NYC Environmental Protection

Combined Sewer Overflow Long Term Control Plans

Citywide Public Meeting

La Guardia Community College

January 12, 2016

Agenda

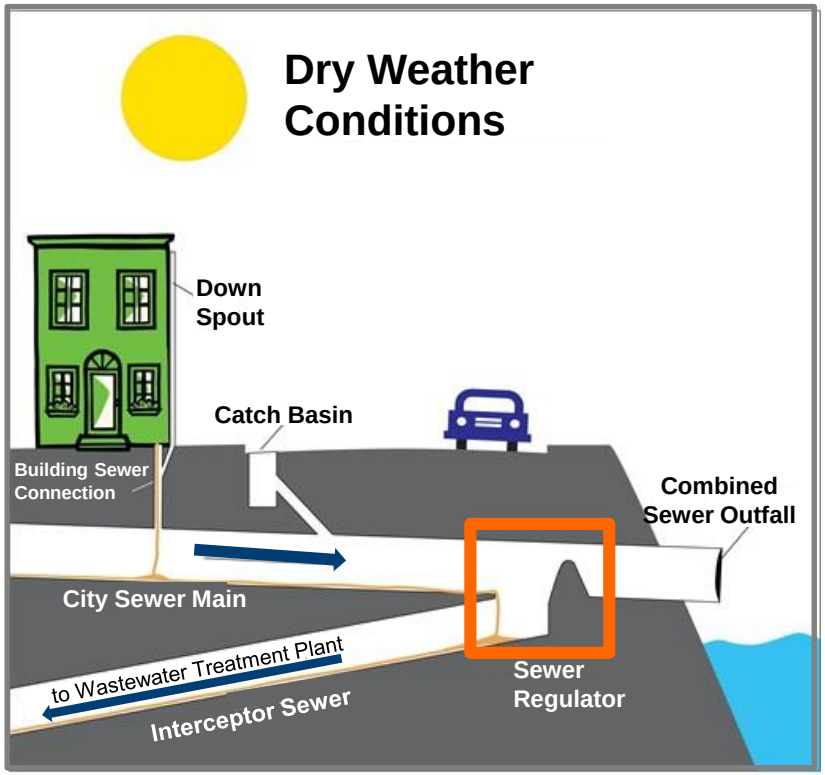
	Topic	Speaker
1	**New York City Wastewater Infrastructure**	Emily Lloyd
2	**Long Term Control Plan (LTCP)**	Jim Mueller
3	**LTCP Submittal Status**	Jim Mueller
4	**Green Infrastructure Status Update**	Angela Licata
5	**Breakout Sessions & Summary** • Affordability • Water Quality, Uses, Classification • CSO Control • Green Infrastructure	All
6	**Ongoing LTCP Public Participation Program**	All
7	**Next Steps**	All

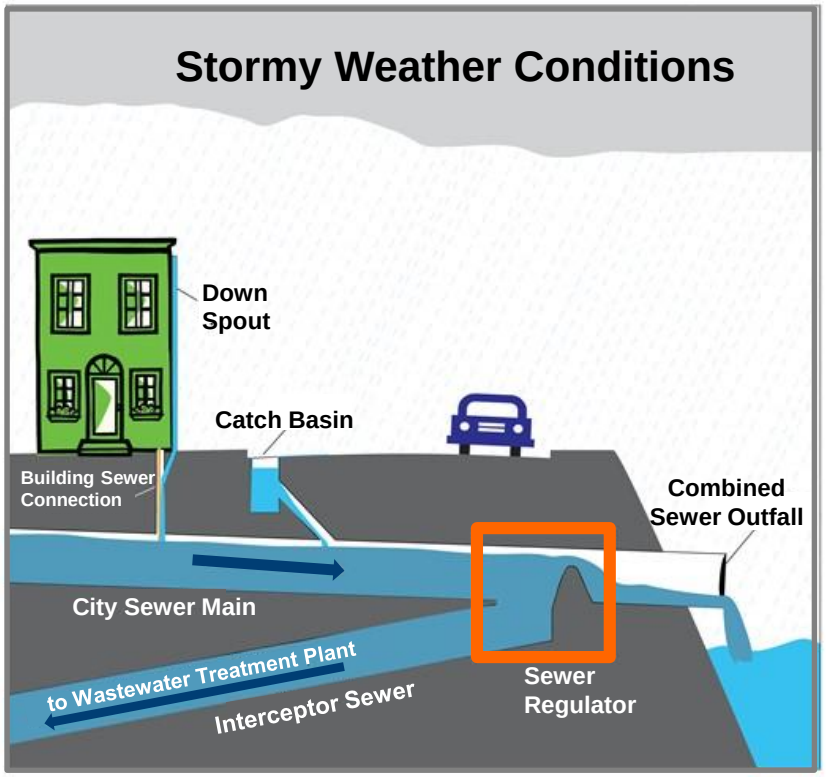
New York City Wastewater Infrastructure

Emily Lloyd
Commissioner
DEP

What is a Combined Sewer Overflow (CSO)?

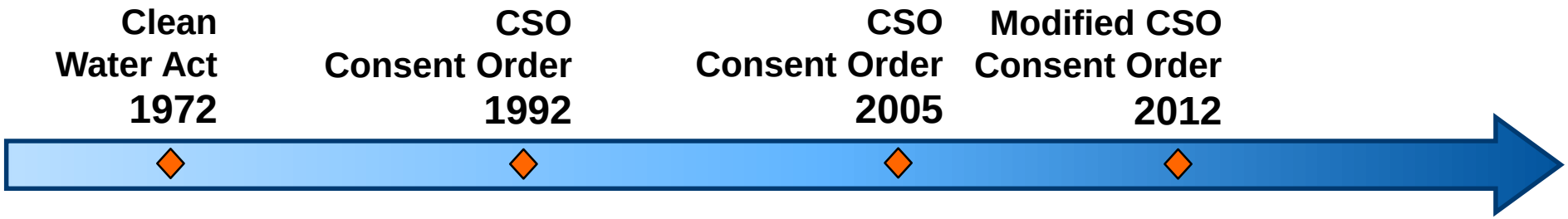
- NYC's sewer system is approximately 60% combined, which means it is used to **convey both sanitary and storm flows**.





- 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.

