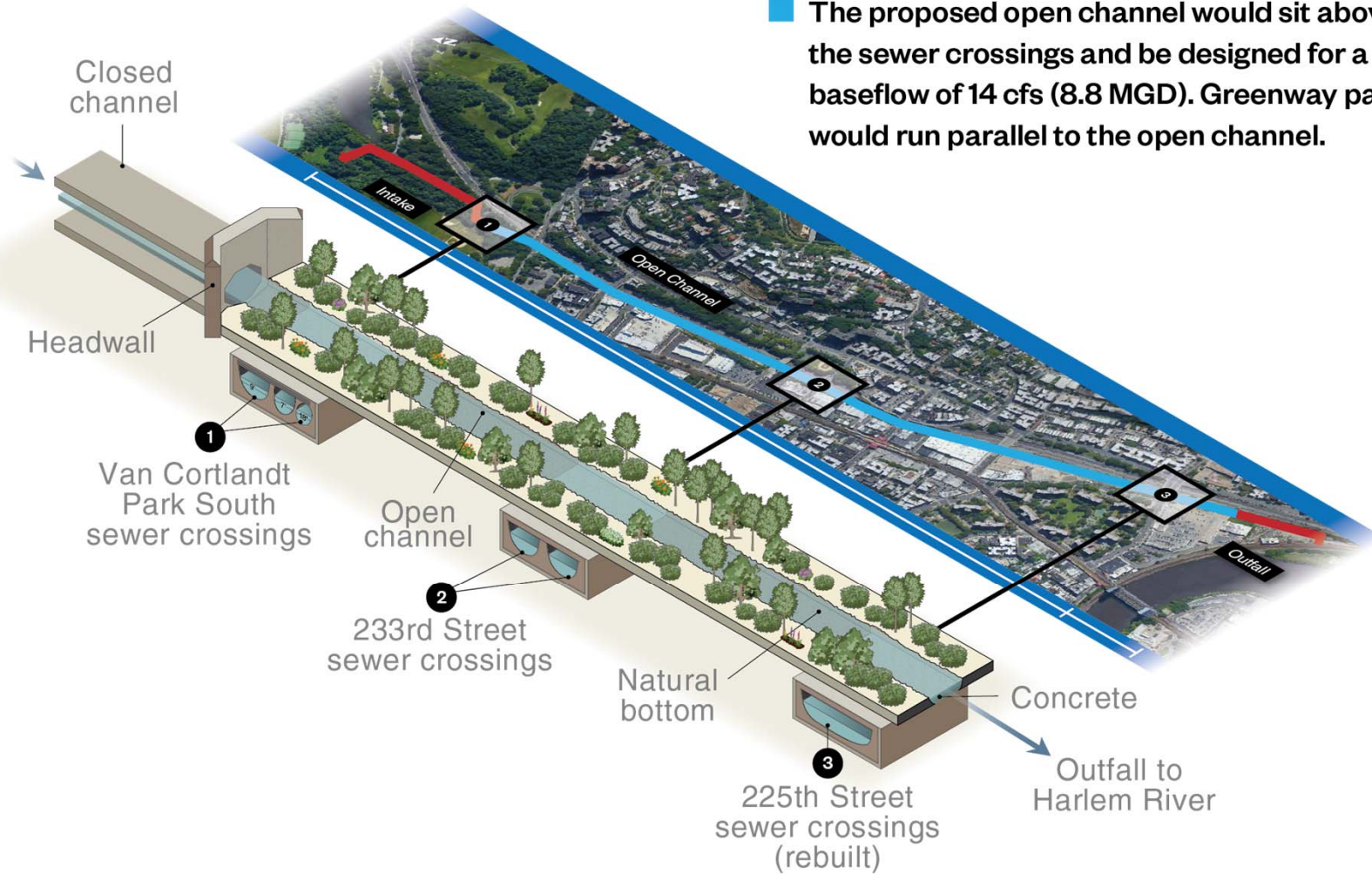


CSO Reduction	Cost Estimate	Cost per CSO Volume Reduction
228 MGY	\$63 Million	\$0.28/gal

- Reroutes flow from Van Cortlandt Lake, away from Broadway Sewer
- Daylighted stream along former CSX right-of-way, discharging directly to Harlem River
- Reducing CSO flows from WI-056
- No siphon needed
- Open Channel flow up to 31 cfs

Tibbetts Brook Baseline Project

- The proposed open channel would sit above the sewer crossings and be designed for a baseflow of 14 cfs (8.8 MGD). Greenway paths would run parallel to the open channel.



Proposed Improvements at Van Cortlandt Lake

- Increase storage through downstream overflow weir modification and construction of a new weir
- Lake restoration through creation of an additional 0.85 acre of wetlands



Proposed Improvements at Van Cortlandt Lake





Questions

Overview of Recommended Plan

Keith Mahoney, PE
DEP

WQS Attainment Chart

Summary of WQ Standards Compliance

yes
 no
 not applicable

Waterbody	Classification	Fecal Coliform Monthly GM ⁽¹⁾		Enterococci 30-day GM ⁽²⁾		Enterococci 30-day STV ⁽²⁾		Dissolved Oxygen (DO)	
		Baseline Conditions	100% CSO Control	Baseline Conditions	100% CSO Control	Baseline Conditions	100% CSO Control	Baseline Conditions	100% CSO Control
Harlem River	Class I	✓	✓					✓	✓
Hudson River	Class SB	✓	✓					✓	✓
	Class I	✓	✓					✓	✓
East River/LIS	Class SB ⁽²⁾	✓	✓	✓	✓	✓	✓	✓	✓
	Class I	✓	✓					✓	✓
New York Bay	Class SB ⁽²⁾	✓	✓	✓	✓	✗	✓	✓	✓
Kill van Kull	Class SD	✗ ⁽³⁾	✗ ⁽³⁾					✓	✓
Arthur Kill	Class SD	✗ ⁽³⁾	✗ ⁽³⁾					✓	✓
	Class I	✗ ⁽³⁾	✗ ⁽³⁾					✗ ⁽³⁾	✗ ⁽³⁾

(1) Fecal Coliform attainment is assessed on an annual basis.

