

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

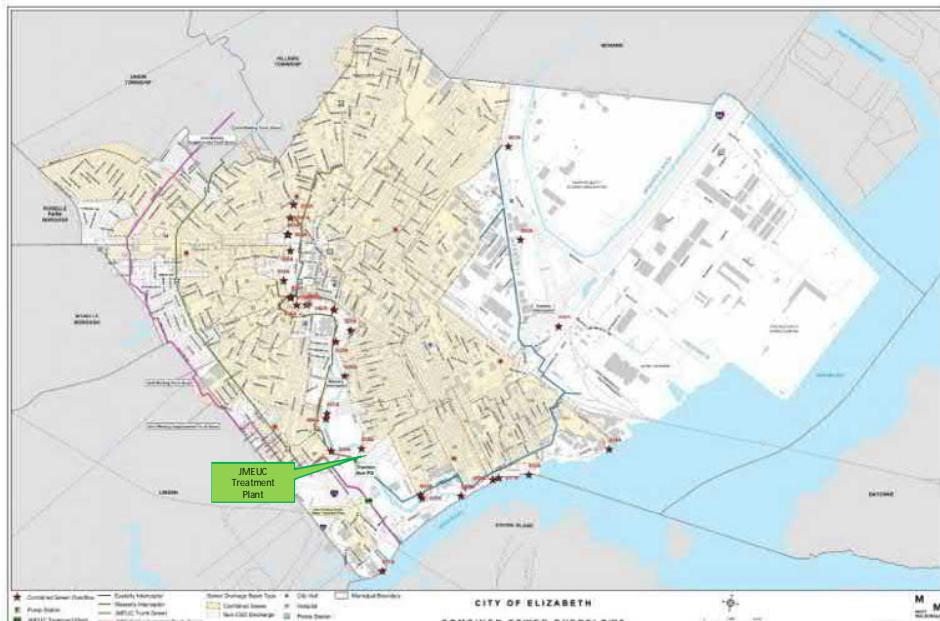
- Previous meeting recap
- CSO outfall locations
- Sewer sampling summary
- Modeling updates (Elizabeth and JMEUC)
- Recent and pending sewer improvement projects
- Input on public outreach opportunities
- Input on potential sensitive areas
- 6-month look-ahead

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



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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



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Elizabeth River / Arthur Kill
Watershed Association

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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



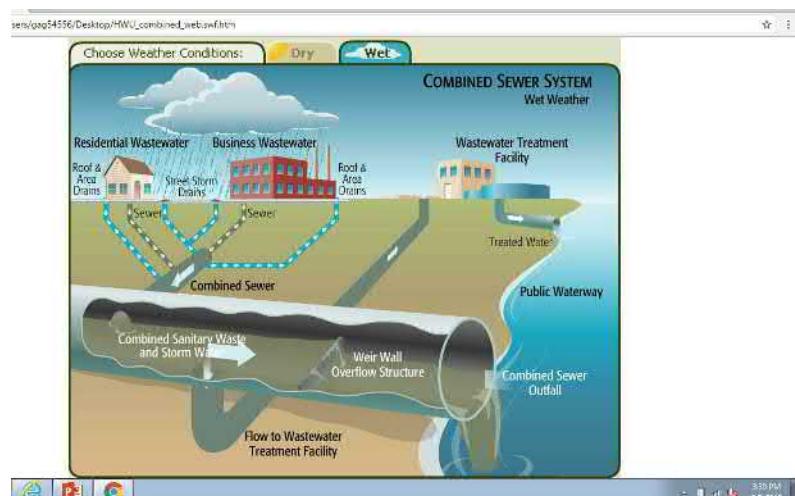
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Prior Meeting Recap: What Is a Combined Sewer Overflow?

Combined Sewer Flow Animation File:

[HWU_combined_web.swf](#)

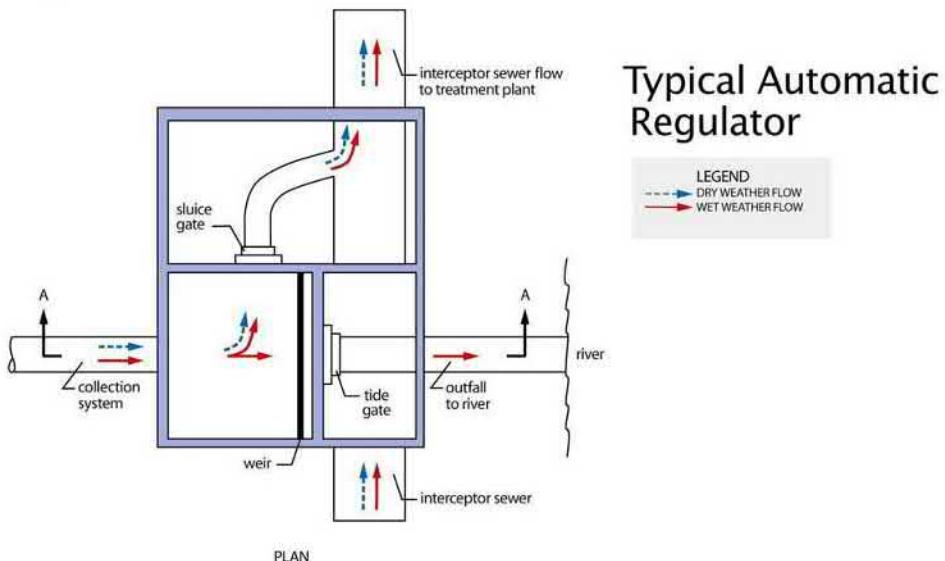


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Prior Meeting Recap: What is a Combined Sewer Overflow?

Wet weather flows to the Sewage Treatment Plant are controlled by CSO Control Facilities



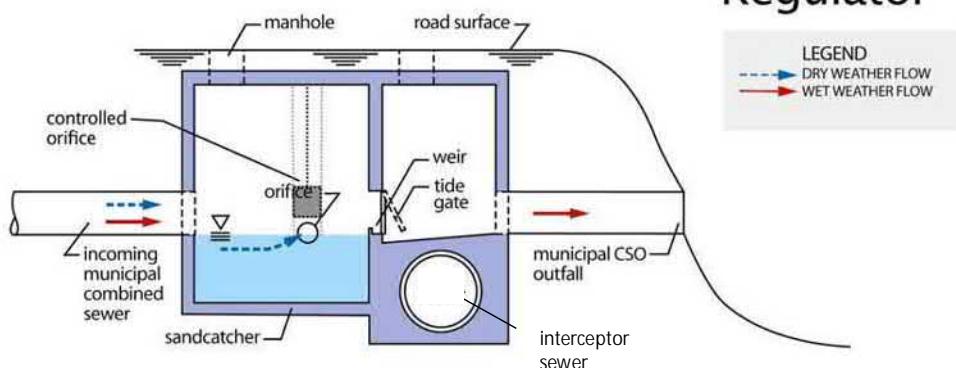
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Prior Meeting Recap: What is a Combined Sewer Overflow?