Major Historical Timeline for Wastewater Infrastructure



- **1967**: Newtown Creek WWTP Commissioned
- **1972**: Spring Creek CSO Facility Commissioned

$40 Billion
OMB Records & 10-yr Capital Plan

1973 – 2011: Upgraded 12 WWTPs to Secondary Treatment and built 2 new Wastewater Treatment Plants

$1.1 Billion
OMB Records & 10-yr Capital Plan

1999 – 2020
Upgrade Biological Nitrogen Removal at 70% of WWTPs

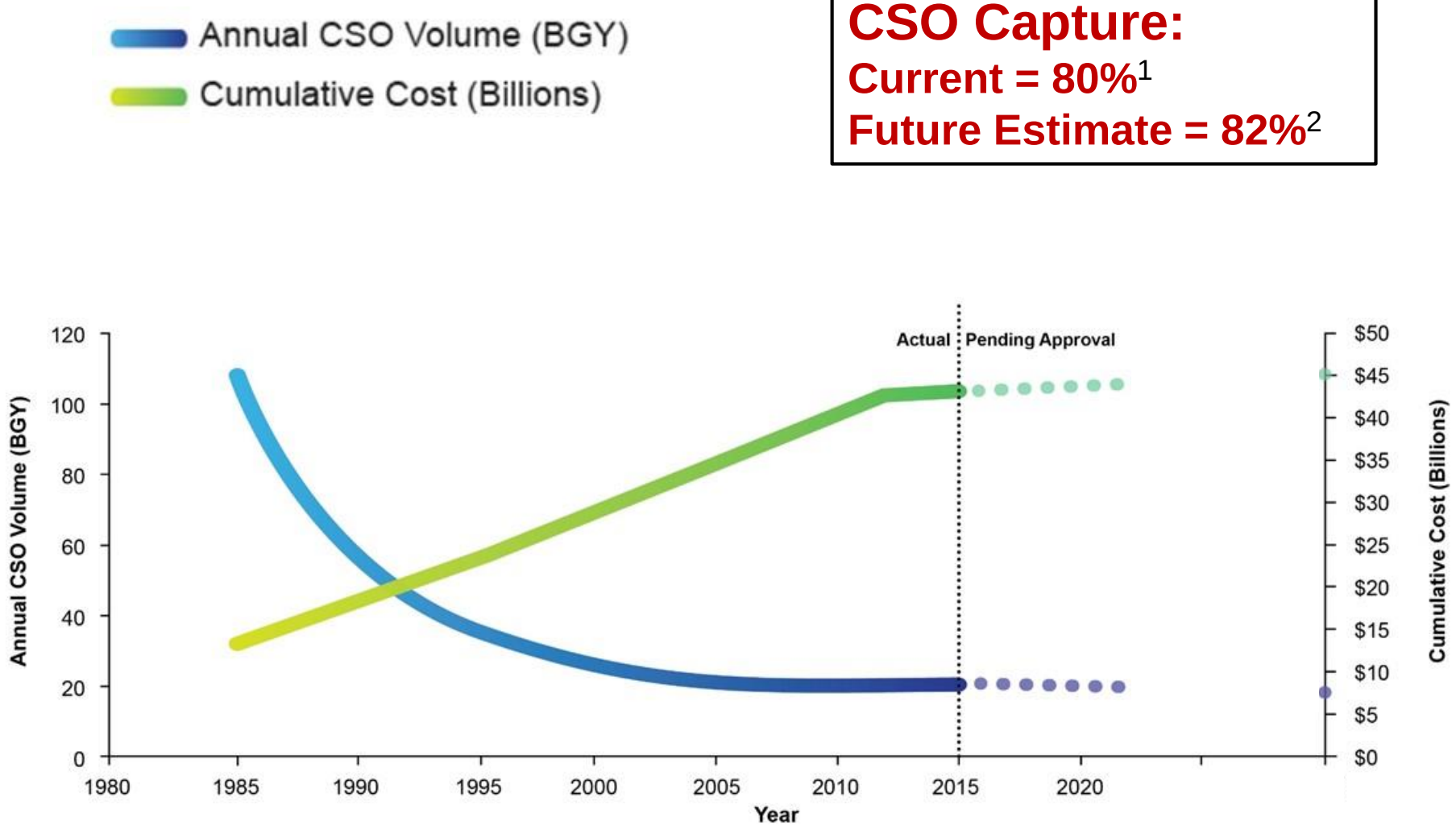
$4.2 Billion
OMB Records & 10-yr Capital Plan
Grey (1995 – 2022, $2.7 B)
Green (2012 – 2030, $1.5 B)

1995 – 2030
Construct Grey / Green Infrastructure to Mitigate CSOs

OMB = Office of Management and Budget

Historical Investment and CSO Reduction Over Time

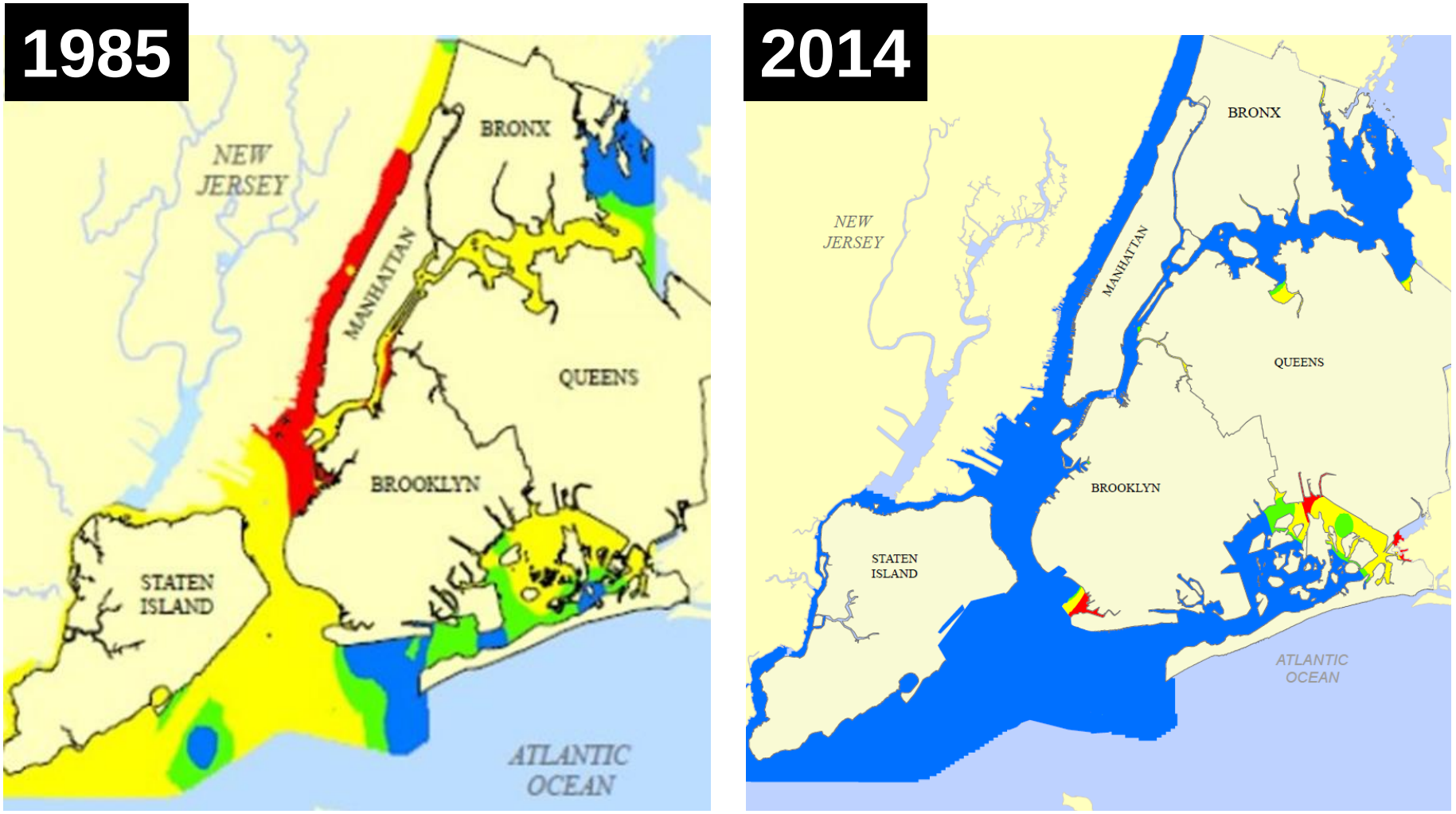
CSO Capture:
Current = 80%[1]
Future Estimate = 82%[2]



Note: Dashed lines reflect estimated future cost and CSO volume reduction associated with implementation of the Long Term Control Plans, which are currently under development. Future CSO control will be a combination of storage and disinfection projects, with the exact volume to be developed during the LTCP process.

