Supplemental CSO Team - Session #12

Held: May 28, 2019

Washington School

Bayonne, NJ

Agenda:

- ❑ Introduction and Recap
- ❑ Evaluation of Alternatives Status Update – Harrison
- ❑ Evaluation of Alternatives Status Update – Newark
- ❑ Overview of Development and Evaluation of Alternatives Report
- ❑ Preliminary Screening Table
- ❑ Alternatives Evaluation Results Summary
- ❑ Alternatives Being Proposed for Further Consideration
- ❑ Breakout Groups

Supplemental CSO Team – Session 12

PVSC Service Area
North Bergen MUA Service Area (Woodcliff Treatment Plant)
Long Term Control Plan

May 28, 2019

CLEAN WATERWAYS
Healthy Neighborhoods

Agenda

- Introduction and Recap
- Evaluation of Alternatives Status Update – Harrison
- Evaluation of Alternatives Status Update – Newark
- Overview of Development and Evaluation of Alternatives Report
- Preliminary Screening Table
- Alternatives Evaluation Results Summary
- Alternatives Being Proposed for Further Consideration
- Breakout Groups
- Questions and Discussion
- Adjourn

CLEAN WATERWAYS
Healthy Neighborhoods

MOTT MACDONALD

Town of Harrison Development and Evaluation of Alternative Controls – Update

PVSC CSO Group Supplemental CSO Team Meeting

May 28, 2019

Town of HARRISON

Evaluation Overview

Prework

- **Available Space Analysis**

Alternatives

- **Green Infrastructure**
- **Storage**
- **Treatment Plant Expansion – NA**
- **I/I Reduction – NA**
- **Sewer Separation**
- **CSO Treatment**
- **WWTP Alternative Wet Weather Protocol – NA**

Available Space Analysis

Objective: Identify potential sites for storage or end-of-pipe treatment

GIS Analysis

Aerial Imagery, Sewer Facilities (pipes, outfalls, etc.), Land Use/Cover, Parcel Data, Contours, Contaminated Sites

Site Considerations

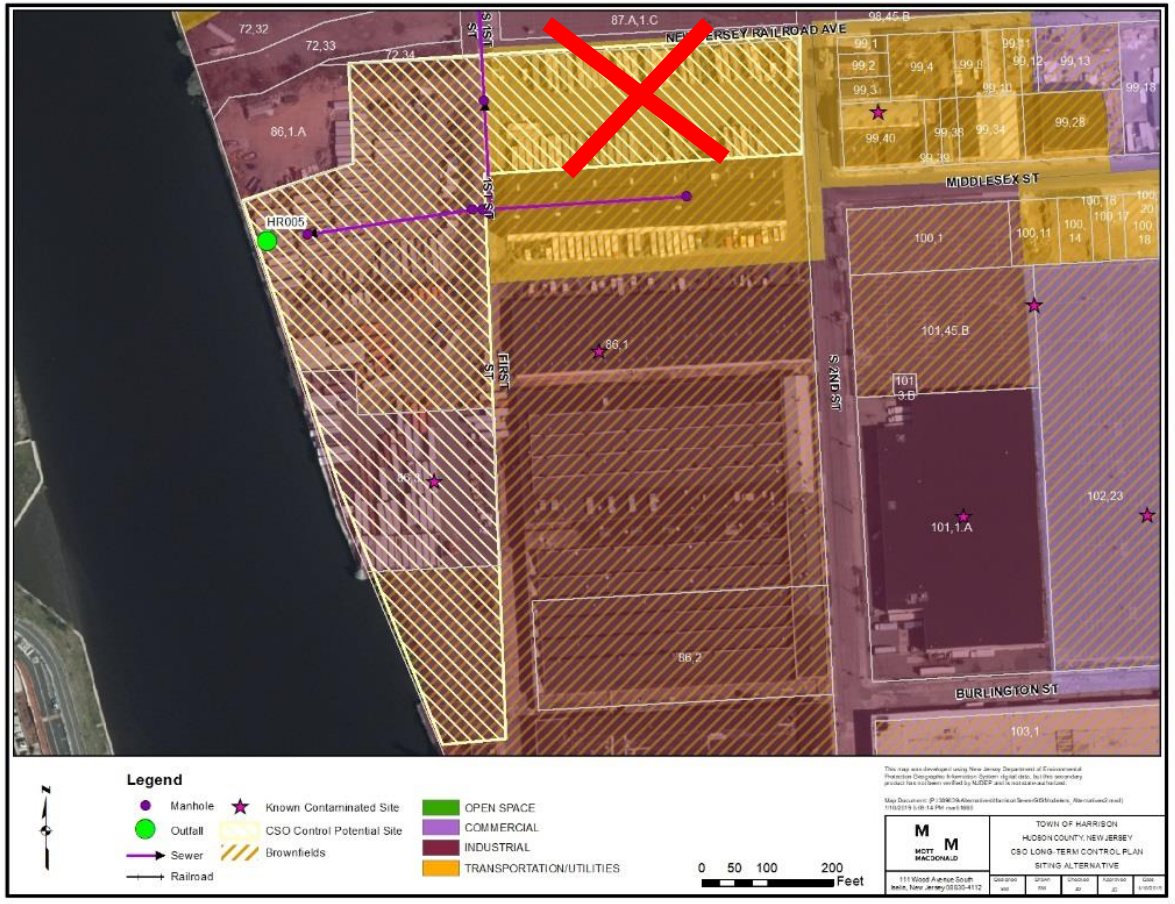
What's on the site?

What's the site use for?

Who owns the property?

How close is it to the outfall?

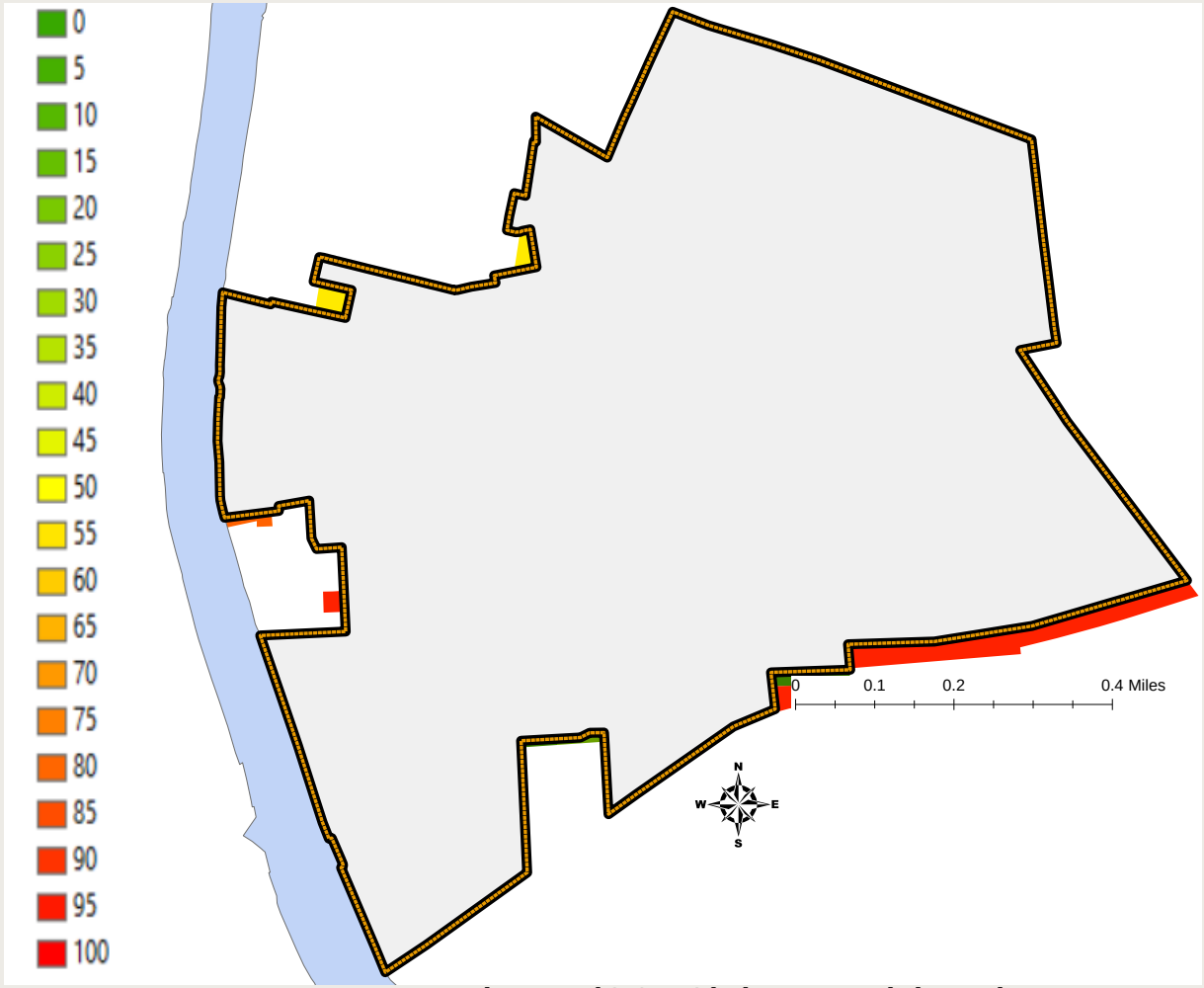
Is the soil contaminated?



CSO - 005

Green Infrastructure

- Maximum % of impervious that can be treated by GSI?
- Evaluate 2.5%, 5%, 7.5%, 10% and 15% of directly connected impervious.
- Minimal benefits
- $5.8M-$35M
- $58 – $70 per gallon CSO removed.



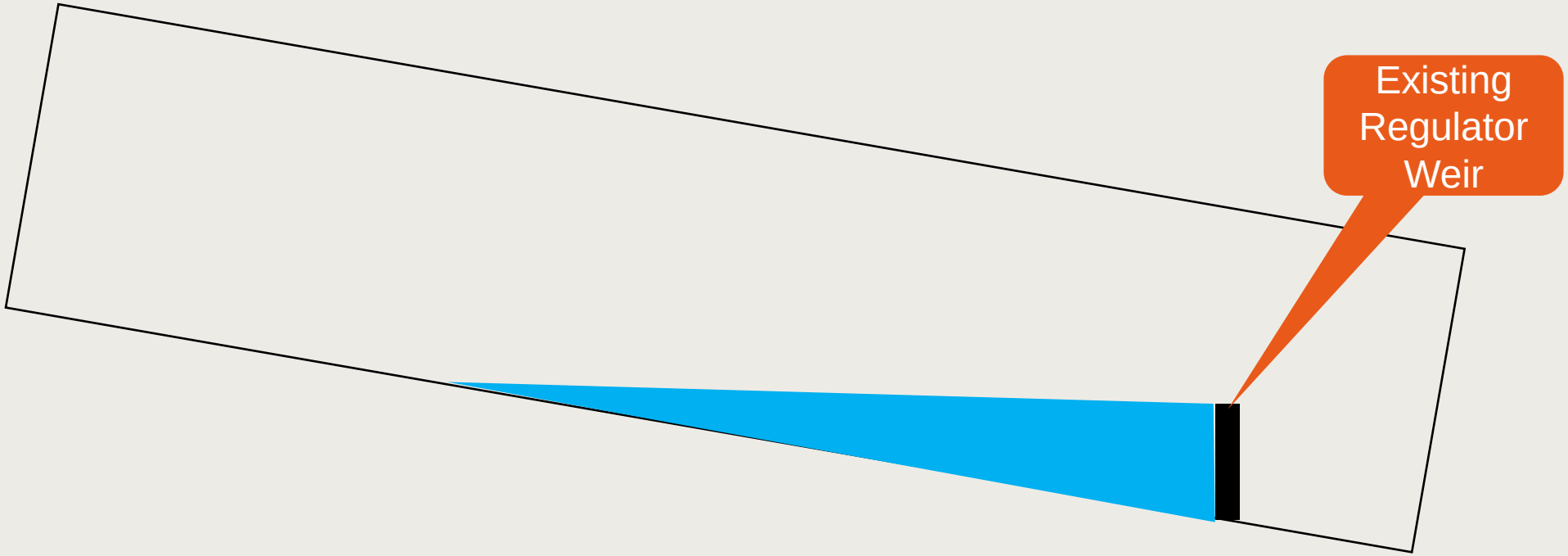
Percent Impervious (2012) in combined sewer area.

