

Bergen County Utilities Authority  
Supplemental CSO Team  
Meeting Number 9  
Development and Evaluation of Alternatives  
BCUA Administration Building, Public Meeting Room  
May 15, 2019 10:00 – 11:30 am

Attendees – See attached sign in sheet

Presentation slides attached

Minutes

1. Introductions
  - New participants from the general public were welcomed.
2. Safety Minute
  - Ladder safety - see attached presentation
3. Review of prior meeting
  - John presented recap, see attached presentation.
  - John indicated minutes from prior meetings are now posted on the BCUA website.
    - DEP asked what documentation is included on the BCUA website.  
John, indicated minutes, sign in sheets and presentations.
4. Status of submissions
  - Consideration of Sensitive Areas – Approved 4/18/2019
  - Baseline Compliance Monitor Report – Approved 3/1/2019
  - System Characterization Reports – BCUA, Fort Lett, Hackensack and Ridgefield Park all approved various dates.
  - PPP – NJDEP requested additional information on specific activities, responses are being drafted, due to NJDEP 5/23/2019
5. Public Participation Discussion
  - John expanded on certain aspects of the role of the SCSO Team
  - Reviewed the NJDEP letter
  - Requested suggestions for specific activities to present information on CSOs and the LTCP:
    - Earthfest at Overpeck – River Park Commission this Sunday, John indicated there were some online resources, and suggested brochures but that the timeframe was too short to formally participate.
    - Hold meetings in the evening to allow participation by those with daytime commitments.
    - Fort Lee street fair in June, date is being finalized.
    - Fort Lee intends to make a presentation once the costs are finalized.
    - Hold meetings near public transportation.

## 6. Development and Evaluation of Alternatives Review

- NJDEP stated that if new ideas come out outside the alternative analysis, you will be able to use them in implementing the LTCP.
- BCUA – John presented, see attached presentation.
  - DEP will entertain modification to % removal requirements during wet weather for plants that seek permission to establish a bypass procedure.
  - DEP inquired on the highest flows seen at the plant BCUA has seen, John indicated the plant has seen flows greater than 200MGD.
  - It was asked what model was used, Mark DelBove indicated he thought BioWin.
  - NJDEP wanted to know if BCUA owns the property the additional facilities are shown on, John indicated they did, but it may be environmentally or otherwise constrained.
  - It was discussed that the potential plant wet weather capacity and interceptor capacity are similar so there is little opportunity for the municipalities to send additional wet weather flow to the plant without upgrading the interceptor and plant capacity.
- Village of Ridgefield Park – John presented, see attached presentation.
- Fort Lee – Gary presented, see attached presentation.
  - Still undecided between presumptive and demonstration.
  - Indicated the regulation did not define % capture, using rain event plus 12 hours to identify wet weather periods.
  - Green infrastructure expensive and did not result in much change in % capture.
  - Storage maintenance costs make it impractical.
  - Comment made, for green infrastructure, do you have the land to implement.
- Hackensack – Frank presented, see attached presentation.
  - Hackensack River has different water quality than Hudson. Leaning towards the presumptive approach because of this.
  - Most likely separation of sewers will not occur due to expense.
  - Modeled green infrastructure. Green infrastructure movement for new development is occurring in city for redevelopment areas. It will be a long time component, but there still needs gray infrastructure alternative.
  - Infiltration and inflow (I/I) investigations revealed no “gushers” or “runners” present. There is little low hanging fruit available to reduce I/I.
  - Primary consideration given to offline storage. Most likely two storage tanks.
  - Storage tank location options are the Costco Parking lot and the Anderson Street park area.
  - Posted surveys to website to get the public's opinion and to educate.
  - They have a website and email setup for public participation.
  - Hackensack Medical Center localized sewer separation. The railroad in area creates a berm that causes flooding. The city has

asked Arcadis to look at the flooding in that area, there could possibly be a sewer separation project in that area.

7. Upcoming Schedule / Next Steps

- Development and Evaluation of Alternative Report due July 1, 2019
- NJDEP will try to provide initial comments within 60-90 days.

8. Wrap up and open discussion of additional topics.

- NJ Future
  - Requested an executive summary that could be distributed to the public. John indicated that an executive summary is already planned.
  - Asked if community benefits were being considered, John indicated that the reports are focused on the permit requirements to address CSO reduction. Incorporation of community benefits is a political decision to be made separately.
  - Social, economic and environmental (triple bottom line assessment) is being piloted in Camden.
  - Water conservation can get residents involved.
  - Make the conversations identifiable to the public.
- Little Ferry resident
  - Little Ferry is a direct recipient of the CSO flows.
  - Disappointed in the level of public participation.
  - Discussed that Little Ferry has almost no waterfront access, and would like to see an emphasis on green space. John indicated that since the costs were being borne by the combined sewer communities it was unlikely they make adding green space in another municipality will be a part of their plans.
  - Suggested notifying local clubs and groups to get the word out. Rebuild by Design seems to be getting the word out.
- Fort Lee resident
  - Requested stock photos not be use used in the fliers, since community members may think that they were taken locally and be misled. At a minimum identify the photo source. John indicated we will try to be more sensitive to those issues in the future.

9. Next Meeting

- John will follow up with potential dates for late Summer if that does not work, then he will suggest some dates for early Fall.

Bergen County Utilities Authority  
 Supplemental CSO Team  
 Meeting Number 9  
 BCUA Administration Building, Public Meeting Room  
 May 15, 2019 10:00 am

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# Development and Evaluation of Alternative Controls

BCUA CSO Group Supplemental CSO Team Meeting #9

May 15, 2019



## Safety Topic

Ladders

**1**

**Pick the Right Ladder for the Job**

- Type
- Length
- Material

**2**

**Inspect the Ladder**

- Corrosion
- Rot
- Clean

**3**

**Set up the Ladder**

- 4:1 Rule
- Level Ground
- 3' Above Roof

**4**

**Use the Ladder**

- Keep centered
- 3 Points of Contact
- Proper footwear
- Use a toolbelt



# BCUA CSO Group Supplemental CSO Team

Meeting No. 9 Agenda

Refresher – In meeting #8 we covered:

- Submissions Status
  - Status of NJDEP Review of Characterization and Public Participation Reports
  - Status of Development and Evaluation of Alternatives
  - Draft Report Outline
  - Future Public Participation
  - Upcoming Schedule
- 
- Note minutes now posted on BCUA Website

# BCUA CSO Group Supplemental CSO Team

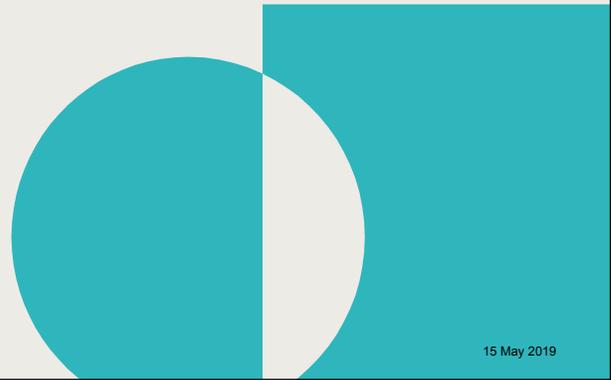
Meeting No. 9 Agenda



## BCUA CSO Group Supplemental CSO Team

Meeting No. 9 Agenda

- Submissions Status
- Public Participation Status
- Status of Development and Evaluation of Alternatives
  - BCUA
  - Village of Ridgefield Park
  - Fort Lee
  - Hackensack
- Upcoming Schedule



## BCUA Supplemental CSO Team

DEP review status – July 1, 2018 submittals

- **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. DEP comment letter dated 3/01/19. Approved 4/8/19
- **Public Participation Process Report:** comment letter dated 11/15/2018; revised report submitted 1/07/19. Received NJDEP Comments 4/23/19. Drafting response due 5/23/19.
- **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. DEP **Approval** letter dated 3/01/19.
- **System Characterization Reports:** comment letter dated 12/17/2018, Revised Report submitted 2/15/19. NJDEP **Approval** letter dated 03/05/19

## BCUA CSO Group Supplemental CSO Team

### Future Public Participation Activities

- Looking for Supplemental CSO Team to liaise with public and other groups.
- New member(s)

## Public Participation Comment Letter



April 23, 2019

To: Distribution List

Re: Review of Revised Public Participation Process Report Required by Part IV.D.3.b.iii  
 Bergen County Utilities Authority, NJPDES Permit No. NJ0020028  
 Borough of Fort Lee, NJPDES Permit No. NJ0034517  
 City of Hackensack, NJPDES Permit No. NJ0108766  
 Village of Ridgefield Park, NJPDES Permit No. NJ0109118

Dear Permittees:

The New Jersey Department of Environmental Protection (the Department) is in receipt of the following public participation process reports:

- BCUA CSO Group, "Public Participation Program Report," June 27, 2018, revised January 4, 2019,
- City of Hackensack's "Public Participation Process Report," June 2018, revised January 2019,
- Village of Ridgefield Park's "Supplemental CSO Team Public Participation Report," July 1, 2018, revised January 7, 2019,
- Borough of Fort Lee's "Public Participation Program Report for the Borough of Fort Lee," January 18, 2019.