1) April 2015 CSO Annual Best Management Practices (BMP) Report
2) 2030 LTCP Baseline Scenario for Grey & Green Infrastructure Estimate

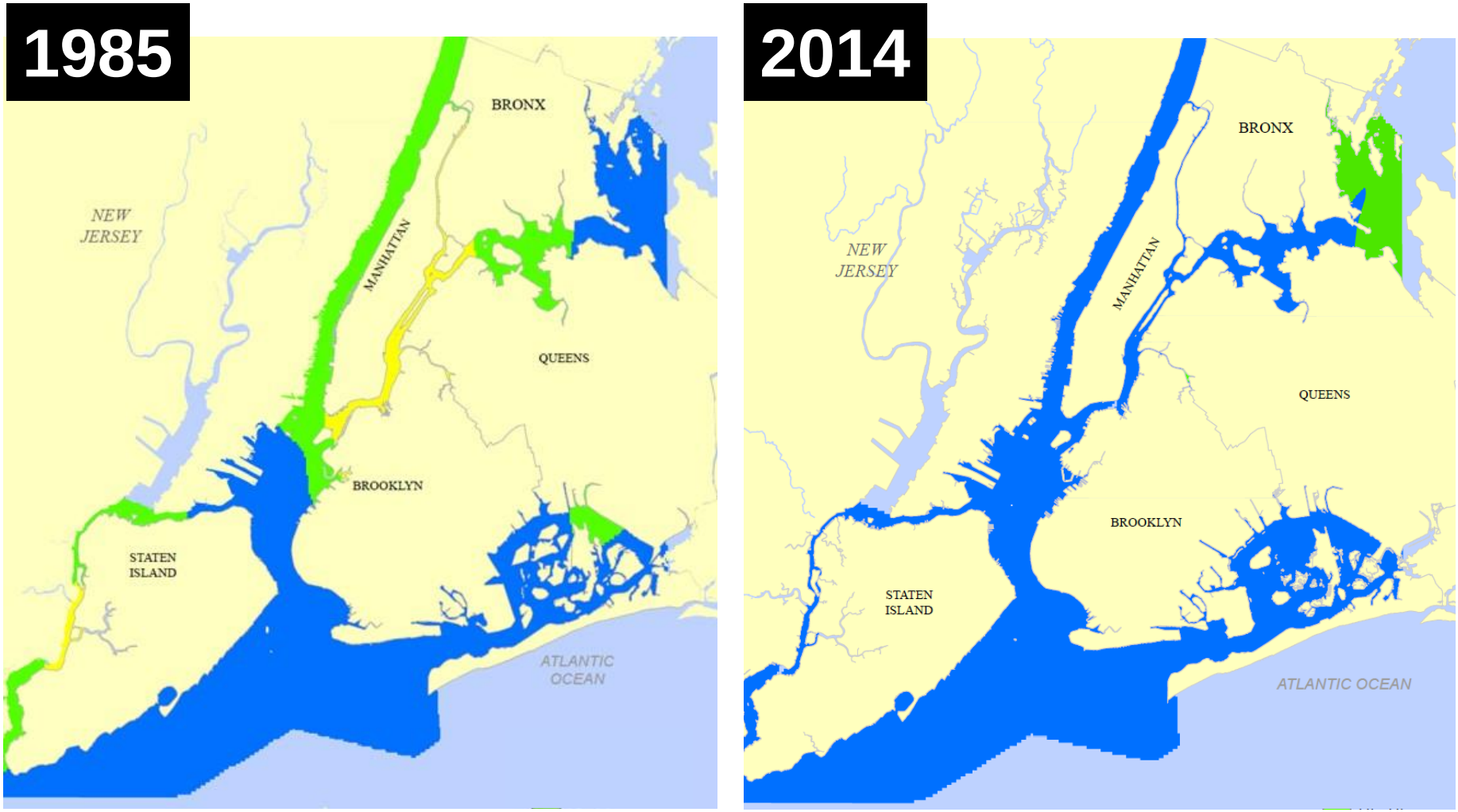
Fecal Bacteria (Summer Geometric Means)



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

Data from Harbor Survey Program.

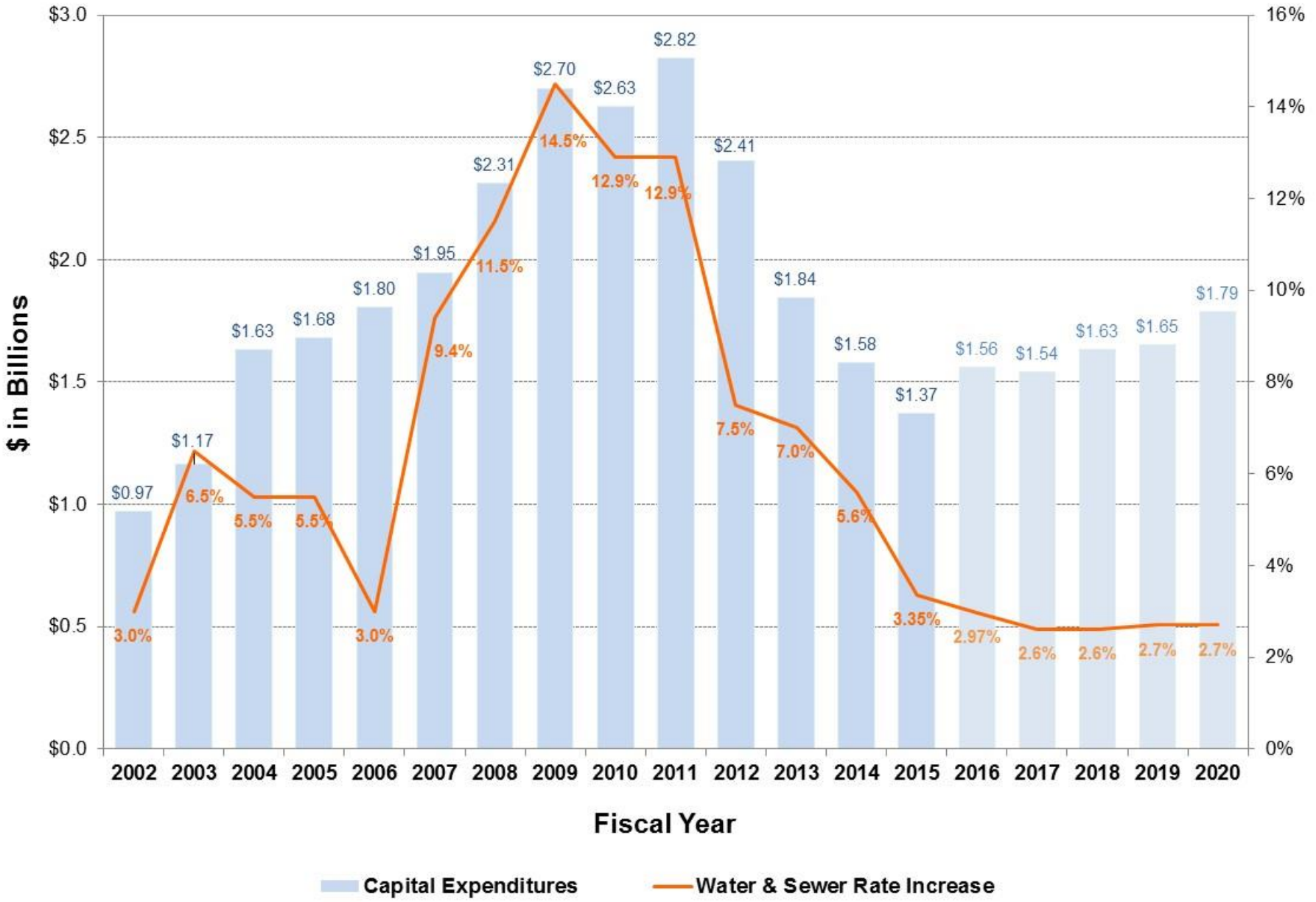
Dissolved Oxygen (Summer Average for Bottom Waters)