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Typical Automatic Regulator

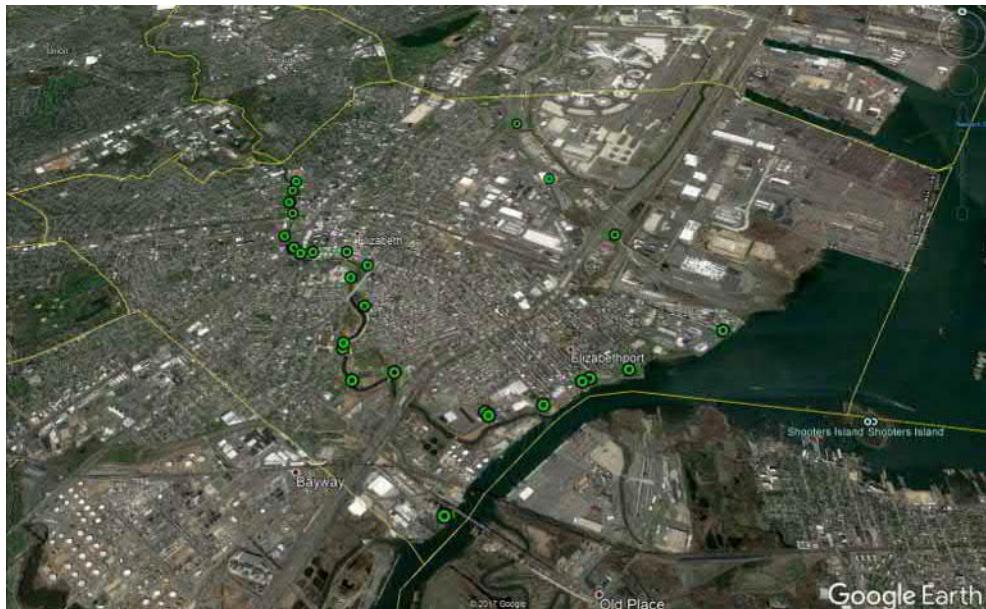


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CSO Outfall Locations

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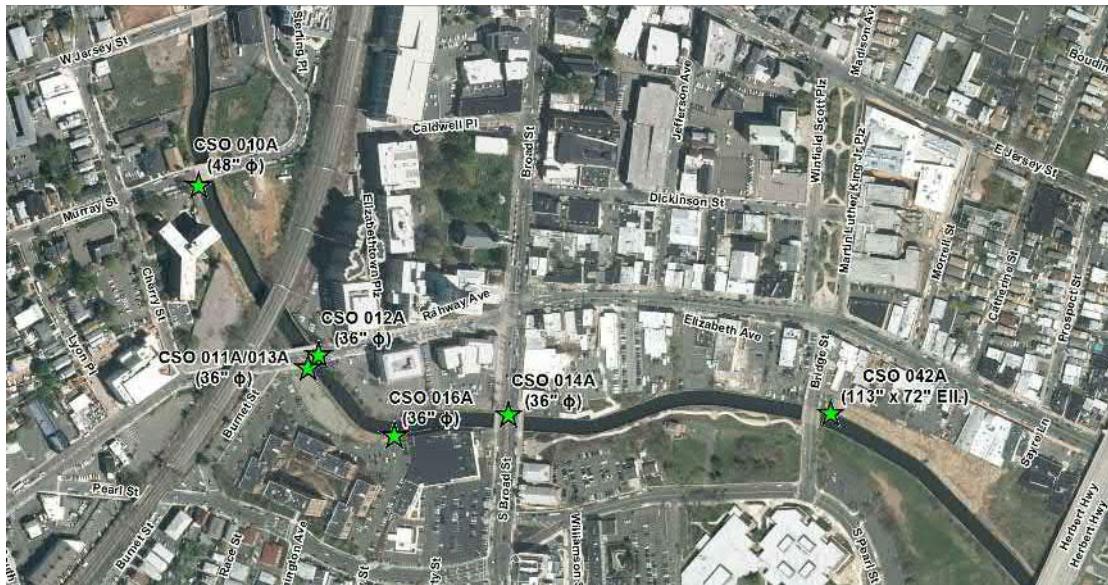
CSO Outfall Locations



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CSO Outfall Locations



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CSO Outfall Locations



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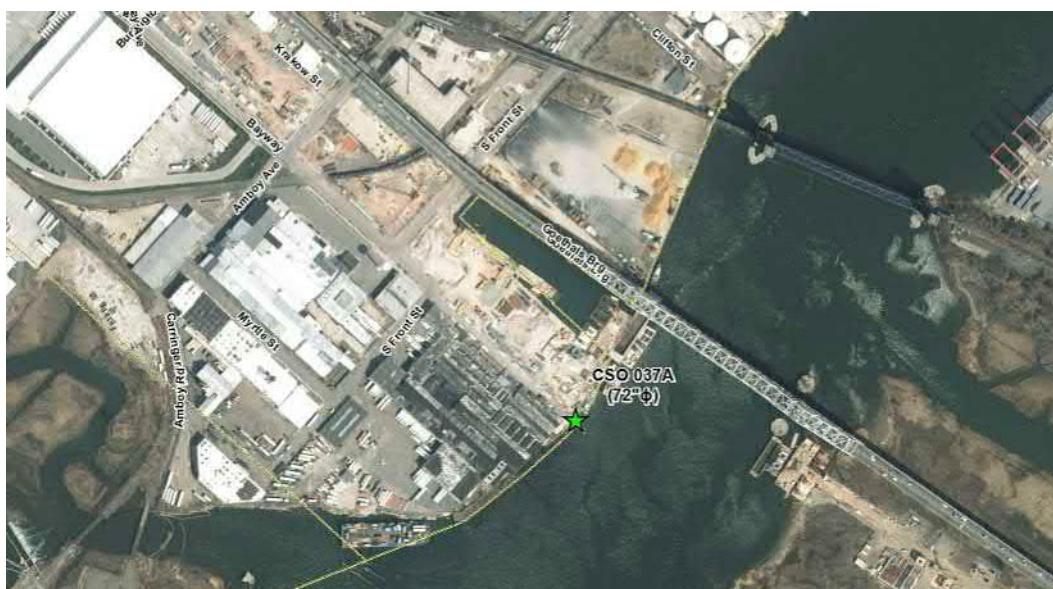
CSO Outfall Locations



