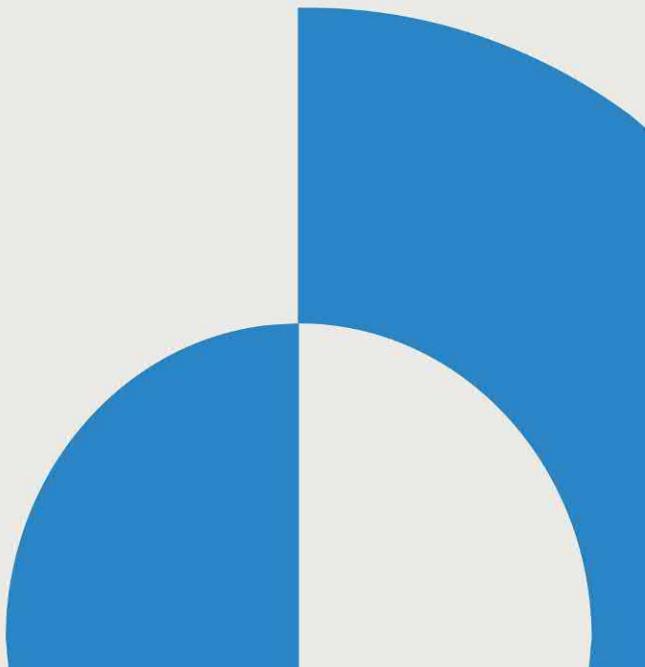


Supplemental CSO Team

Meeting No. 6
Long-Term Control Plan Permit Compliance

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

January 30, 2019 – 10:00 am
Peterstown Community Center
408 Palmer Street, Elizabeth, NJ 07202



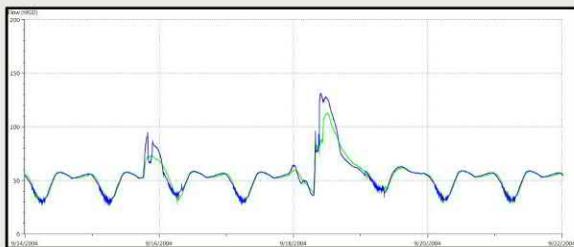
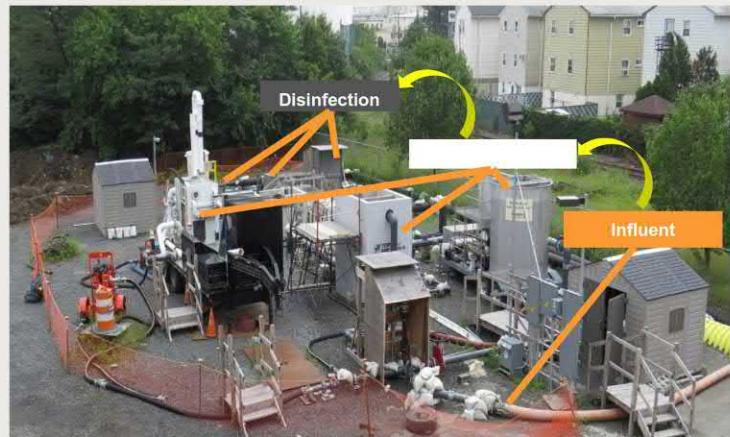
Meeting No. 6 agenda

- Prior meeting recap
- Public participation process update
- Groundwork Elizabeth – Climate Safe Neighborhoods grant
- Status of NJDEP review of LTCP submittals
- Pathogen water quality model baseline estimates
- Alternatives analysis
 - Maximizing wet weather treatment at the JMEUC WWTF
 - Siting Alternatives Analysis
 - Green Infrastructure Analysis
- Next meeting lookahead

Meeting No. 5 refresher

Material covered in prior meeting (10/26/2018):

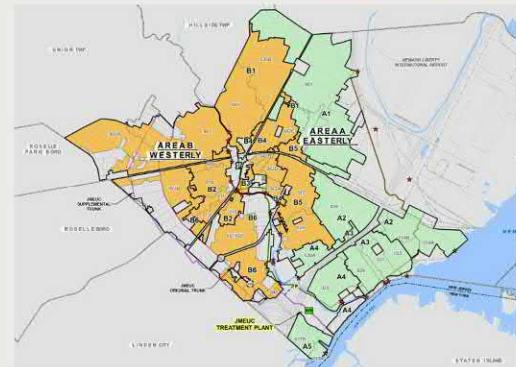
- July 1, 2018 submission status review
- Interactive surveys
- Alternatives evaluation overview
- Bayonne Wet Weather Demonstration Project treatment technologies



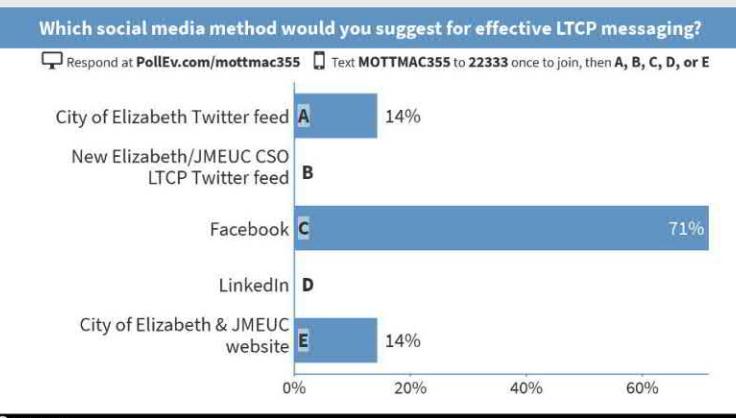
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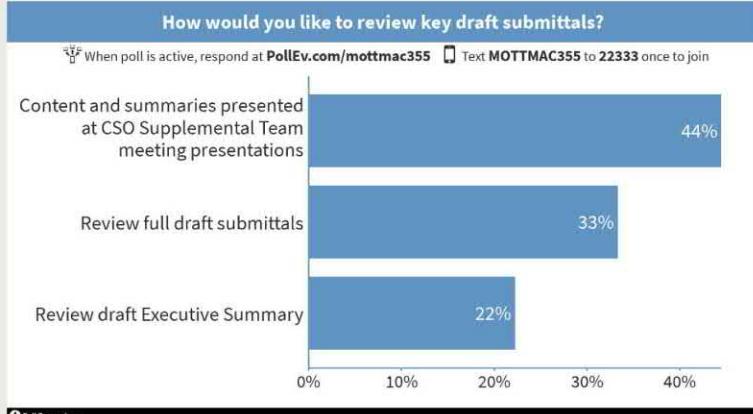
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Results of member surveys