Dissolved Oxygen: ≥ 5 mg/L | 4.0 – 4.9 | 3.0 – 3.9 | < 3.0

Data from Harbor Survey Program

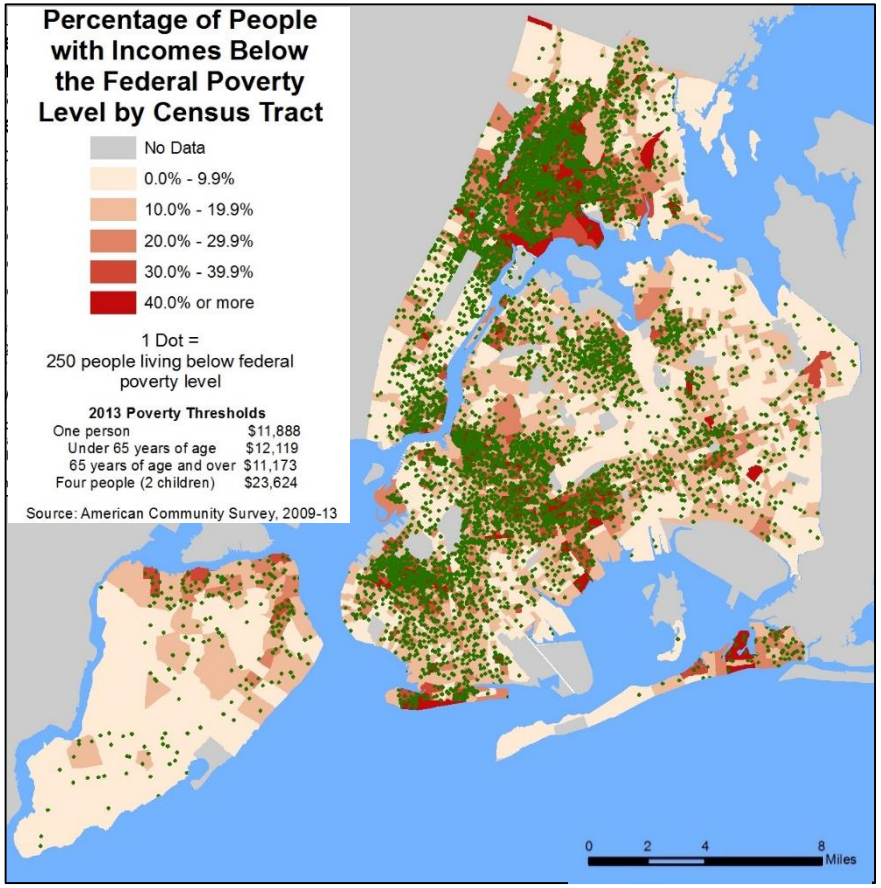
Capital Expenditures



NYC Income Levels and Poverty Rates

	Median Household Income (MHI)	% of Residents Living Below Federal Poverty Level
United States	**$53,675**	**15.5%**
NYC	**$52,996**	**20.9%**
Bronx	$33,712	31.6%
Brooklyn	$47,966	23.4%
Manhattan	$76,089	17.6%
Queens	$57,241	15.2%
Staten Island	$71,121	14.5%

Source: U.S. Census Bureau 2014 ACS 1-Year Estimates.

