Supplemental CSO Team
Meeting No. 5
Long-Term Control Plan Permit Compliance

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

October 26, 2018 – 10:00 am
Peterstown Community Center
408 Palmer Street, Elizabeth, NJ 07202

Meeting no. 5 agenda

• Prior meeting recap
  – Results from member surveys
• Status of DEP review of July 1, 2018 submittals
  – System Characterization Reports, Public Participation Process Report, Consideration of Sensitive Areas Report, and Baseline Compliance Monitoring Program Report
• Public participation process update
• LTCP step 2 - development and evaluation of alternatives
  – Project team schedule and draft report outline
  – Grouping of CSO outfalls/basins for control objectives and planning
  – Initial discussion of CSO control objectives
  – Identification and screening of available CSO control technologies
  – Initial investigation of increasing combined sewer system flow from Elizabeth to JMEUC plant
• Bayonne Wet Weather Demonstration Project treatment technologies
• Next meeting lookahead
Meeting no. 4 refresher
Material covered in prior meeting (6/5/2018):

- Summaries of the July 1, 2018 submissions
- Interactive surveys
- Alternatives evaluation overview

Results of member surveys

- What kind of organization do you represent?
  - Business/Industry: 43%
  - Environmental: 34%
  - Community/Resident: 14%
  - Government: 43%

- How clean do you think the Elizabeth River is?
  - Very clean: 36%
  - Somewhat clean: 64%
Results of member surveys

Would you/your group be willing to add green elements at home, like a rain garden?

- Yes: 94%
- No: 6%

What increase per month would you/your group accept for the CSO Control Program?

- $10 A: 6%
- $15 B: 88%
- $30 C: 6%
- $45 D: 0%

Results of member surveys

What is your preferred level of CSO control?

- Complete elimination: 6%
- Prescribed minimum (4%/yr or 85% capture): 29%
- Water quality-based cost/performance analysis: 65%
DEP review status – July 1, 2018 submittals
Quarterly progress meeting held on October 10, 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.

• **System Characterization Reports:** individual JMEUC and City of Elizabeth reports; positive verbal comments, awaiting written comments

• **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.

• **Public Participation Process Report:** joint report from the City of Elizabeth and JMEUC; comment letter dated 10/12/2018; preparing response

Public Participation Report - Summary of NJDEP Comments

• **Comment letter received October 12, 2018**

• **Spreadsheet format:**
  1. Does the report include clear discussion of specific topics
  2. Summary of Findings
  3. Action Required

• **Overview:**
  • Comprehensive variety of outreach and engagement methods
  • Recognition of engagement with hydraulically connected municipalities such as Roselle Park
  • Documentation of entities invited to join Supplemental Team and responses
  • Quarterly Supplemental Team meetings, documentation of agendas and meeting materials

• **Response will be provided to NJDEP by November 12, 2018**
Action Items for Public Participation – DEP Comment Responses

<table>
<thead>
<tr>
<th>Do</th>
<th>Measure</th>
<th>Identify</th>
<th>Continue</th>
<th>Consider</th>
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<tbody>
<tr>
<td>• Additional outreach to JMEUC separately sewer communities</td>
<td>• Number of attendees, social media posts, flyers distributed, etc.</td>
<td>• Specific affected organizations</td>
<td>• Surveys</td>
<td>• Public or Supplemental CSO Team review of key draft submittals</td>
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<td>• If other languages needed</td>
<td>• Recording comments</td>
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<td>• How updates will be provided to public (social media, council meetings, website, etc.)</td>
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Public participation process update

Public outreach and education

Future City – Elizabeth Estuary Day

• October 5, 2018
• Over 250 students and 40 adults
• YouTube video at: Elizabeth Estuary Day 2018 – YouTube
  https://www.youtube.com/watch?v=x5h6Rk7TSXk&feature=youtu.be

• Elizabeth Environmental Day, scheduled for April 26, 2019
Interactive Survey

- We would like your feedback:

Please go to [www.pollev.com/mottmac355](http://www.pollev.com/mottmac355) on your smartphone

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Development and evaluation of alternatives

Regulatory requirements

1. The permittees shall evaluate a reasonable range of CSO control alternatives that will meet the water quality-based requirements of the CWA.

2. The Development and Evaluation of Alternatives Report shall include a list of control alternative(s) evaluated for each CSO enabling the permittees, ..., to select the alternatives to ensure the CSO controls will meet the water quality-based requirements of the CWA.