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CSO Outfall Locations



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CSO Outfall Locations



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CSO Outfall Locations



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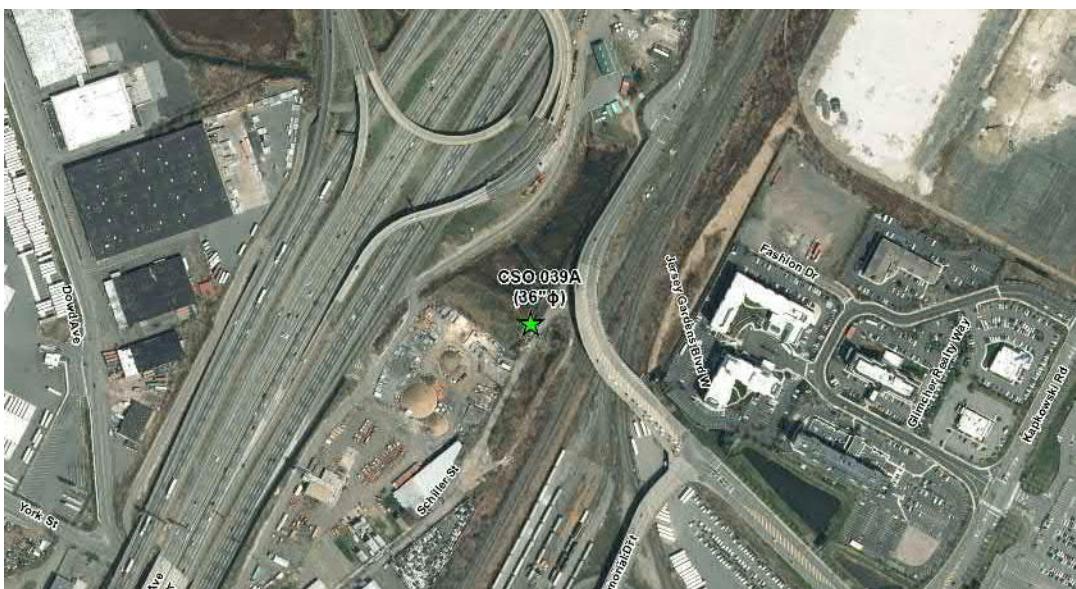
CSO Outfall Locations



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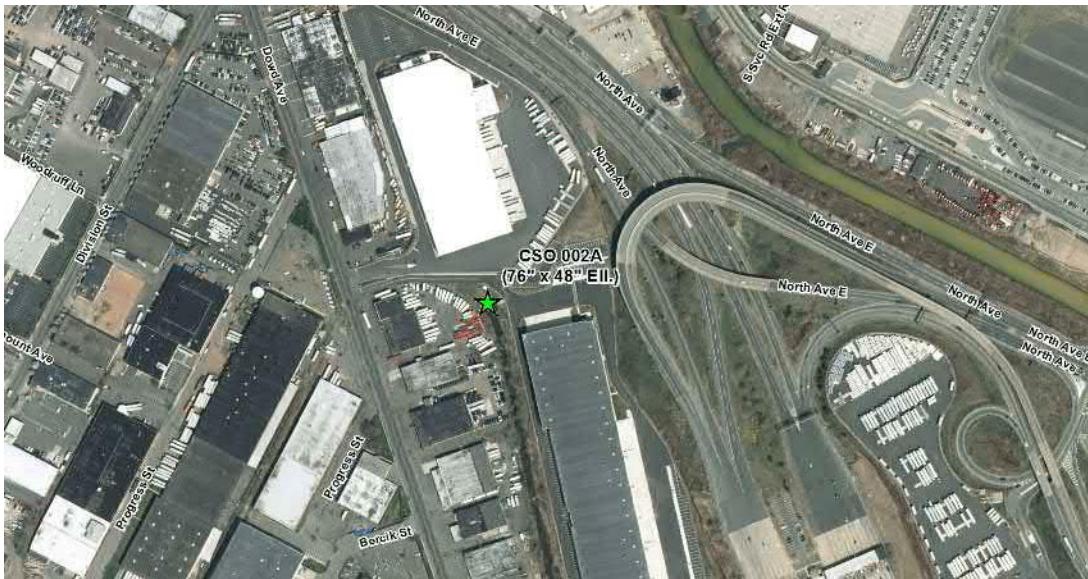
CSO Outfall Locations



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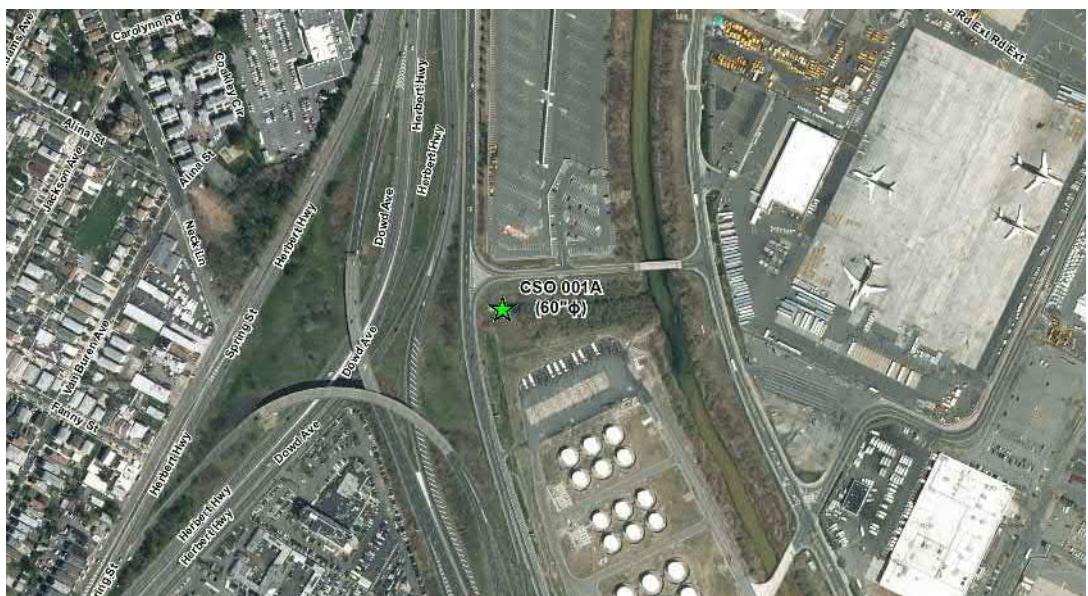
CSO Outfall Locations