346 acres of impervious (69% of CS area)

Storage

Existing Inline Storage

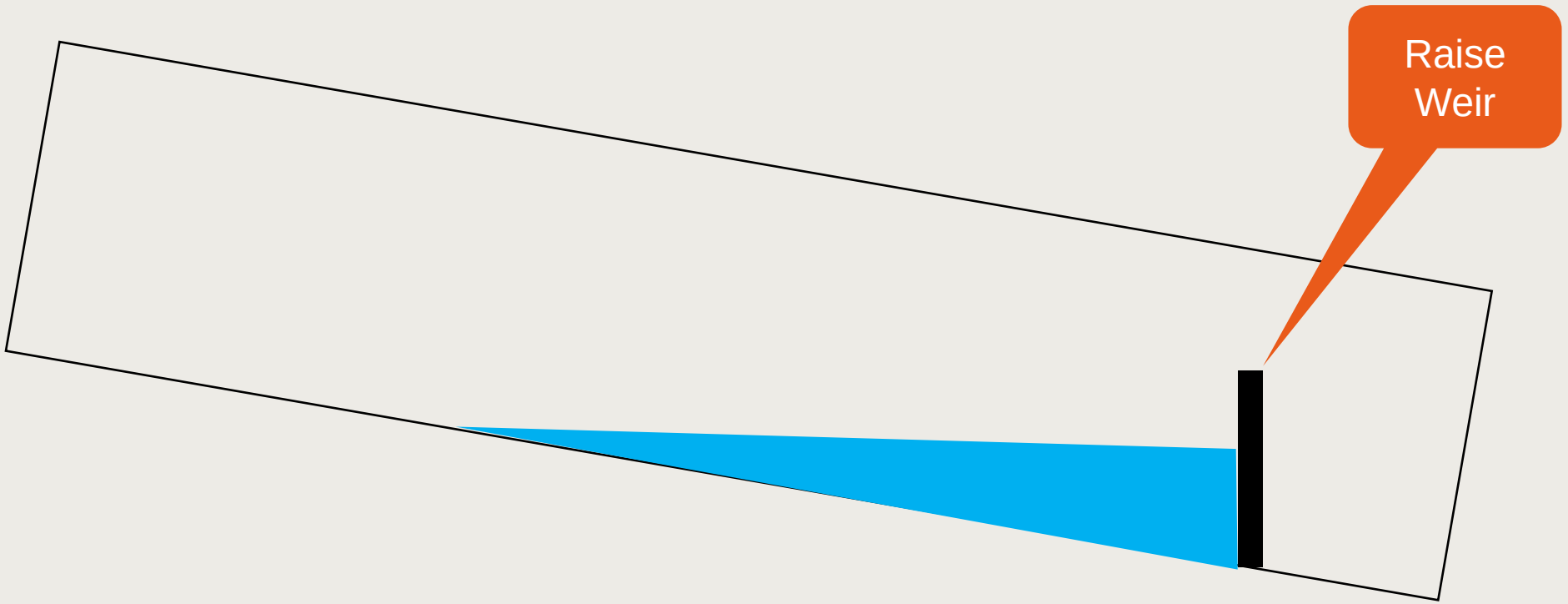
Maximize inline storage capacity



Storage

Existing Inline Storage

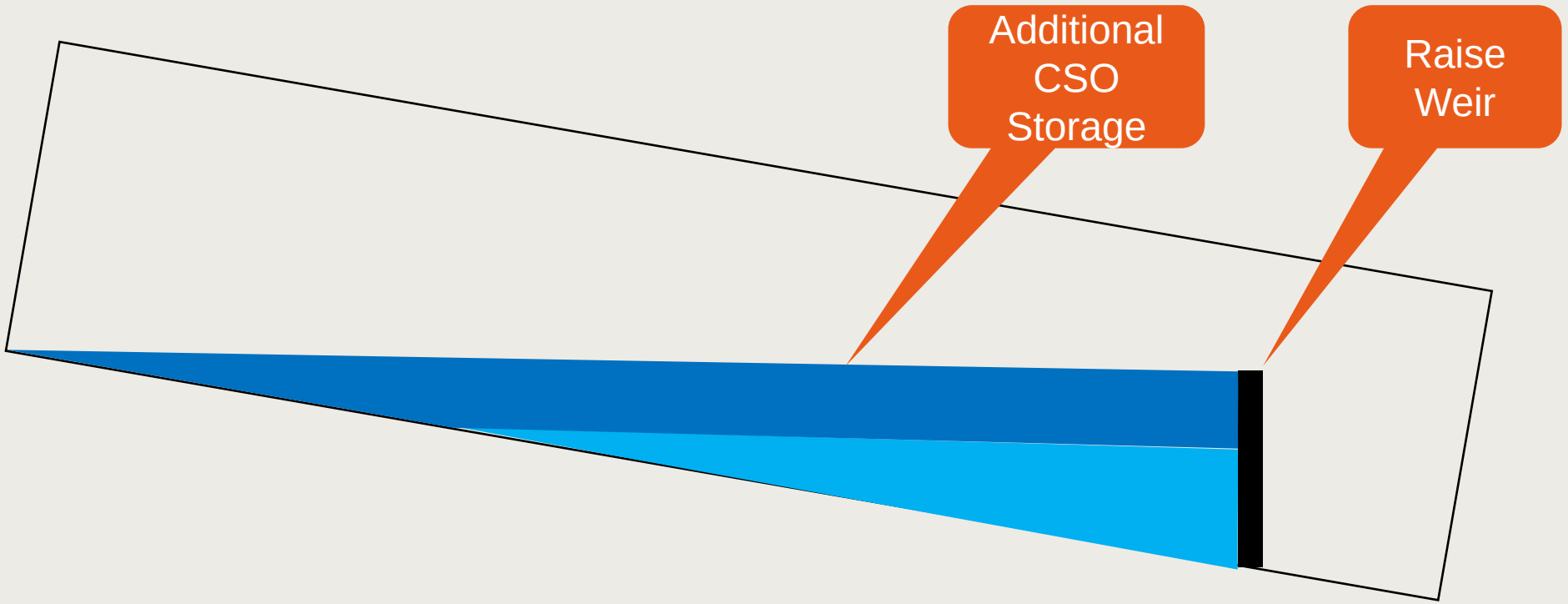
Maximize inline storage capacity



Storage

Existing Inline Storage

Maximize inline storage capacity



Storage

Existing Inline Storage

Maximize inline storage capacity

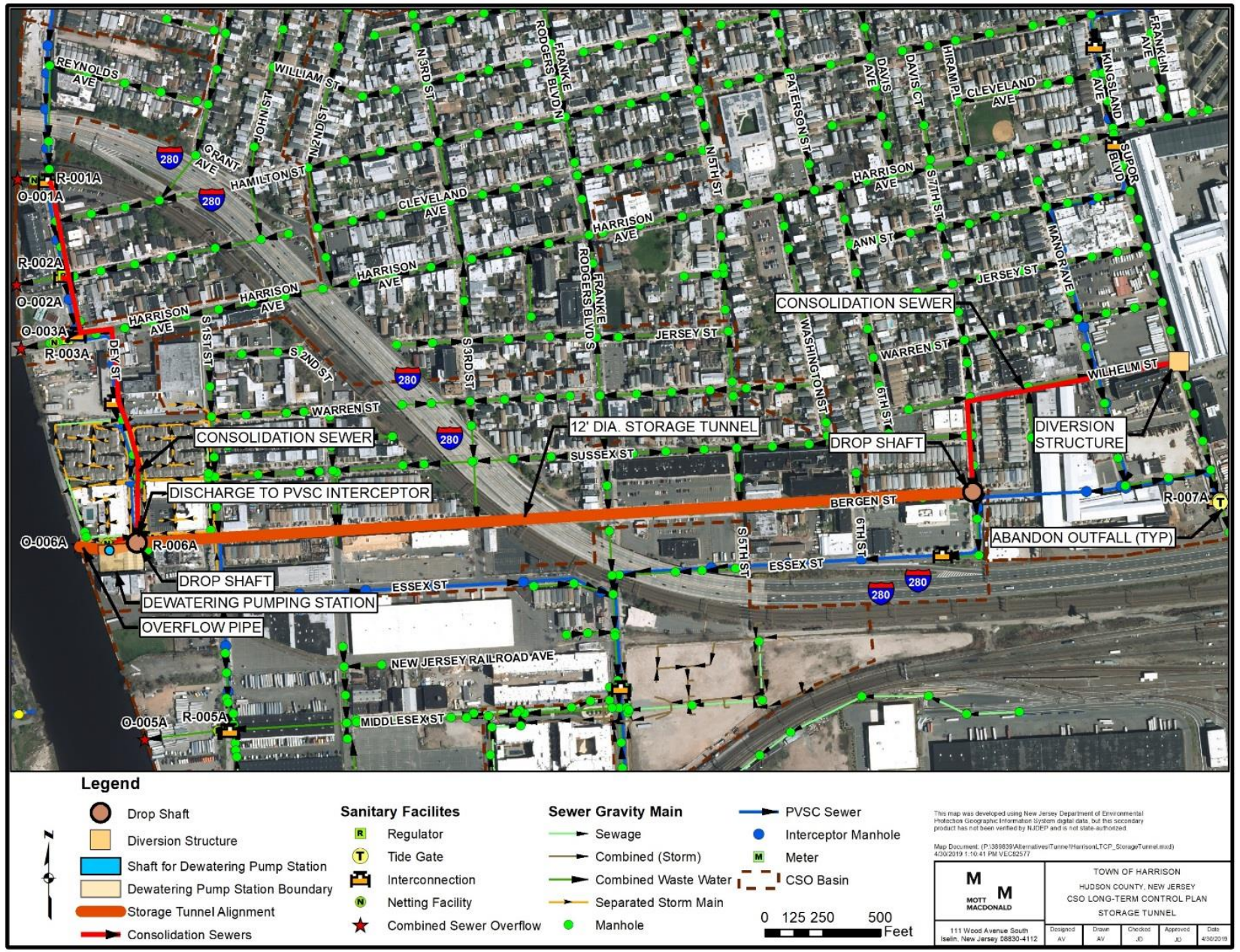
Most weirs at or above pipe crown

Inline Storage Maximized

Storage

New Offline Storage – Tunnel

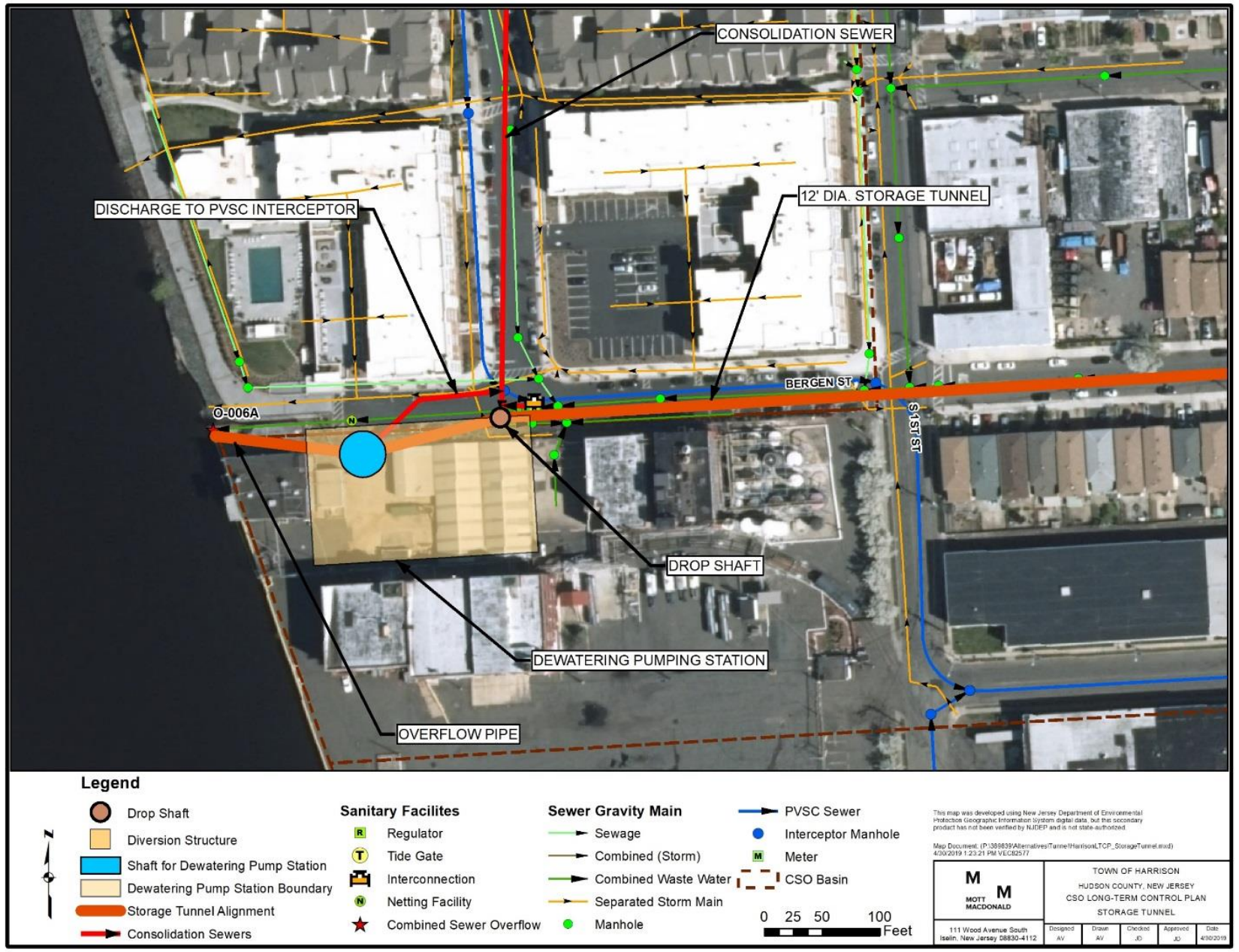
- Requires consolidation piping
- Difficult Construction
  - Soft Ground
  - Tight working space