These reports were submitted in accordance with Part IV.D.3.b.iii of your New Jersey Pollutant Discharge Elimination System (NJPDES) Combined Sewer Overflow (CSO) permit and serve as a necessary element to the Long Term Control Plan (LTCP) as due on June 1, 2020. The Department acknowledges that Bergen County Utilities Authority, the Borough of Fort Lee, the City of Hackensack and the Village of Ridgefield Park have committed to a single, coordinated LTCP where the Public Participation Process Report contains the appropriate certification statements. The Department also acknowledges that the Borough of Fort Lee, City of Hackensack, and Village of Ridgefield Park submitted Public Participation Process Reports intended to supplement the BCUA CSO Group report. On November 7, 2018 the Department issued comments on the initial June/July 2018 submittals. This letter serves to provide a determination on these submissions and to document the phone call on April 17, 2019 held between Department representatives and representatives for each of the above referenced CSO permittees. While Fort Lee is a participant in the BCUA CSO Group, note that comments on the January 18, 2019 submission entitled "Public Participation Program Report for the Borough of Fort Lee" will be made under separate cover.

As discussed in the April 17, 2019 phone call, the Department acknowledges that the revised submissions reflect the Department's recommendation to expand the composition of the regional supplemental team by stating the intention to invite additional non-governmental members of the community. The Department also acknowledges that in addition to the regional Supplemental CSO Team, Fort Lee and Ridgefield Park

# Public Participation Comment Letter

Response Due May 23, 2019

Looking for Planned and Future Activities

Actively Engage Public

Through LTCP Submission June 1, 2020

Suggestions?

have formed local Supplemental CSO Teams. However, gaps exist in the permittee planned efforts to engage the affected public beyond those that sit on the Supplemental CSO Teams. As required by Part IV.G.2.b. of the permit, "implementation shall actively involve the affected public throughout each of the 3 Steps of the LTCP process." As such, active involvement, including feedback opportunities, must be provided by the permittee to the affected public beyond those who sit on the Supplemental CSO Team. Additionally, as this next year or so will be the time frame during which the permittee will be developing and selecting alternatives, this will be the most advantageous time to solicit and address input from the affected public on the alternatives.

During the call we discussed several ways to demonstrate active involvement with the affected public. Below is a bulleted list of some of the ideas the Department suggested on the call:

- Update the Homeowner's guide, and other pamphlets/flyers to add a brief mention of the CSO LTCP process underway and how to get more information;
- Partner with local community groups to incorporate CSO outreach into their efforts that they are already undertaking;
- Present at a local community group's existing meeting, such as but not limited to, homeowner's associations, boating/kayaking clubs, service-based groups, business associations (ex. chamber of commerce, downtown associations), neighborhood associations, Parent Teacher Organizations, and religious or cultural associations;
- Present at the environmental commission, planning board, and town council/committee meetings.

When hosting your own public meeting, please consider:

- Locations that are most convenient and familiar to residents, such as a local library, community building or school;
- Inviting the local groups that you have offered a presentation to and ask them to inform their members of the meeting;
- Advertising the meeting through multiple avenues, include social media, flyers in high visible locations, municipal email distribution lists, municipal meeting calendars and advertisement in local newspaper; and
- Partnering with a local group for the meeting, which will likely draw a larger attendance.

The above is not a comprehensive list of what could done to demonstrate active involvement and the Department encourages you to think about which approaches are most efficient and effective for your individual communities and the specific segments of the affected public you are seeking to engage. Additionally, as offered during the conference call, the Department is available to meet with you to further discuss specific approaches for public participation, including, sharing best practices from other public participation efforts, feedback on upcoming meeting agenda, format and presentations; suggesting methods to advertise feedback opportunities and upcoming meetings.

The Department requests that the previous submissions be supplemented with additional information **within 30 days of the date of this letter** to detail planned and/or future efforts to actively engage the affected public leading up to the submission of the Development and Evaluation of Alternatives Report and the Selection and Implementation of Alternatives Report. This supplement may be in the form of a letter or as revisions to the plan itself.

## BCUA CSO Group Supplemental CSO Team

What does the permit say about Development and Evaluation of Alternatives?

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

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

The permittee 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

The permittee shall select either the Demonstration or Presumption Approach

## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

### To be Evaluated by Municipalities

- Green Infrastructure
- Increased Storage Capacity
- Infiltration and Inflow Reduction
- Sewer Separation
- Satellite Treatment of CSO Discharge

### To be Evaluated by BCUA

- Bypass of Secondary Treatment at STP
- Treatment Plant Expansion

## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

## BCUA Facilities

- Transport
- Treatment

## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

### BCUA Trunk Sewers Servicing Combined Sewer Municipalities:

Borough of Fort Lee

- Overpeck Trunk Sewer, and
- Overpeck Relief Sewer

City of Hackensack

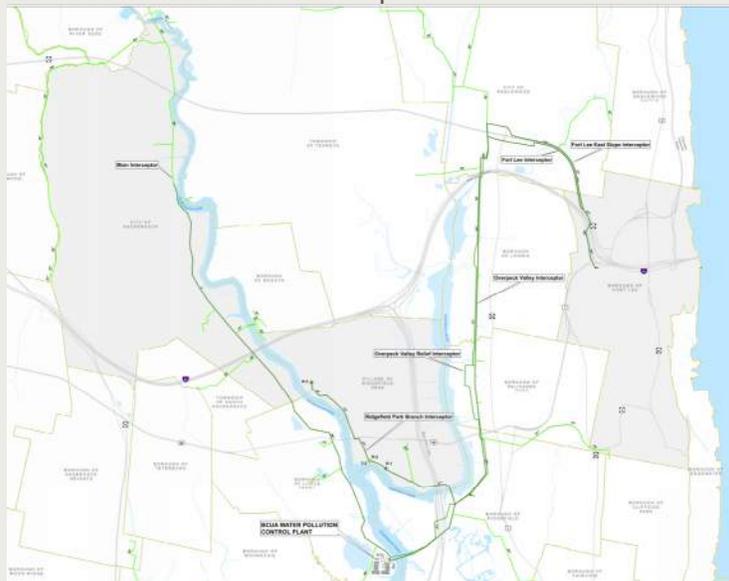
- Main Trunk Sewer

Village of Ridgefield Park

- Ridgefield Park Branch Intercepting Sewer
- Overpeck Trunk Sewer
- Overpeck Relief Sewer

## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report



## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

InfoWorks ICM Model was Used to  
Estimate Sewer Flow Capacity near WPCF:

Trunk Sewer	Estimated Max Flow (mgd)*
Main Trunk Sewer	115
Overpeck Trunk & Relief Sewers	95
Total Max Peak Flow to WPCF	210

\* Based on average wet well elevations and no system surcharge.

## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

Arcadis evaluation:

- Hydraulic and Process Capacity of each Treatment Unit:
  - Influent Pumping Station
  - Grit Removal
  - Primary Settling Tanks
  - Secondary Aeration Tanks
  - Final Settling Tanks
  - Chlorination and Dechlorination
  - Outfall

# BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

## Arcadis Evaluated:

- Existing Plant Capacity
- Bypassing of Secondary Treatment
  - Process Improvements
    - Needed to Meet NJPDES Permit Limits with Bypass
    - Construction and O&M Costs for Process Improvements Required
- Expanding STP Capacity
  - Treatment Improvements using
    - Ballasted Flocculation
    - Cost for Construction and O&M

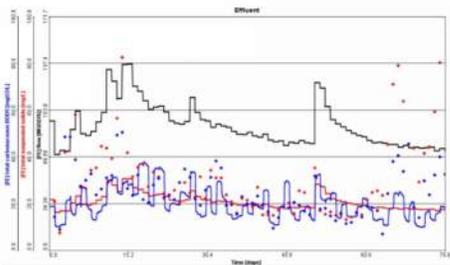


Figure 3. LF WPCF Model Wet Weather Output Comparison

Table 5. Wet Weather Statistical Analysis, mg/L

	Plant Data	Model
<b>TSS</b>		
- Average	25	21
- Min	7	16
- Max	51	31
- Std Deviation	10.1	3
- 30-day max	31	23
- 7-day max	36	28
<b>cBOD</b>		
- Average	34	20
- Min	8	10
- Max	117	38
- Std Deviation	22.5	7
- 30-day max	38	24
- 7-day max	64	31

## WWTP Calibration

Calibrated to 2015 Data

- TSS
- cBOD

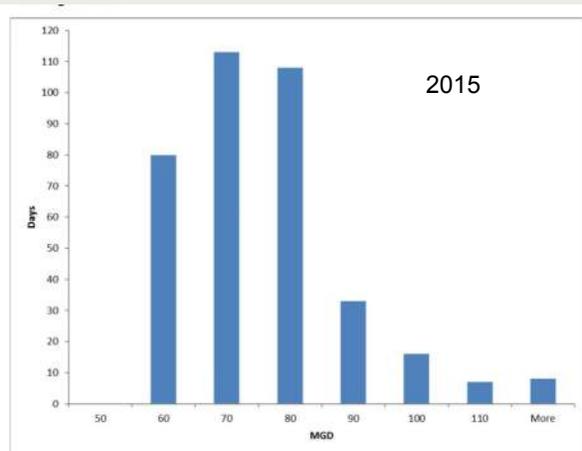
## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