Poll Everywhere



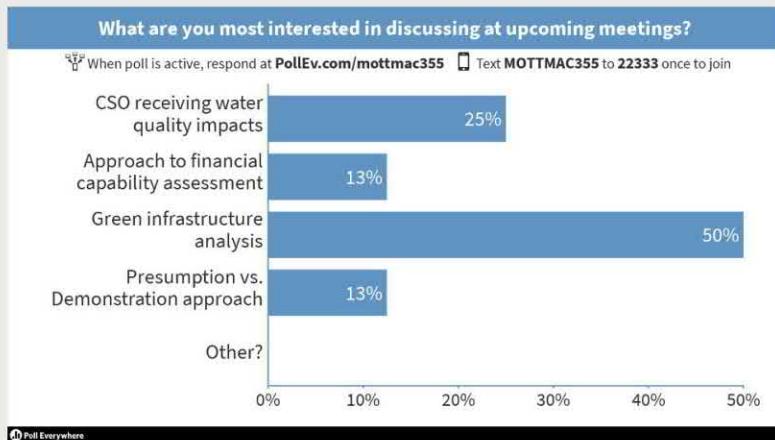
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Results of member surveys



January 30, 2019

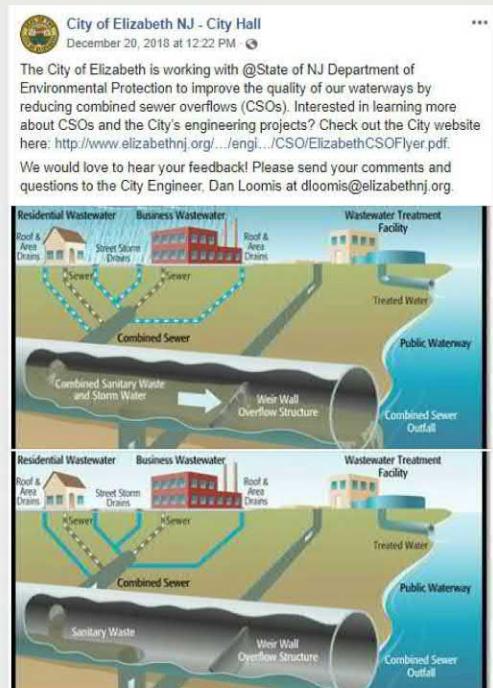
Supplemental CSO Team Meeting No. 6

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Public Participation Process Update

Public outreach and education

- Developed and circulated new informational flyer
 - Posted on City of Elizabeth's Twitter and Facebook
 - Distributing at City Hall
 - Emailed to Supplemental CSO Team
 - Did you circulate the informational flyer to your group?
If so, to how many recipients?



City of Elizabeth NJ @CityofElizabeth · 20 Dec 2018

The City is working with @NewJerseyDEP to improve the quality of our waterways by reducing combined sewer overflows (CSOs). To learn more visit: elizabethnj.org/pdfs/engineer/... and send feedback to the City Engineer at dloomis@elizabethnj.org.



January 30, 2019

Supplemental CSO Team Meeting No. 6

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Public Participation Process Update

Public outreach and education

Upcoming Events

- February 6 - NJDEP Public Participation Workshop
 - Organized by NJDEP to gather Supplemental Team members and CSO Permittees from across the State.
 - Here at Peterstown Community Center, 1 pm – 4 pm
 - Open to Supplemental CSO Team Members, CSO Permittees, and interested municipal officials
- May 3 – Future City Environmental Day school presentations
- June – Union County BioBlitz
- Others?

Outside Groups

- Jersey Water Works, Rutgers Cooperative Extension, and NJ Sea Grant Consortium
 - February 1 - “How to Identify Green Infrastructure Projects in Your Town” workshop (Bordentown, NJ)
 - February 15 - “Moving from planning to implementation of green infrastructure” (Bordentown, NJ)

Stakeholder Presentation – Groundwork Elizabeth

Climate Safe Neighborhoods Grant

Groundwork Elizabeth's 2019 - 2021 Overview of:

The Climate Safe Neighborhoods Partnership



GROUNDWORK
Elizabeth

Groundwork Elizabeth's Mission is to bring about the sustained regeneration, improvement and management of the physical environment by developing community-based partnerships which empower people, businesses and organizations to promote environmental, economic and social well-being.



In short - Groundwork Elizabeth is a people-focused environmental non-profit whose mission it to Change Places by Changing Lives.

Our Focus Areas:

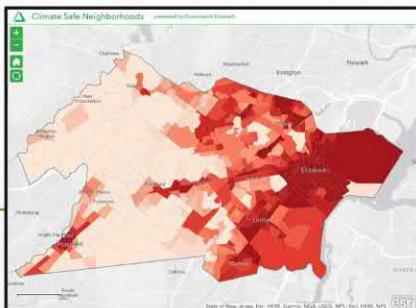
Urban Agriculture
Green Infrastructure + Sustainability
Youth Development
Rivers + Trails



In 2018 Groundwork USA selected Groundwork Elizabeth as one of five cities to receive funding to participate in the Climate Safe Neighborhood Partnership.

The other cities chosen are Denver, Rhode Island (Pawtucket, RI), Richmond (CA) and Richmond (VA) - along with our GIS lead Groundwork Milwaukee.





GROUNDWORK
Elizabeth

**Groundwork's Climate Safe Neighborhood Partnership
seeks to:**

1. Develop community-based plans to address the climate safety needs of vulnerable neighborhoods, with maps that show the origins and distribution of vulnerability and solutions;



GROUNDWORK
Elizabeth

Groundwork's Climate Safe Neighborhood Partnership seeks to:

2. implement solutions through expanded community engagement, neighborhood improvement, and training/employment programs;



Groundwork's Climate Safe Neighborhood Partnership seeks to:

3. organize + advocate for municipal policy + investment to address vulnerability in a systematic way.