Storage

New Offline Storage – Tunnel

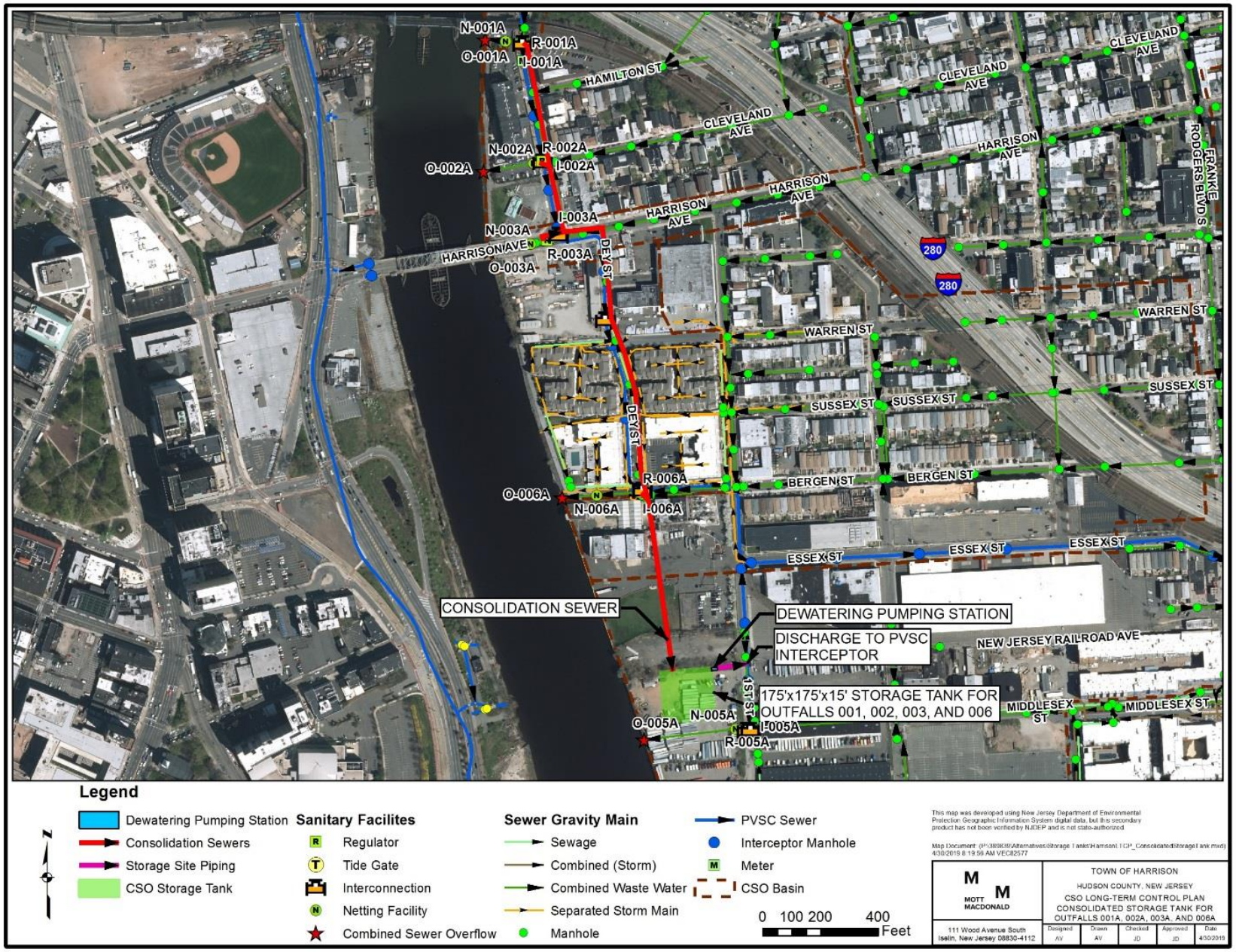
- Requires consolidation piping
- Difficult Construction
  - Soft Ground
  - Tight working space
- $136M-$157M
- $3.70 – $4.90 per gallon CSO removed.



Storage

New Offline Storage – Tanks

- Construction Challenges
- Potential Consolidation



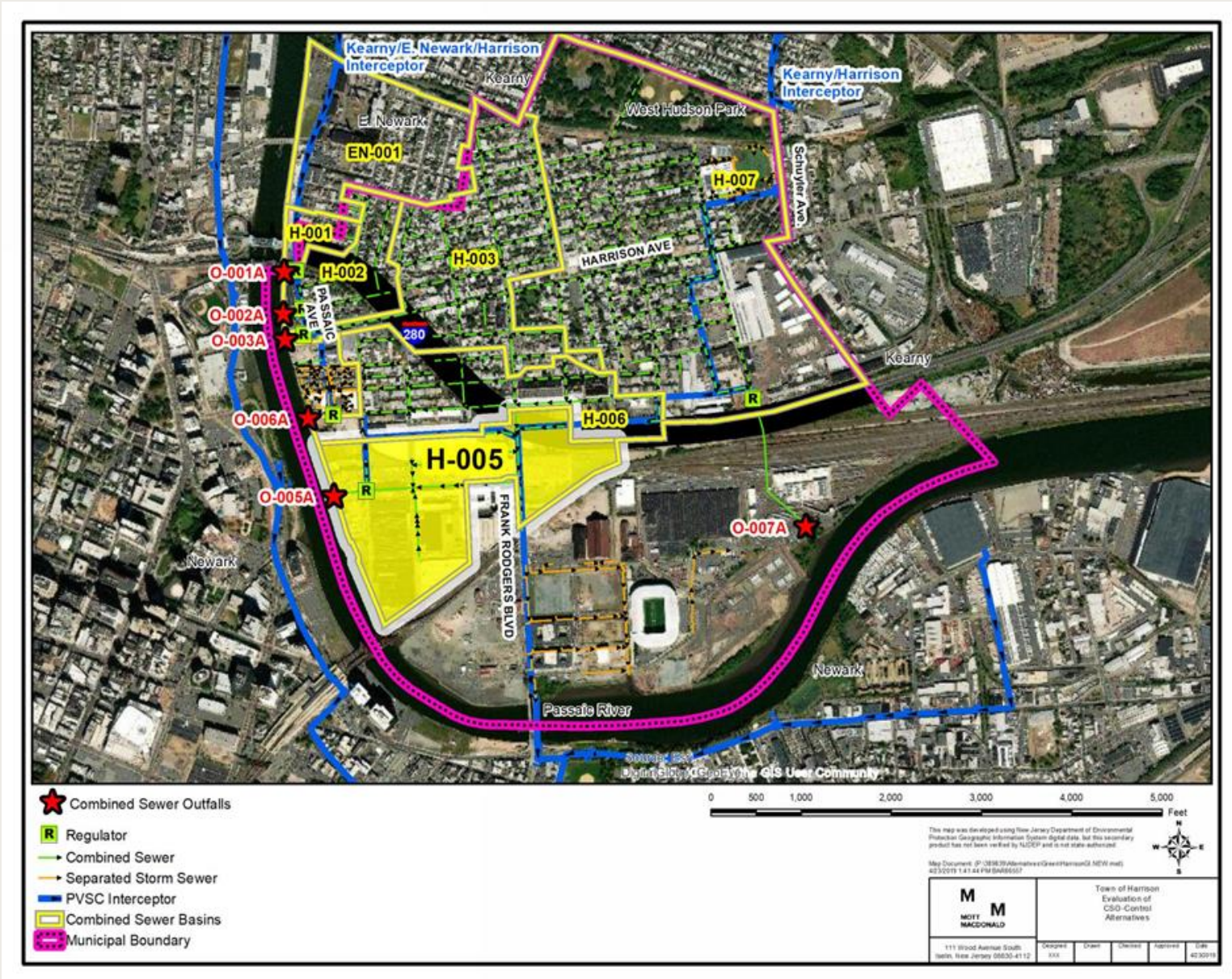
Storage

New Offline Storage – Tanks

- Construction Challenges
- Potential Consolidation
- $40M-$87M
- $1.40 – $2.00 per gallon CSO removed.

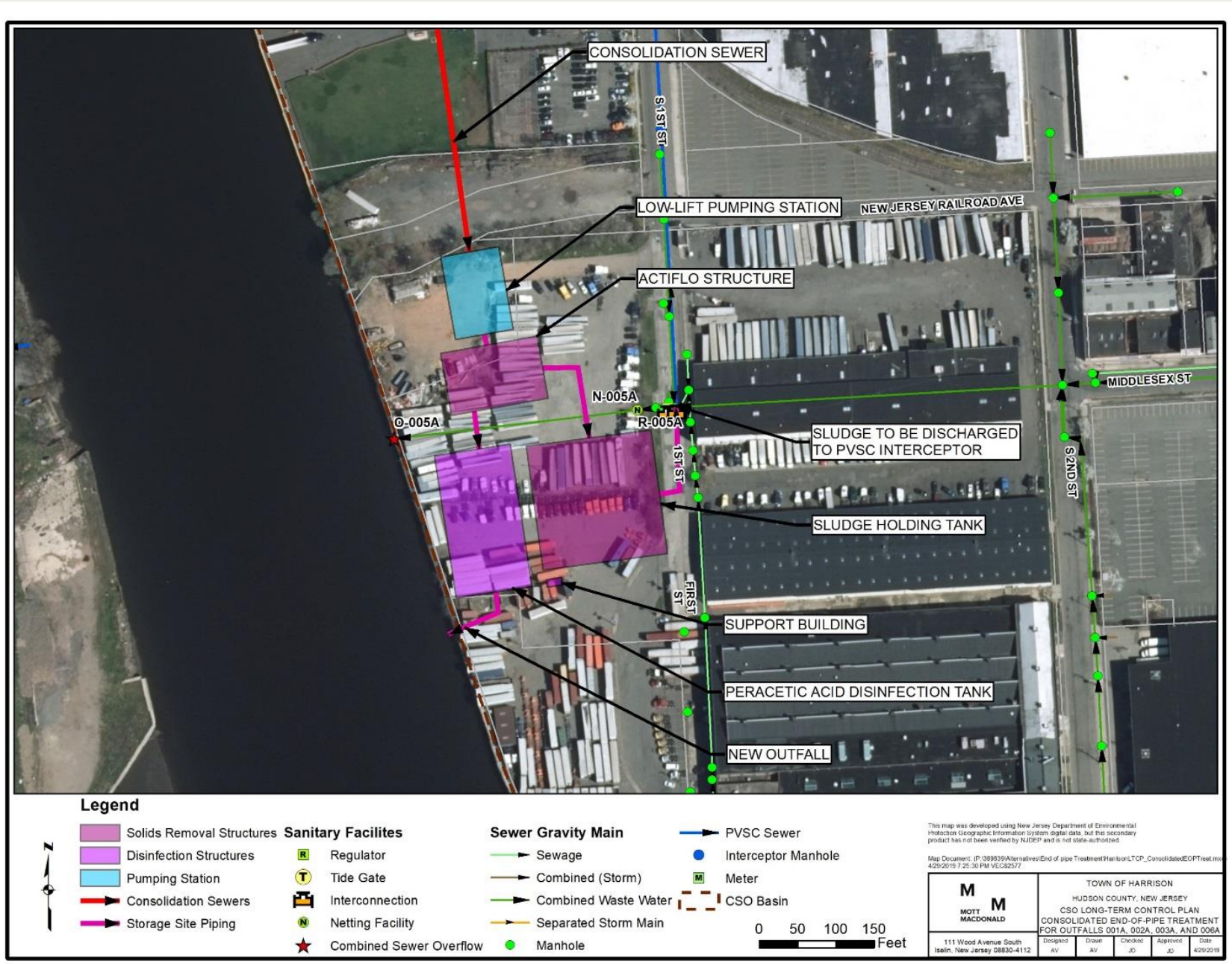
Sewer Separation

- WQ Impacts – Treatment
- Pending Stormwater Rule Changes
- CSO 005 along Angelo Cifelli Drive – Partially separated
- $176M
- $4.10 per gallon CSO removed.