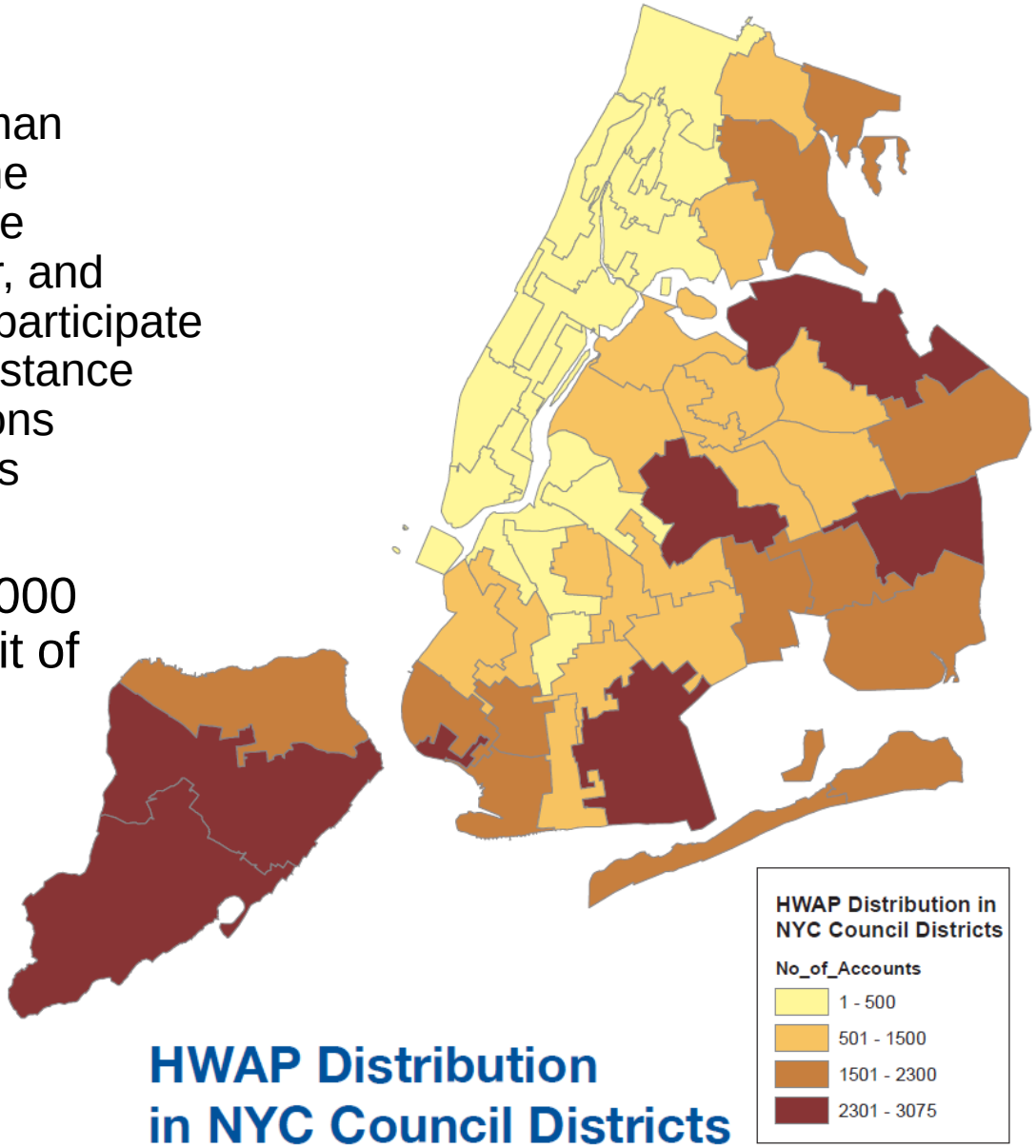


- While NYC MHI is comparable to national average, cost of living and housing burden for NYC residents is generally much higher.
- ~21% of NYC population (>1.7 million people) lives below the federal poverty level
- ~19% of elderly population lives in poverty

Home Water Assistance Program

- DEP has partnered with the Human Resources Administration and the Department of Finance to provide assistance to low income, senior, and disabled households that either participate in the federal Home Energy Assistance Program or receive tax exemptions because of their income or status

- In January 2016, approx. 52,000 homeowners received a credit of $115.89



HWAP Distribution in NYC Council Districts

Avg. Wastewater Bill Compared to HH Income

	Average Wastewater Bill/MHI	% of Household (HH) estimated to be paying more than 2% of HH income on Wastewater Services*
2016	1%	27%
2025	1.5%	40%

*Source: USEPA "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development" (1997)

Questions?

Long Term Control Plan

Jim Mueller, P.E.
Assistant Commissioner
DEP

What is a LTCP and CSO Consent Order?

Long Term Control Plan (LTCP)

identifies and selects appropriate CSO controls to achieve applicable DEC water quality standards

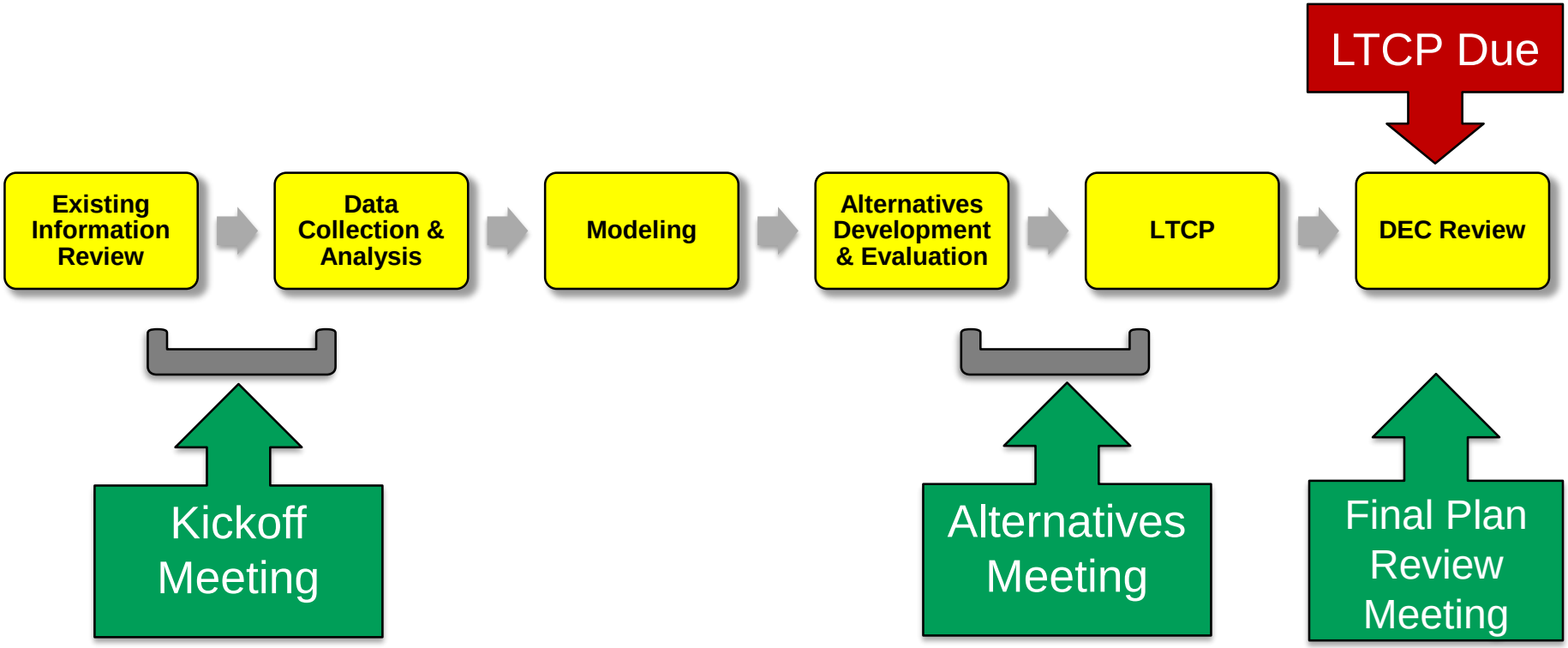
consistent with the Federal CSO Policy and Clean Water Act

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 Process and Public Involvement



ONGOING PUBLIC / STAKEHOLDER INPUT

Typical timeline for this process ranges from 12 to 24 months, depending on the water quality and complexity of the waterbody/watershed.

How does rainfall affect CSOs?