Maps included:

- HOLC Neighborhood Grades (1939)
- Population per Square Mile - Block Group (ACS 2016 5 YR Est.)
- % Black or African American - Block Group (ACS 2016 5 YR Est.)
- % Latino - Block Group (ACS 2016 5 YR Est.)
- % Households in Poverty - Block Group (ACS 2016 5 YR Est.)



Maps included:

- Median Household Income - Block Group (ACS 2016 5 YR Est.)
- Pop less than 5y/o & Greater than 65 y/o - - Block Group (ACS 2016 5 YR Est.)
- % Impervious Surfaces - Block Group (NLCD)
- % Tree Canopy Covered



An Overview or the Vulnerability Index - as conducted in Richmond, VA.**Data Sets:****● Measures of Heat**

NLCD Impervious Surface 2011 (NLCD 2016 is coming out soon)

NLCD Tree Canopy Cover 2011

LANDSAT 8 Land Surface Temperature for summer days with satellite imagery over past two years (<10% cloud cover)

● Measure of Adaptive Capacity*

ACS 2016 5 year estimate - %Households living in poverty (block group)

*There is discussion about including other demographic indicators of adaptive capacity such as race.



Vulnerability Index as conducted in Richmond, VA

Index Methods:

1. Summarize the raster imagery to the block group level by converting raster to points then conducting a spatial join w/ summary statistics for each.
2. Use feature scaling to put the four indicators of heat vulnerability on a scale from -1 to 1 where -1 represents the least vulnerable value in each attribute field and one represents the most vulnerable score in each attribute.
3. Sum the score from the four attribute fields. The closer to four, the more vulnerable the block group, the closer to -4 the less vulnerable. In other words, a score of four would mean that hypothetical block group had the highest value on all four scales.



After analyzing the maps, what will Groundwork Elizabeth do?

- Organize community meetings and surveys
- Create educational materials for distribution
- Build Green Infrastructure Demonstration Areas
- Lead Community Engagement
- Introduce a Green Corp - a community partnership to identify green infrastructure maintenance jobs and provide related trainings
- Expand GWE's Green Team to provide summer green jobs for Elizabeth High School students with an interest in the environmental sciences



HOW CAN YOU HELP?

DONT LITTER!
Garbage on streets clogs storm drains which causes flooding. If it's washed through a storm drain, it can go directly to our rivers.

REFRAIN DURING RAIN!
Help Newark reduce the amount of water entering the CSS during heavy rain by postponing laundry, taking a shower, or running the dishwasher.

REDUCE, REUSE, RECYCLE!
Shopping bags, bottles, and other plastic items are choking our waterways. Reducing the amount of plastic we use each day goes a long way. If you use plastic, re-use or recycle it!

GET THAT OIL LEAK FIXED!
Engine oil leaking from a car will be washed into our storm drains when it rains. When you notice a leak, get it taken care of ASAP.

SCOOP YOUR DOG'S POOP!
Not only is it mandatory in Newark, but picking up after your dog and disposing in the garbage helps reduce bacteria entering our waterways.



TAKE ACTION!



FREE RAINBARREL!

We are currently offering FREE Rain Barrels to Newark citizens and recruiting volunteers to help install rain barrels in their neighborhood.



ADOPT A CATCH BASIN!

Sign up now to adopt a catch ba-sin. Volunteers will be provided with a FREE "catch basin care kit".

HOW TO CARE FOR YOUR CATCH BASIN

1. Using a dust pan, sweep litter and debris from the top of the catch basin on a regular basis. Throw this in the nearest trash receptacle.
2. During rain events, check to make sure that nothing is blocking the catch basin.
3. Clear the catch basin after any snowfall.
4. If you feel as though your catch basin needs more attention than you can give, call the Municipal Utilities Authority for a cleaning at (201) 432-1150.
5. Tweet pictures of your clean catch basin to @innovatejc, and use the hashtags #adoptacatchbasin and #yearofwater



left image: door hanger; right image: sample painting design



"The ultimate goal is to make sure that our communities are safe from hotter and wetter weather."



Steve Burrington
Executive Director
Groundwork USA



For more information please contact:

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Executive Director, Groundwork Elizabeth