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CSO Outfall Locations

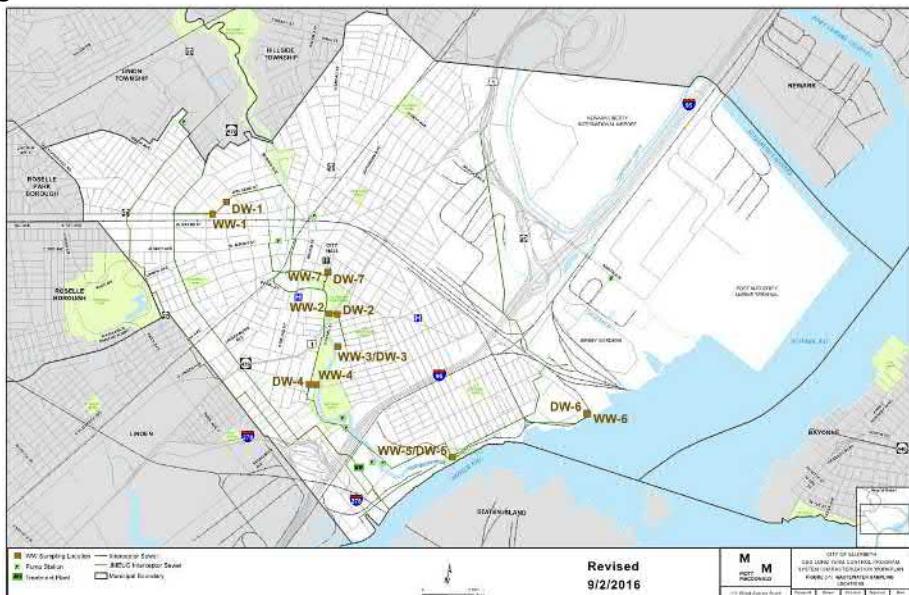


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Sewer Sampling Program

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



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Sewer Sampling Program

- 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.

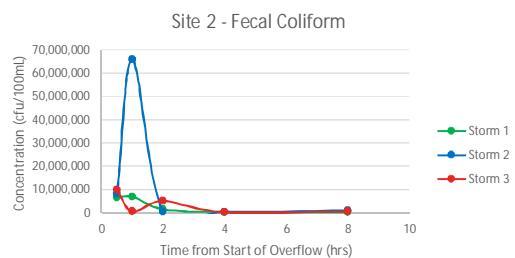
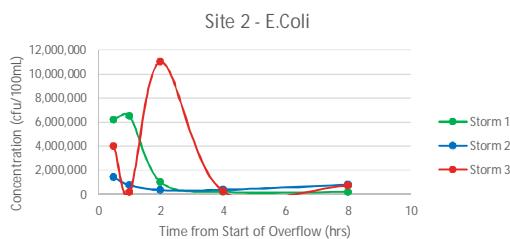
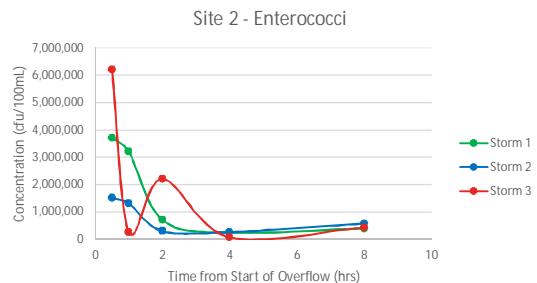


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Sewer Sampling Results

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

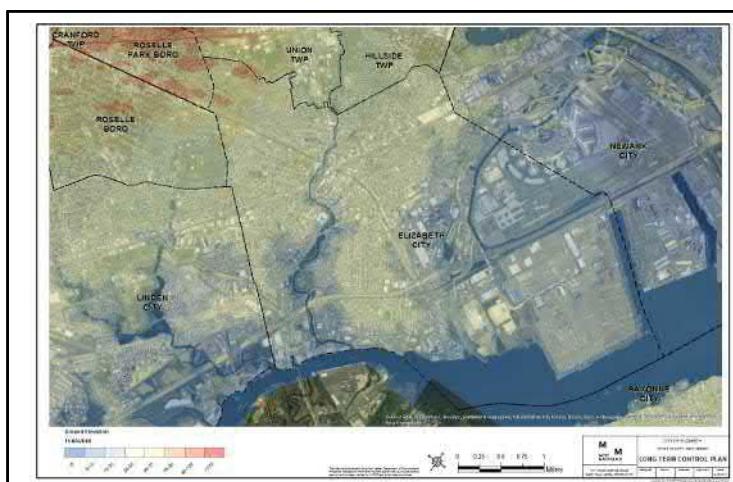


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Elizabeth Combined Sewer System Model Update