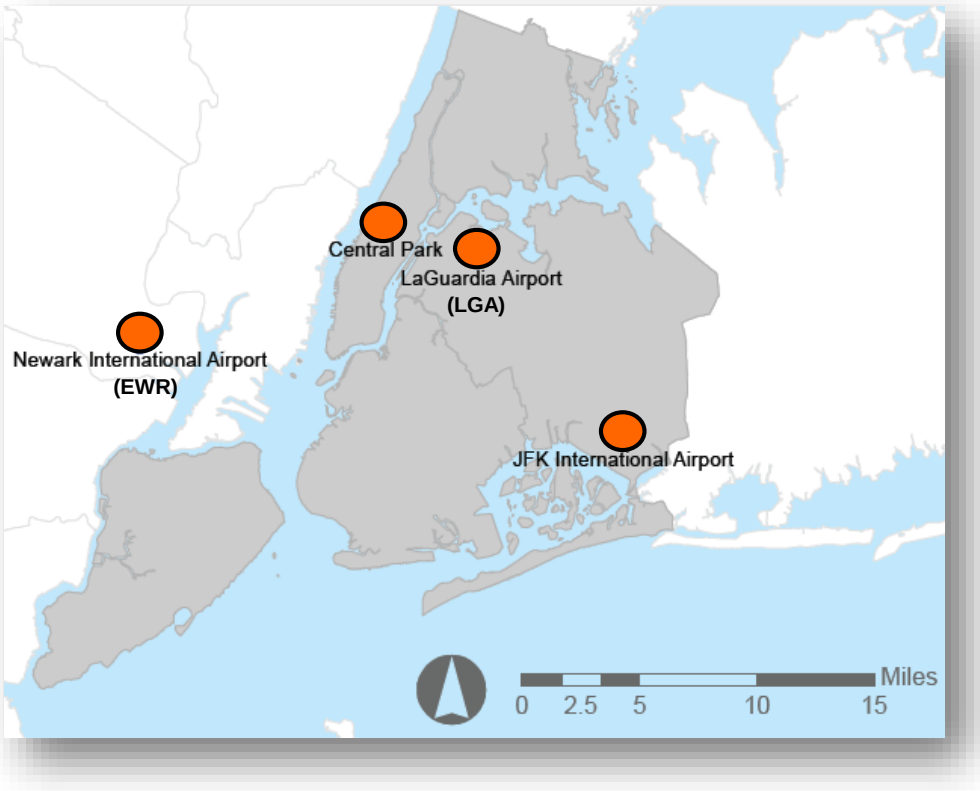
- Throughout the City, rainfall characteristics that may trigger a CSO event vary by drainage area due to different physical characteristics such as:
  - Acreage
  - Impervious Areas
  - Dry Weather Flow
  - Design Capacity of Regulators and Interceptors
  - Treatment Plant Capacity
  - Tides

Photo Credit: Baptisete Pons
https://www.flickr.com/photos/bpt/2882285636/

Rainfall Selection for Model Updates

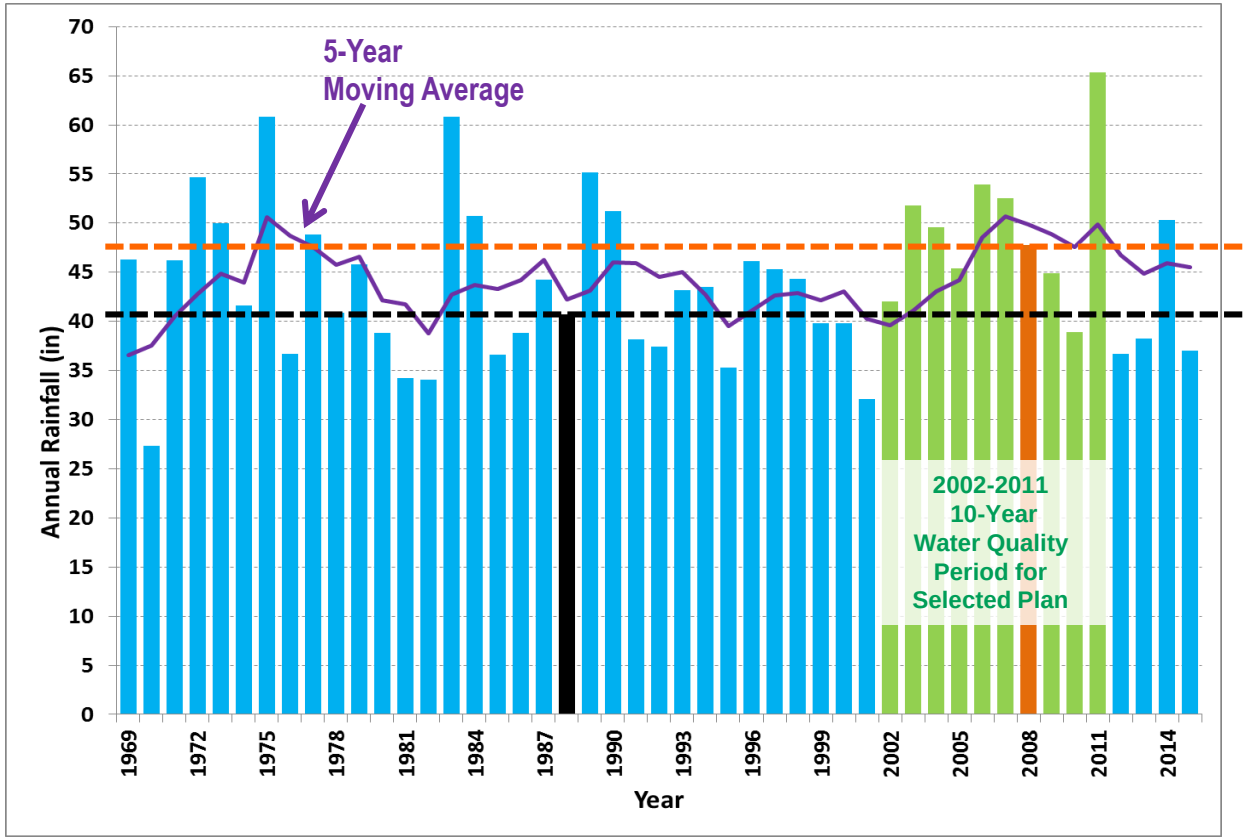
Evaluated a comprehensive range of rainfall data:

- Historical data range:
  42 years from 1969 to 2010
- Only four representative rainfall gauges with *continuous data* within this time frame: Central Park, LGA, JFK, and EWR
- Selected **2008 JFK rainfall** as the most representative of average annual rainfall across all four gauges over the *42-year period*



Model Calibration & Updates

- Receiving Water Quality Model calibrated with Harbor Survey and LTCP sampling data
- Landside InfoWorks Model calibrated with LTCP flow and sampling data
- Future wastewater flows based on **2040 population** projections
- Recalibrated 2012 InfoWorks based on **revised impervious areas**
- Screening of alternatives based on 1-yr data (JFK 2008 “Typical Year Rainfall”)
- Selected Plan Model runs based on 10-yr data (2001 to 2011) to address elevated rainfall amount due to **climate change**



CSO Control Evaluation Process

1. Bacteria Source Component Analysis
   - CSO, stormwater and direct drainage
2. Gap Analysis for Water Quality Standard Attainment
   - Calculate bacteria and dissolved oxygen for:
     - Baseline Conditions
     - 100% CSO Control Conditions
3. Matching CSO Scenarios to CSO Engineering Control Alternatives

100% **Storage**

75% **Treatment**

50% **System Optimization**

25% **Source Control**

CSO Mitigation Toolbox

INCREASING COMPLEXITY

INCREASING COST

Source Control	Additional Green Infrastructure		High Level Sewer Separation (HLSS)	
System Optimization	Fixed Weir	Parallel Interceptor / Sewer	Bending Weirs Control Gates	Pump Station Expansion
CSO Relocation	Gravity Flow Tipping to Other Watersheds	Pumping Station Modification	Flow Tipping with Conduit / Tunnel and Pumping	
Water Quality / Ecological Enhancement	Floatables Control	Dredging	Dissolved Oxygen Improvement	Flushing Tunnel
Treatment ***Satellite:***	Outfall Disinfection	Retention Treatment Basin (RTB)		High Rate Clarification (HRC)
Centralized:	WWTP Expansion			
Storage	In-System	Shaft	Tank	Tunnel

Questions?

