Citywide/Open Waters

CSO Long Term Control Plan

Stakeholder Meeting

The CUNY School of Law Auditorium

April 16, 2019
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<td>1 Welcome &amp; Introduction</td>
<td>Mikelle Adgate</td>
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<td>2 Overview of Progress</td>
<td>Keith Mahoney, PE Pinar Balci, PhD</td>
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<td>3 Next Steps</td>
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Welcome & Introduction

Mikelle Adgate
Senior Advisor, BPAC
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 & storm flow is captured at treatment plants.

- 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).
### 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.

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**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.
<table>
<thead>
<tr>
<th>ID</th>
<th>LTCP</th>
<th>Approved?</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Alley Creek</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>Westchester Creek</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>Hutchinson River</td>
<td>✓</td>
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<tr>
<td>4</td>
<td>Flushing Creek</td>
<td>✓</td>
</tr>
<tr>
<td>5</td>
<td>Bronx River</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>Gowanus Canal</td>
<td>✓</td>
</tr>
<tr>
<td>7</td>
<td>Coney Island Creek</td>
<td>✓</td>
</tr>
<tr>
<td>8</td>
<td>Flushing Bay</td>
<td>✓</td>
</tr>
<tr>
<td>9</td>
<td>Newtown Creek</td>
<td>✓</td>
</tr>
<tr>
<td>10</td>
<td>Jamaica Bay and Tributaries&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Under DEC review</td>
</tr>
<tr>
<td>11</td>
<td>Citywide/Open Waters&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>LTCP in development Due to DEC March 2020</td>
</tr>
</tbody>
</table>

(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
• Waterbody-specific CSO evaluation of Open Waters:
  - Harlem River
  - Upper and Lower New York Bay
  - East River/Long Island Sound
  - Hudson River
  - Arthur Kill and Kill Van Kull

• Citywide/Open Waters LTCP will be submitted to DEC in March 2020
Public Outreach Update

• Held three kick-off meetings

• Presentations are available at: nyc.gov/dep/ltcp

• Presentations covered:
  - Waterbody and watershed characteristics and water quality sampling
  - Existing and planned water quality improvement projects
  - LTCP modeling and alternatives development process

Hudson River and Harlem River
January 31, 2018

East River and Long Island Sound
May 10, 2018

Lower East River, Kill van Kull, Arthur Kill, New York Bay
March 27, 2018
Citywide/Open Waters Schedule

Stakeholder Briefings
- Overview of LTCP Sections 1-7 Content
- Outline of LTCP Summary Document
- Updates on Progress

Retained Alternatives Public Meeting
- Release of Draft LTCP Summary
- Presentation of Retained Alternatives

LTCP Recommended Plan Public Meeting
- Presentation of LTCP Recommended Plan
- Revised LTCP Summary Document

Stakeholder Briefing Comments Due
LTCP Alternatives Comments Due
LTCP Recommended Plan Comments Due

Citywide/Open Waters LTCP Submittal to DEC
- LTCP Summary Document
- Complete LTCP Report
- Response to Public Comments
The Executive Summary will be **distributed in two formats, but content will be identical**:

1. *Incorporated within LTCP Document*

2. *Standalone Document*
The table of contents will be **compliant with DEC’s requirements**, containing all sections in the sequence stipulated by DEC.
However, the Executive Summary will be structured differently. We plan to group sections that apply to all waterbodies first.
Next, we will group sections with information unique to each waterbody into specific waterbody snapshots.

