Supplemental CSO Team
Meeting No. 2 – Project Update
Long-Term Control Plan Permit Compliance

City of Elizabeth and
Joint Meeting of Essex & Union Counties (JMEUC)

October 11, 2017 – 1:00 pm
Elizabeth City Hall Council Chambers

Supplemental CSO Team
Meeting No. 2 Agenda

- Previous meeting recap
- CSO outfall locations
- Sewer sampling summary
- Modeling updates (Elizabeth and JMEUC)
- Recent and pending sewer improvement projects
- Input on public outreach opportunities
- Input on potential sensitive areas
- 6-month look-ahead
Prior Meeting Recap:
City of Elizabeth Combined Sewer System

Population: 129,000

CSO Characteristics:
29 CSO Discharge Points

Receiving Waters:
Elizabeth River, to the Arthur Kill

Prior Meeting Recap:
Why are the City and JMEUC undertaking this work?

- Long history of regulatory action on combined sewers
- Most recently, NJDEP issued Individual NJPDES Permits in March 2015, Amended in October 2015
- To develop Long-Term CSO Control Plans per EPA National Policy
- 25 Permittees Total – Fractured ownership of collection systems and treatment plants
  - With regional coordination and cooperation, LTCP anticipated to center around Treatment Plant and its associated CSO communities
    - JMEUC has the sewage treatment plant
    - Elizabeth has the combined sewer system
Prior Meeting Recap:
What are the regulatory requirements?

Nine elements of the Long-Term Control Plan:
1. System characterization, monitoring, and modeling
2. Public participation (Supplemental CSO Team is a component)
3. Consideration of sensitive areas
4. Evaluation of alternatives
5. Cost/performance considerations
6. Operational plan
7. Maximizing treatment at the existing treatment plant
8. Implementation schedule
9. Compliance monitoring program

Prior Meeting Recap:
Public Participation Process

- Supplemental CSO Team is an essential part of this process!
- To seek to actively involve the affected public
  - Rate payers
  - Environmental groups
  - Economic Development Groups
  - Industrial, Institutional, and Educational Interests
  - Integration with Municipal Agencies
- NJDEP willing to assist in the public participation efforts
Prior Meeting Recap:
Supplemental CSO Team

- Advisory role; two-way communications is key
- Our link to the general public
- Provide input throughout LTCP process
- Provide input on:
  - evaluation of sensitive areas
  - evaluation of CSO control alternatives
  - selection of CSO control alternatives
- Final selection and decision rests with permittees, with NJDEP approval

Prior Meeting Recap:
What is a Combined Sewer Overflow?
Combined Sewer Flow Animation File:
HWU_combined_web.swf
Prior Meeting Recap:
What is a Combined Sewer Overflow?
Wet weather flows to the Sewage Treatment Plant are controlled by CSO Control Facilities

Typical Automatic Regulator

PLAN

SECTION A–A
CSO Outfall Locations
CSO Outfall Locations

CSO Outfall Locations
CSO Outfall Locations
CSO Outfall Locations

CSO Outfall Locations
Sewer Sampling Program

- Seven locations across the city with varied upstream land-use characteristics
- Samples taken upstream of outfall
- Testing for Fecal coliforms, Enterococci and E. coli

Weather monitored between October 2016 and May 2017 for rainfall greater than 0.5”

- Three sampling events:
  - November 29, 2016 (2.02”)
  - April 25, 2017 (0.88”)
  - May 5, 2017 (3.05”)
- Dry weather samples taken the day before each rain event.
- Wet weather samples collected at 30mins, 1 hour, 2 hours, 4 hours and 8 hours from the beginning of overflow at each site.
Sewer Sampling Results

- Results fall within typical ranges and patterns
  - First flush
  - Concentrations generally decrease over the course of storm (dilution)

Site 2 - E.Coli

Site 2 - Fecal Coliform

Site 2 - Enterococci

Elizabeth Combined Sewer System Model Update

- Lay of the Land
## Sewer Data Collection

**As-Built Drawings**

### Field Data Collection

### Existing Sewers

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<th>Pipes</th>
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<td><strong>Grand Total</strong></td>
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**Sewer Data Collection**

**As-Built Drawings**

**Field Data Collection**

**Existing Sewers**

**Purple - Combined**

**Orange - Separate (Storm)**

**Green - Sanitary**
Hydraulic Model

Monitoring Locations

<table>
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<tr>
<th>FLOW METER LOCATION</th>
<th>COUNT</th>
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<td>STORM</td>
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Flow Meter Data

Meter vs. Model
Local CSO situation – physical system

- City of Elizabeth: 29 CSO outfalls discharging to Elizabeth River, Arthur Kill and other waterbodies
- Intercepted dry- and wet-weather flows conveyed to City of Elizabeth's Trenton Avenue Pump Station (TAPS)
- TAPS discharges to main sewer entering plant about 1500 feet above headworks
- Combined sewer flows from Elizabeth and separate sanitary sewer flows from JMEUC system all conveyed to and treated at JMEUC WWTP
Descriptions of current models