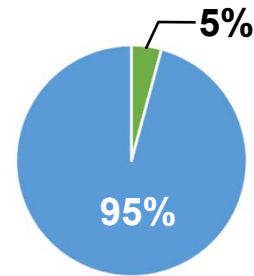
(2) Enterococci attainment is assessed for the recreational season (May 1st – Oct 31st) for SB coastal waters.

(3) There are additional loadings other than NYC CSO discharges that prevent full attainment with WQS.

Key Take-Aways for Alternatives Analysis



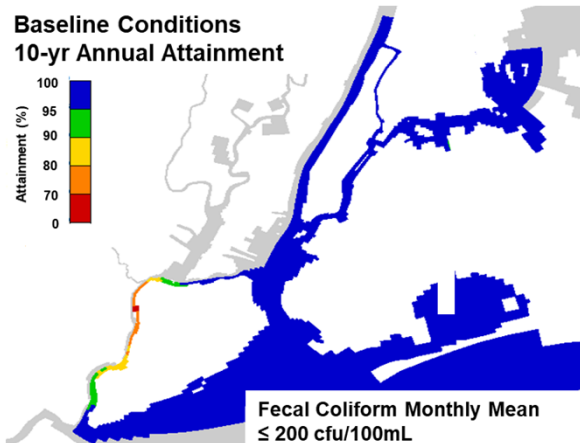
Over \$9B in investments have been made or committed as part of the CSO Program to date



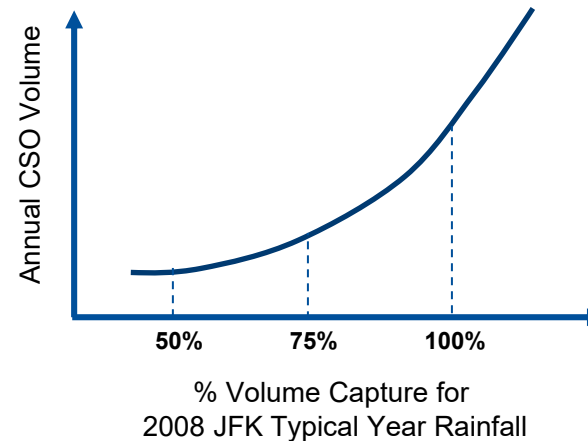
Annual CSO volume is small percentage of total volume treated at WRRFs

- Annual CSO Volume (11 BGY)*
- Annual Volume Treated at WRRFs (251 BGY)*

*Based on only on outfalls and WRRFs associated with citywide open waters and the 2008 JFK Typical Year rainfall.



Baseline water quality shows high levels of attainment with applicable WQS

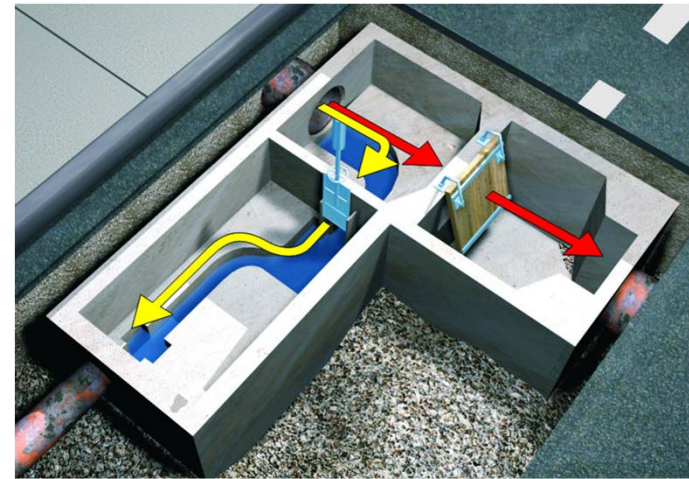


CSO volume to be captured increases significantly with increasing level of control

Overview of Alternatives Analysis

Approach:

- Toolbox defines technologies to be assessed
- Range of levels of CSO control evaluated per EPA CSO Policy
- Multiple iterations of screening steps to identify alternatives to be retained for cost/benefit evaluations presented in LTCP
- Screening considers:
 - Hydraulic/operational feasibility
 - CSO reduction
 - Cost
 - Siting availability
 - Impact on attainment of Water Quality Standards
- Screening process resulted in focus on system optimization alternatives and tunnel storage



Retained Alternatives from the 10/15/19 Meeting can be found online at www.nyc.gov/dep/ltcp

System Optimization Analysis Summary

Targeted 100 monitored BMP regulators and prioritized CSO reduction from outfalls adjacent to public access locations

- Evaluation was driven by system hydraulics and optimizing flow delivery
- Selection of alternatives limited by constraints on increasing water levels in the sewers
- Analysis demonstrated that the existing system is currently being operated as designed to maximize hydraulic flow delivery while also protecting the WRRFs



Summary of Optimization Evaluations



Alternatives excluded from the Recommended Plan:

Waterbody	Alt.	Description	CSO Volume Reduction ⁽¹⁾	Est. Probable Bid Cost	Cost Effective	No Add'l CSO to Tribs
Harlem River	HAR-1	<ul style="list-style-type: none"> Optimization of regulators associated with Outfalls NR-007, 008, 009, 010, 017 Relocate and upsize portion of Main Interceptor 	16 MGY	\$35M	✗	✓
	HAR-2	<ul style="list-style-type: none"> Optimization of regulators associated with Outfalls NR-008 and NR-010 Relocate and upsize portion of Main Interceptor 	15 MGY	\$31M	✗	✓
Hudson River	HUD-1	<ul style="list-style-type: none"> Optimization of regulators associated with HUD-2 Outfalls plus NR-022, 023, 026, 027, 031, 032, 035 	9 MGY	\$19M	✗	✗
East River	ER-1	<ul style="list-style-type: none"> Optimization of regulator associated with Outfall HP-025 	30 MGY	\$16M	✓	✗
	ER-2	<ul style="list-style-type: none"> Optimization of regulators associated with Outfalls HP-016, 018, 019, 025 	30 MGY	\$24M	✓	✗
	ER-3	<ul style="list-style-type: none"> Optimization of regulators associated with Outfalls TI-003, 022 	102 MGY	\$4M	✓	✗
	ER-4	<ul style="list-style-type: none"> Optimization of regulators associated with Outfalls TI-003, 022, 023 	122 MGY	\$7M	✓	✗
	ER-5	<ul style="list-style-type: none"> Bending Weir at Regulator TI-13, Outfall TI-023 	42 MGY	\$3M	✗	✓