Jonathan@groundworkelizabeth.org

908-289-0262

Jackie Park Albaum

Director of Urban Agriculture, Groundwork Elizabeth

jackie@groundworkelizabeth.org

(917) 544-5638

John Evangelista

Director of Operations, Groundwork Elizabeth

john@groundworkelizabeth.org

973-931-3849

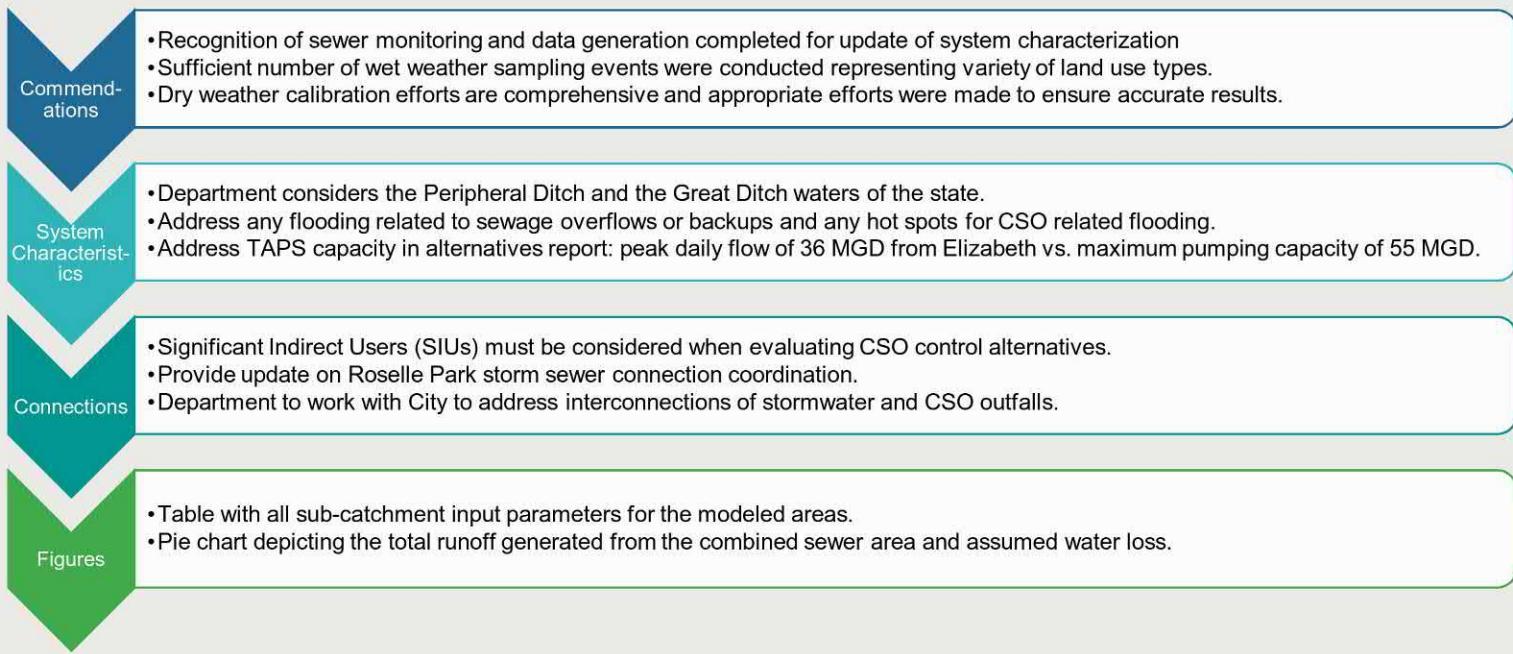
DEP review status – LTCP submittals

Quarterly progress meeting held on December 11, 2018

- **System Characterization Reports:** comments received on both individual JMEUC and Elizabeth reports on 11/8/2018; JMEUC revised report submitted 12/6/2018; Elizabeth revised report submitted 1/4/2019; **NJDEP approval on 1/17/2019 for both.**
- **Public Participation Process Report:** joint report from Elizabeth and JMEUC; comment letter dated 10/12/2018; revised report submitted 11/12/2018.
- **Consideration of Sensitive Areas Report:** NJ CSO Group report; DEP comment letter dated 9/20/2018; revised report submitted to DEP on 10/19/2018.
- **Baseline Compliance Monitoring Program Report:** NJ CSO Group report; DEP comment letter dated 9/7/2018; revised report submitted to DEP on 10/5/2018.

System Characterization Report - Elizabeth

- Comment letter received November 8, 2018



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Action Items Completed – Comment Responses

1. Peripheral Ditch and Great Ditch noted as waters of the State
2. Additional discussion on SIU impacts provided
3. Additional discussion of flooding related to sewer system backups/overflows included
4. NJDEP to work with City for monitoring storm sewers on CSO outfalls
5. Update on Roselle Park storm sewer connection coordination
6. Commitment to evaluate maximizing flow to STP as a CSO control alternative
7. Appendix M – subcatchment characteristics table added
8. Figure added with overall water budget chart for total runoff from combined sewer area

- Revised report submitted 1/4/2019 and NJDEP approval received 1/17/2019.

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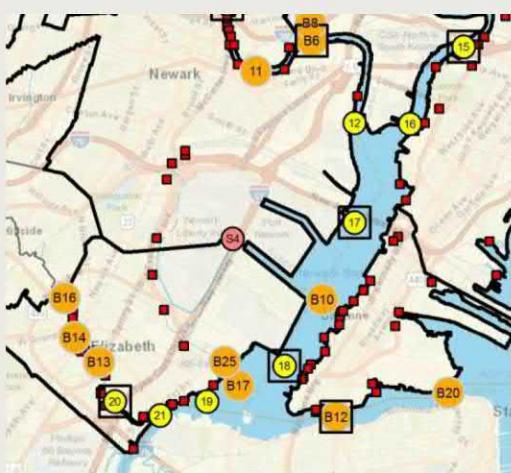
System Characterization Report - JMEUC

Submitted June, 27, 2018

- Minor comments received from NJDEP on November 8, 2018
- Revised report submitted on December 6, 2018
- NJDEP approval letter received on January 17, 2019

Demonstration Approach: Application to Peripheral Ditch and Great Ditch Water Quality Monitoring and Modeling

- Peripheral Ditch and Great Ditch water quality monitoring and modeling addressed in approved Baseline Compliance Monitoring and Pathogen Water Quality Model programs.
- Monitoring locations and model extents documented in QAPP and Report.



Pathogen Water Quality Modeling Update

Preliminary Baseline Results

Baseline Conditions

- 2004 Meteorological Conditions
- 2015 Infrastructure
- Existing River Concentrations and Dry Weather Loadings

New Jersey Pathogen Criteria

- N. J. A. C. 7:9B - Surface Water Quality Standards
- Use geometric mean to assess compliance with the bacterial quality indicators. Minimum of 5 samples collected over a 30-day period.

New Jersey Pathogen Criteria

- Newark Bay, Arthur Kill, and Lower Elizabeth River (SE3 waters)
 - Fecal coliform levels shall not exceed a geometric mean of **1500/100 ml**
- Upper Elizabeth River (FW2 waters)
 - E. coli levels shall not exceed a geometric mean of **126/100 ml** or a single sample maximum of **235/100 ml**

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Pathogen Water Quality Modeling Update

Preliminary Baseline Results

Water Quality Attainment Estimates

- Specific sampling point basis, 30-day rolling geometric mean
- Estimate of % of the time pathogen WQ standard for receiving body is met

Preliminary Baseline Findings

- For Newark Bay stations, the model estimates 100% WQ attainment with or without existing CSOs
- For Elizabeth River SE3 section, the model estimates 34.1%, 93.3%, and 100% WQ attainment at Stations B13, 20, and 21
- For Elizabeth River FW2 section, the model estimates 0% WQ attainment at Stations B16 and B14 with or without existing CSOs

Next Steps

- Provide hydraulic model outputs for different CSO control levels as input to pathogen WQ model
- Evaluate potential water quality impacts with the corresponding CSO control levels

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Interactive Survey

- We would like your feedback:

Please go to www.pollev.com/mottmac355 on your smartphone

What do you consider the primary benefit of green infrastructure practices?

Water quality improvements

Reduced flooding

Water harvesting / conservation

Aesthetic, green community spaces

Increased property values

Job creation for operations & maintenance

What do you consider the primary barrier to green infrastructure implementation in public right-of-ways and open space areas?