### BCUA Water Pollution Control Facility Preliminary Information

Description	Max Flow (mgd)
NJPDES Permitted*	94
Average Daily Flow	75
Treatment Capacity (10 state standard)	105
Existing Hydraulic Capacity	220
Max. Peak Flows	>200

\* BCUA is currently undertaking a TMDL Study to potentially increase



## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

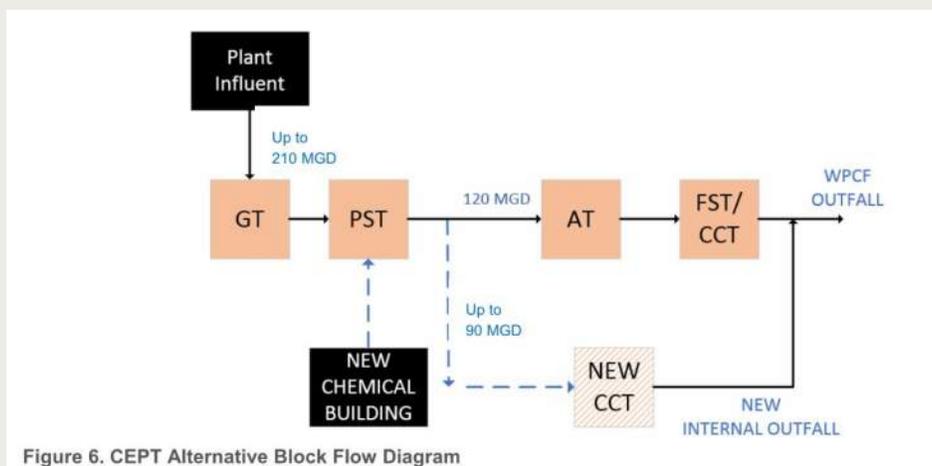


Figure 6. CEPT Alternative Block Flow Diagram

### Chemically Enhanced High Rate Treatment



Chemically Enhanced High Rate Treatment

BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

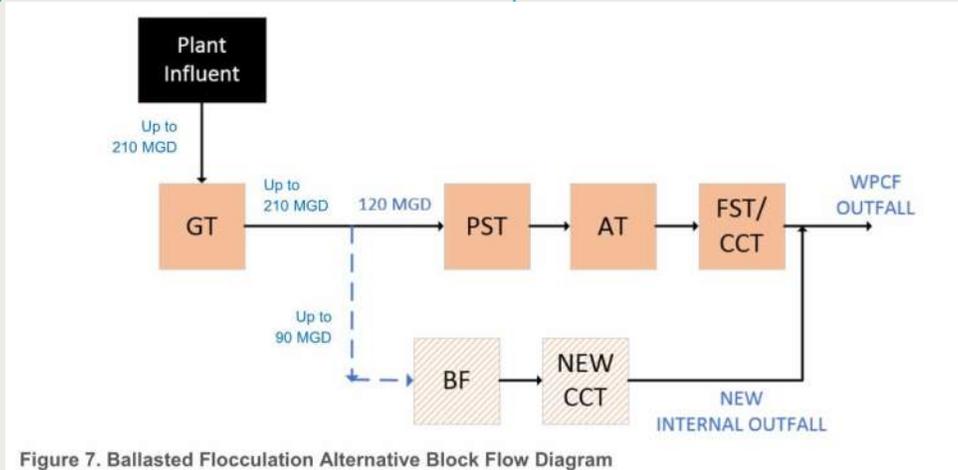


Figure 7. Ballasted Flocculation Alternative Block Flow Diagram

Ballasted Flocculation



Ballasted Flocculation

## BCUA CSO Group Supplemental CSO Team

### Development and Evaluation of Alternatives Report

Alternative	Construction Cost	Operation Costs	20-Year Present Worth
Chemically Enhanced High Rate Treatment	\$32M-\$127M (\$64M)	\$0.8M	\$44M-\$139M (\$76M)
Ballasted Flocculation	\$55M-\$220M (\$110M)	\$1.2M	\$73M-\$238M (\$128M)

Class 5 Cost Estimate (+100% -50%)

# BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

## Village of Ridgefield Park

### Preliminary Alternatives

## Ridgefield Park

Development and Evaluation of Alternatives Report – Screening Process

Area available: 0.8 Acres

Ownership: Village of Ridgefield Park

Land use considerations:

DPW Operations

BCUA Interceptor



## Ridgefield Park

Development and Evaluation of Alternatives Report – Screening Process

### 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

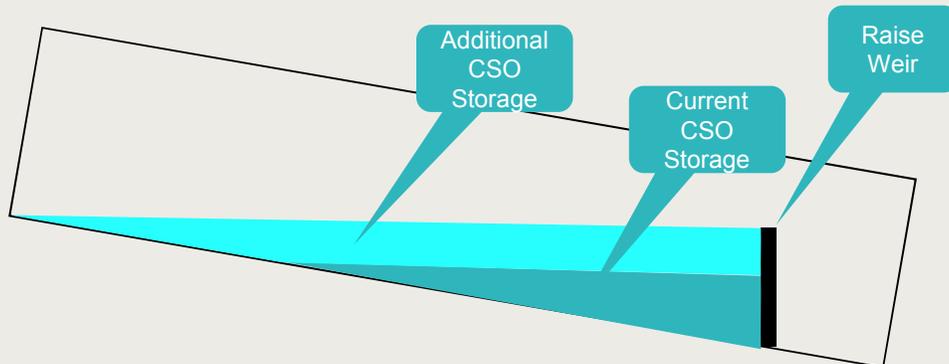


## Ridgefield Park

Development and Evaluation of Alternatives Report – Screening

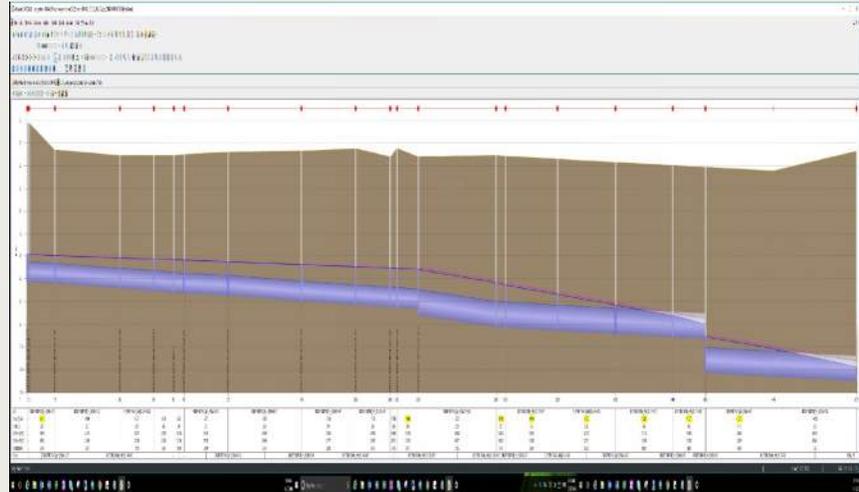
### Maximize inline storage capacity

Works best with large flat pipes, which are not typical in Ridgefield Park



# Ridgefield Park

## Development and Evaluation of Alternatives Report – Screening Process



# Ridgefield Park

NJ CSO Group Coordination – Agreed with BCUA Modeled Output

## Levels of Control

- 0 Overflows
- 4 Overflows
- 8 Overflows
- 12 Overflow
- 20 Overflows
- 85% Capture

	Rank	Event	Total CSO (MG)	Start	End
Top 4 Storm Events by Overflow	1	49	262.0	9/28/2004 5:30	9/30/2004 13:45
	2	46	154.4	9/8/2004 3:30	9/9/2004 22:00
	3	48	129.4	9/18/2004 7:15	9/18/2004 15:15
	4	36	115.0	7/18/2004 16:30	7/19/2004 2:00
Top 8 Storm Events by Overflow	5	56	106.9	11/28/2004 3:30	11/29/2004 0:15
	6	35	101.0	7/12/2004 9:15	7/14/2004 23:30
	7	32	98.1	6/25/2004 17:00	6/26/2004 6:15
	8	37	94.4	7/23/2004 10:30	7/24/2004 4:15
Top 12 Storm Events by Overflow	9	6	89.9	2/6/2004 8:00	2/6/2004 23:45
	10	23	87.6	5/12/2004 15:30	5/12/2004 21:45
	11	38	78.9	7/27/2004 16:15	7/28/2004 8:45
	12	15	78.5	4/12/2004 18:15	4/14/2004 21:00
Top 20 Storm Events by Overflow	13	44	59.7	8/21/2004 13:30	8/21/2004 18:30
	14	17	59.5	4/26/2004 1:30	4/27/2004 6:00
	15	34	57.7	7/5/2004 3:00	7/5/2004 16:45
	16	43	57.2	8/14/2004 22:30	8/16/2004 12:30
	17	52	44.4	11/4/2004 14:15	11/5/2004 17:30
	18	57	44.3	12/1/2004 4:30	12/1/2004 15:15
	19	24	38.7	5/15/2004 21:30	5/16/2004 9:00
	20	22	38.6	5/10/2004 23:45	5/11/2004 5:45