Summary of Optimization Evaluations



Alternatives *included in* the Recommended Plan:

Waterbody	Alt.	Description	CSO Volume Reduction ⁽¹⁾	Est. Probable Bid Cost	Cost Effective	No Add'l CSO to Tribs
Hudson River	HUD-2	<ul style="list-style-type: none"> Optimization of regulators associated with Outfalls NR-038, 040, 046 	7 MGY	\$3M	✓	✓
East River	ER-6	<ul style="list-style-type: none"> Bending weir at Regulator TI-13 (TI-023) plus regulator optimization associated with TI-003 	86 MGY	\$6M	✓	✓
New York Bay	NYB-1	<ul style="list-style-type: none"> Optimization of regulators associated with CSOs RH-005, 014 	15 MGY	\$6M	✓	✓
	NYB-2	<ul style="list-style-type: none"> Gravity flow connection from Victory Boulevard combined sewer directly to interceptor, bypassing Hannah Street PS, diverting dry and wet weather flow upstream of CSO PR-013 	43 MGY	\$22M	✓	✓
	NYB-3	<ul style="list-style-type: none"> RTC gate for Regulator 9C, Outfall OH-015 	90 MGY	\$5M	✓	✓

Recommended Plan Project: HUD-2



Project Location

Hudson River Waterbody Alternative HUD-2

Optimization of regulators associated with Outfalls NR—038, 040, 046



10 MGY

CSO reduction to Hudson River

3 MGY*

CSO increase to Harlem River

7 MGY

Net CSO volume reduction

\$3M

Estimated probable bid cost

28

activation reductions

✓ Fecal attainment maintained

✓ DO attainment maintained

*Tibbetts daylighting project will reduce CSOs to Harlem River by 228 MGY

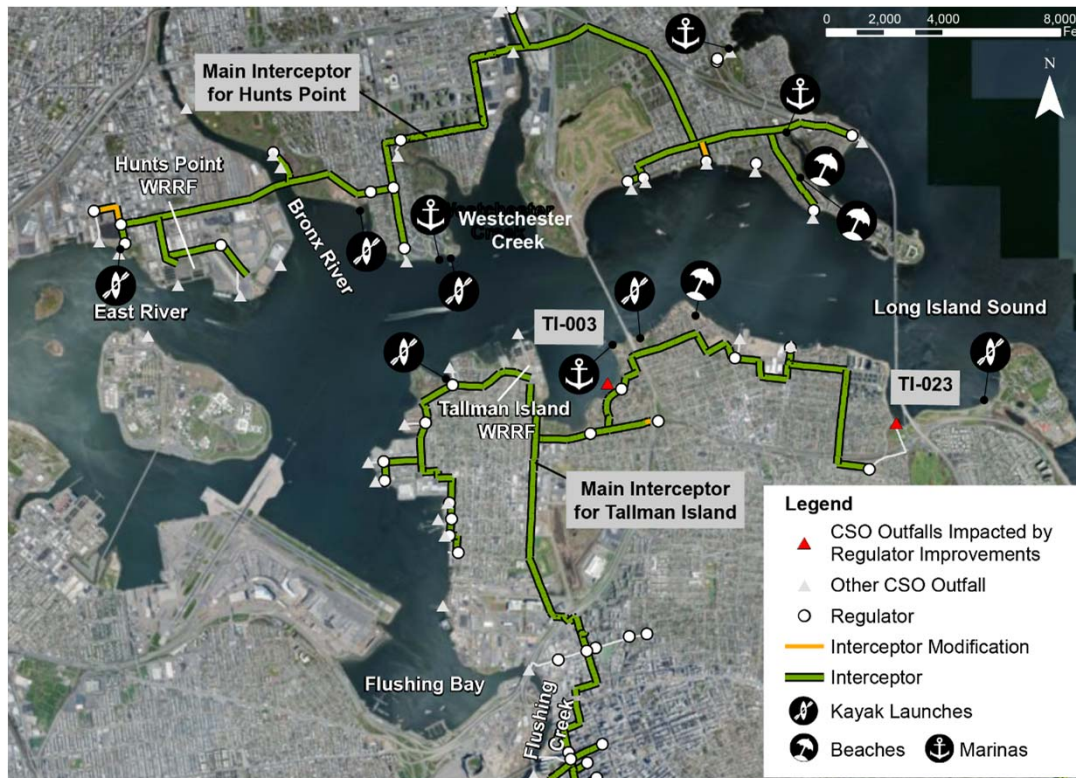
Recommended Plan Project: ER-6



Project Location

East River Waterbody Alternative ER-6

Bending weir at outfall TI-023 plus optimization of the regulator associated with outfall TI-003