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<td>2.0 WATERSHED/WATERBODY CHARACTERISTICS</td>
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<td>5.0 GREEN INFRASTRUCTURE</td>
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<tr>
<td>APPENDICES</td>
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</table>
Structure of Executive Summary

So the structure of the Executive Summary will look like this:
1. Introduction

Background/Goals

In 2000, New York City (NYC) and the Department of Environmental Conservation (DEC) entered into a Combined Sewer Overflow (CSO) Consent Order (DEC Case No. C00-20000107-A), as modified and collectively referred to as the “CSO Order,” to address CSOs in NYC. Among other requirements, the CSO Order requires DEP to evaluate and implement CSO abatement strategies on an enforceable timetable for long-term CSO control. Pursuant to the CSO Order, DEP is required to submit 10 waterbody-specific Long Term Control Plans (LTCPs) and one citywide LTCP to DEC for review and approval. DEC is the regulatory agency reviewing and approving these LTCPs based on their compliance with the water quality goals of the Federal Clean Water Act, the State Environmental Conservation Law and EPA’s CSO Control Policy.

Long Term Control Plan

The Long Term Control Plan 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.

Combined Sewer Overflow

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 rainwater and sewage may be released into the local waterways. This is called a combined Sewer Overflow (CSO).

Citywide/Open Waters LTCP Areas

- Harlem River
- Upper and Lower New York Bay
- East River/Long Island Sound
- Hudson River
- Arthur Kill and Kill Van Kull

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Causes of Impairment

- Pathogens
- Nitrogen
- DDO and Nitraten
- DDO and Phosphate

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Saline Surface Water Quality Standards

<table>
<thead>
<tr>
<th>Class</th>
<th>Total Coliform</th>
<th>Fecal Coliform</th>
<th>Enterococci</th>
<th>Dissolved Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>5A</td>
<td>≤ 100,000 CFU/100 mL</td>
<td>≤ 1,000 CFU/100 mL</td>
<td>≤ 300 CFU/100 mL</td>
<td>≥ 4.0 mg/L (daily avg) 3.5 mg/L</td>
</tr>
<tr>
<td>5B</td>
<td>Monthly Median ≤ 4,000 CFU/100 mL, 25% ≤ 1,000 CFU/100 mL</td>
<td>Monthly Median ≤ 300 CFU/100 mL</td>
<td>Monthly Median ≤ 300 CFU/100 mL</td>
<td>≥ 4.0 mg/L (daily avg) 2.5 mg/L</td>
</tr>
<tr>
<td>5C</td>
<td>Monthly Median ≤ 4,000 CFU/100 mL, 25% ≤ 1,000 CFU/100 mL</td>
<td>Monthly Median ≤ 300 CFU/100 mL</td>
<td>-</td>
<td>≥ 4.0 mg/L</td>
</tr>
<tr>
<td>5D</td>
<td>Monthly Median ≤ 4,000 CFU/100 mL, 25% ≤ 1,000 CFU/100 mL</td>
<td>Monthly Median ≤ 300 CFU/100 mL</td>
<td>-</td>
<td>≥ 3.5 mg/L</td>
</tr>
</tbody>
</table>
Sample Waterbody Specific Spread

Harlem River

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Typical Year Storm Volumes and Peak Discharge Rates*

<table>
<thead>
<tr>
<th>Storm Volume (Mgal)</th>
<th>Peak Flow (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1500</td>
</tr>
<tr>
<td>20</td>
<td>2000</td>
</tr>
<tr>
<td>30</td>
<td>2500</td>
</tr>
<tr>
<td>40</td>
<td>3000</td>
</tr>
</tbody>
</table>

* Data based on most recently reviewed simulations of Western collection system and tunnel

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Overview of Progress

Keith Mahoney, PE and Pinar Balci, PhD
DEP
## New York State
### Saline Surface Water Quality Standards