- Project site identification
- Operations & maintenance requirements
- Cost effectiveness relative to storage (relative to other technologies)
- Lack of funding/acceptance due to newer technology

What do you consider the primary benefit of grey infrastructure practices?

- Reduced flooding
- Lower maintenance than green infrastructure
- Lower cost per gallon captured vs. green infrastructure
- Less visible

What do you consider the primary barrier to grey infrastructure implementation?

Capital cost

Large site disruption during construction

Does not create long term jobs
(less maintenance required)

Does not contribute to community aesthetics/green spaces

What do you consider more appropriate in selecting CSO control alternatives?

Low capital costs, higher long-term maintenance cost

High capital costs, lower long-term maintenance cost

Please select the indicator most important to your stakeholders in considering the financial capability of the community.

- Median household income
- Current cost of wastewater/water usage
- Unemployment rate
- Cost of living (available disposable income)
- % of homes owned vs. rented in the City
- % of population receiving social security benefits
- % of population below the poverty line
- Other?

Development and evaluation of alternatives report

Draft report outline

1. Introduction

- 1. Regulatory Context and Report Objectives
- 2. Combined Sewer System and Service Area Overview
- 3. Previous Studies
- 4. Organization of Report
- 5. Certification

2. Overview of Combined Sewer Overflow Locations and Impacts on Receiving Waterbodies

3. CSO Control Objectives

[sub-sections for CSO outfall groups as appropriate]

4. Identification and Screening of Alternative CSO Control Approaches

[sub-sections for CSO outfall groups as appropriate]

5. Basis for Cost/Performance Considerations

- 1. Levels of Control
- 2. Estimating Costs of Controls [application of PVSC Technical Guidance Manual]

6. Development and Evaluation of Alternative Approaches for CSO Control

[sub-sections for CSO outfall groups as appropriate]

7. Conclusions

Appendices

Alternatives Evaluation - JMEUC

- Treat increased wet weather flow at JMEUC WWTF pumped from Elizabeth combined sewer system:
 - Interim increase from current maximum rate (36 mgd) to 55 mgd with advanced pumping controls (no increase in peak flow rate at WWTF)
 - Long-term plan to increase to 140 mgd+ with plant improvements
- Evaluate potential to increase available wet weather capacity at JMEUC WWTF with additional I/I reduction in sanitary sewer areas

Alternatives Evaluation

Control Objectives – Presumption vs. Demonstration Approaches

Presumption Approach (performance based)

- Presumes controls needed to meet **defined performance criteria** will provide adequate level of protection to meet WQ-based objectives of Clean Water Act
 - Reduction of CSO frequency to an average of 4 overflows per year (with discretion to add 2 additional overflows)
 - Elimination or capture for treatment of 85% of the volume of combined sewage in CSS during precipitation events on an "average annual basis."
 - Elimination or capture for treatment of the mass of pollutants in CSS equal to 85% control by volume.
 - Still requires post-construction compliance monitoring

Demonstration Approach (WQ based)

- Requires permittees to demonstrate that:
 - The LTCP is adequate to meet WQ standards
 - Remaining CSO discharges will not preclude attainment of WQ standards
 - LTCP provides maximum pollutant reduction benefits **reasonably attainable**
- Water quality data and modeling to obtain sufficient information to identify the appropriate level of CSO control
- Post-construction compliance monitoring

Alternatives Evaluation

Evaluation Criteria

Alternatives will be evaluated based on criteria including:

- Potential reduction of overflows
- Available area
- Cost
 - Capital
 - Financial capability analysis
- Operational & maintenance considerations
- Traffic disruptions / existing infrastructure
- Community impacts / benefits

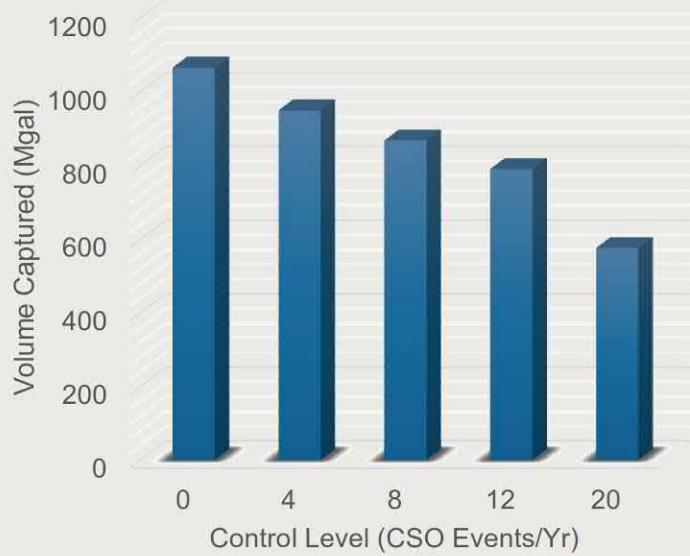
Alternatives Evaluation

Top 20 Events – Existing Conditions 2004 Typical Year

| Rank | Event | Total CSO (MG) | Start | End |
|------|-------|----------------|-----------------|------------------|
| 1 | 45 | 145.61 | 9/28/2004 9:15 | 9/29/2004 5:09 |
| 2 | 42 | 89.27 | 9/8/2004 4:36 | 9/9/2004 20:26 |
| 3 | 44 | 64.23 | 9/18/2004 7:10 | 9/18/2004 13:47 |
| 4 | 32 | 61.07 | 7/18/2004 16:31 | 7/18/2004 23:44 |
| 5 | 27 | 56.73 | 6/25/2004 17:05 | 6/25/2004 23:23 |
| 6 | 52 | 54.39 | 11/28/2004 7:00 | 11/28/2004 15:29 |
| 7 | 30 | 44.49 | 7/12/2004 11:36 | 7/13/2004 6:53 |
| 8 | 19 | 44.09 | 5/12/2004 15:30 | 5/12/2004 20:40 |
| 9 | 33 | 39.91 | 7/23/2004 11:45 | 7/23/2004 23:33 |
| 10 | 6 | 39.12 | 2/6/2004 8:05 | 2/6/2004 23:21 |
| 11 | 14 | 38.59 | 4/12/2004 18:35 | 4/14/2004 18:40 |
| 12 | 34 | 33.40 | 7/27/2004 16:18 | 7/28/2004 1:47 |
| 13 | 39 | 30.81 | 8/14/2004 22:50 | 8/16/2004 9:16 |
| 14 | 15 | 30.34 | 4/26/2004 2:32 | 4/27/2004 1:58 |
| 15 | 40 | 29.89 | 8/21/2004 13:20 | 8/21/2004 17:45 |
| 16 | 29 | 29.38 | 7/5/2004 2:50 | 7/5/2004 15:08 |
| 17 | 48 | 22.75 | 11/4/2004 14:25 | 11/4/2004 23:51 |
| 18 | 53 | 21.63 | 12/1/2004 4:45 | 12/1/2004 14:36 |
| 19 | 18 | 18.78 | 5/10/2004 23:55 | 5/11/2004 3:24 |
| 20 | 49 | 18.37 | 11/12/2004 9:29 | 11/13/2004 5:27 |