86 MGY

CSO reduction to East River

\$6M

Estimated probable bid cost

34

activation reductions



Fecal attainment maintained



Enteric GM & STV attainment maintained



DO attainment maintained

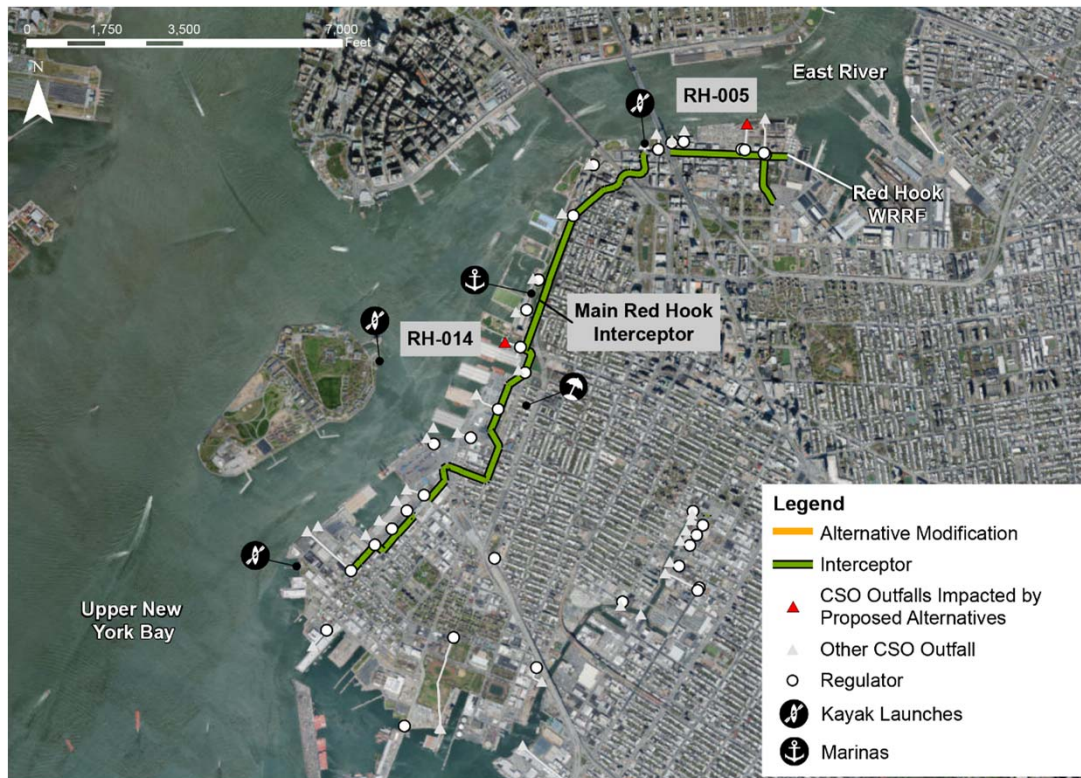
Recommended Plan Project: NYB-1



Project Location

New York Bay Alternative NYB-1

Optimization of regulators associated with CSOs RH-005 and 014



15 MGY

CSO reduction to Upper New York Bay

\$6M

Estimated probable bid cost

14

activation reductions

- ✓ Fecal attainment
- ✓ Entero GM attainment
- ✗ Entero STV attainment
- ✓ DO attainment

Recommended Plan Project: NYB-2



Project Location

New York Bay Alternative NYB-2

Gravity flow connection from Victory Blvd combined sewer to interceptor, bypassing Hannah St PS
Diverts dry and wet weather flow upstream of CSO PR-013



43 MGY

CSO reduction to Upper New York Bay

\$22M

Estimated probable bid cost

50

activation reductions

- ✓ Fecal attainment
- ✓ Entero GM attainment
- ✗ Entero STV Attainment
- ✓ DO attainment

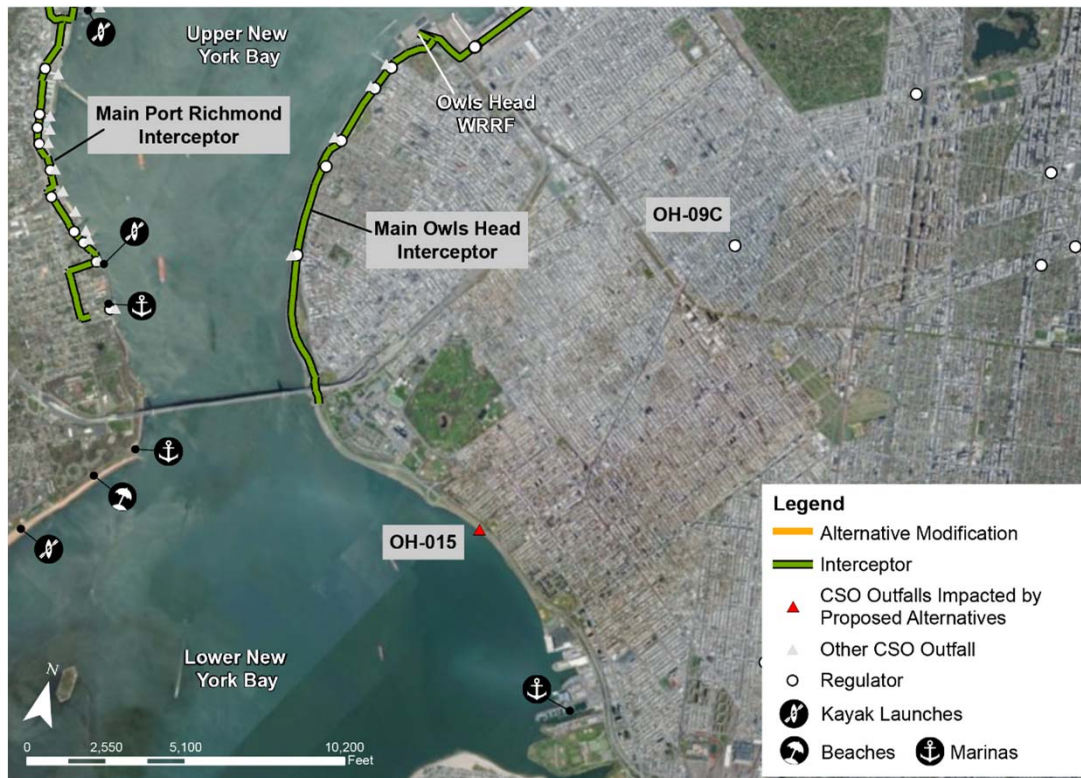
Recommended Plan Project: NYB-3



Project Location

New York Bay Alternative NYB-3

Real time control gate at Regulator 9C, Outfall OH-015



90 MGY

CSO reduction to Lower New York Bay

\$5M

Estimated probable bid cost

-3

activation reductions

- Fecal attainment
- Entero GM attainment
- Entero STV Attainment
- DO attainment