LTCP Submittal Status

Jim Mueller, P.E.
Assistant Commissioner
DEP

Alley Creek LTCP

➢ **Submitted to DEC June 2014**

Recommended Plan: Disinfect at the Existing 5 MG CSO Retention Facility during Recreational Season (May 1st – Oct 31st) and Initiate a post-construction compliance monitoring program

➢ **Primary Contact Compliance**
- Annual = 90%
- Seasonal = 98%

(Fecal Monthly GM ≤ 200 #/100 mL)

➢ **Benefits:**
- Reduce bacteria load to creek
- Avoid structural modifications to existing tank

➢ **Challenges:**
- Control of residual chlorine

➢ **Total Capital Cost / Annual O&M:**

$7.6 Million / $250,000

Hutchinson River LTCP

➢ Submitted to DEC September 2014

Recommended Plan:

- Divert flow to Outfall HP-024 Extension,
- Provide Floatables Control,
- Disinfect 50 MGD in Recreational Season*
- Initiate a post-construction compliance monitoring program

➢ Primary Contact Compliance

- Annual = 84%
- Seasonal = 95%

(Fecal Monthly GM ≤ 200 #/100 mL)

➢ Benefits:

- Reduces bacteria load to river from seasonal disinfection
- Provides floatables control
- Avoid construction of costly retention tank

➢ Challenges:

- Solids deposition in outfall
- Permitting of new outfall

➢ Est. Construction Cost / Annual O&M:

$90 Million / $1.25 Million

*Recreational Season is from May 1st through October 31st

Flushing Creek LTCP

➢ Submitted to DEC December 2014

Recommended Plan:

Recreational Season Disinfection (May 1st – Oct. 31st)

- Outfall TI-010 – Disinfect at Influent Screens and DC5*
- Outfall TI-011 – Disinfect at Regulator 9*

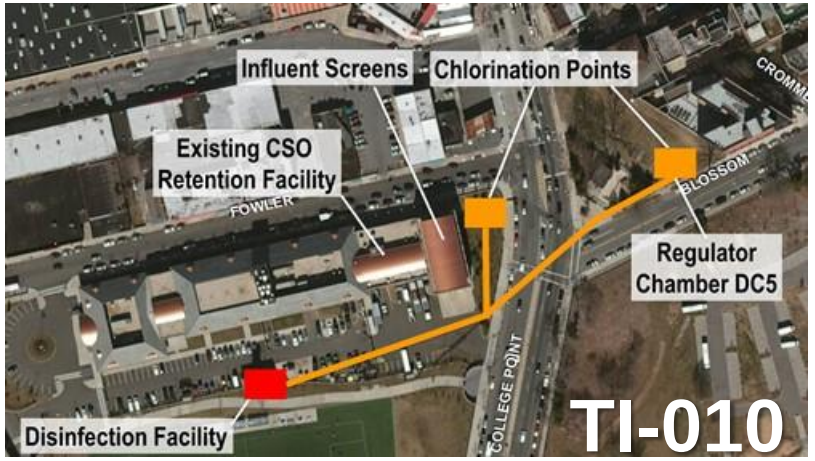
Initiate post-construction compliance monitoring

	Outfall TI-010	Outfall TI-011
Benefits	• Provides disinfection of tank bypass flows • Disinfection equipment can be installed at existing site	• Provides disinfection of CSO discharge • Maximizes use of existing infrastructure
Challenges	• Potential residual chlorine issues	• Potential residual chlorine issues
Construction	$2 Million	$5 Million
O&M Cost	$350,000 per Year	$300,000 per Year

➢ Primary Contact Compliance

- Annual = 67%
- Seasonal = 78%

(Fecal Monthly GM ≤ 200 #/100 mL)



***Note:** Provisions for floatables control to be evaluated and included in the design for both TI-010 and TI-011.

Westchester Creek LTCP

➢ **Submitted to DEC June 2014**

Recommended Plan:
Continue to Implement the WWFP Recommendations

➢ **Primary Contact Compliance**
- Annual = 93%
- Seasonal = 95%

(Fecal Monthly GM ≤ 200 #/100 mL)

➢ Initiate a post-construction compliance monitoring program

Weir Modifications to Regulators CSO-29A and CSO-29

(Directs more flow to WWTP)