- Lay of the Land

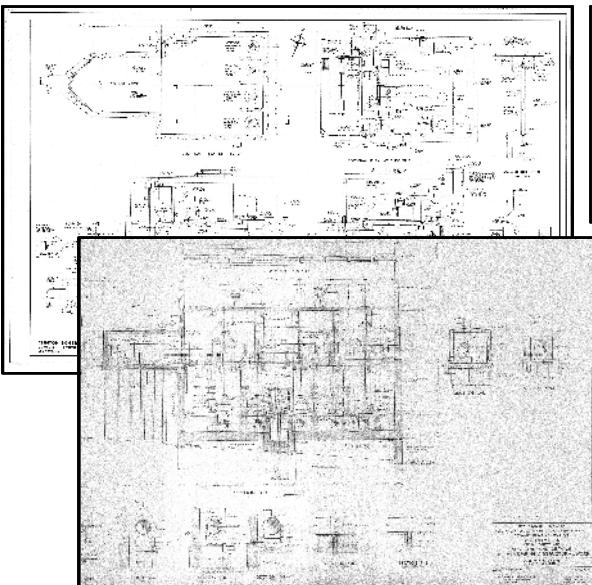


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Sewer Data Collection

As-Built Drawings



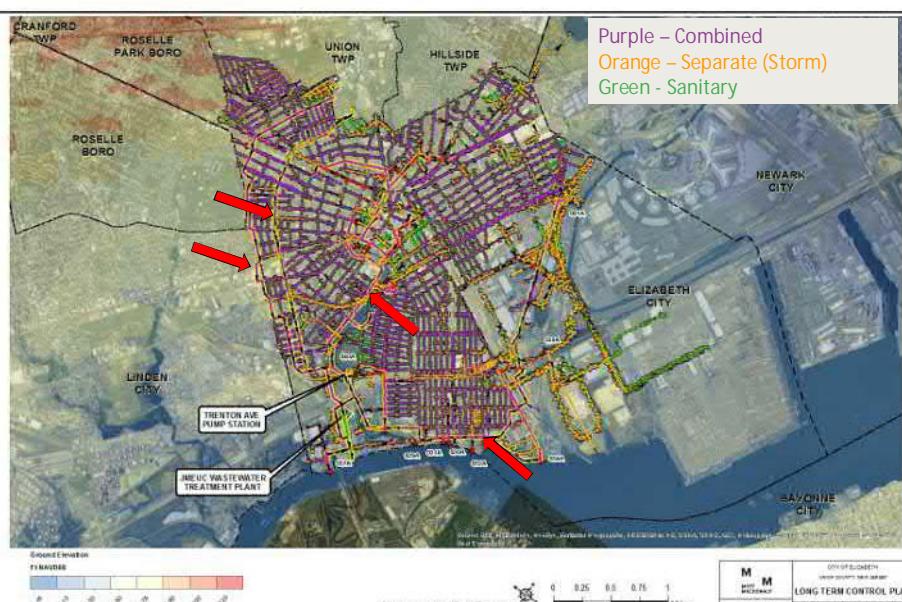
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Field Data Collection



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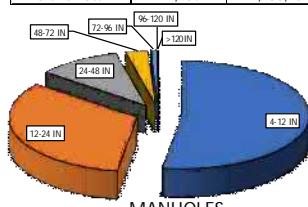
Existing Sewers



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PIPES

TYPE	COUNT	LENGTH (LF)
Combined	6,352	766,035
Sewage	517	63,646
Storm	4,566	309,228
Grand Total	11,435	1,138,909



DRAINAGE

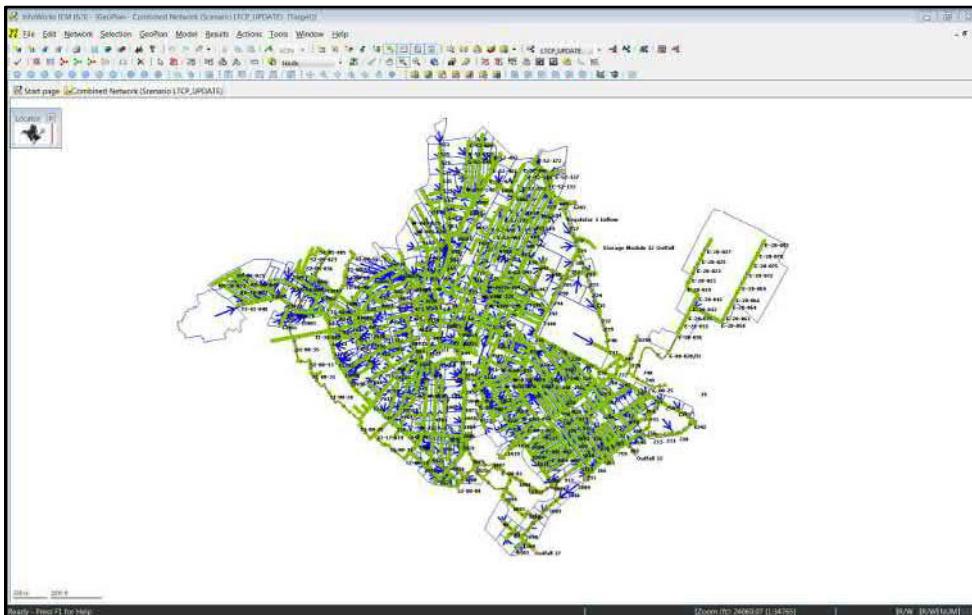
TYPE	COUNT
INLETS	4695

FACILITIES

FACILITY TYPE	COUNT
Treatment Plant	1
Pump Station	9
CSO Outfalls	29
Netting Chambers	28
Siphon Chambers	16
Regulators	39
Tide Gates	43
Sluice Gates	12