Recommended Plan WQ Attainment

WQ Standards Compliance

yes
 not
 not applicable

		Fecal Coliform Monthly GM ⁽¹⁾	Enterococci 30-day GM ⁽²⁾	Enterococci 30-day STV ⁽²⁾	Dissolved Oxygen (DO)
Waterbody	Classification	Recommended Plan	Recommended Plan	Recommended Plan	Recommended Plan
■ Harlem River	Class I	✓			✓
■ Hudson River	Class SB	✓			✓
	Class I	✓			✓
■ East River/LIS	Class SB (coastal waters)	✓	✓	✓	✓
	Class I	✓			✓
■ New York Bay	Class SB (coastal waters)	✓	✓	✗	✓
■ Kill van Kull	Class SD	✗ ⁽³⁾			✓
■ Arthur Kill/	Class SD	✗ ⁽³⁾			✓
	Class I	✗ ⁽³⁾			✗ ⁽³⁾

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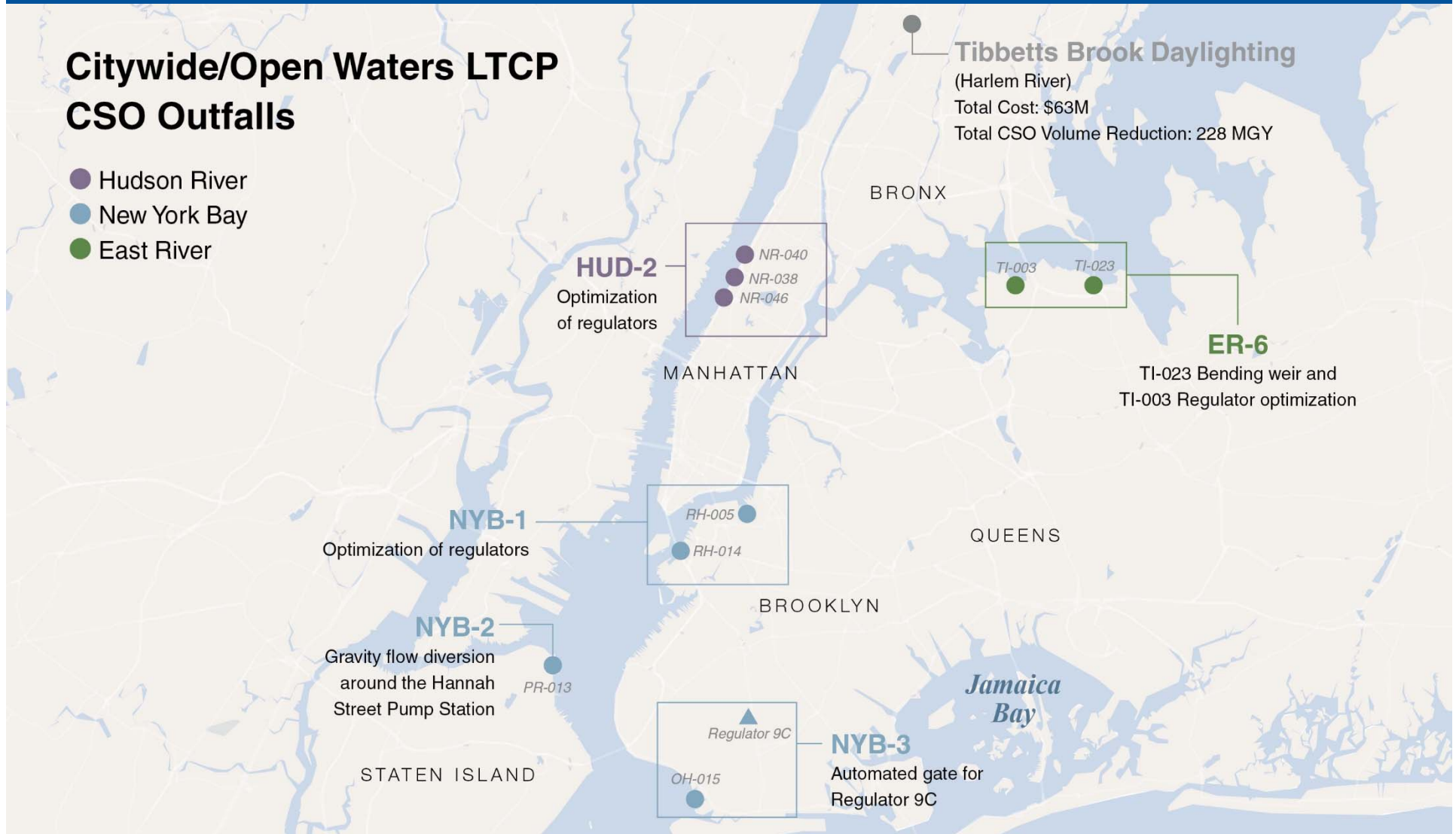
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(3) There are additional loadings other than NYC CSO discharges that prevent full attainment with WQS.