CSO Treatment

- Pretreatment
- Primary Clarification
- Disinfection
- Potential Consolidation
- $69M-$186M
- $1.90 – $4.40 per gallon CSO removed.



Thank you

Contact Information

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CITY OF NEWARK, NJ
CSO LTCP
Evaluation of Alternatives

Supplemental CSO Team Meeting

Washington School
191 Ave B Bayonne NJ

May 28, 2019

Model Development

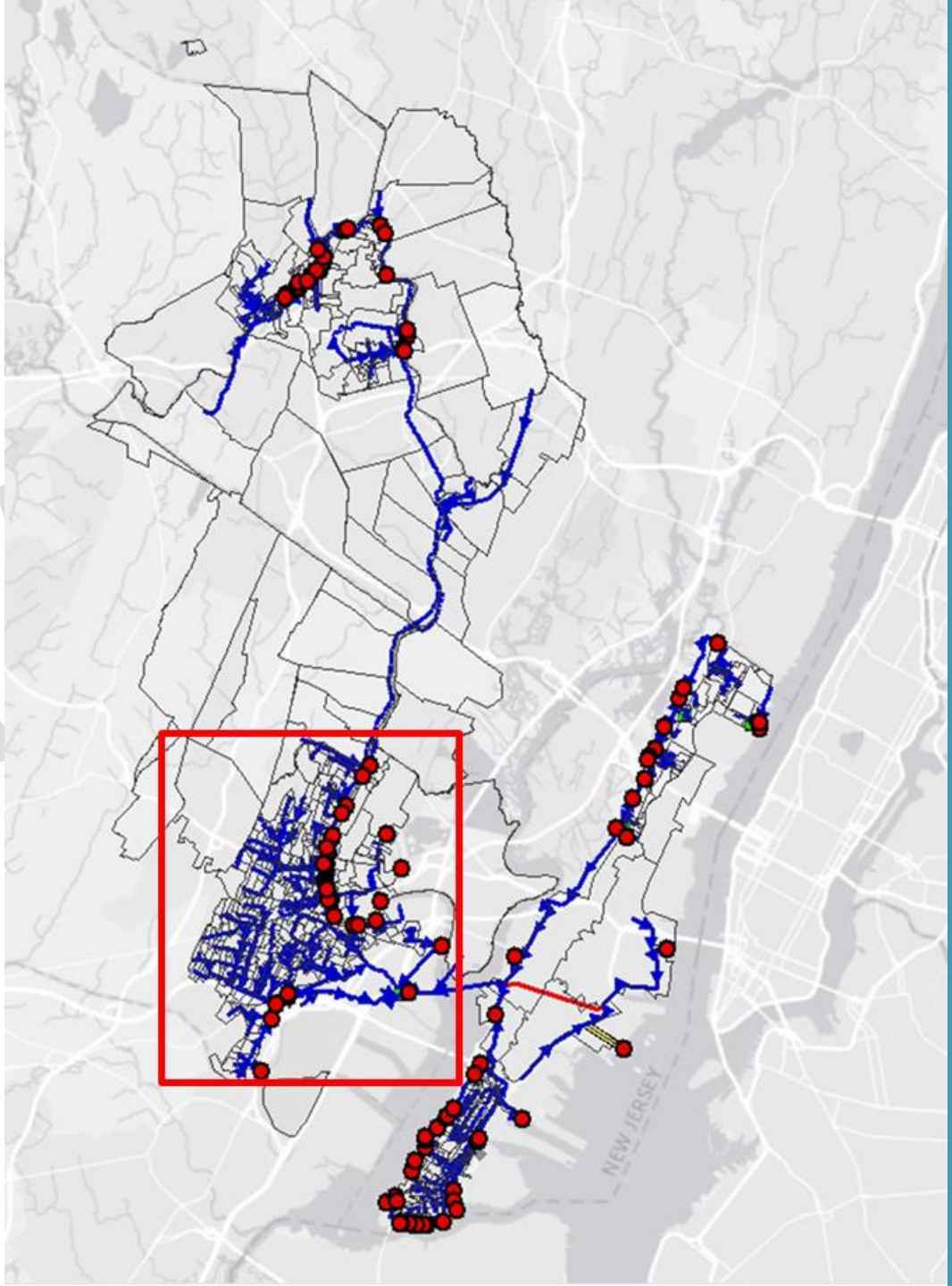
Baseline Results

Alternatives Evaluated to Date

Summary and Next Steps

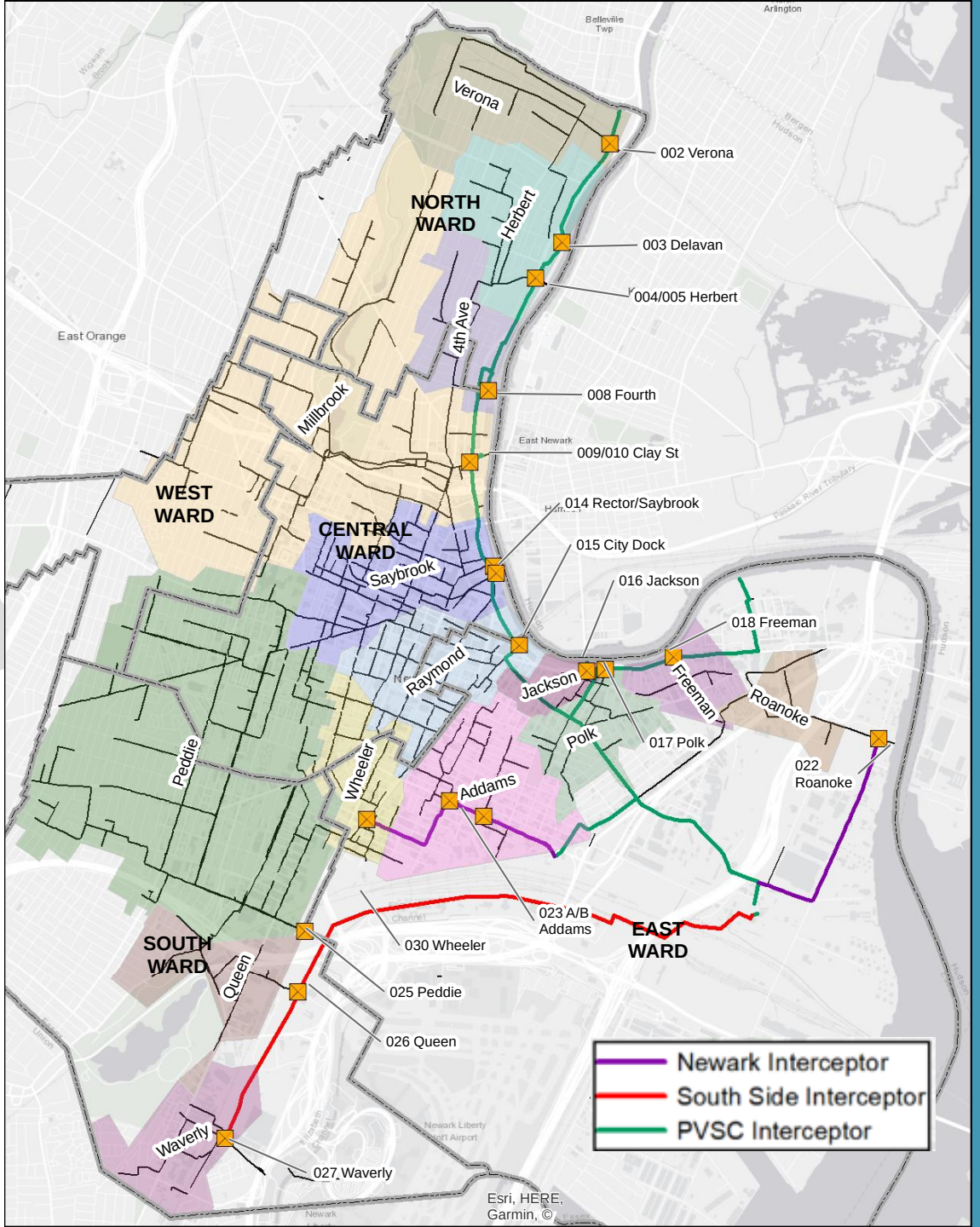
Model Development

- CSO Characterization and Modeling Study (2000)
  - Created XP-SWMM model
  - Calibrated to monitored data
  - Final report 2005
- PVSC LTCP Phase I (2005-2008)
  - Integrated into PVSC model
  - Converted to InfoWorks CS
- PVSC LTCP Phase II (2016-2018)
  - Interceptor Recalibration
  - Converted InfoWorks ICM
  - Calibrated to monitored data



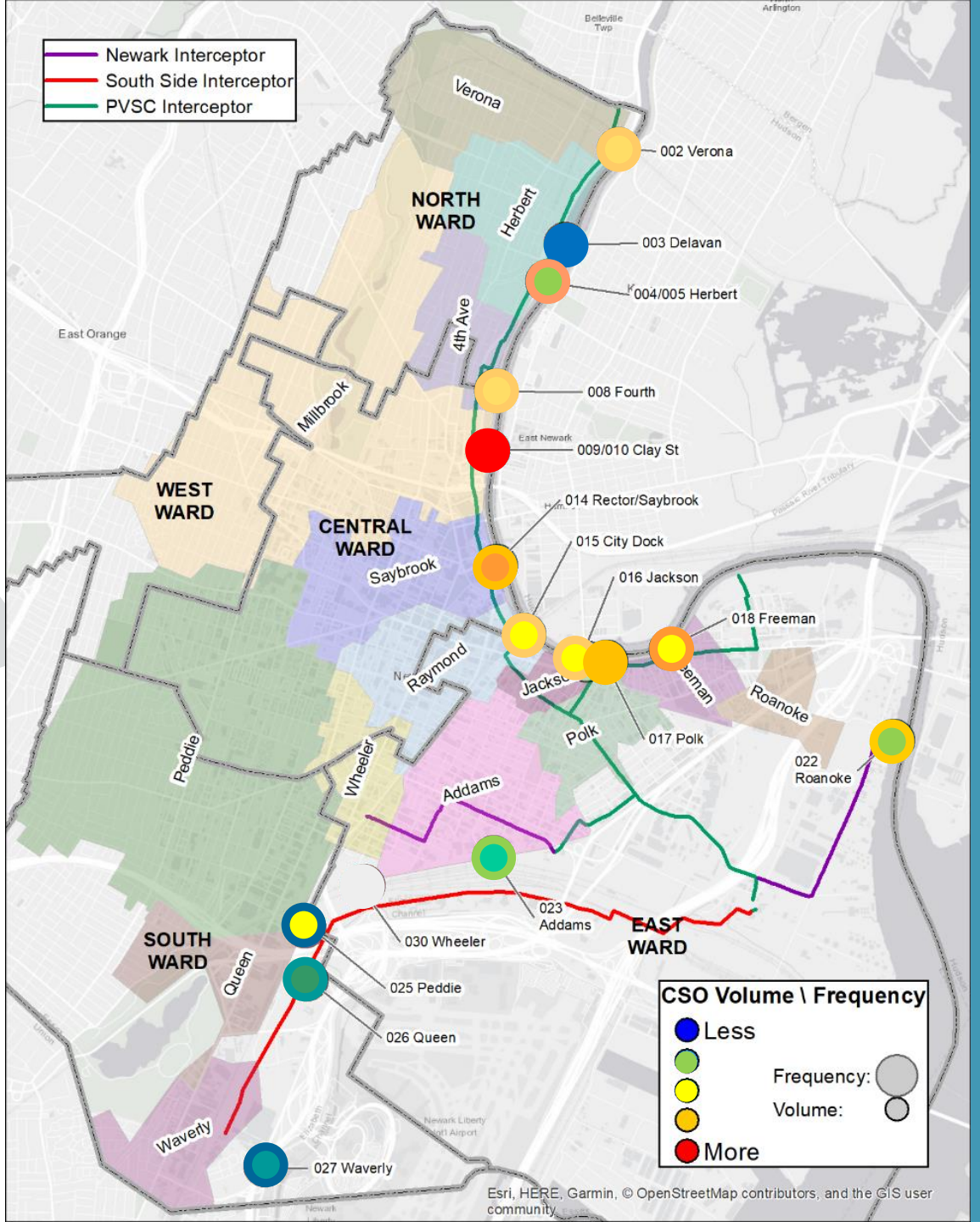
Model Development

- Collection System Overview
  - Combined CSO System
  - Interceptors
    - PVSC
    - South Side
    - Newark Internal
  - Regulators
    - 18 Regulators
    - 11 PVSC, 7 Newark
  - Outfalls
    - 16 Permitted Outfalls
- Recent Updates
  - 2016 Calibration Data
  - Branch Brook Park Drainage Area and Flow
  - Weequahic Park Flow