<table>
<thead>
<tr>
<th>Class</th>
<th>Total Coliform</th>
<th>Fecal Coliform</th>
<th>Enterococcus&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>Dissolved Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SA</strong></td>
<td>Median ≤ 70 MPN/100mL</td>
<td>-</td>
<td>GM ≤ 35/100mL</td>
<td>&gt; 4.8 mg/L (daily avg) ≥ 3.0 mg/L</td>
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<tr>
<td><strong>SB</strong></td>
<td>Monthly Median ≤ 2,400 cfu/100mL 80% ≤ 5,000 cfu/100mL</td>
<td>Monthly GM ≤ 200/100mL</td>
<td>GM ≤ 35/100mL</td>
<td>&gt; 4.8 mg/L (daily avg) ≥ 3.0 mg/L</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>Monthly Median ≤ 2,400 cfu/100mL 80% ≤ 5,000 cfu/100mL</td>
<td>Monthly GM ≤ 200/100mL</td>
<td>-</td>
<td>≥ 4.0 mg/L</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>Monthly Median ≤ 2,400 cfu/100mL 80% ≤ 5,000 cfu/100mL</td>
<td>Monthly GM ≤ 200/100mL</td>
<td>-</td>
<td>≥ 3.0 mg/L</td>
</tr>
</tbody>
</table>

### Notes:
1. Applicable to coastal recreational waters only

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[Map Image]
## Proposed Water Quality Standards and Classification

### New York State Saline Surface Water Quality Standards

<table>
<thead>
<tr>
<th>Class</th>
<th>Bacteria</th>
<th>Dissolved Oxygen</th>
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<tr>
<td></td>
<td>Total Coliform&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>Fecal Coliform&lt;sup&gt;(1)&lt;/sup&gt;</td>
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<tr>
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<td>Monthly Median ≤ 2,400 cfu/100mL&lt;br&gt;80% ≤ 5,000 cfu/100mL</td>
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<td>Monthly Median ≤ 2,400 cfu/100mL&lt;br&gt;80% ≤ 5,000 cfu/100mL</td>
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<td>SD</td>
<td>Monthly Median ≤ 2,400 cfu/100mL&lt;br&gt;80% ≤ 5,000 cfu/100mL</td>
<td>Monthly GM ≤ 200/100mL</td>
</tr>
</tbody>
</table>

### Notes:
(1) Assessed during primary contact recreational season or as necessary to protect human health
(2) Applicable to coastal recreational waters only

Reclassified Upper and part of Lower New York Bay from Class I to Class SB
Data Collection Update

- Installed regulator flow monitoring equipment
- Completed flow monitoring of 20 open water regulators
- Received Passaic Valley Sewerage Commission (PVSC) sampling data
Modeling Update

• Collection System Modeling
  - Calibrating to meter data
  - Updating Baseline Conditions Models
  - Incorporating citywide green infrastructure

• Water Quality Modeling
  - Increasing the density of the water quality model grid cells
  - Calibrating to NYC and NJ sampling data
  - Conducting preliminary gap analysis using grid cells to represent attainment
Fecal Attainment – Existing Conditions

2008 Annual Attainment
Monthly Geomean ≤ 200 cfu/100 mL
(Preliminary Results)

2008 Recreational Attainment
Monthly Geomean ≤ 200 cfu/100 mL
(Preliminary Results)
2008 Recreational Attainment (GM)
30-day Rolling Geomean ≤ 35 cfu/100 mL
(Preliminary Results)

2008 Recreational Attainment (STV)
30-day Rolling 90th Percentile ≤ 130 cfu/100 mL
(Preliminary Results)
## Preliminary Alternatives for Review & Analysis

<table>
<thead>
<tr>
<th>Source Control</th>
<th>Green Infrastructure</th>
<th>Storm Sewers</th>
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<tbody>
<tr>
<td><strong>System Optimization</strong></td>
<td>Fixed Weir</td>
<td>Parallel Interceptor / Sewer</td>
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<tr>
<td></td>
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<td>Bending Weirs Control Gates</td>
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<td></td>
<td></td>
<td>Pump Station Optimization</td>
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<td></td>
<td></td>
<td>Pump Station Expansion</td>
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<tr>
<td><strong>CSO Relocation</strong></td>
<td>Gravity Flow Tipping to Other Watersheds</td>
<td>Pumping Station Modification</td>
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<tr>
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<td>Flow Tipping with Conduit/Tunnel and Pumping</td>
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<tr>
<td><strong>Water Quality / Ecological Enhancement</strong></td>
<td>Floatables Control</td>
<td>Environmental Dredging</td>
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<tr>
<td></td>
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<td>Wetland Restoration &amp; Daylighting</td>
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<tr>
<td><strong>Treatment Satellite</strong></td>
<td>Outfall Disinfection</td>
<td>Retention Treatment Basin (RTB)</td>
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<tr>
<td></td>
<td></td>
<td>High Rate Clarification (HRC)</td>
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<tr>
<td><strong>Centralized</strong></td>
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<td>WRRF Expansion</td>
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<td><strong>Storage</strong></td>
<td>In-System</td>
<td>Shaft</td>
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<td></td>
<td></td>
<td>Tank</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tunnel</td>
</tr>
</tbody>
</table>