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Hydraulic Model



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Monitoring Locations



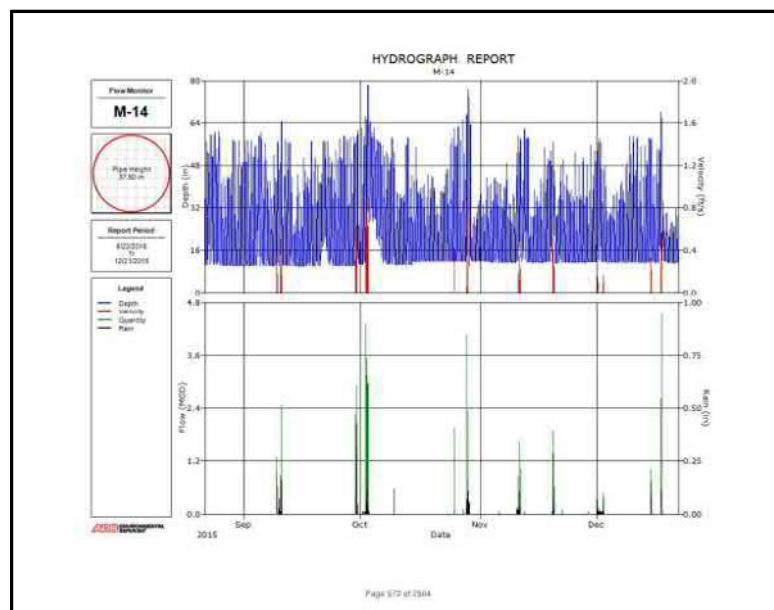
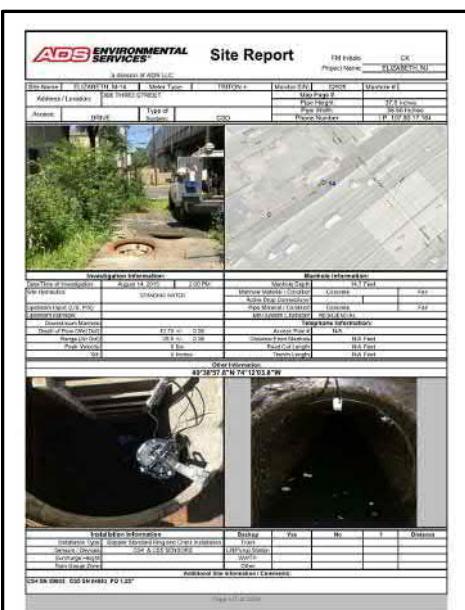
FLOW METERS

FLOW METER LOCATION	COUNT
DWF	14
EAST-INT	6
OVERFLOW	10
STORM	4
WEST-INT	6
Grand Total	40

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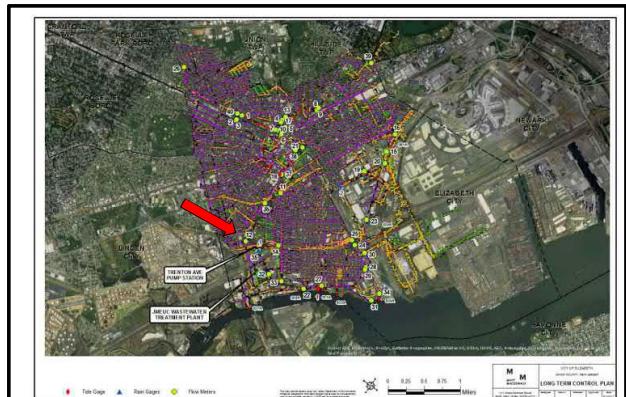
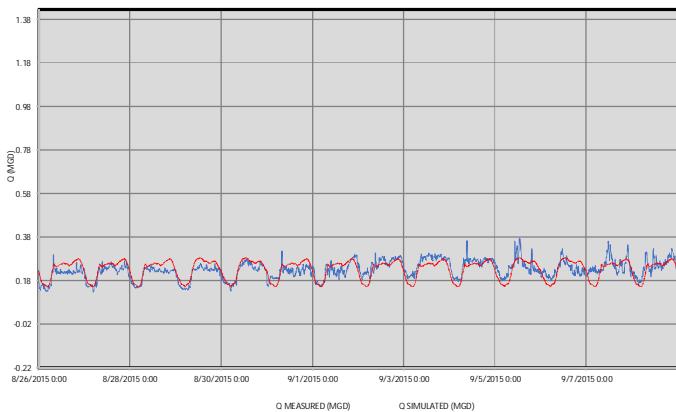
Flow Meter Data



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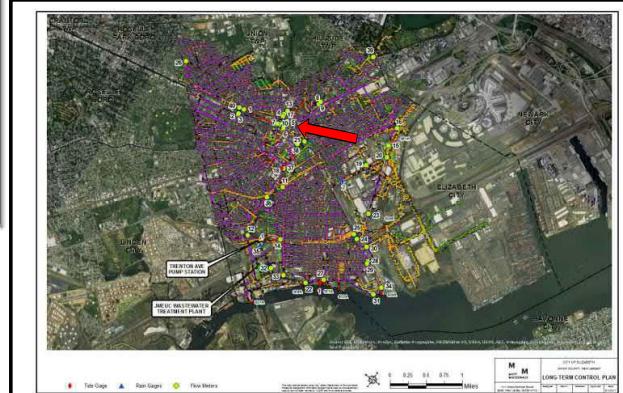
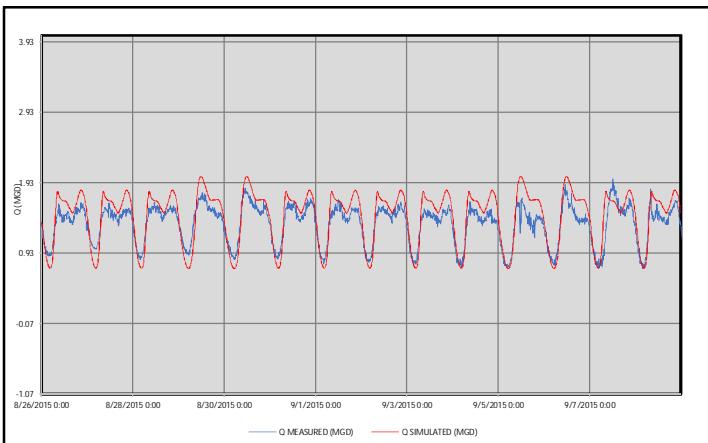
Meter vs. Model



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Meter vs. Model

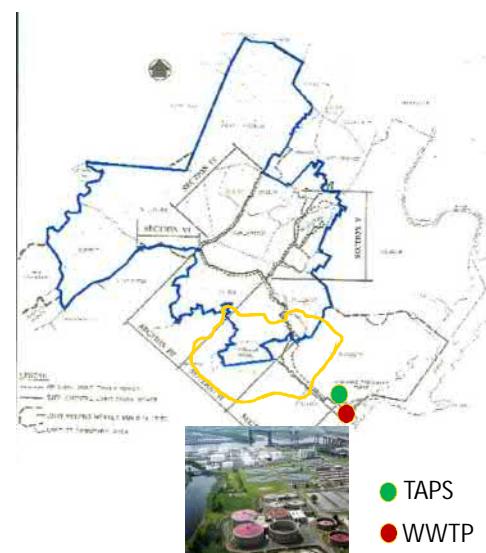


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Local CSO situation – physical system

- 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



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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