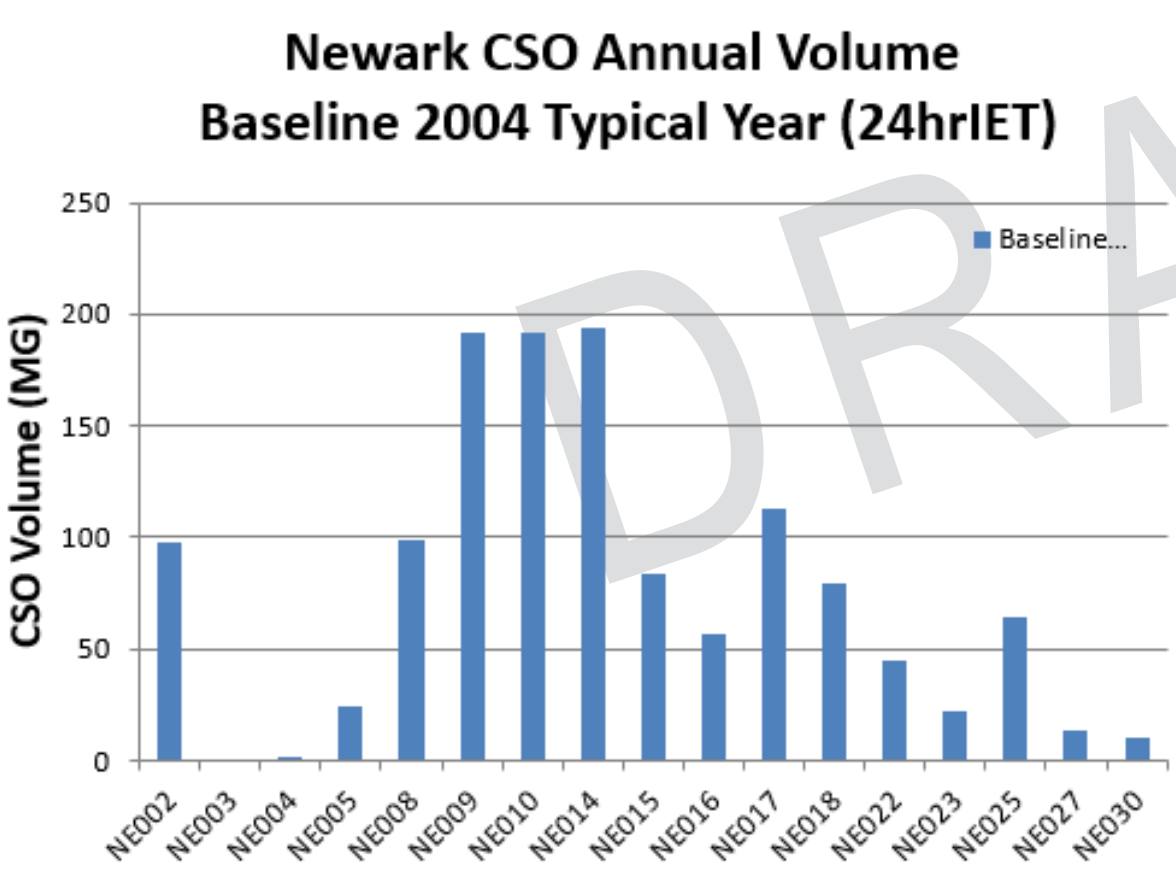
Baseline Results

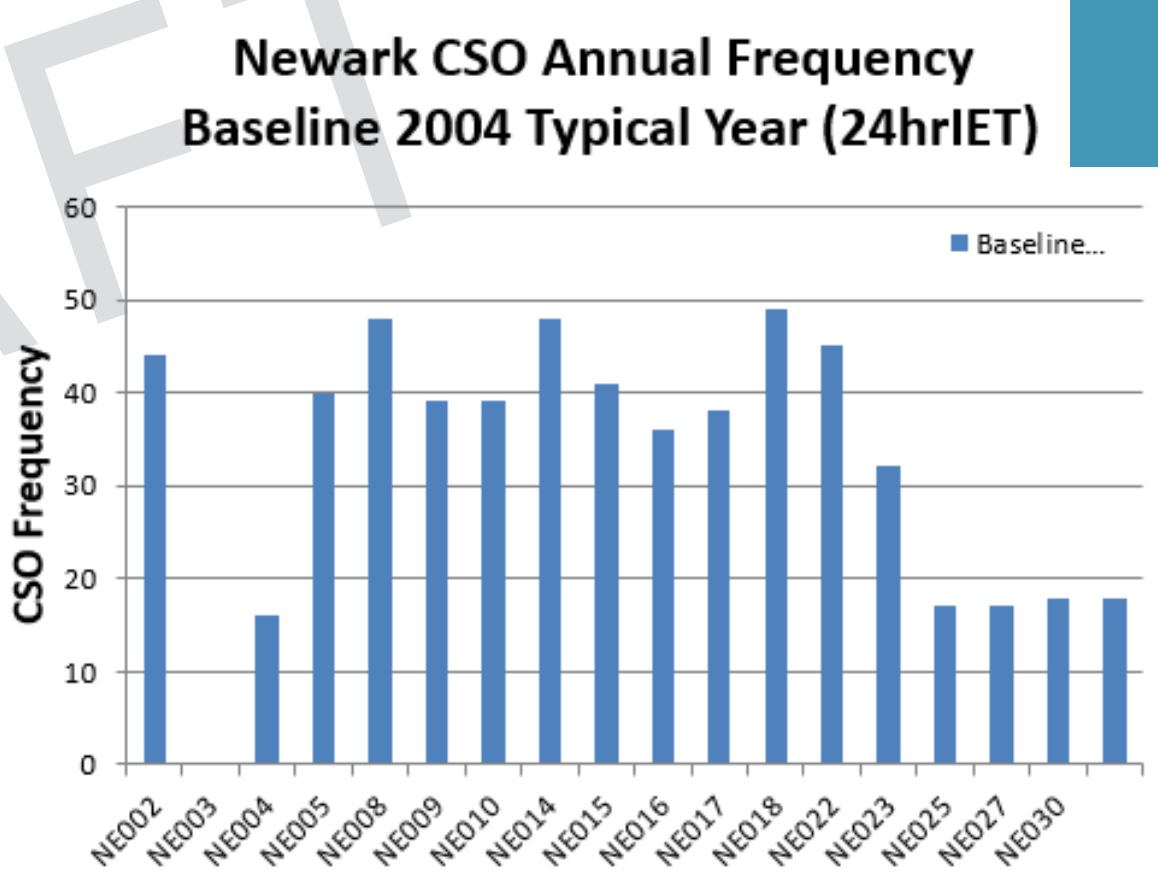
- 2004 Baseline Annual Overflow Map
  - Volume Top 4 Outfalls
    1. Clay
    2. Rector/Saybrook
    3. Polk
    4. Fourth
  - Frequency Top 4 Outfalls
    1. Freeman
    2. Rector/Saybrook
    3. Fourth
    4. Roanoke