Alternatives Evaluation

Preliminary Storage Volume Sizing by Control Level System-Wide Total Storage Volume and CSO Volume Captured



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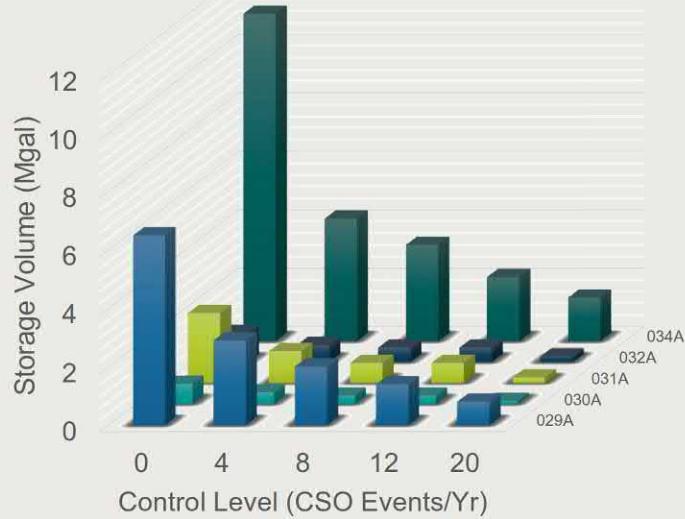
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Alternatives Evaluation

Preliminary Storage Volume Sizing by Control Level Breakdown by Outfalls

Outfalls along Arthur Kill



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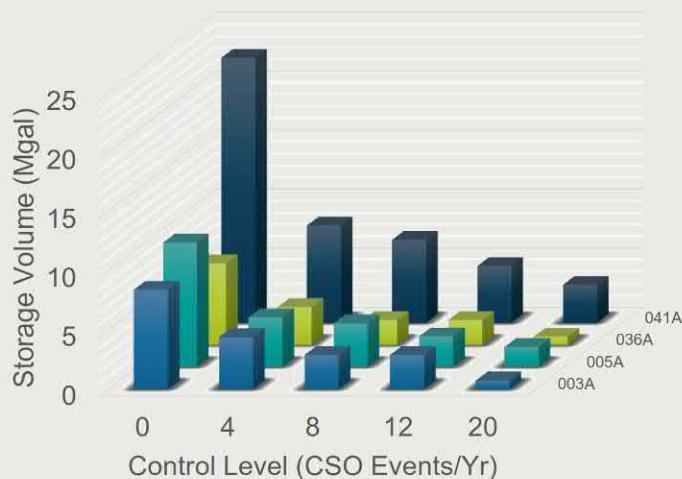
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Alternatives Evaluation

Preliminary Storage Volume Sizing by Control Level

Breakdown by Outfalls

Northern Elizabeth R. Outfalls



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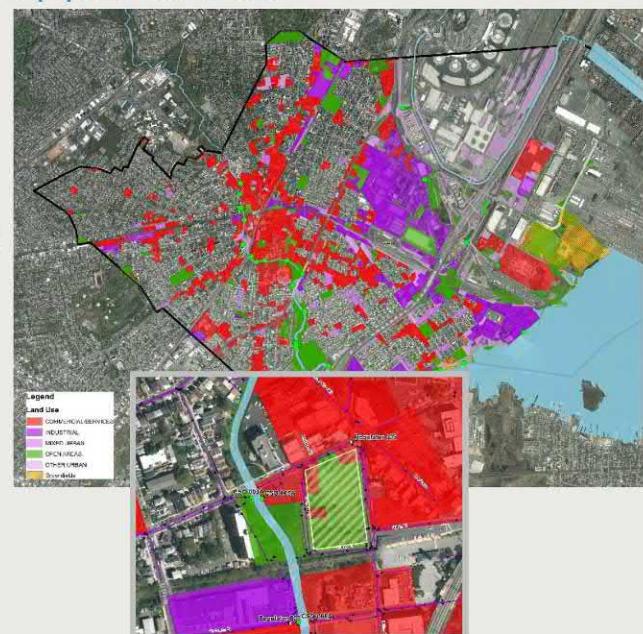
47

Alternatives Evaluation: Siting Analysis

Objective: To identify potential sites for storage or end-of-pipe treatment.

Analysis using GIS (mapping) data, including:

- Aerial photography
- Land Use / Land Cover
- Property data (vacant land, land ownership, property value)
- Open Space / Green Acres
- Soil Type
- Topography
- Contaminated Sites
- Brownfields



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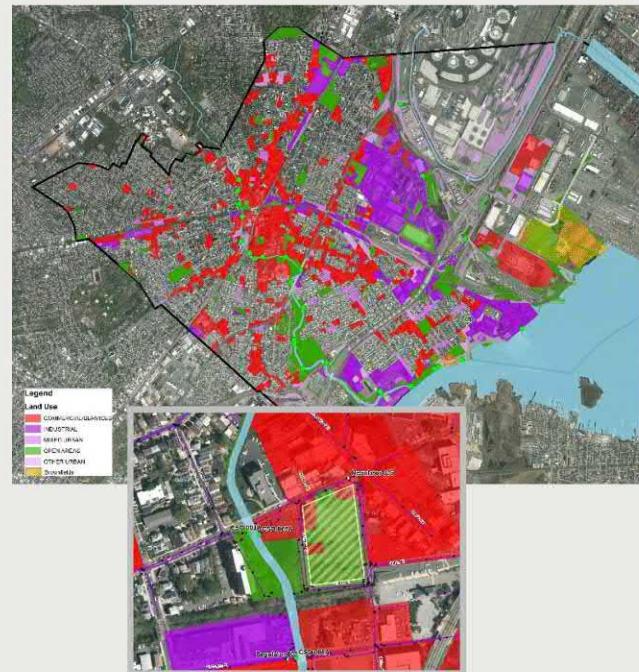
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Alternatives Evaluation: Siting Analysis