3. NJPDES Permit Section G.4.

4. The permittees shall select either the Demonstration or Presumption Approach.

5. The permittees shall evaluate the practical and technical feasibility of the proposed CSO control alternative(s), and water quality benefits and give the highest priority to controlling CSO discharges to sensitive areas.
Which social media method would you suggest for effective LTCP messaging?

A. City of Elizabeth Twitter feed
B. New Elizabeth/JMEUC CSO LTCP Twitter feed
C. Facebook
D. LinkedIn
E. City of Elizabeth & JMEUC website

How would you like to review key draft submittals?

Content and summaries presented at CSO Supplemental Team meeting presentations

- Review full draft submittals
- Review draft Executive Summary
What are you most interested in discussing at upcoming meetings?

- CSO receiving water quality impacts
- Approach to financial capability assessment
- Green infrastructure analysis
- Presumption vs. Demonstration approach
- Other?

Development and evaluation of alternatives

Regulatory requirements

First, let's consider: “What are the pollutants of concern for CSOs?”

Pathogens & Floatables

In NJ, earlier DEP emphasis on floatables from CSOs has largely eliminated floatables through strategies such as City’s netting and screening facilities. So in this LTCP, the focus is:

Pathogens

Other pollutants should be considered, but are not the focus of the LTCP.
### Development and evaluation of alternatives report

#### Preliminary project schedule

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Target Date</th>
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<tbody>
<tr>
<td>Project kick-off</td>
<td>September 14, 2018 (TBD)</td>
</tr>
<tr>
<td>Identify key CSO outfall groups for planning purposes</td>
<td>September 14, 2018 (TBD)</td>
</tr>
<tr>
<td>Define CSO control objectives for each outfall group</td>
<td>November 2, 2018</td>
</tr>
<tr>
<td>Status meeting (CSO-208) with ADCP</td>
<td>October 10, 2018</td>
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<tr>
<td>Supplement: CSO Team formation</td>
<td>October 10, 2018</td>
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<tr>
<td>Alternatives screening</td>
<td>Confirmed at September 6, 2018 meeting of the NCSO Group</td>
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<tr>
<td>Complete alternatives for developable alternatives</td>
<td>Mid to Late November 2018</td>
</tr>
<tr>
<td>Status meeting (OA-208) with ADCP</td>
<td>Early December 2018</td>
</tr>
<tr>
<td>CSO Team formation</td>
<td>May to mid-June 2018</td>
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#### Substantially complete technical evaluation of potential alternatives
- LSIR of facilities for a range of control targets
- Characteristic and quantity benefits
- Develop cost estimates

- Status meeting (CSO-208) with ADCP
- Supplement: CSO Team formation

- Late March 2019
- May 2019

### 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

6. **Development and Evaluation of Alternative Approaches for CSO Control**
   [sub-sections for CSO outfall groups as appropriate]

7. **Conclusions**

**Appendices**

**Notes**

- October 26, 2018
- Supplemental CSO Team Meeting No. 5
Development and evaluation of alternatives

Groupings of CSO outfalls/basins for control objectives and planning

By waterbody classification

By hydraulic connectivity, size, & proximity

Development and evaluation of alternatives

CSO outfalls grouping

By waterbody classification

- FW2-NT Waters
  - Outfalls 003A, 005A, 008A, 010A, 012A, 013A, 014A, 016A, 036A, & 041A

- SE3 Waters
Development and evaluation of alternatives

CSO outfalls grouping

By hydraulic connectivity, size, & proximity

- **Area A – Easterly Interceptor**
  - A1 – 001A & 002A
  - A2 – 034A & 039A
  - A3 – 029A, 030A, 031A, 032A
  - A4 – 035A, 043A & 038A
  - A5 – 037A
- **Area B – Westerly Interceptor**
  - B1 – 003A, 005A, 036A & 041A
  - B2 – 008A, 010A, 013A, & 016A
  - B3 – 012A & 014A
  - B4 – 042
  - B5 – 021A, 022A, & 026A
  - B6 – 027A, 028A, & 040A

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Development and evaluation of alternatives

Initial discussion of CSO control objectives

**Presumption vs. Demonstration Approach**

- Alternative methods for developing a water quality-based control program in the LTCP
  - Presumption approach (performance based)
  - Demonstration approach (water quality based)
  - Combination of both

- **Presumption Approach**
  - Presumes that implementation of controls needed to meet defined performance criteria (e.g., controlling CSOs to no more than an average of four overflow events per year) will provide an adequate level of protection to meet the WQ-based objectives of the CWA.