# Ridgefield Park

Existing Conditions

Outfall No.	Outfall Name	Annual Total			Maximum
		No. Overflow Events	Overflow Volume (Mgal)	Duration (hours)	Peak Flow (mgd)
001A	Bergen Turnpike	44	12.99	273.15	20.86
002A	Main Street and Bergen Turnpike	37	2.10	125.30	7.89
003A	Christie Street	59	15.49	310.99	31.87
004A	Mount Vernon Street	72	23.41	652.37	49.36
005A	Industrial Avenue	37	4.32	75.92	7.84
006A	Hackensack Avenue	35	0.75	205.94	3.74
<b>System-wide Total</b>		<b>not appl.</b>	<b>59.05</b>	<b>not appl.</b>	<b>not appl.</b>
<b>System-wide Maximum</b>		<b>72</b>	<b>23.41</b>	<b>652.37</b>	<b>49.36</b>

## Ridgefield Park

Future Baseline Conditions - 2050

- Required by Permit

Year	Population
1970	13,990
1980	12,738
1990	12,522
2000 (US Census)	12,873
2010 (US Census)	12,729
2017 (US Census 7-Year Estimate)	13,154

## Ridgefield Park

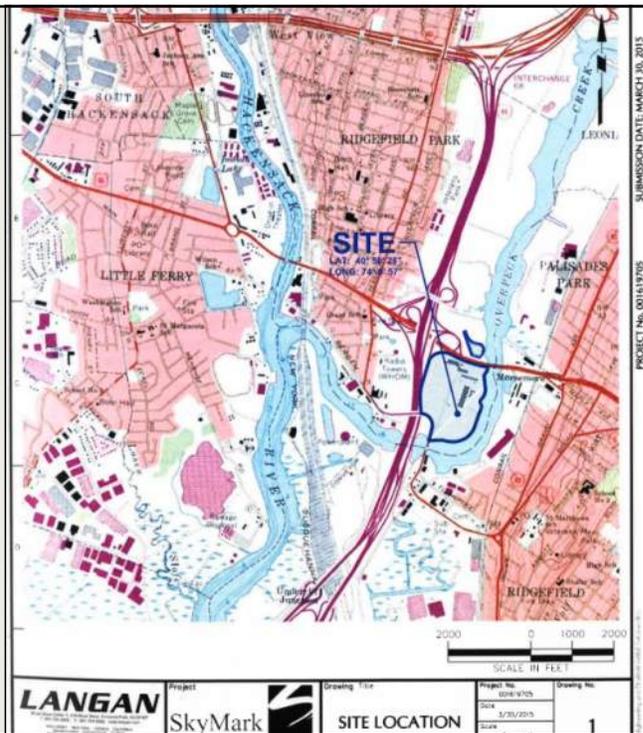
Future Baseline Conditions

Data Source	Projected Population to 2050 - Conservative (people)	Projected Population to 2050 – All Sources (People)
NJTPA	17,960	17,960
US Census Projection		15,910
NJ Department of Labor	15,720	15,720
Sky Mark Development Analysis	16,470	16,470
BCUA Projections		14,620
Average	16,720	16,100

## Ridgefield Park

### Future Baseline Conditions

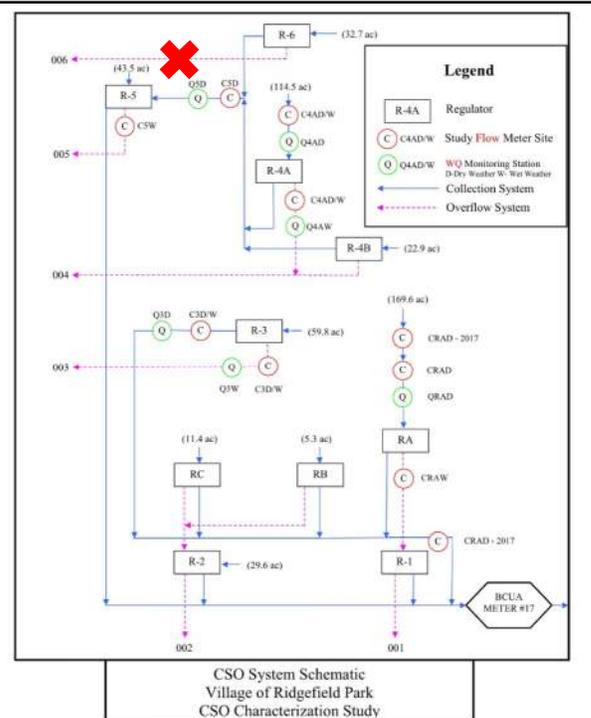
- Future growth associated with SkyMark and outside of combined area.



## Ridgefield Park

### Control Programs

- Eliminate Regulator 006



## Ridgefield Park

### Control Programs

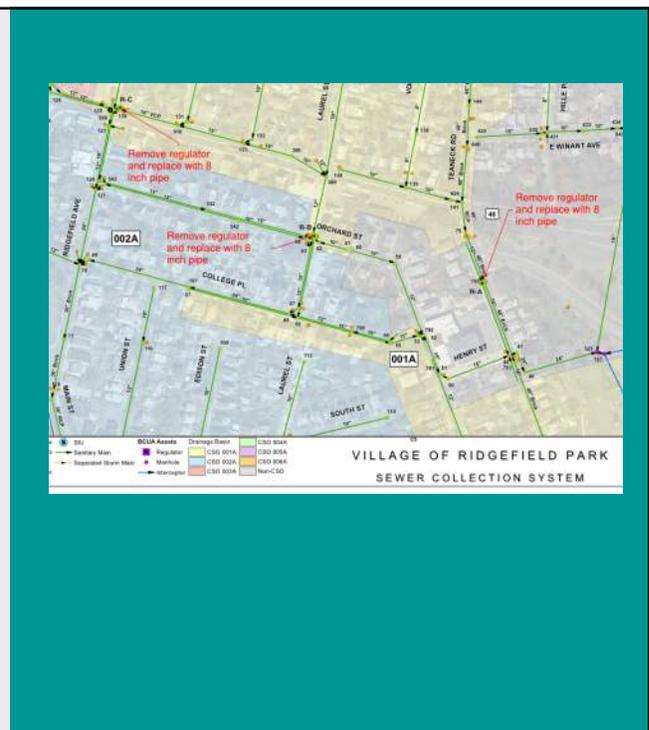
- Eliminate Regulator 006



## Ridgefield Park

### Control Programs

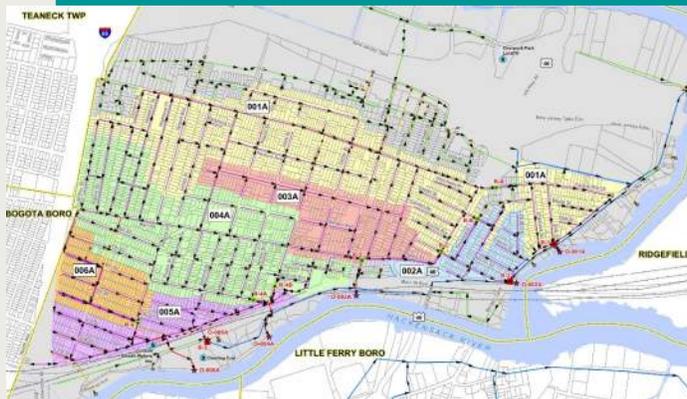
- Eliminate Regulator 006
- Eliminate Internal Regulators



## Ridgefield Park

### Control Programs

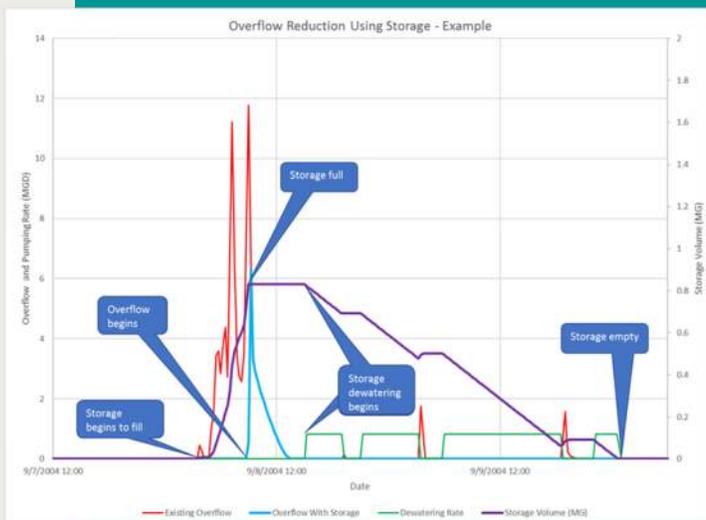
- Eliminate Regulator 006
- Eliminate Internal Regulators
- Sewer Separation