**Retained Alternatives**

**Ongoing Projects**
**Combined Sewer** conveys stormwater runoff and sanitary waste to the Wastewater Resource Recovery Facility.

**Stormwater Runoff** flows into the combined sewer.

**Catch Basins** convey stormwater into the combined sewer.

**Regulator** directs combined sewage to the wastewater resource recovery facility. If the facility reaches full capacity, the combined sewer flow is directed to overflow outfalls.

**CSO Outfalls** are locations where “combined sewer overflows” discharge.

**Wastewater Resource Recovery Facility** treats the combined sewage and releases clean water into surrounding waterbodies.
Collection System Optimization

• Evaluating regulator optimization alternatives using a specialized optimization software

• Typical optimization measures include:
  ▪ Increasing dry weather flow connection
  ▪ Weir modifications
  ▪ Localized branch sewer relief

• Strategy Assessment Criteria:
  ▪ Cost
  ▪ Overflow volume, duration, and timing
  ▪ Outfall sensitivity (beaches, boat launches, etc.)
  ▪ Hydraulic impacts (flooding risks)
Example of Gravity Diversion Structure

- **New Gravity Diversion**
- **60” x 36” Combined Sewer**
- **36” Force Main**
- **Hannah St. Pump Station**

**PR-013** +/- 36 MG/yr

**PR-032** +/- 10 MG/yr
96% of citywide street litter (floatables) is captured \(^{(1)}\)

Ongoing Citywide Floatables Program

- **Street Sweeping**
- **Catch Basin Hooding**
- **Netting/Booms**
- **Wastewater Resource Recovery Facility (WRRF)**

\(^{(1)}\) Source: NYC Stormwater Management Program, NYCDEP, August 2018
Tibbetts Brook Existing Conditions – Overflow Weir

LAKE OVERFLOW WEIR

ENTRANCE TO COLLECTION SYSTEM
### ALTERNATIVES

1. VanCortlandt Lake Additional Storage BMP
2. Tibbets Wetland BMP
3. Elm-Birch Wetlands BMP
4. All three above BMPs Combined
5. Daylighting Full Flow
6. Daylighting Full Flow and BMP combination
7. Daylighting Base Flow
8. Daylighting Base Flow + VanCortlandt Lake
9. Daylighting Base Flow + Tibbets Wetland
10. Daylighting Base Flow + Elm-Birch Wetlands
11. Daylighting Base Flow + Van Cortlandt + Elm-Birch
12. Daylighting Base Flow + Van Cortlandt + Tibbets
13. Daylighting Base Flow + Tibbets + Elm-Birch
14. Daylighting Base Flow + All three BMPs
Putnam Trail (CSX) – Tibbetts Brook Existing Conditions

WEST 230TH STREET

NEAR HARLEM RIVER
• Compile & Analyze Existing Conditions
• Hydrology and Hydraulics Modeling & Analyses
• Develop & Evaluate Alternatives
• Feasibility Technical Memo

• Survey of Existing Sewer Lines
• Phase I Environmental Site Assessment

Optional Tasks:
• Limited Phase II Environmental Site Assessment
• Topo Survey
Next Steps

Mikelle Adgate
Senior Advisor, BPAC
DEP
Citywide/Open Waters Schedule

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Stakeholder Briefing Comments Due May 17th

LTCP Recommended Plan Comments Due
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