Baseline Results

- Total CSO Volume: 1,313 MG
- Total wastewater to PVSC: 61,925 MG



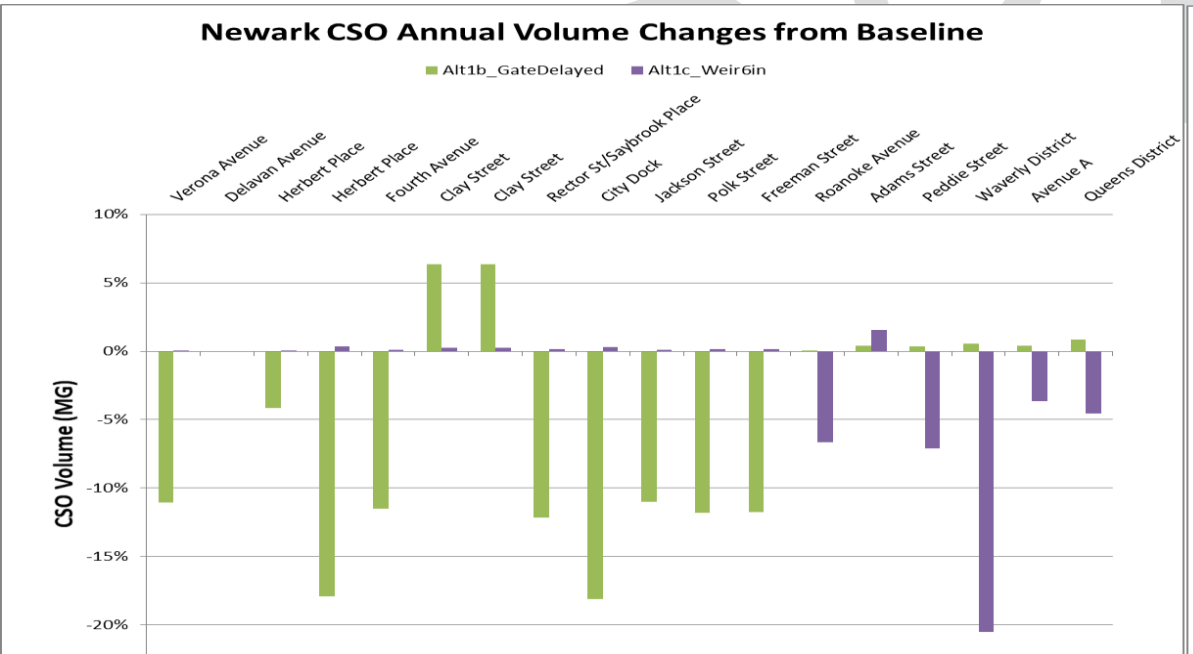


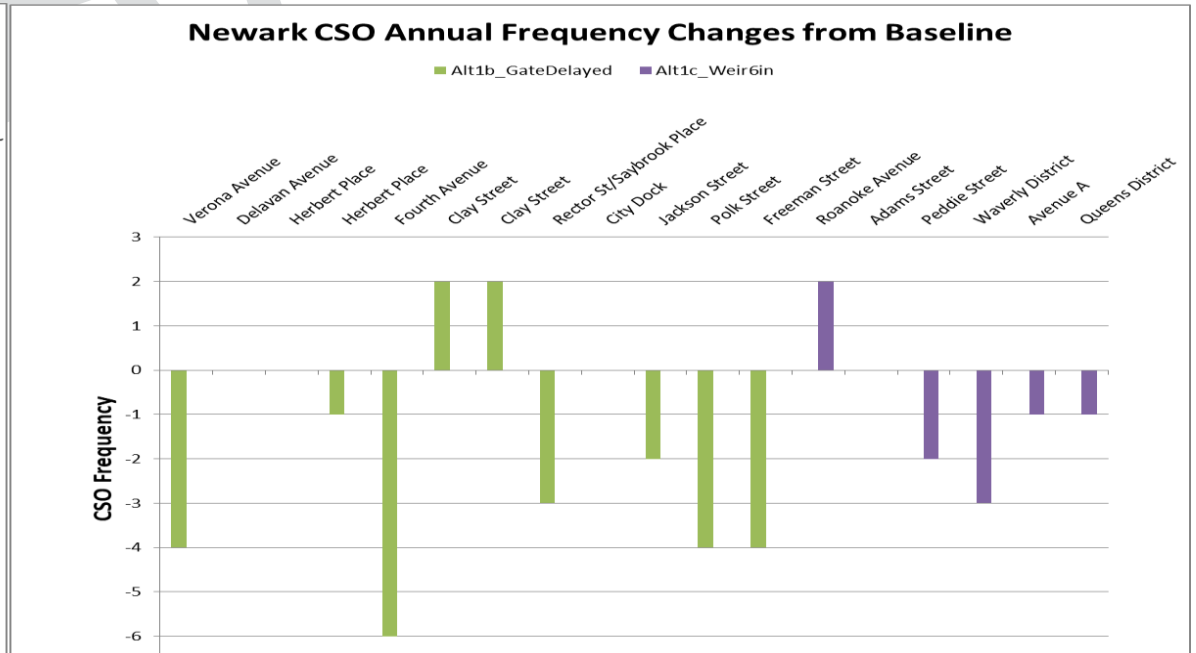
Alternatives Evaluated to Date

- Alternative 1 – Regulator Modifications
  - Alternative 1B – Regulator Gate Operation Change
    - Modify PVSC gate closure point by +10%
      (no change at Clay St Regulator)
  - Alternative 1C – Newark Regulator Modification
    - Increase weir heights at Newark-owned regulators by 6 in.
- Alternative 2 – Green Infrastructure
  - Alternative 2A – 10% Impervious area managed
  - Alternative 2B – 5% Impervious area managed
  - Alternative 2C – Rutgers Scenario
- Alternative 3 – Storage
  - Alternative 3A – 0 Overflows
  - Alternative 3B – 4 Overflows
  - Alternative 3C – 8 Overflows
  - Alternative 3D – 12 Overflows
  - Alternative 3E – 20 Overflows
- Alternative 4 – Inflow / Infiltration Reduction
  - Eliminate base flow from Branch Brook Park and:
    - 10% I/I Reduction
    - 25% I/I Reduction
    - 50% I/I Reduction
- Alternative 5 – Conservation
  - Reduce water/wastewater use by 10%
- Alternative 6 – Disinfection
  - Developed scenarios for 0, 4, 8, 12, and 20 events having any portions that exceed the design flow rate (for 3-log pathogen removal).
  - Calculated reduction in untreated CSO volume

Alternative 1 – Regulator Modifications

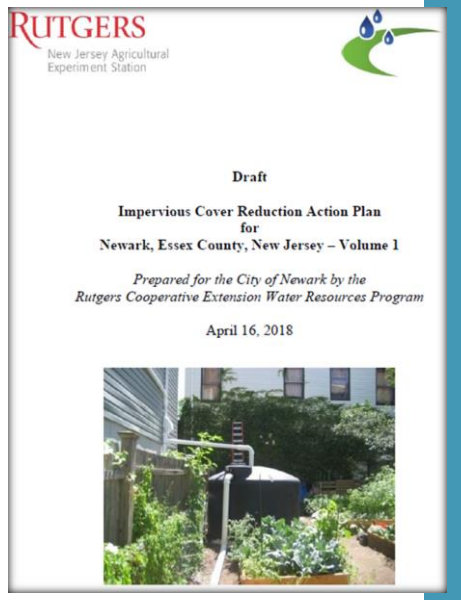
- Alternative 1B – Regulator Gate Operation Change
  - CSO Volume Reduction: 5.3% (69 MG)
  - Overflow Frequency Reduction: 1-6 Overflows depending on outfall
- Alternative 1C – Newark Regulator Modification
  - CSO Volume Reduction: 0.7% (9.5 MG)
  - Overflow Frequency Reduction: 1-3 Overflows depending on outfall





Alternative 2 – Green Infrastructure (GI)

- Alternative 2C: Rutgers Scenario
  - CSO Volume Reduction: 0.3% (3.9 MG)
  - Overflow Frequency Reduction: No reduction in frequency
- Alternative 2B: 5% Impervious area managed
  - CSO Volume Reduction: 7.4% (97 MG)
  - Overflow Frequency Reduction: 0-6 Overflows depending on outfall
- Alternative 2A: 10% Impervious area managed
  - CSO Volume Reduction: 14.6% (192 MG)
  - Overflow Frequency Reduction: 0-8 Overflows depending on outfall

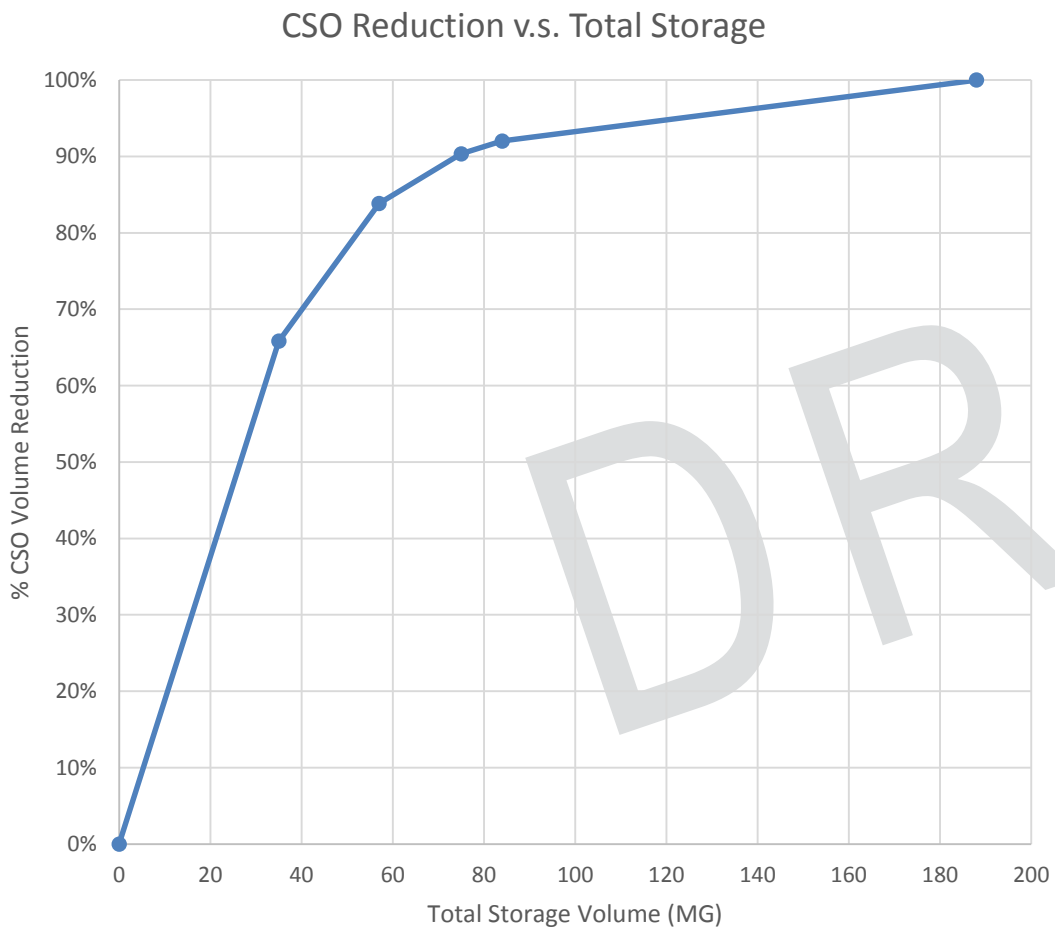


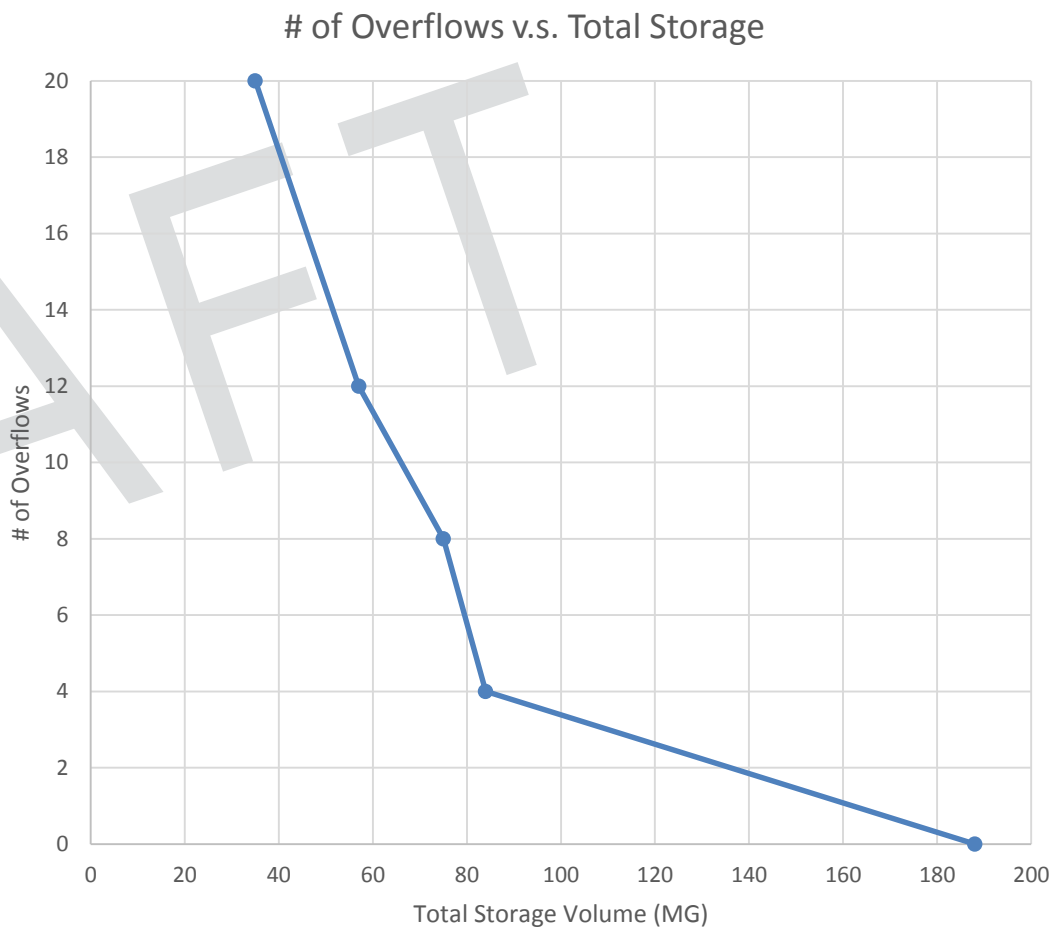
Alternative 3 – Storage

- Storage scenarios
  - 0, 4, 8,12, 20 overflows
  - Wait 12 hrs. for system to return to normal before pump back; hold < 3 days
  - Pump back should not cause >75% of average dry weather flow

Alt #	Overflow Frequency	Total Storage Volume (MG)	Approximate Days to Dewater	Volume Captured (MG)	% Volume Reduction
3E	0	188	5.0	1,313	100%
3A	4	84	2.5	1,208	92%
3B	8	75	2.0	1,186	90%
3C	12	57	1.5	1,101	84%
3D	20	35	1.0	864	66%

Alternative 3 – Storage





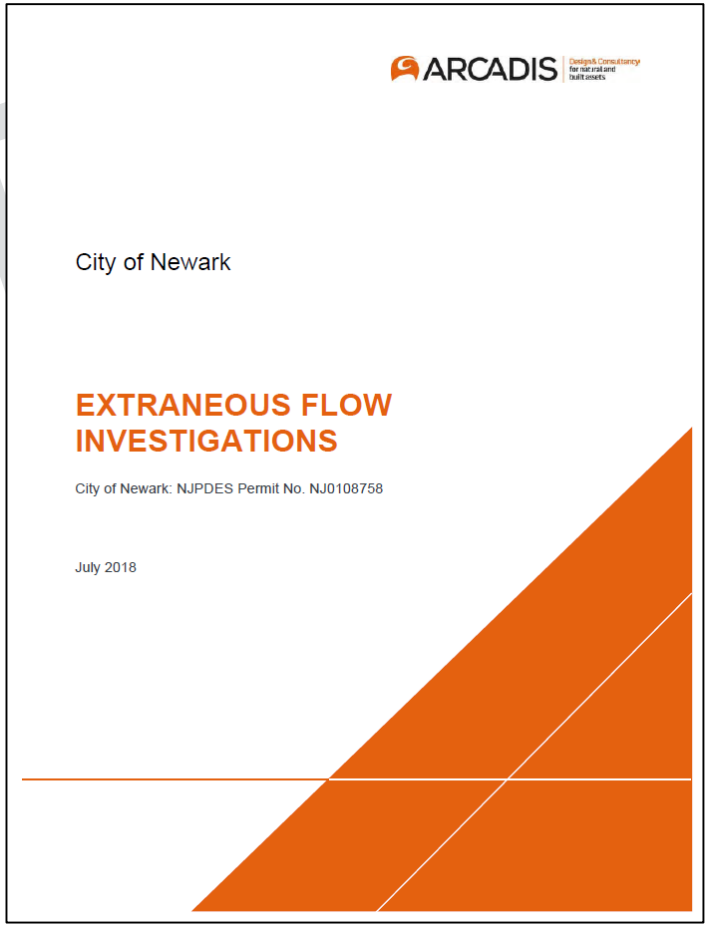
Alternative 4 – Infiltration / Inflow Reduction