## Ridgefield Park

### Control Programs

- Eliminate Regulator 006
- Eliminate Internal Regulators
- Sewer Separation
- Consolidated Storage



# Ridgefield Park

## Control Programs

- Eliminate Regulator 006
- Eliminate Internal Regulators
- Sewer Separation
- Consolidated Storage



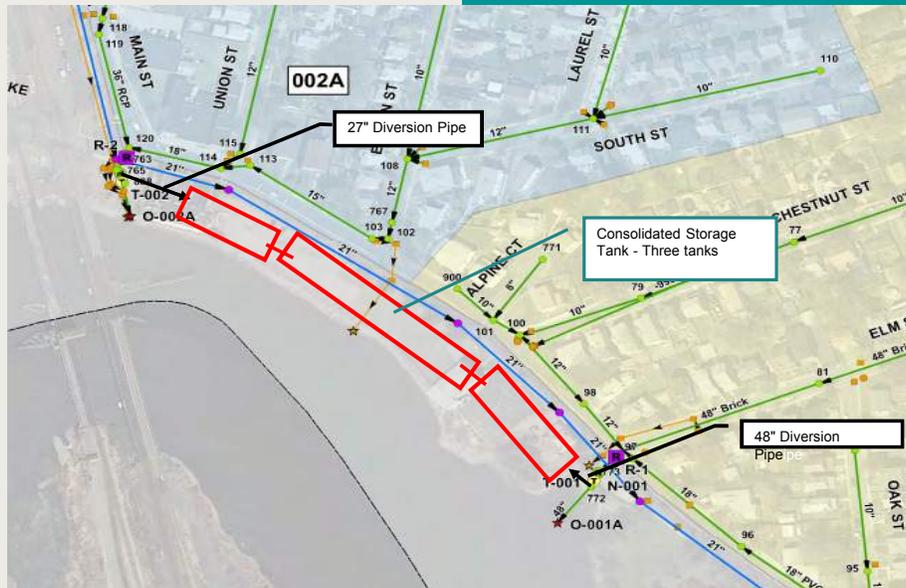
# Ridgefield Park

## Control Programs

- Eliminate Regulator 006
- Eliminate Internal Regulators
- Sewer Separation
- Consolidated Storage



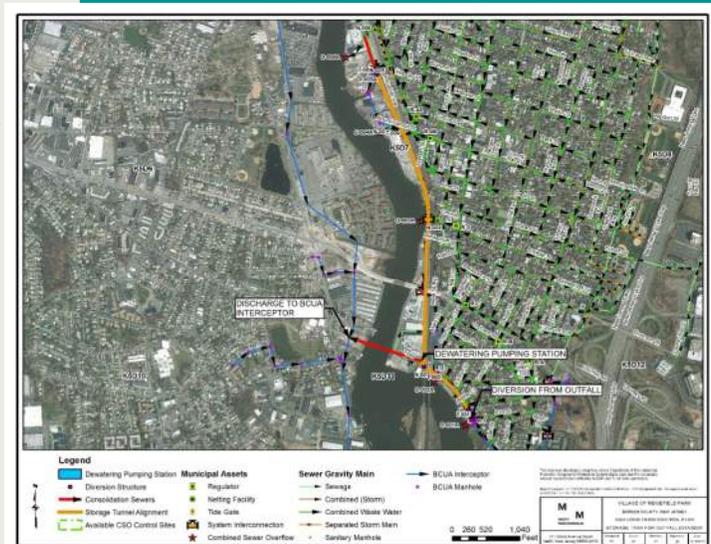
## Ridgefield Park



## Ridgefield Park

### Control Programs

- Eliminate Regulator 006
- Eliminate Internal Regulators
- Sewer Separation
- Consolidated Storage
- Tunnel



# Ridgefield Park

## Control Programs

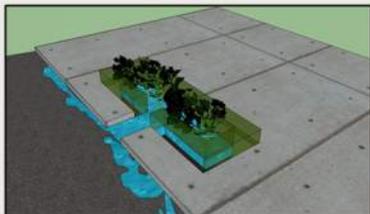
- Eliminate Regulator 006
- Eliminate Internal Regulators
- Sewer Separation
- Consolidated Storage
- Tunnel



# Ridgefield Park

## Control Programs

- Eliminate Regulator 006
- Eliminate Internal Regulators
- Sewer Separation
- Consolidated Storage
- Tunnel
- Green Infrastructure





## Borough of Fort Lee CSO Team Meeting Long Term Control Plan

May 15, 2019



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### AGENDA

- Introductions
- Long Term Control Plans
- Fort Lee's CSOs
- Modeling
- CSO Controls
- Preliminary Costs
- Remaining CSO Permit Requirements

## INTRODUCTIONS

- Ed Mignone – Borough Engineer Fort Lee
- Bob Applebaum – Member Supplemental CSO Team
- Jan Goldberg – Member Supplemental CSO Team
- Sal Pagano – Member Supplemental CSO Team
- Yingying Wu – HDR Engineering Inc.
- Gary Grey – HDR Engineering Inc.

### Long Term Control Plan

- Step 1 – System Characterization
  - CSOs
  - Existing controls and performance
  - Landside model
- Step 2 – Evaluation of Alternatives
  - Identify target parameters
  - Select alternatives and control level
  - Cost estimates
- Step 3 – Implementation Schedule
  - Consider median family income and costs of other water quality improvements





## Outfall Summary – 2004 Rainfall

### Before Model Update

Outfall	001		002	
	Number of Overflows	Overflow Volume (MG)	Number of Overflows	Overflow Volume (MG)
January	3	0.91	1	0.01
February	2	4.58	2	0.79
March	5	1.24	5	0.60
April	5	6.91	7	1.01
May	10	7.14	3	0.69
June	6	3.96	1	0.60
July	7	17.10	8	2.88
August	6	5.93	3	0.45
September	6	19.42	4	3.77
October	1	0.28	2	0.58
November	5	6.03	2	0.33
December	4	3.71	0	0.00
Total	60	77.20	38	11.73

### After Model Update

Outfall	001		002	
	Number of Overflows	Overflow Volume (MG)	Number of Overflows	Overflow Volume (MG)
January	3	0.91	0	0.00
February	2	4.58	2	0.11
March	5	1.24	0	0.00
April	5	6.91	4	0.01
May	10	7.14	3	0.24
June	6	3.96	1	0.30
July	7	17.10	5	0.94
August	6	5.93	2	0.14
September	6	19.42	3	2.09
October	1	0.28	0	0.00
November	5	6.03	2	0.35
December	4	3.71	0	0.00
Total	60	77.20	22	4.19

## CSO CONTROL OBJECTIVES

### Presumptive Approach

- 85% Capture
- 4 Overflows per year
- 8 Overflows per year
- 12 Overflows per year
- 20 Overflows per year

### Demonstration Approach

- Demonstrate that the selected control program, though not meeting Presumptive Approach criteria, will meet water quality based requirements

# CSO CONTROLS



## CONTROLS

### Source Controls:

Green infrastructure, ***I&I Reduction***, Sewer separation, BMPs, ***Nine Minimum Controls***

### Collection System Controls

***Gravity sewers, pump stations***, hydraulic relief structures, in-line storage, outfall relocation/consolidation, regulator modification

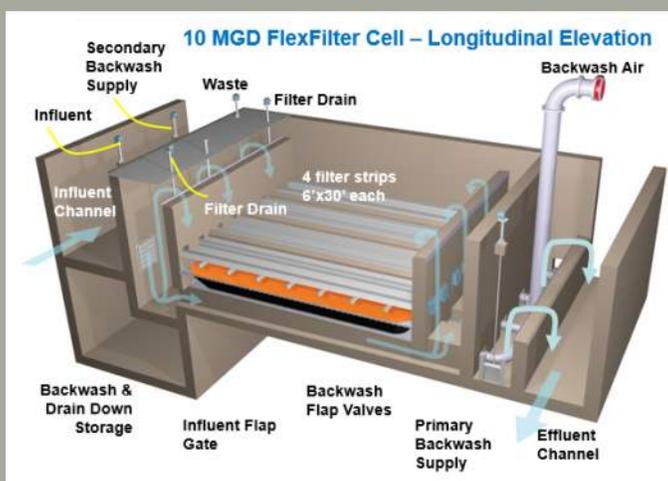
### Storage Technologies

***Above and below ground storage tanks, storage tunnels***

### Treatment Technologies

Screening and disinfection, vortex separation, retention/treatment basins, ***high rate filtration/clarification***, chlor/dechlor disinfection, ***PAA disinfection***, UV disinfection, WWTP plant expansion