- **Demonstration Approach**
  - Requires municipality 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

October 26, 2018  Supplemental CSO Team Meeting No. 5
Development and evaluation of alternatives
Initial discussion of CSO control objectives

Presumption Approach: Performance Criteria

• 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

Development and evaluation of alternatives
Initial discussion of CSO control objectives

Coordination with NJ CSO Group

• September 6 meeting of NJ CSO Group with DEP

• Water quality modeling of harbor
  - Baseline CSO and plant effluent flows and concentrations provided to PVSC
  - Model runs for baseline and full CSO removal scenarios to set boundaries on CSO impacts (by October 31)

• Objectives and approach may vary by receiving water and CSO outfall groups
Development and evaluation of alternatives

CSO control technology screening

Logical decision-making process: Screen different control technologies before detailed evaluations

Screening based on:

- Predicted effectiveness
  - Bacteria reduction
  - Volume reduction
  - Basement / street flooding control
- Implementation and operation factors
  - Land requirements
  - Suitable site locations
  - Maintenance intensity and reliability
- Cost and performance data

NJPDES CSO Permit list of alternatives

- Green Infrastructure
- Collection System Storage
- Sewage Treatment Plant (STP) Expansion & Storage
- Infiltration / Inflow Reduction in entire connected system
- Sewer Separation
- CSO Discharge Treatment
- CSO Related Bypass at STP (Blending)
Development and evaluation of alternatives

CSO control technology screening

Green Infrastructure
- Buildings
  - Green Roofs
  - Blue Roofs
  - Rainwater Harvesting
- Impervious Areas
  - Permeable Pavements
  - Planter Boxes
  - Pervious Areas
  - Bioswales
  - Free-Form Rain Gardens

Source Control Technologies
- Stormwater Management
  - Street/Parking Lot Storage (Catch Basin Control)
  - Catch Basin Modification (for Floatables Control)
  - Construction Site Erosion & Sediment Control
  - Illegal Dumping Control
  - Pet Waste Control
- Litter Control
- Illicit Connection Control
- Good Housekeeping
  - Water Conservation
  - Catch Basin Stenciling
  - Community Cleanup Programs
  - Public Outreach Programs
  - FOG Program
  - Garbage Disposal Restriction
  - Pet Waste Management
  - Lawn and Garden Maintenance
  - Hazardous Waste Collection

Source Control (cont.)
- Ordinance Enforcement
  - Construction Site Erosion & Sediment Control
  - Illegal Dumping Control
  - Pet Waste Control
  - Litter Control
  - Illicit Connection Control
  - Good Housekeeping
  - Street Sweeping/Flushing
  - Leaf Collection
  - Recycling Programs
  - Storage/Loading/Unloading Areas
  - Industrial Spill Control

Development and evaluation of alternatives

Increase conveyance and treatment

Initial investigation of increasing combined sewer system flow from Elizabeth to JMEUC plant
- TAPS pumping station location
- TAPS pumping rate
- Peak timing of TAPS flow versus sanitary sewer system flows from JMEUC service area
- Impacts on hydraulic grade line in trunk sewers
Location of Trenton Avenue Pump Station

(from Figure 2.2 in JMEUC SCR; source: City of Elizabeth SCR, both June 2018)
Peak flow timing for the Elizabeth combined sewer system and for the upstream sanitary sewer portions of the JMEUC trunk sewer system

Modeled Flow from TAPS to JMEUC WWTF

- 36 mgd – current max rate per contractual limit
- 55 mgd – potential future max rate per physical limit of pumping facilities
Simulated flow at WWTF – 2/6/2004 Event

Simulated flow at WWTF – 4/12/2004 Event
Simulated flow at WWTF – 9/17/2004 Event

Simulated flow at WWTF – 9/28/2004 Event
Upstream extent of hydraulic grade line impacts of increased TAPS flow

Comparison of Peak HGL along the Trunk Sewers (September 28, 2004 Storm)
Preliminary findings on typical year CSO performance

Increasing Trenton Avenue PS maximum discharge to 55 Mgal/day, with existing collection and treatment system, predicted to result in:

17.6% reduction in annual total overflow volume, from 1065 to 878 Mgal.

12.5% reduction in the number of overflow events per year, from 56 to 49 Mgal.

10.1% reduction in the overflow volume for the 5th largest event, from approximately 56.7 to 51 Mgal.

Much more pronounced impacts nearer to the pump station, with an estimated 71.4% reduction in total annual overflow volume at CSO Outfall 035A, from 81.3 to 23.2 Mgal.