Overview of the Recommended Plan

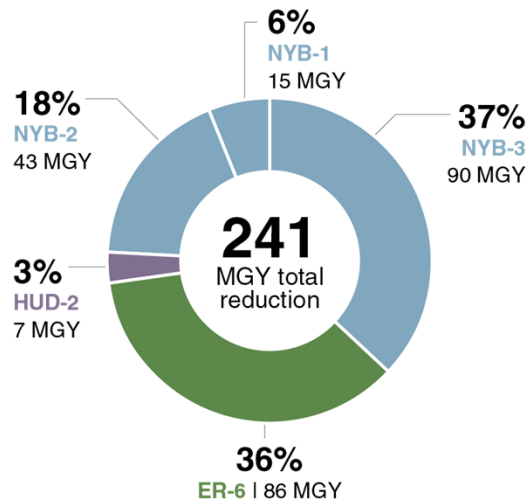
Citywide/Open Waters LTCP CSO Outfalls

- Hudson River
- New York Bay
- East River

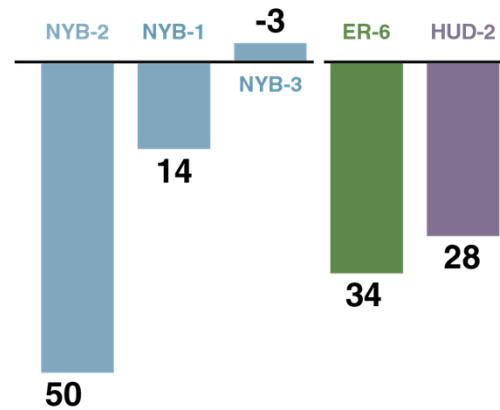


Overview of the Recommended Plan

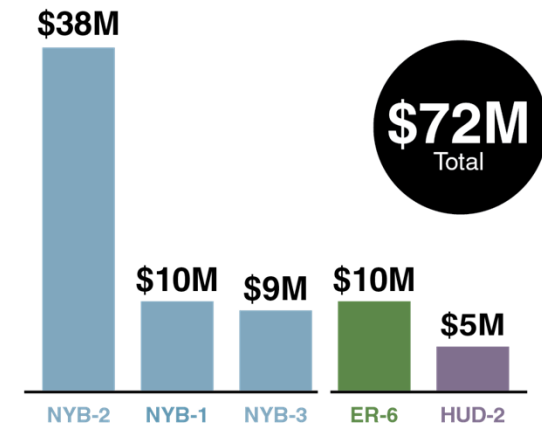
Net Reduction in CSO Volume¹



CSO Activation Reduction¹



Projected Escalated Cost²



(1) Based on 2008 JFK Typical Year Rainfall

(2) Projected CSO LTCP escalated costs includes design/DSDC escalated to mid-point of design and construction/CM escalated to mid-point of construction



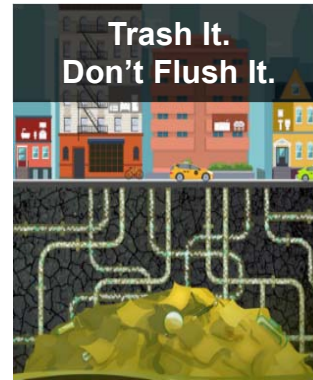
Questions

City-wide Integrated Floatables Program

Pinar Balci, PhD
DEP

Public Education and Outreach

Awareness Campaigns and Stewardships



Public Education and Outreach



Education Programs and Trash Free Waters Challenge



School Sustainability Coordinator Trainings



Catch Basin Marking



SAFE Disposal Events

NYC TRASH FREE WATERS CHALLENGE

When you litter... Trash in our harbor begins as litter on our streets. Rain carries litter that storm drains where it enters our sewer system and ends up in New York Harbor.

It collects in our sewers... ~165 MILLION plastic particles are floating in the harbor at any given time, roughly 18% are the same type of plastic as single-use plastic bags.

Drains into our harbor... Do your part! Use LESS single-use bags. Use MORE reusable bags.

Impairs water quality...
Impacts human health...
Harms wildlife...

NYC Environmental Protection
For more information: NYC.gov/trashfreewaters @nyowater

© 2018 NYC Environmental Protection. Based on: NYC Harbor Estuary Plastic Collection Report, WNYC Region, February 2018



Special Waste Drop Off Sites



BetterBin Competition



Environmental Education

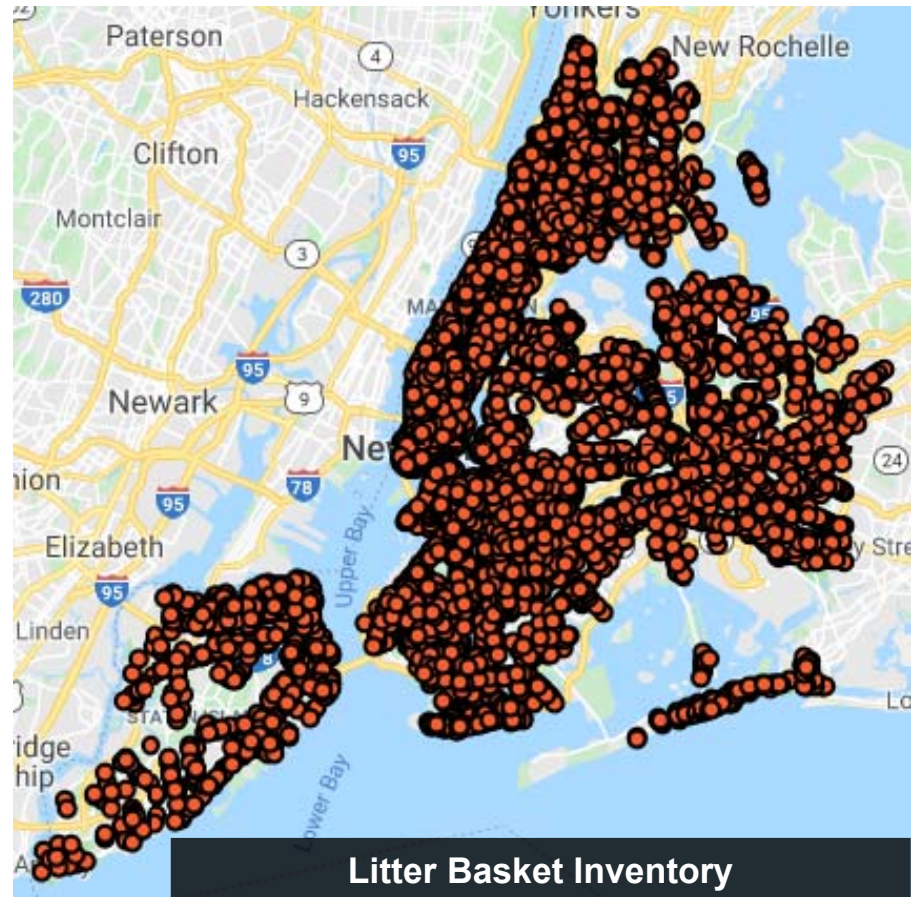
Regulatory Measures

- Prohibitions and fines for littering and illegal dumping
- Requirements to for property owners to keep sidewalks, gutters, backyard areaways and alleys clean
- Styrofoam Ban- in effect on January 1, 2019
- Single-use plastic bags ban (NYS) with five cent fee for paper bag (NYC)- in effect on March 1, 2020
- Executive Order banning City Agencies from purchasing single-use plastic foodware