## Flex Filter

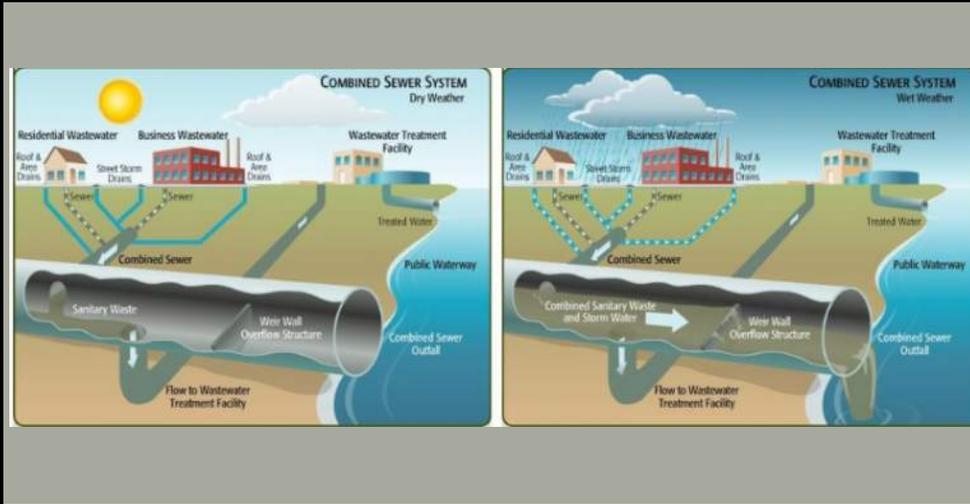


## PAA Disinfection

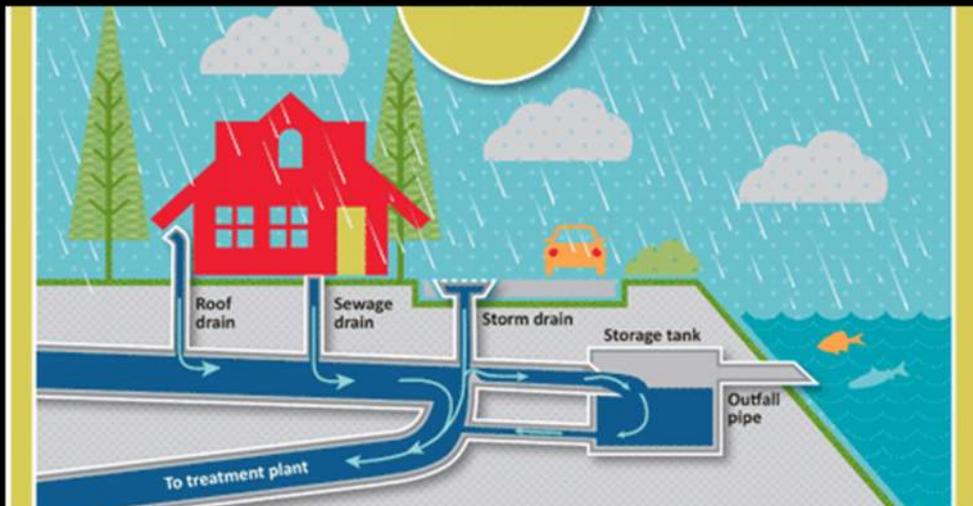
- Peracetic Acid (PAA)
  - Acetic Acid and Hydrogen Peroxide solution
- Common Elements
  - 275 gallon totes or 55 gallon drums
  - Feed pumps
  - Mixers / diffusers
  - Instrumentation (flow, TSS)
  - Sampling equipment
  - Pressure relief
  - Temperature monitoring



## In-Line Storage



## Off-Line Storage



## Green Infrastructure Options

Downspout Disconnection



Rain Gardens



Planter Boxes



Bioswales



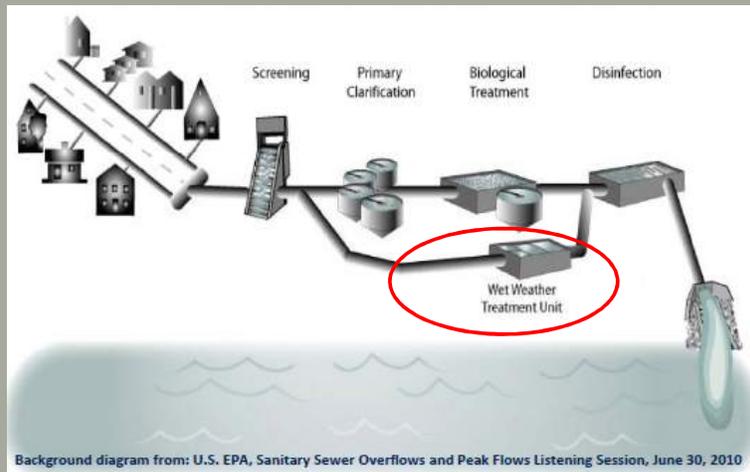
Permeable Pavements



Green Streets and Alleys



## Auxiliary Treatment at a WWTP (Blending)



## Preliminary Results

CSO Volumes and Frequencies at Each CSO Control Level

Outfall	Baseline			0 CSO			4 CSOs			8 CSOs			12 CSOs			20 CSOs		
	CSO Volume (MG)	CSO Events	Percent Capture	CSO Volume (MG)	CSO Events	Percent Capture	CSO Volume (MG)	CSO Events	Percent Capture	CSO Volume (MG)	CSO Events	Percent Capture	CSO Volume (MG)	CSO Events	Percent Capture	CSO Volume (MG)	CSO Events	Percent Capture
FL-001	82.5	58	90.8%	0	0	100.0%	8.6	4	99.0%	11.1	8	98.8%	20.0	12	97.8%	34.0	20	96.2%
FL-002	4.7	20		0	0	100.0%	1.0	3	98.0%	1.8	6	96.4%	2.9	11	94.3%	4.7	20	90.8%

Storage Tank Size (MG)					
Outfall	0 CSO events	4 CSO events	8 CSO events	12 CSO events	20 CSO events
FL-001	12.5 <sup>(1)</sup>	4.6	4.1	3.1	2.0
FL-002	1.2	0.4	0.3	0.1	0.0
<b>Total</b>	<b>13.7<sup>(1)</sup></b>	<b>5.0</b>	<b>4.3</b>	<b>3.2</b>	<b>2.0</b>

(2 MG = 150' x 150' x 12')

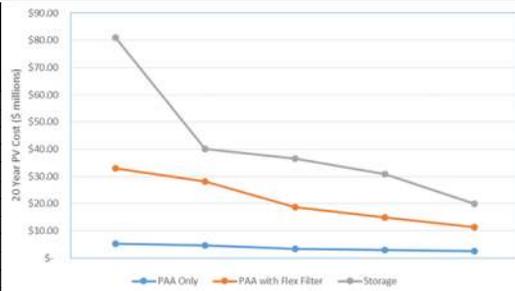
<sup>(1)</sup> Cannot dewater within 3 days for zero CSO events at FL-001

Outfall	GI Alternatives								
	Baseline			5% GI-Bluff Road			10% GI-Bluff Road		
	CSO Volume (MG)	CSO Events	Percent Capture	CSO Volume (MG)	CSO Events	Percent Capture	CSO Volume (MG)	CSO Events	Percent Capture
FL-001	82.5	58	90.8%	79.8	57	91.1%	77.0	58	91.4%
					Additional Percent Capture	<b>0.3%</b>		Additional Percent Capture	<b>0.6%</b>

## Preliminary Costs – Gray Infrastructure

### Sewer Separation Costs - \$400 to \$450 million (\$478,650/acre)

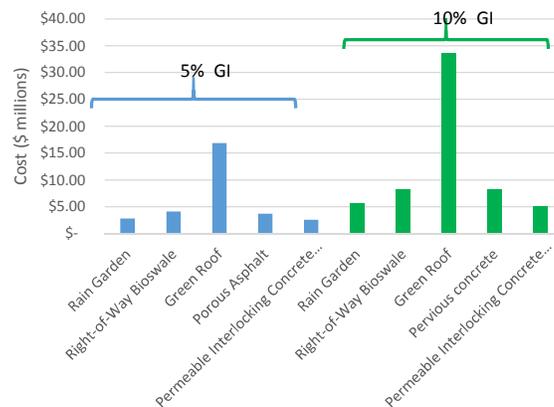
	PAA Only	PAA w/ FlexFilter	Tanks
<b>0 CSOs per year</b>			
Capital Cost (\$M)	\$ 1.35	\$ 28.95	\$ 50.64
20 yr PV O&M Cost (\$M)	\$ 3.90	\$ 7.80	\$ 30.29
Total 20 yr PV Cost (\$M)	\$ 5.25	\$ 32.97	\$ 80.94
<b>4 CSOs per year</b>			
Capital Cost (\$M)	\$ 1.27	\$ 24.67	\$ 22.60
20 yr PV O&M Cost (\$M)	\$ 3.40	\$ 3.51	\$ 17.48
Total 20 yr PV Cost (\$M)	\$ 4.67	\$ 28.18	\$ 40.07
<b>8 CSOs per year</b>			
Capital Cost (\$M)	\$ 1.07	\$ 16.16	\$ 20.11
20 yr PV O&M Cost (\$M)	\$ 2.38	\$ 2.45	\$ 16.34
Total 20 yr PV Cost (\$M)	\$ 3.45	\$ 18.61	\$ 36.45
<b>12 CSOs per year</b>			
Capital Cost (\$M)	\$ 1.00	\$ 12.97	\$ 16.31
20 yr PV O&M Cost (\$M)	\$ 1.99	\$ 2.05	\$ 14.61
Total 20 yr PV Cost (\$M)	\$ 2.99	\$ 15.01	\$ 30.91
<b>20 CSOs per year</b>			
Capital Cost (\$M)	\$ 0.85	\$ 9.75	\$ 11.25
20 yr PV O&M Cost (\$M)	\$ 1.60	\$ 1.64	\$ 8.72
Total 20 yr PV Cost (\$M)	\$ 2.44	\$ 11.39	\$ 19.97