Bayonne Wet Weather Treatment Demonstration Project: treatment technologies

Project objectives

- Gather performance data & evaluate the effectiveness of CSO treatment technologies
  - Under field conditions
  - For solids removal & disinfection
  - At remote satellite locations

- Gain improved understanding of their potential use for satellite wet weather treatment, including CSOs
  - Reliability
  - Scalability
  - Anticipated capital and O&M costs
Bayonne Wet Weather Treatment Demonstration Project

Six (6) pilot technologies tested

<table>
<thead>
<tr>
<th>Function</th>
<th>Type</th>
<th>Technology</th>
</tr>
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<tbody>
<tr>
<td>Solid removal</td>
<td>Vortex</td>
<td>Storm King</td>
</tr>
<tr>
<td>Solid removal</td>
<td>Plate settler unit</td>
<td>Terre Kleen</td>
</tr>
<tr>
<td>Enhanced solid removal</td>
<td>Compressed media filter</td>
<td>Flex Filter</td>
</tr>
<tr>
<td>Disinfection</td>
<td>Low pressure UV</td>
<td>Trojan</td>
</tr>
<tr>
<td>Disinfection</td>
<td>Medium pressure UV</td>
<td>Aquionics</td>
</tr>
<tr>
<td>Disinfection</td>
<td>Peracetic acid (PAA)</td>
<td>Injexx/Verdent</td>
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Selected based on:
- Suitability for satellite facilities
- Promising data on CSO performance
- Simple operation / low maintenance
- Small footprint
- Cost

Bayonne Wet Weather Treatment Demonstration Project

Project site layout photo
Bayonne Wet Weather Treatment Demonstration Project

High rate solids removal

Storm King

Schematic

Typical full scale installation

Bayonne Wet Weather Treatment Demonstration Project

Enhanced high rate solids removal

Flex Filter (Westech WWETCO)

- High rate filtration system
- Uses synthetic compressible media
- Incoming flow applies hydrostatic force to the compression bladder causing tapered compression
- Densely compressed media at the bottom, expanded bed toward the surface
- Filter requires backwash: stop feed, which decompresses media; apply air scour and backwash water
Bayonne Wet Weather Treatment Demonstration Project

General findings / observations

Course solids must be controlled!
- Course screening should precede any treatment scenarios.
- CSO Permit requires solids/floatables removal equal to or greater than ½ inch; primary screening must meet this requirement.

Substantial prior volatile suspended solids (VSS) removal required for an effective disinfection process.
- Total suspended solids (TSS) have 2 components
  - Fixed suspended solids (FSS): primarily grit and sediment material
  - Volatile suspended solids (VSS): primarily organic material

Bayonne Wet Weather Treatment Demonstration Project

Summary of results

<table>
<thead>
<tr>
<th>High-rate solids removal (Storm King &amp; Terre Kleen)</th>
<th>Enhanced high-rate solids removal (Flex Filter)</th>
<th>UV Disinfection</th>
<th>Peracetic Acid (PAA) Chemical Disinfection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective for grit removal (heavier solids)</td>
<td>Filter was effective, but required shorter run time and frequent backwash.</td>
<td>UV transmittance (UVT) decreases as TSS, COD, &amp; CBOD increases</td>
<td>Effective disinfectant at comparable or lower dosages to chlorination.</td>
</tr>
<tr>
<td>Unable to reduce solids loadings for UV disinfection</td>
<td>Average TSS (FSS + VSS) removal in most runs: close to 90%.</td>
<td>Lower UVT requires higher UV output (more bulbs)</td>
<td>PAA contact time of 3 to 6 minutes were effective, compared to typical 30 minutes for chlorine.</td>
</tr>
<tr>
<td>Low volatile suspended solids (VSS) removal overall</td>
<td>Effective on its own for UV pretreatment.</td>
<td>Both low &amp; medium pressure units capable of achieving water quality objectives for pathogen reduction, but only if preceded by compressed media filter (Flex Filter)</td>
<td>Less toxic than chlorine disinfection (no by products) and no dechlorination requirements.</td>
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Next Steps – Timeline

- **Mid-Late November 2018**: Complete initial screening to identify viable alternatives
- **Mid-March 2019**: Detailed evaluation of viable alternatives (cost, sizing, benefits)
- **Mid-April 2019**: Refine alternatives based on feedback
- **Mid-May 2019**: Finalize alternatives, draft report submission
- **June 2019**: Submit final report to NJDEP

Next meeting lookahead

**Next Supplemental CSO Team meetings**
- Mid December 2018 – Early January 2019
- 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

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