- City of Elizabeth and JMEUC have independently developed models of their respective sewer systems in InfoWorks ICM modeling software
  - Combined sewer system in Elizabeth to TAPS
  - JMEUC separate sanitary sewer system to WWTP
  - Independent models are being linked at common junction (TAPS connection to JMEUC system)
- JMEUC model:
  - Hydraulic model (does not route pollutants)
  - 43 miles of interceptor/trunk sewer conduits
  - No combined sewers or CSO outfalls

JMEUC Interceptor Model Sewer Network

Gravity sewers ranging from 10-inches in diameter to the twin 67 x 68-inch rectangular sewers at the wastewater treatment plant (WWTP)

WWTP capacity:
- Design flow = 85 mgd
- Maximum capacity varies with tidal conditions: up to 225 mgd
JMEUC Interceptor Model Sewersheds

Total Service Area = 60 square miles

11 member communities:
- East Orange
- Hillside
- Irvington
- Maplewood
- Millburn
- Newark
- Livingston
- Orange
- New Providence

4 customer communities:
- City of Elizabeth (inflow from TAPS)
- Livingston
- Orange
- New Providence

32 flow monitoring sites

JMEUC modeling process

- Update previously developed model of system: newest software, improved level of detail in system representation (e.g. WWTP)
- Calibrate model – adjust parameters until model results agree with observed data at 32 meter sites for monitored rainfall events
- Complete linkage with City of Elizabeth model
- Initial simulations with combined JMEUC-Elizabeth model to characterize system performance during wet weather (the typical year precipitation record)
Calibration process – example calibration plot
JMEUC model status and next steps

- Model updates substantially complete
  - Next steps: further refine WWTP elements in JMEUC model
- Model calibration complete at upstream sites
  - Next steps: complete calibration at downstream sites
- JMEUC sub-model linked with City of Elizabeth sub-model
  - Next steps: ensure both sub-models are fully consistent to finalize linkage with City of Elizabeth model
- Complete initial typical year simulations with combined JMEUC-Elizabeth model

Recent and Pending Improvement Projects:
Partial Listing

- Progress Street Stormwater Control Project
- Verona Avenue/Gebhardt Avenue Storm Sewer Improvements Project
- Elizabeth River Flood Control Project - Levee and Drainage Structure Stabilization Work
- Midtown Infrastructure Improvements Project - CSO Abatement Work
- Westfield Avenue/Elmora Avenue Sewer Improvements Project
- South Street, North Avenue, & Third Avenue Flood Control Projects
- Westerly Interceptor Cleaning and Inspection Project
- Trumbull Street Stormwater Control Project
Recent Projects – Verona Gebhardt
Before
Recent Projects – Verona Gebhardt
During Construction

Recent Projects – Verona Gebhardt
After Construction
Recent Projects – Progress St Flood Control
During Construction

Recent Projects – Progress St Flood Control
After Construction
Recent Projects – Trumbull St Flood Control
Last Summer

Recent Projects – Trumbull St Flood Control
Construction to begin late 2017
Opportunities for Outreach

- Goal: Increase residents’ understanding of environment and the connection to sewer infrastructure
- Environmental Day: April 28, 2017
- Estuary Day: October 6, 2017
- Press releases for upcoming projects: Trumbull Street

Other opportunities for engagement:
- Supplemental CSO members connection to community
- Other events?
- Information to share with constituents?

Input on Potential Sensitive Areas

- Sensitive Areas, as defined by the CSO Control Policy, include:
  - Outstanding National Resource Waters
  - National Marine Sanctuaries
  - Waters with threatened or endangered species and their habitat
  - Waters with primary contact recreation
  - Public drinking water intakes or their designated protection areas
  - Shellfish beds
- Are sensitive areas present and impacted by CSO discharges?
Sensitive Areas: Primary Contact Recreation Areas?

- N. J. A. C. 7:9B -1.4: “Primary contact recreation” means water related recreational activities that involve significant ingestion risks and includes, but is not limited to, wading, swimming, diving, surfing, and water skiing.
  - No bathing beaches
  - Channelized portion of Elizabeth River upstream of South Broad St, no existing primary contact use. No access, concrete base and walls, shallow water depth.
  - No existing primary contact use in downstream earthen channel of Elizabeth.
  - Arthur Kill and Newark Bay – industrial / commercial shipping waterway. No primary contact recreation use present. (Boat ramp access at Elizabeth Marina)

Six-month Look Ahead

- Next meeting: January 2018
- Link City of Elizabeth combined sewer system model to JMEUC interceptor sewer model
- Refine interceptor sewer model representation of WWTP
- Update interceptor sewer system model calibration
- Apply updated model to characterize interceptor sewer system performance
- Characterize WWTP performance
- Prepare System Characterization Report
Questions?

Thank you

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