## Preliminary Costs – Green Infrastructure

Green Infrastructure Type		Min Capital Cost (\$M)	Max Capital Cost (\$M)	20 Year PV O&M Cost (\$M)	Min Total 20 year PV Cost (\$M)	Max Total 20 year PV Cost (\$M)
5% GI (~6.5 Acres)	Rain Garden	\$ 0.63	\$ 2.00	\$ 0.80	\$ 1.43	\$ 2.80
	Right-of-Way Bioswale	\$ 0.99	\$ 3.29	\$ 0.80	\$ 1.79	\$ 4.09
	Green Roof	\$ 3.15	\$ 16.03	\$ 0.80	\$ 3.95	\$ 16.83
	Porous Asphalt	\$ 1.71	\$ 3.58	\$ 0.13	\$ 1.83	\$ 3.71
	Permeable Interlocking Concrete Pavers (PICP)	\$ 0.85	\$ 2.43	\$ 0.13	\$ 0.98	\$ 2.56
10% GI (~13 Acres)	Rain Garden	\$ 1.26	\$ 4.01	\$ 1.60	\$ 2.86	\$ 5.61
	Right-of-Way Bioswale	\$ 1.97	\$ 6.57	\$ 1.60	\$ 3.57	\$ 8.17
	Green Roof	\$ 6.31	\$ 32.06	\$ 1.60	\$ 7.91	\$ 33.66
	Pervious concrete	\$ 4.01	\$ 8.02	\$ 0.25	\$ 4.26	\$ 8.27
	Permeable Interlocking Concrete Pavers (PICP)	\$ 1.71	\$ 4.86	\$ 0.25	\$ 1.96	\$ 5.11

## Preliminary Costs – Green Infrastructure



## Remaining 2015 CSO Permit Requirements

- ✓ CSO signs have been posted near outfalls
- ✓ CSO notification system is online (<http://NJCSO.hdrgateway.com>)
- ✓ CSO monthly Discharge Monitoring Reports (DMRs)
- ✓ Work plans/QAPPs submitted to NJDEP
  - Baseline Compliance Monitoring Plan
  - System Characterization and Landside Monitoring QAPP
- ✓ Monthly CSO Permittee meetings at BCUA
- ✓ Evaluation of previous landside model
- ✓ Water Quality monitoring
- ✓ Complete flow monitoring
- ✓ Update landside model
- Conduct alternatives analysis July 1, 2019
- Submit the LTCP June 1, 2020

# Questions Comments Discussion

Gary Grey  
HDR Inc.

Yingying Wu  
HDR Inc.

# City of Hackensack

COMBINED SEWER SYSTEM  
LONG TERM CONTROL  
PLAN

DEVELOPMENT AND EVALUATION  
OF ALTERNATIVES STATUS

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MAY 15, 2019





## Agenda

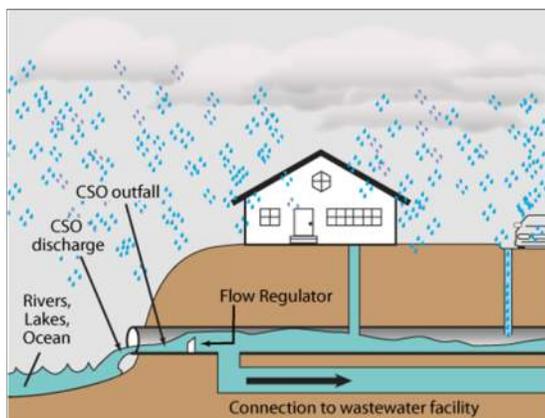
- ❑ Overview of Hackensack's Combined Sewer System
- ❑ Overview of the NJDEP permit requirements
- ❑ Development and Evaluation of Alternatives Status
- ❑ Coordination and Public Participation goals
- ❑ Summary

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## Overview of Hackensack Combined Sewer System



- ❑ What is a Combined Sewer Overflow (CSO)?

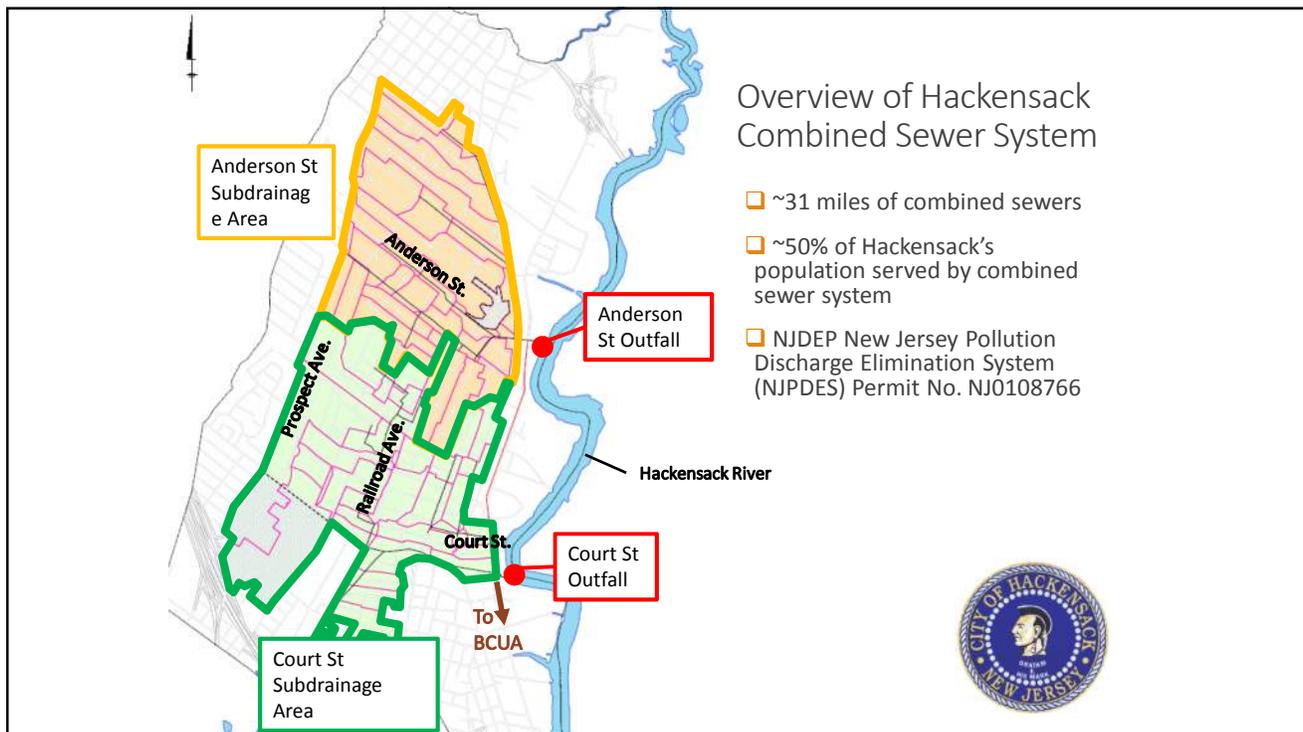


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# Overview of Hackensack Combined Sewer System



Court Street Outfall



## Overview of Hackensack Combined Sewer System

- ~31 miles of combined sewers
- ~50% of Hackensack's population served by combined sewer system
- NJDEP New Jersey Pollution Discharge Elimination System (NJPDES) Permit No. NJ0108766



# Overview of Hackensack Combined Sewer System



## Screening facilities



Court Street Screening Facility



Bar screens

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# NJDEP Permit Requirements



- Long Term Control Plan (LTCP) goals:
  - Reduce combined sewer overflows to obtain water quality compliance
    - Using "presumptive" or "demonstration" approach
    - Utilize important public feedback throughout the process
- Sewer System Characterization Report
  - Submitted July 1, 2018; approved March 19, 2019
- Public Participation Process Report
  - Submitted July 1, 2018; approval is pending
- Development and Evaluation of Alternatives Report – due July 1, 2019
  - The NJDEP Permit requires City of Hackensack to evaluate:
    - Sewer Separation
    - End of pipe treatment
    - Green infrastructure
    - Infiltration/inflow control
    - Storage – tanks or tunnel

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# Development and Evaluation of Alternatives



## Sewer separation – two separate sanitary and stormwater systems

- ☐ Positives – improves water quality, reduces or eliminates untreated sanitary discharge, reduces flooding in basements and streets
- ☐ Negatives – high cost, extensive construction, internal plumbing work