Cost = $15 Million

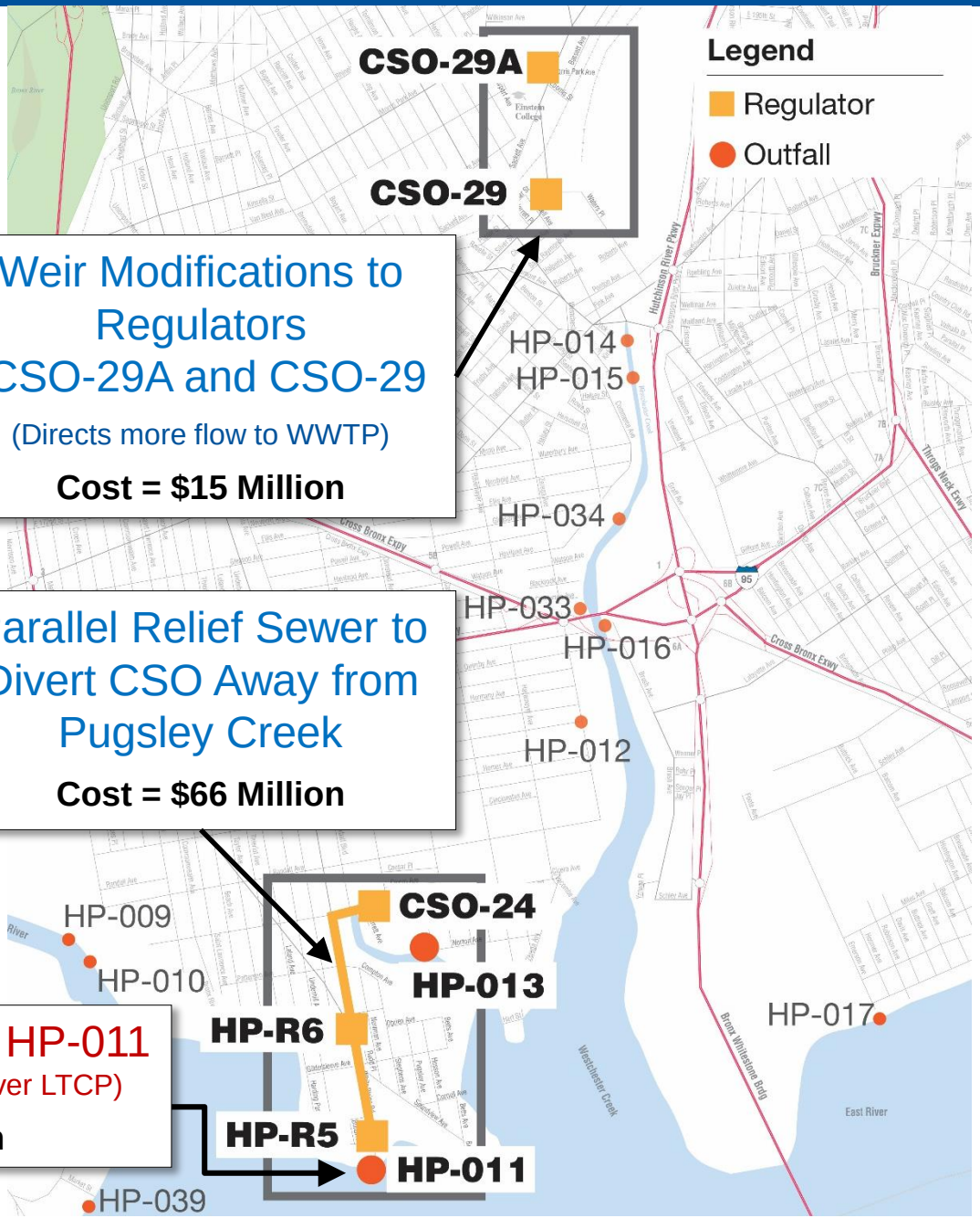
Parallel Relief Sewer to Divert CSO Away from Pugsley Creek

Cost = $66 Million

Floatables Control at HP-011

(Incorporated under Bronx River LTCP)

Cost = $9 Million



Bronx River LTCP

➢ Submitted to DEC June 2015

Recommended Plan

Hydraulic Relief (HP-007 & HP-009)
Floatables Control (HP-011) and
Initiate post-construction compliance monitoring

➢ Primary Contact Compliance

- Annual = 83%
- Seasonal = 87%

(Fecal Monthly GM ≤ 200 #/100 mL)

	Outfall HP-007	Outfall HP-009	Outfall HP-011
Benefits	• CSO volume reduction	• CSO volume reduction	• CSO volume reduction • Provides floatables control
Challenges	• Need to maintain hydraulic neutrality	• Proximity to parkland/shoreline	• Need to maintain hydraulic neutrality
Construction	$111 Million		
O&M Cost	$53,000 per Year		

Gowanus Canal LTCP

➢ Submitted to DEC June 2015

➢ Primary Contact Compliance

- Annual = 98%
- Seasonal = 100%

(Fecal Monthly GM ≤ 200 #/100 mL)

Current Status:

➢ Flushing Tunnel Activation and Gowanus Pump Station Upgrade with floatables control enables Gowanus to meet current & future dissolved oxygen and recreational season fecal water quality standards

➢ Superfund Mandate requires an estimated reduction of 58% to 74% of CSO solids at:

- Owl's Head Outfall OH-007
  - 4 MG Storage Tank
- Red Hook Outfall RH-034
  - 8MG Storage Tank

➢ Initiate a post-construction compliance monitoring program

Current Gowanus Canal Improvements:

Flushing Tunnel Upgrades

- Operational since May 2014
- New automated screens
- Increased capacity to 250 MGD (3 new pumps)

Gowanus Pump Station Upgrades

- Operational since June 2014
- Increased capacity from 20 to 30 MGD
- Added screening facility and floatables control

Total Capital Cost for Flushing Tunnel and Pump Station Upgrades
= $190 Million

Upcoming LTCP Submittals

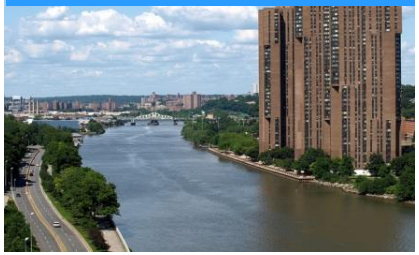
Flushing Bay
June 2016

Coney Island Creek
June 2016

Jamaica Tribs & Bay
June 2017

Newtown Creek
June 2017

Harlem River
Date Pending



Citywide
Date Pending

Questions?

Green Infrastructure Status Update

Angela Licata
Deputy Commissioner
DEP

Green Infrastructure Status Update

Submitted LTCP	Green Infrastructure (GI) Status Update
Alley Creek	• No public GI proposed as part of the LTCP
Hutchinson River	• Construction of ROW GI complete in 2016, Edenwald Houses in construction, and porous pavement pilot (LL80) in design. Estimated construction value = $14 million
Flushing Creek	• TI-11/22 start ROW GI construction spring 2016, TI-10 design start spring 2016.
Westchester Creek	• ROW GI construction start fall 2016, porous pavement pilot currently in design. Public retrofits under investigation.
Bronx River	• Design start January 2016, construction start fall 2016.
Gowanus Canal	• ROW GI construction complete spring 2016. Estimated ROW construction value for ROW = $2.1 million. Public retrofits in design, construction start in 2016 and 2017.

Questions?

45 Minute Breakout Sessions

	Topic	Speaker
1	Affordability	Angela Licata
2	Water Quality, Classification, Uses	Vinny Sapienza
3	CSO Control	Jim Mueller
4	Green Infrastructure	Margot Walker and Mikelle Adgate

30 Minute Breakout Session Summary

	Topic	Speaker
1	Affordability	Angela Licata
2	Water Quality, Classification, Uses	Vinny Sapienza
3	CSO Control	Jim Mueller
4	Green Infrastructure	Margot Walker and Mikelle Adgate

Ongoing LTCP Public Participation Program

GOAL

Raise awareness, foster understanding,
and encourage input on LTCP development

➢ Activities:

- **Annual citywide public meetings rotating across boroughs**
- Local public meetings in each watershed and existing forums
- Meeting with key stakeholders and organizations
- Briefings with elected officials and their staff

➢ Communication Tools:

- Program Website
- Social Media 
- Advisories & Notifications

Next Steps

- Please visit www.nyc.gov/dep to access:
  - LTCP Public Participation Plan
  - Presentation, handouts and poster boards from kick-off meeting
  - Links to Waterbody/Watershed Facility Plans
  - CSO Order including LTCP Goal Statement
  - NYC's Green Infrastructure Plan
  - Green Infrastructure Pilots 2011 Monitoring Results
  - Real-time waterbody advisories
  - Upcoming meeting announcements
  - CSO Quarterly Reports
  - Other LTCP updates
- Comments can be submitted at any information station or sent to:
  - New York City DEP at: ltcp@dep.nyc.gov