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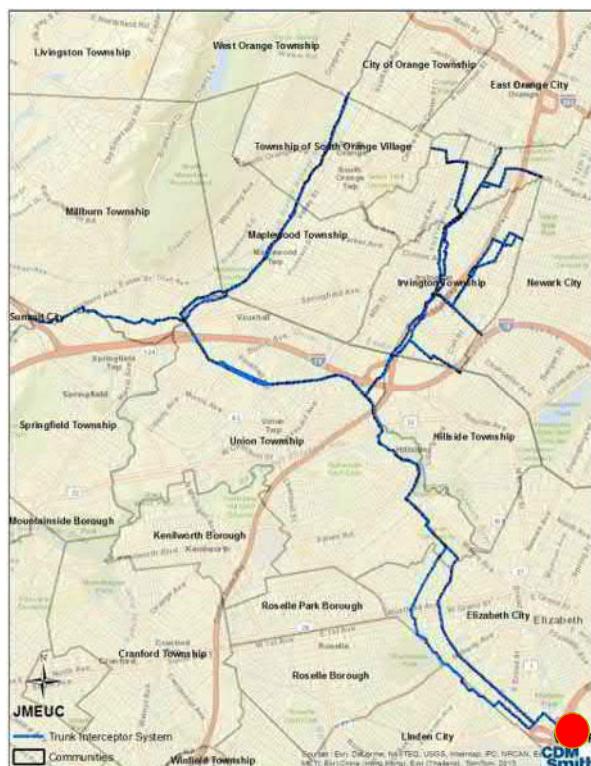
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JMEUC Interceptor Model Sewer Network

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
Wastewater
Treatment Plant

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JMEUC Interceptor Model Sewersheds

Total Service Area = 60 square miles

11 member communities:

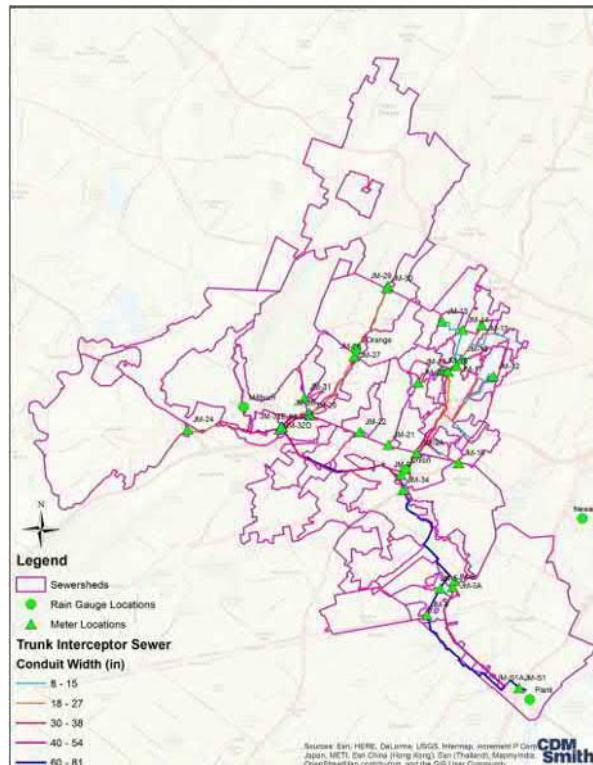
East Orange	Roselle Park
Hillside	South Orange
Irvington	Summit
Maplewood	Union
Millburn	West Orange
Newark	

4 customer communities:

City of Elizabeth (inflow from TAPS)
Livingston
Orange
New Providence

32 flow monitoring sites

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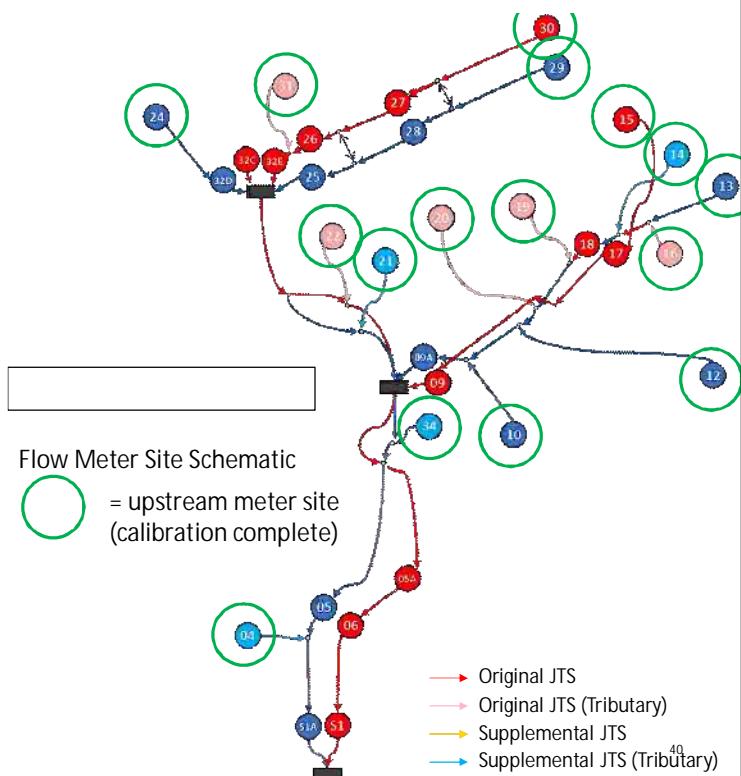
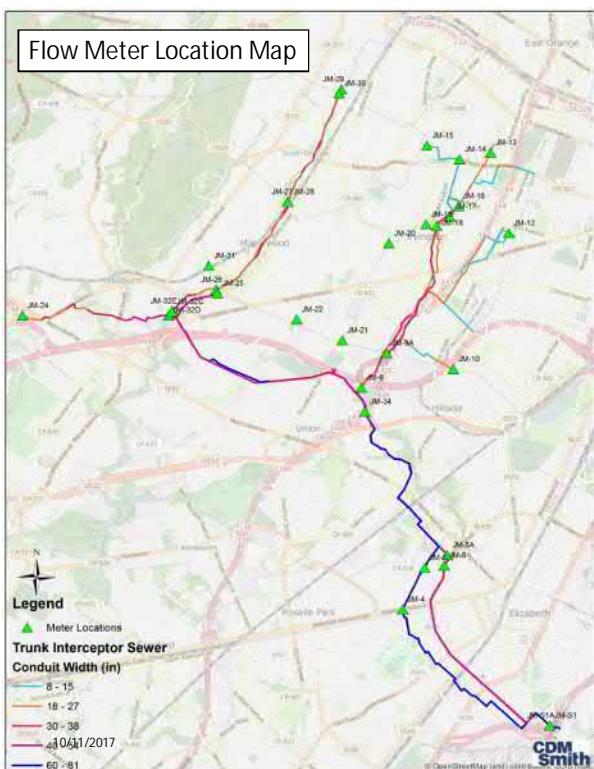
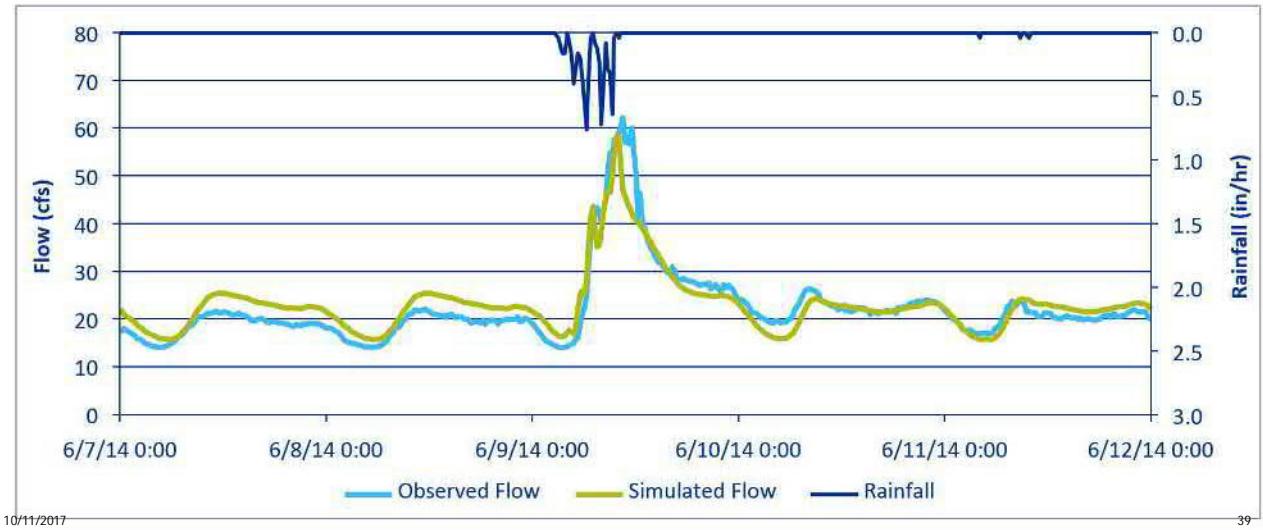
JMEUC modeling process