## Alternative prescreening – no further consideration recommended City wide due to extensive construction costs

- ☐ Estimated cost \$750M
  - ☐ Cost Source: Updated 2007 Cost
- ☐ New storm sewers in the CSS



Analysis Report

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# Development and Evaluation of Alternatives



## End of pipe treatment – screening and discharge disinfection

- ☐ Positives – smaller footprint, chlorine widely used in wastewater treatment
- ☐ Negatives – limited use in the US for CSOs, potentially produce toxic byproducts
- ☐ City of Hackensack currently has screening facilities at both outfalls

## Alternative prescreening – still under consideration

- ☐ Potential lower costs for disinfection alone
  - ☐ Unsure if disinfection alone will satisfy water quality requirements

80

# Development and Evaluation of Alternatives



## Green infrastructure (GI) – stores, absorbs, and uses storm water runoff

- ☐ Positives – lower capital cost, can assist in reducing flooding, streetscape
- ☐ Negatives – higher maintenance cost, site specific, low impact on CSOs

Green Roof



Bioswale



Rain Garden



# Development and Evaluation of Alternatives



LID Control Editor ? X

Bioretention Basin Default Configurations							
Surface		Soil Layer		Storage Layer		Underdrain	
Beam Height (in)	9	Thickness (in)	21	Thickness (in)	15	Drain Coef. (in/hr)	1.5
Vegetation volume (fraction)	0.05	Porosity (Vol. Fraction)	0.26	Void Ratio	0.7	Drain Exponent	0.5
Surface roughness (Manning's n)	0.25	Field Capacity (Vol. Fraction)	0.09	Seepage Rate (in/hr)	0.01	Drain Offset (in)	4.5
Surface Slope (percent)	1	Wilting Point (Vol. Fraction)	0.035	Clogging factor	0		
		Conductivity (in/hr)	2.1				
		Conductivity slope	8				
		Suction Head	3.5				

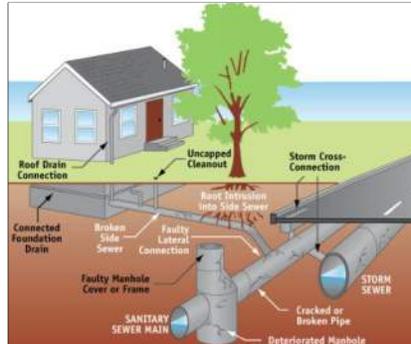
10% Area Controlled	14.9 MG	Δ2%
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# Development and Evaluation of Alternatives



## Infiltration/Inflow (I/I) Control

- ☐ Positives – improves water quality, reduces combined sewer volume
- ☐ Negatives – high cost, possible disruption in services, extensive construction



# Development and



Attributes	
Junction: AMH493R1	
<b>Name</b>	AMH493R1
X-Coordinate	617942
Y-Coordinate	751094
Description	
Tag	
Inflows	YES
Treatment	NO
Invert Elev. (ft)	9.91
Rim Elev. (ft)	22.21
Depth (ft)	12.3
Initial Depth (ft)	0
Surcharge Dep.	0
Ponded Area (ft)	0
<b>Inflows</b>	
Baseline (cfs)	0
Baseline Patter	
Time Series	
Scale Factor	1
Average Value	0.089
Time Pattern 1	AndersonDryWeath

# Development and Evaluation of Alternatives



**Storage alternatives— temporarily store combined sewer flow and pump back slowly to the treatment plant after rain event**

- ❑ In-line storage – not feasible because there is no additional capacity to store combined flow in the current sewer system
- ❑ Off-line storage – storage tanks near the outfalls or a tunnel
  - ❑ Positives – eliminates or reduces overflow discharges, reduces sewer backups, improves the efficiency of existing treatment capacity
  - ❑ Negatives – lack of real estate, high cost



# Development and Evaluation of Alternatives



**Storage Prescreening**

- ❑ Large conduit with pump back control

**Submission to Court**

SWMM model with



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## Public Participation Goals

- Educate residents and businesses about the combined sewer system
- Inform residents/businesses about future projects and costs
- Incorporate public feedback into the selection of alternatives
- How?
  - Surveys – posted to the City’s website
  - Public meetings – hopeful to present at the City’s June 11<sup>th</sup> Council Meeting
  - Invite interested residents to join Public Participation Team
- Meet NJDEP Permit requirements






# Summary

- Development and Evaluation of Alternatives
  - Model alternatives
  - Evaluate estimated costs for alternatives
  - Complete report by July 1, 2019
    - BCUA to receive draft on June 1, 2019
- Coordination and Public Participation
  - Add a member of the public to the Supplemental CSO team
  - Conduct outreach efforts to receive public feedback



# Questions?

- Website: [www.hackensack.org/cso](http://www.hackensack.org/cso)
- Email: [csoteam@hackensackdpw.org](mailto:csoteam@hackensackdpw.org)



# 2018 CSO Summary

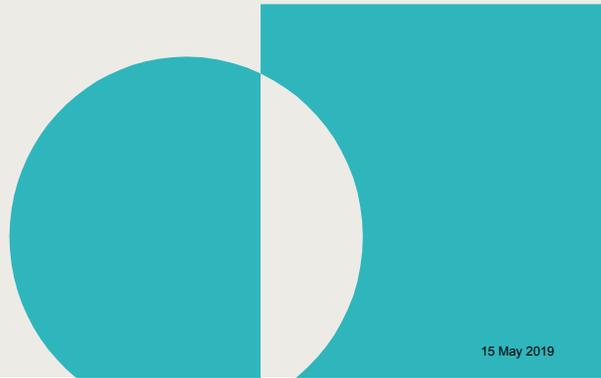
Month	Rainfall (in)	001A Anderson	002A Court	Combined
Jan-18	2.91	3	2	3
Feb-18	6.11	7	7	8
Mar-18	4.78	2	2	2
Apr-18	5.48	5	5	5
May-18	3.16	7	10	10
Jun-18	3.67	6	6	6
Jul-18	6.85	9	9	10
Aug-18	6.32	11	10	11
Sep-18	6.73	5	6	6
Oct-18	3.24	5	5	5
Nov-18	6.05	9	8	9
Dec-18	4.50	4	4	4
<b>Average</b>	<b>4.98</b>	<b>6</b>	<b>6</b>	<b>7</b>
<b>Total</b>	<b>59.80</b>	<b>73</b>	<b>74</b>	<b>79</b>

\*Number of overflows estimated using PCSWMM model of the City of Hackensack's combined sewer system

## BCUA CSO Group Supplemental CSO Team

Development and Evaluation of Alternatives Report

# Back to General Discussions



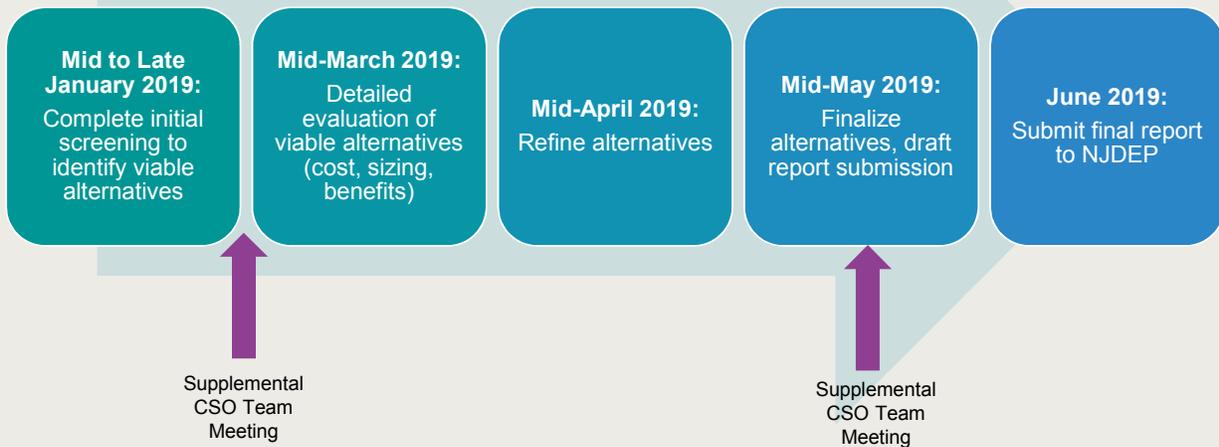
## BCUA CSO Group Supplemental CSO Group

Development and Evaluation of Alternatives Report – DRAFT Outline

- Introduction
- General Information
- Public Participation Update
- Water Quality Objectives
- Development of Alternatives
  - Development and Screening Levels
- Costing
- Available Land Analysis
- Alternatives Evaluation
- Summary
- References

## BCUA CSO Group Supplemental CSO Team

Upcoming Schedule



## Upcoming Schedule

July 1, 2019 – Development and Evaluation of Alternatives Report Due to NJDEP

- Develop Comprehensive List of Alternatives
- Screen Alternatives
- Evaluate Alternatives
- Cost Estimates
- Coordinate with other Members of BCUA Group
- Produce and Submit Report

Next Meeting Date?

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## Final Questions?

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# Thank You?

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