Street Sweeping and Public Litter Baskets



A Department of Sanitation (DSNY) mechanical broom



Litter Basket Inventory

Includes DSNY, BID, and DSNY approved but privately owned baskets

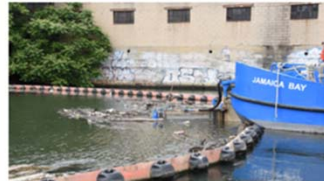
Citywide Integrated Floatables Program



■ Street Sweeping



■ Catch Basin Hooding



■ Netting/Booms

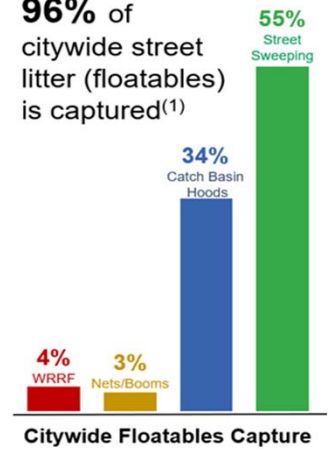


■ Wastewater Resource Recovery Facility (WRRF)



Skimmer Boats

96% of citywide street litter (floatables) is captured⁽¹⁾



(1) Source: NYC Stormwater Management Program, NYCDEP, August 2018

Public Engagement on Floatables

- Signature Campaign
Clean Streets = Clean Beaches
was launched in the 1990s
- DEP is seeking to refresh messaging
- Conducted an online survey with over 200 New Yorkers
- Focus-group tested multiple campaigns