- 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)

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Calibration process – example calibration plot

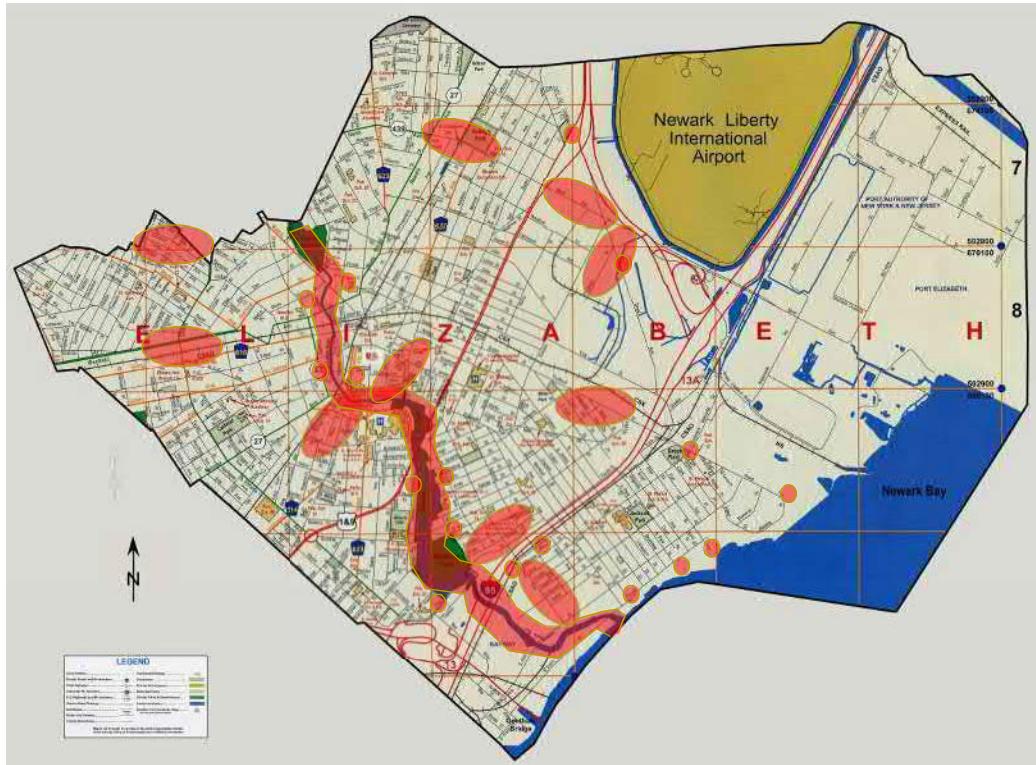


JMEUC model status and next steps

- 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



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Recent Projects – Verona Gebhardt

During Construction



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Recent Projects – Verona Gebhardt

After Construction



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Recent Projects – Progress St Flood Control During Construction



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Recent Projects – Progress St Flood Control After Construction



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Recent Projects – Trumbull St Flood Control

Last Summer

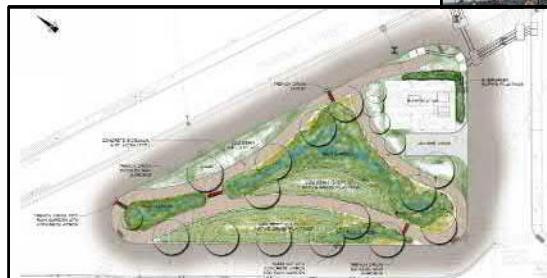


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Recent Projects – Trumbull St Flood Control

Construction to begin late 2017



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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?



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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?



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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)



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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



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Questions?



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Thank you

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

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