Initial Screening:

- Subtract residential areas, transportation corridors and water bodies
- Analyze parcels surrounding outfalls for:
 - Parcel size and open space area
 - Distance from outfall, regulator, and S/F control facility
 - Parcel ownership (City, other public, and private)
 - Land use and density
 - Existing infrastructure
 - Existing re-development commitments
 - Public acceptance and improvement opportunity



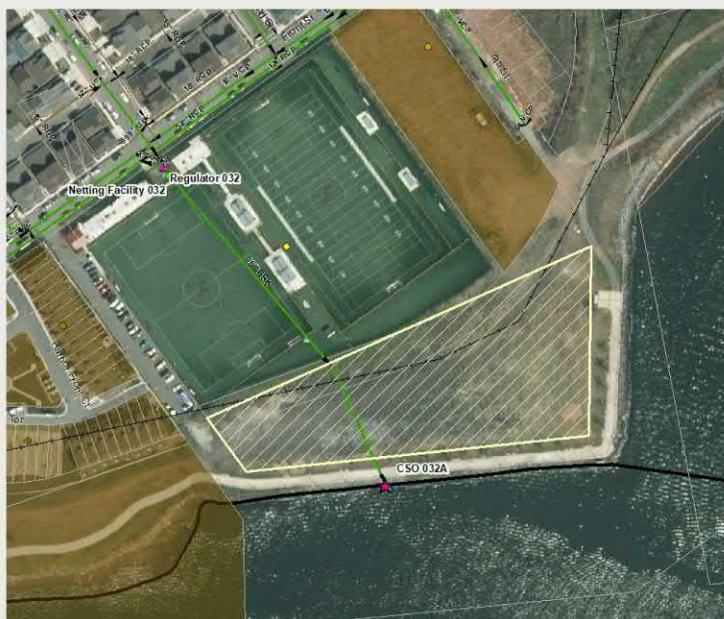
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Examples of Potential Sites

Example 1: CSO-032A



Area available:

- 2.8 acres in Arthur Kill Park open space adjacent to Outfall 032A (Court St. & Waterfront)

Ownership:

- City of Elizabeth

Land use considerations:

- Abandoned, buried railroad that cuts through the property.
- Site listed on NJDEP Recreation and Open Space Inventory (ROSI) database as a Green Acres property. Only green infrastructure alternatives allowed?
- Site is in concept design for park expansion likely in the next 3 years and may not align with CSO LTCP.

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Examples of Potential Sites

Example 2: CSO-029A



Area available:

- 4.1 acres at Elizabeth Ave. & S. 1st St.
- Underutilized Industrial parking and open space (vacant land) northwest of Outfall 029A

Ownership:

- MASH Realty Company

Land use considerations:

- Abandoned, buried railroad that cuts through the property.

Examples of Potential Sites

Example 3: CSO-001A



Area available:

- 9.2 acres at Parking Lot P1 for Newark Liberty International Airport
- 200 feet north of Outfall 001A

Ownership:

- Port Authority of NY & NJ

Land use considerations:

- Coordination with and approval from Port Authority of NY & NJ required

Examples of Potential Sites

Example 4: CSO-013A



Area available:

- 0.55+0.33 acres of underutilized parking lot at Bumet St. and Rahway Ave.
- Adjacent to Outfall 013A

Ownership:

- Elizabeth Center Apartments, Union County

Land use considerations:

- Could also be used for Outfall 016A

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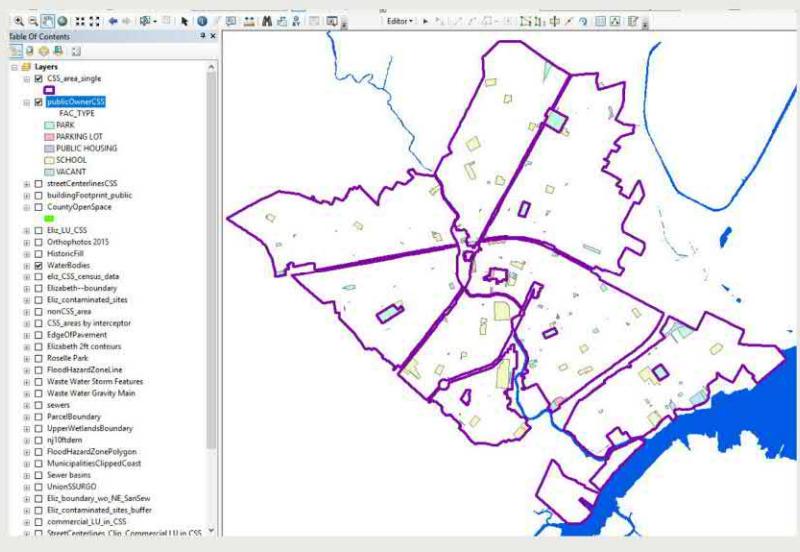
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Alternatives Evaluation: Green Infrastructure Screening

Green infrastructure (GI) = practices which reduce stormwater volume or flow rate by allowing the stormwater to infiltrate, to be treated by vegetation or by soils, or to be stored for reuse

- Desktop, planning-level study
- Estimate upper bound on impervious acres that could be feasibly managed by GI practices
- Following Chapter 2 “Locating and Assessing the Feasibility of Green Infrastructure” from NJDEP guidance document *Evaluating Green Infrastructure: A Combined Sewer Overflow Control Alternative for Long Term Control Plans*



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Green Infrastructure Siting Evaluation

Analysis using GIS (mapping) data, including:

- Boundary of combined sewer area
- Aerial photography
- Land Use / Land Cover
- Tax parcels including area and ownership
- Building footprints
- Impervious area
- Streets
- Soil Type / Depth to Water (limited info on soil infiltration potential b/c urban land)
- Contaminated Sites



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Green Infrastructure Siting Evaluation

Strategies considered:

- Bioretention (raingardens, bioswales, etc.)
- Pervious pavement
- Dry wells



Potential locations considered:

- City right-of-way – curb strip
- City right-of-way – shoulder in non-parking locations
- City public and school properties
- Parking lanes
- Parking lots
- Roofs – dry wells



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Alternatives Evaluation

Green Infrastructure (GI) Screening

Key assumptions and parameters

- Drainage-area-to-practice-area ratios
- Installation numbers per street segment
- Installation dimensions

Basic input parameters

| | | |
|--|-------|------|
| Area of Elizabeth (ac & sq mi) | 8,842 | 13.8 |
| Combined sewer service area, CSSA (ac & sq mi) | 4,100 | 6.4 |
| Percent of Elizabeth in CSSA | 46% | |
| Percent impervious in CSSA | 62% | |
| Impervious area in CSSA (ac & sq mi) | 2,542 | 4.0 |
| County and local street segments in CSSA (each spans one linear block) | | |
| Number of segments | 1750 | |
| Total length, mi | 130.1 | |
| Average segment length, ft: | 393 | |

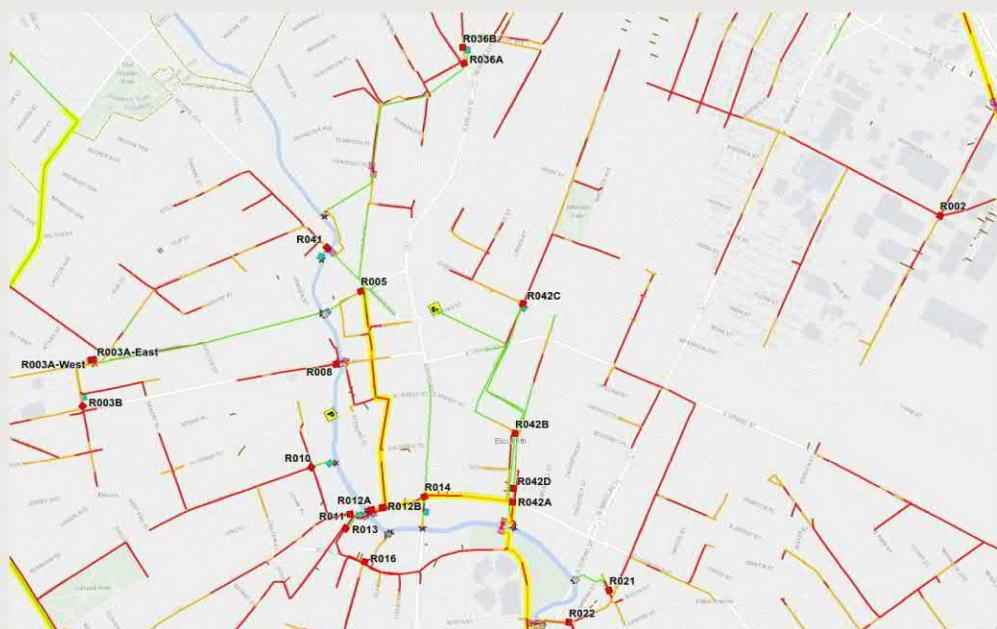
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Alternatives Evaluation

Inline Storage Screening



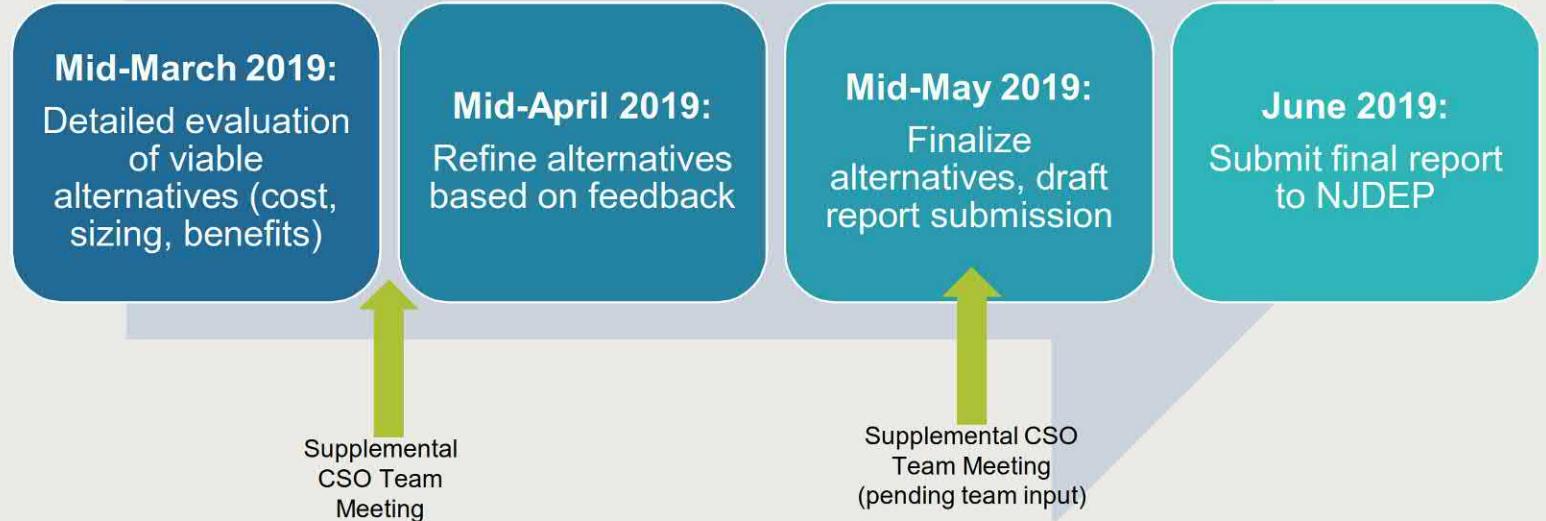
- Over typical year, many upstream sewers reach pipe full capacity.
- Limited application for static weir raising

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Next Steps – Timeline



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Next meeting lookahead

Next Supplemental CSO Team meeting

March – April 2019

Focusing on development and evaluation of alternatives report

- List of alternatives
- Screening for viable alternatives
- Sizing and costing of viable alternatives
- Modeling for CSO performance
- Draft report sections

Questions?



Thank you

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

Supplemental CSO Team

Meeting No. 6
Long-Term Control Plan Permit Compliance