- Eliminate base flow from Branch Brook and Weequahic Parks
  - CSO Volume Reduction: 2.7% (35.7 MG)
  - Overflow Frequency Reduction: 0-2 Overflows depending on outfall

Alt 4a: 10% I/I Reduction
  - CSO Volume Reduction: 1.4% (18.8 MG)
  - Overflow Frequency Reduction: 0-2 Overflows depending on outfall

Alt 4b: 25% I/I Reduction
  - CSO Volume Reduction: 3.4% (44.3 MG)
  - Overflow Frequency Reduction: 0-4 Overflows depending on outfall

Alt 4c: 50% I/I Reduction
  - CSO Volume Reduction: 6.7% (88.5 MG)
  - Overflow Frequency Reduction: 0-5 Overflows depending on outfall



Alternative 5 – Water Conservation

- Alternative 5 – Conservation (10% Reduction in water use)
  - CSO Volume Reduction: 2.7% (35.7 MG)
  - Overflow Frequency Reduction: 0-2 Overflows depending on outfall
- Conservation measures
  - Low-flow shower heads (1.6-2.5 gpm v.s. 5-8 gpm)
  - Low-flow toilets (1.3-1.6 gpf v.s. 3-5 gpf)
  - Conservation education
  - City and Building Ordinances

Alternative 6 – Disinfection

- Pollutant of concern is *pathogens*
- Disinfection using Peracetic Acid selected for analysis

CSO-Control Scenario	Untreated[1] CSO Events		Untreated[2] CSO Volume	
	Count	Reduction	(MG)	Reduction
Baseline	61	-	1,313	-
<20 CSO events partly treated	20	67%	496	62%
<12 CSO events partly treated	12	80%	234	82%
<8 CSO events partly treated	8	87%	171	87%
<4 CSO events partly treated	4	93%	49	96%
<0 CSO events partly treated	0	100%	0	100%

[1] In this context, an "Untreated CSO Event" occurs if the CSO flow rate at any outfall exceeds the design flow rate for a 3-log pathogen removal. In fact, most of the event received full treatment.

[2] In this context, "Untreated CSO Volume" is defined as the sum of discharged volumes during any 5-minute period that exceed the design flow rate for 3-log pathogen removal. During those periods, there is some treatment, but no "credit" is shown for that in the "untreated CSO volume" shown.

Overall Performance Results

- Some alternatives are more effective than others; not all can attain the targets by themselves.
- Costs are also being developed to show which are more *cost effective.*
- Combinations of different types of alternatives can also be used to achieve targets.
  - Example: to achieve the “85% Capture Target” a reduction in untreated CSO of 7% is required:

Control Alternative	Untreated CSO Events (count/yr)	Untreated CSO Volume (MG/yr)	Untreated CSO Volume Reduction (%)	20-Yr Life-Cycle Cost, Raw as PV ($M)	20-Yr Life-Cycle Cost, PTPC as PV ($M)
Baseline	61	1,313	-	-	-
Gate Delay + Disinfection at NE022	50	1,199	9%	$1.9	$2.9
Disinfection at NE002	61	1,215	7%	$4.4	$5.8
Green Infrastructure applied on 5% imp. area	57	1,216	7%	$22 - $556	$50 - $583

Next Steps

- Short Term (next few months)
  - Complete costing analyses
  - Finalize Development and Evaluation of Alternatives Report (DEAR)
- Long term (next year)
  - Refine alternatives
  - Select alternative
  - Alternatives selection report

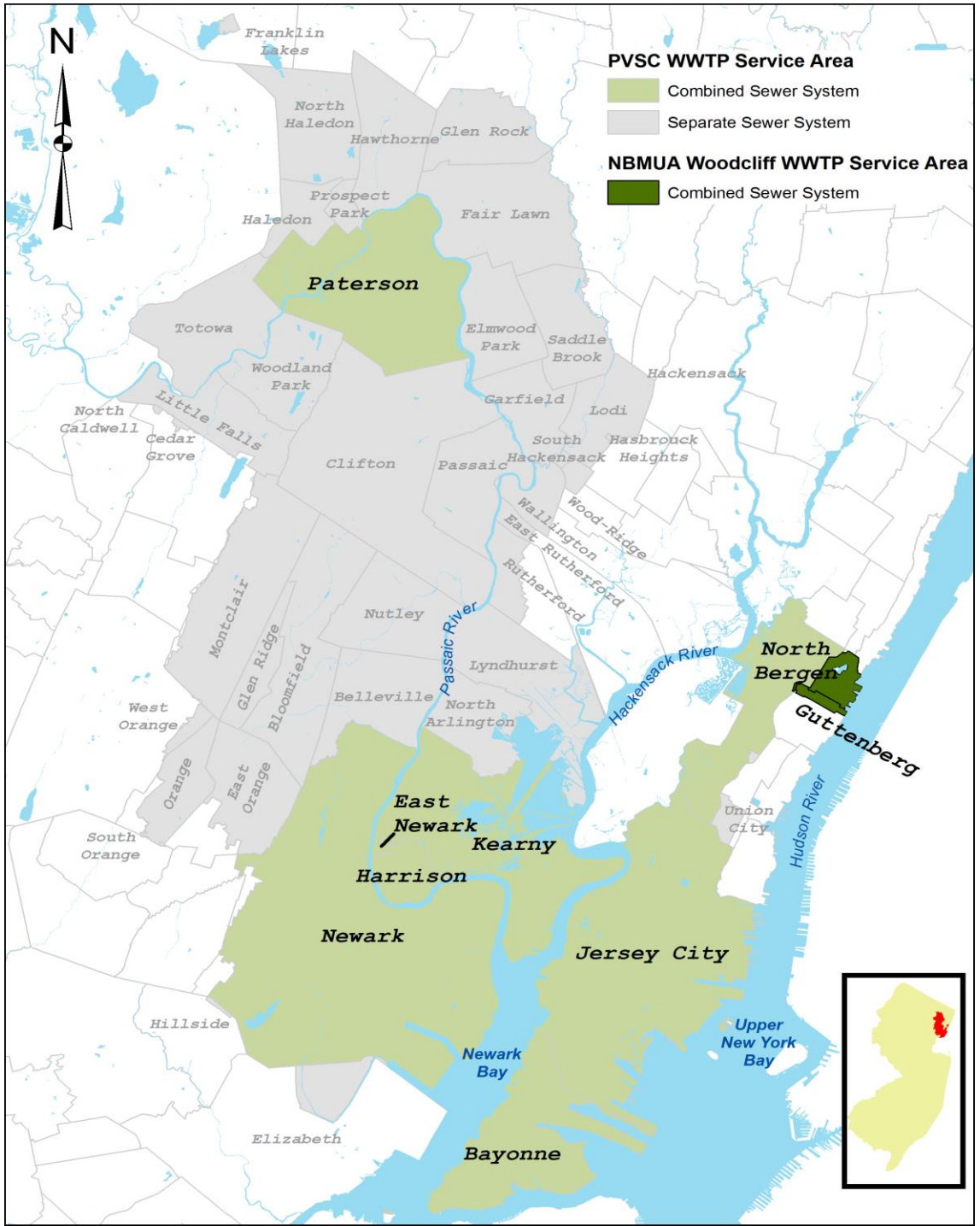
Introduction and Recap

CLEAN WATERWAYS
Healthy Neighborhoods

CLEAN WATERWAYS

Healthy Neighborhoods

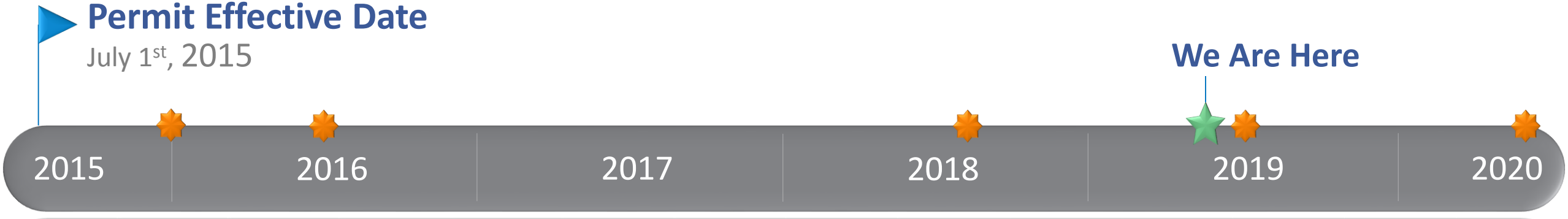
- City of Paterson
- City of Newark
- Town of Guttenberg
- Town of Harrison
- Town of Kearny
- Borough of East Newark
- North Bergen MUA
- Bayonne MUA
- Jersey City MUA
- Passaic Valley Sewerage Commission (PVSC)



Supplemental CSO Team Members

Member	Organization		Member	Organization
Dan Smereda	Bayonne Water Guardians		Sue Levine	Paterson Smart
Lisha Smereda	Bayonne Water Guardians		Ruben Gomez	City of Paterson Economic Development
Nicole Miller	Newark DIG		Sheri Ferreira	Greater Paterson Chamber of Commerce
Drew Curtis	Ironbound Community Corporation		Betty Jane Boros	New Jersey Business & Industrial Association
Robin Dougherty	Newark Greater Conservancy/Newark Business Partnership		Vacant	Montclair State University - Passaic River Institute
Jorge Santos	Newark Community Economic Development Corporation		Christopher C. Obropta, Ph.D	Rutgers University - Cooperative Extension Water Resources
Christopher Pianese	Township of North Bergen		Captain Bill Sheehan	Hackensack Riverkeeper
Janet Castro	Hudson Regional Health Commission Town of North Bergen		Harvey Morginstin	Passaic River Boat Club & Passaic River Superfund CAG
Thomas Stampe	North Bergen "Sustainable Jersey" group		Laurie Howard	Passaic River Coalition
Nancy Kontos	Bunker Hill Special Improvement District		Ben Delisle	Passaic River Rowing Association
Alison Cucco	Jersey City Environmental Commission		Patricia Hester-Fearon	Town of Kearny
Michele Langa	NY/NJ Baykeeper		Christopher Vasquez	Town of Kearny

59-Month Program Schedule and Milestones



January 1, 2016

- ✓ Coordinates of pumps, regulators, and outfalls
- ✓ System Characterization Work Plan
- ✓ Baseline Compliance Monitoring Program Work Plan

July 1, 2016

- ✓ Map of Combined and Separate Sewer Areas

Permit Due Date

July 1, 2018

- ✓ System Characterization Report
- ✓ Public Participation Process Report
- ✓ Compliance Monitoring Program Report
- ✓ Consideration of Sensitive Areas Plan

July 1, 2019

- Development and Evaluation of Alternatives Report

June 1, 2020

- Selection and Implementation of Alternatives Report in the Final LTCP

Overview of Evaluation of Alternatives Report

CLEAN WATERWAYS
Healthy Neighborhoods

Permit Requirements

- Evaluate the feasibility of potential control alternatives, including:
  - Green infrastructure
  - Increased storage capacity in the collection system
  - Treatment expansion or storage at PVSC
  - Inflow and Infiltration (I/I) reduction
  - Sewer separation
  - *Treatment of CSO discharge*
  - CSO related bypass of secondary treatment at the treatment plant

CLEAN WATERWAYS
Healthy Neighborhoods

Purpose of the Evaluation of Alternatives Report

- NJPDES Permit Section G.4.b

  "The permittee shall submit….. the Evaluation of Alternatives Report that will enable the permittee, in consultation with the Department, the public, owners and/or operators of the entire collection system that conveys flows to the treatment works, to select the alternatives to ensure the CSO controls will meet the water quality-based requirements of the CWA, will be protective of the existing and designated uses….., give the highest priority to controlling CSOs to sensitive areas, and address minimizing impacts from SIU discharges."