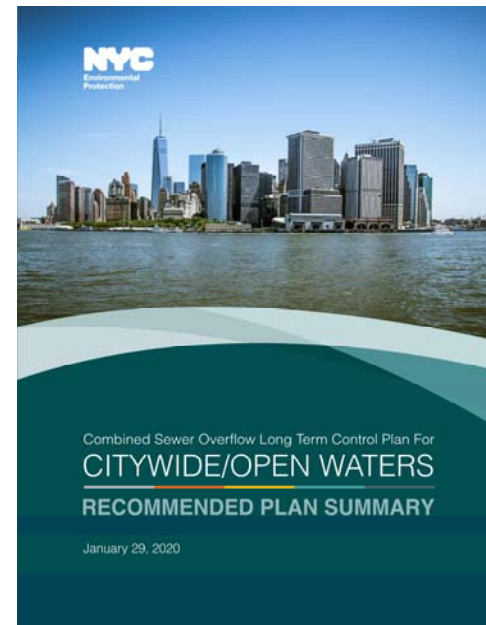
Questions

Next Steps

Mikelle Adgate
DEP

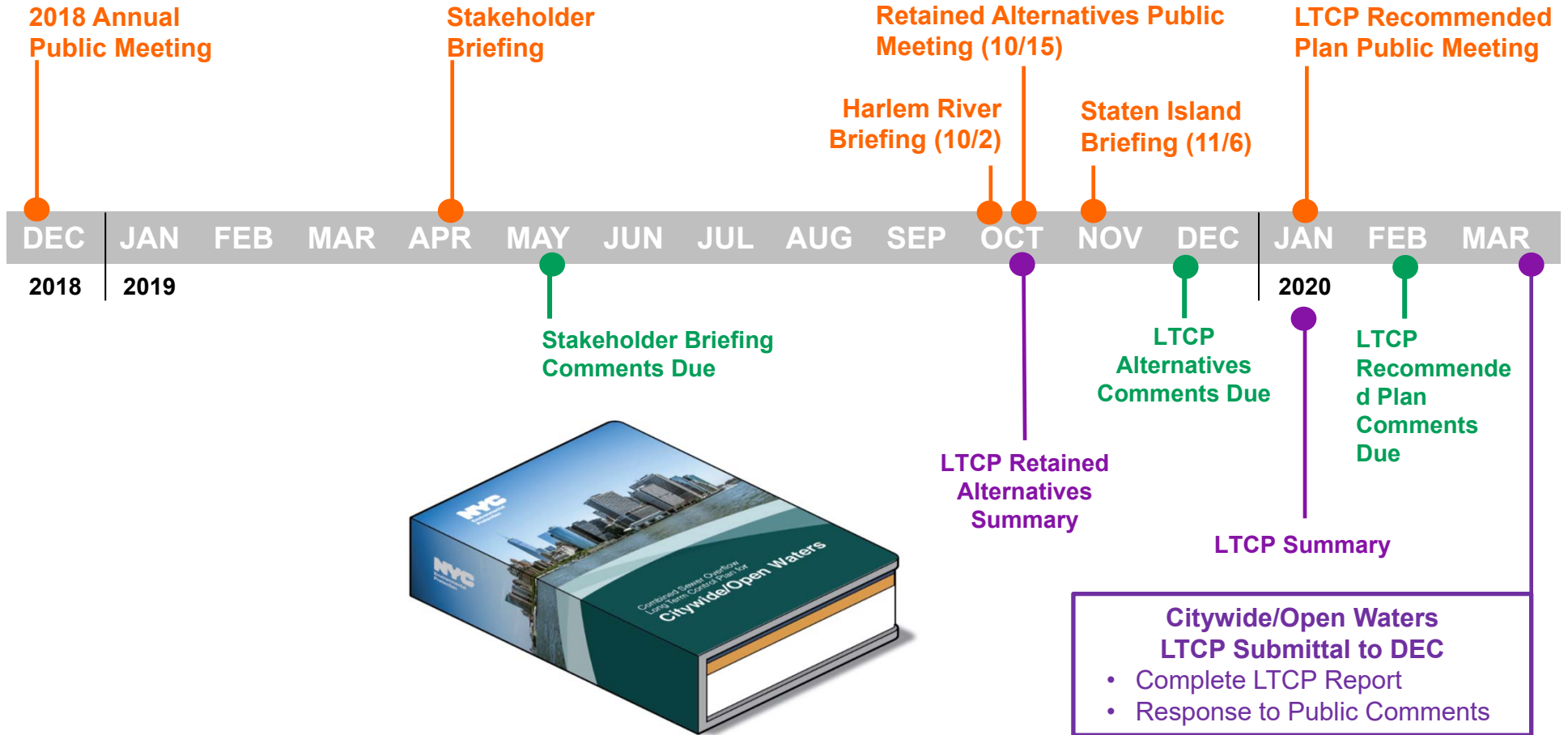
LTCP Summary

- LTCP Retained Alternatives Summary was released in October 2019
- LTCP Recommended Plan Summary is now available online at nyc.gov/dep/ltcp
- Table of Contents
 1. Introduction
 2. CSO Best Management Practices
 3. Grey Infrastructure Strategies
 4. Green Infrastructure Strategies
 5. Summary of Submitted Tributary LTCPs
 6. Baseline Conditions for LTCP Models
 7. WQS Attainment and Alternatives Screening
 8. Waterbody Snapshots and Retained Alternatives
 - 9. The Recommended Plan**
 10. Public Outreach
 11. Affordability and Financial Capability



**Public Comments on the Recommended Plan are due to
ltcp@dep.nyc.gov by March 2nd, 2020**

Citywide/Open Waters LTCP Public Outreach



Additional Information & Resources



Visit the DEP Website for more information: www.nyc.gov/dep/ltcp

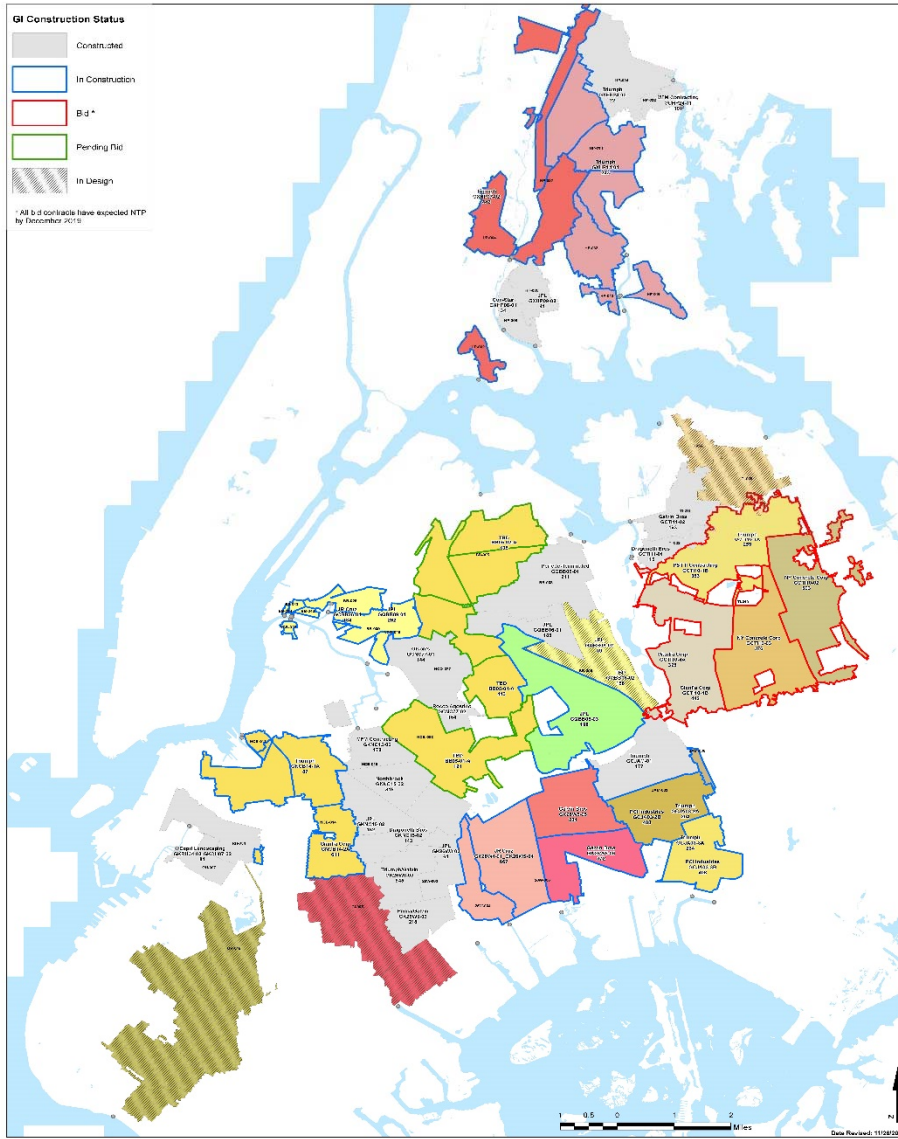
- Monthly Updates on the Citywide LTCP
- Citywide LTCP Content: sampling information, baseline information etc.
- CSO Order including LTCP Goal Statement
- Links to Waterbody/Watershed Facility Plans
- Presentations, Meeting Materials and Meeting Summaries
- LTCP Brochure and Waterbody Fact Sheets
- All Submitted LTCP Reports and Other LTCP Updates
- NYC's Green Infrastructure Reports and Grant Program
- Green Infrastructure Interactive Map of Projects
- NYC Waterbody Advisory Program
- Upcoming Meeting Announcements

Thank You!



www.nyc.gov/dep/ltcp
ltcp@dep.nyc.gov

Green Infrastructure Program Area-wide Construction





Selection of 2008 Rainfall as Typical Year