CLEAN WATERWAYS
Healthy Neighborhoods

Evaluation of Alternatives Report – Due July 1, 2019

Evaluation of Alternatives For The PVSC Service Area

+

Evaluation of Alternatives

City of Newark

Evaluation of Alternatives

Town of Kearny

Evaluation of Alternatives

Town of Harrison

Evaluation of Alternatives

Borough of East Newark

Evaluation of Alternatives

Jersey City MUA

Evaluation of Alternatives

North Bergen MUA

Evaluation of Alternatives

City of Paterson

Evaluation of Alternatives

Bayonne MUA

Evaluation of Alternatives

PVSC

- Front end of report containing repetitive information and overall summaries
- 9 individual reports as appendices

CLEAN WATERWAYS
Healthy Neighborhoods

Preliminary Screening Table

CLEAN WATERWAYS
Healthy Neighborhoods

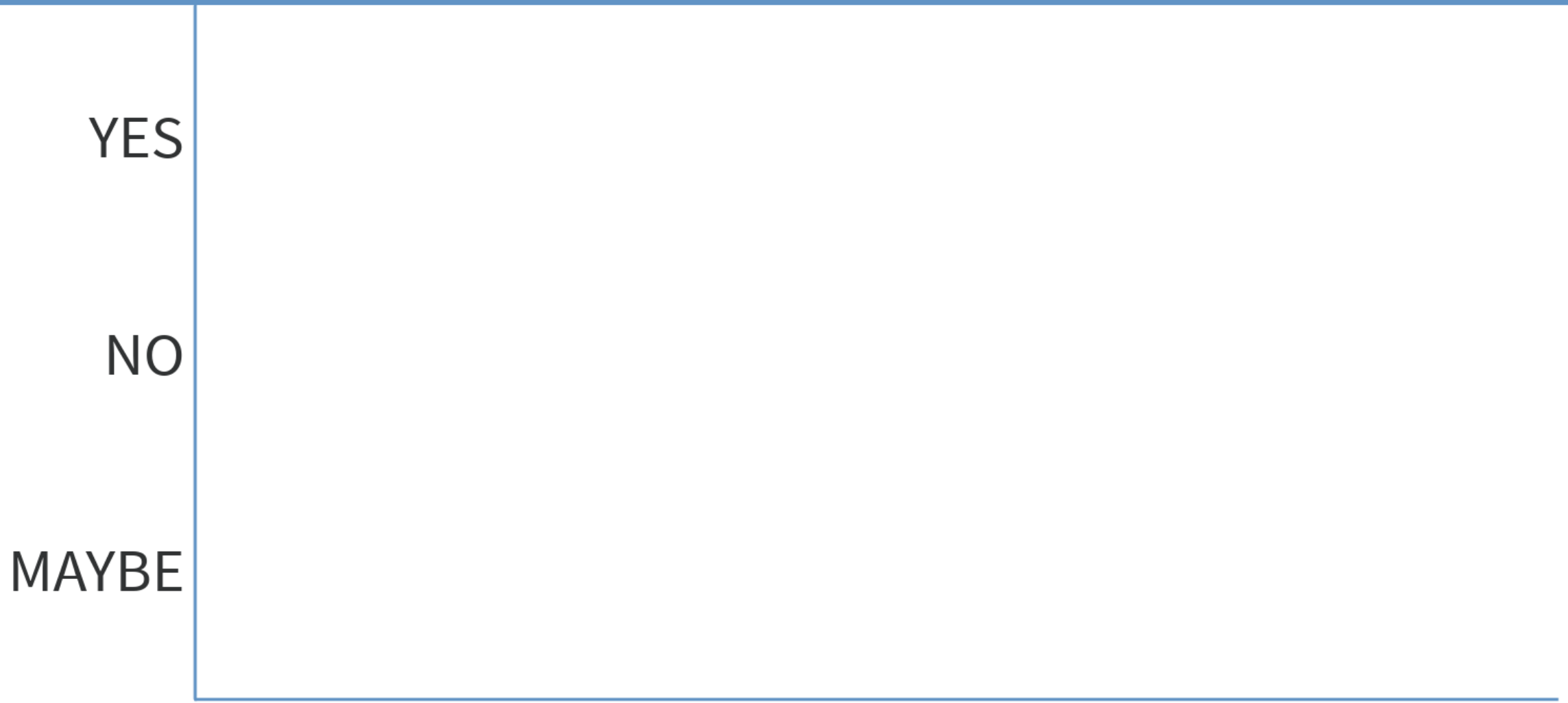
Alternatives Evaluation Results Summary/ Alternatives Being Proposed for Further Consideration

CLEAN WATERWAYS
Healthy Neighborhoods

Poll Everywhere: What Do You Think?

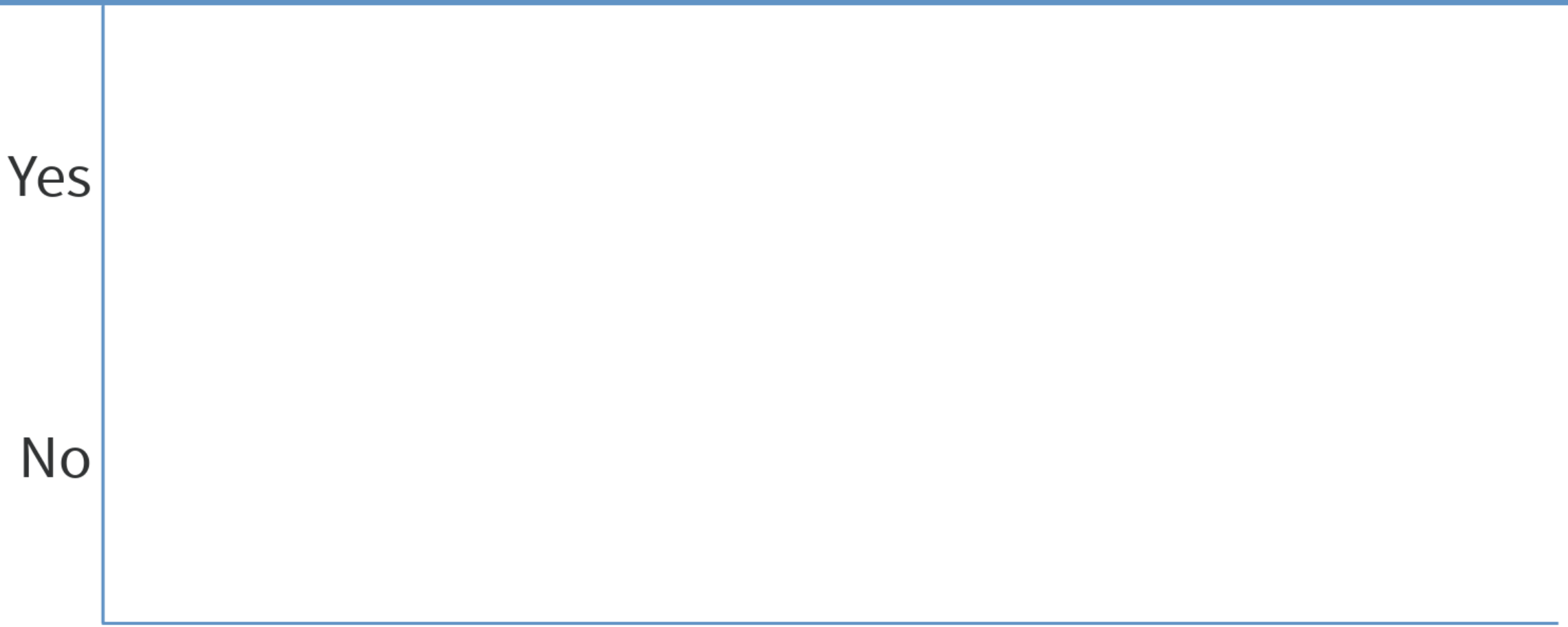
CLEAN WATERWAYS
Healthy Neighborhoods

Let's test this thing! Are you there?



Name a fun thing you did over the long weekend

Do you live in the PVSC Sewer District or the NBMUA Woodcliff/Guttenberg Sewer Service Area?



Do you live in a CSO community?

What is your preference for CSO controls?

Green Infrastructure

Gray Infrastructure

Combination of both Green and Gray Infrastructures

What is more important: providing affordable alternatives or eliminating CSOs at all costs?

Providing affordable alternatives that achieve water quality control objectives

Eliminate CSOs at all costs

Based on your answer to the previous question, how does your response change if a non-preferred CSO control element is more cost-effective?

Cost is not a factor; I just want my preferred method of CSO control

Cost is important. I would prefer a more cost-effective CSO Control alternative

Breakout Session

CLEAN WATERWAYS
Healthy Neighborhoods

What is your preference for CSO controls?

Green Infrastructure

Gray Infrastructure

Combination of both Green and Gray Infrastructures

What is more important: providing affordable alternatives or eliminating CSOs at all costs?

Providing affordable alternatives that achieve water quality control objectives

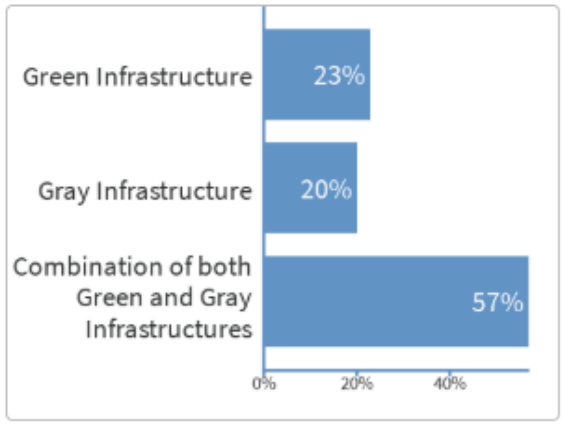
Eliminate CSOs at all costs

Based on your answer to the previous question, how does your response change if a non-preferred CSO control element is more cost-effective?

Cost is not a factor; I just want my preferred method of CSO control	**A**
Cost is important. I would prefer a more cost-effective CSO Control alternative	**B**

Before Breakout Session

What is your preference for CSO controls?



Response options	Correct	Count	Percentage
Green Infrastructure	✓	8	23%
Gray Infrastructure	✓	7	20%
Combination of both Green and Gray Infrastructures	✓	20	57%

97%

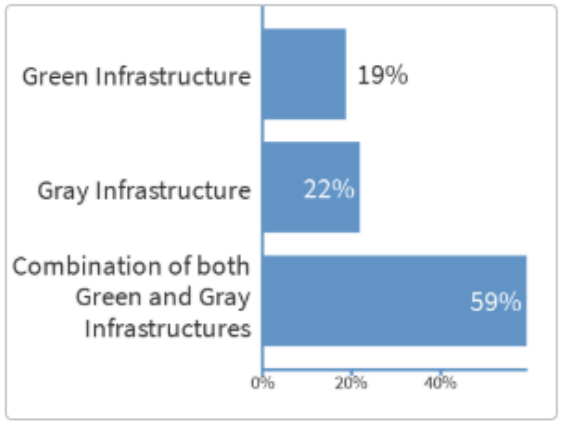
Engagement

35

Responses

After Breakout Session

What is your preference for CSO controls?



Response options	Correct	Count	Percentage
Green Infrastructure	✓	6	19%
Gray Infrastructure	✓	7	22%
Combination of both Green and Gray Infrastructures	✓	19	59%

100%

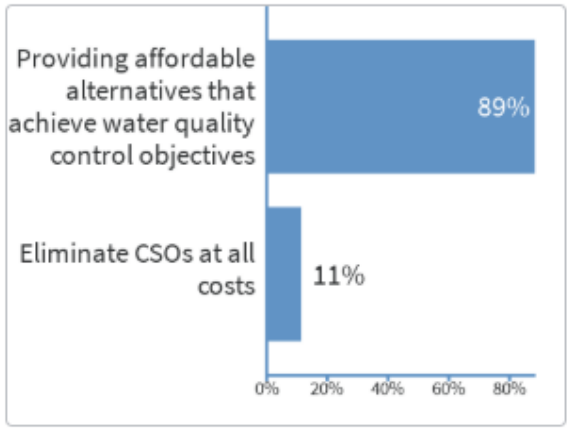
Engagement

32

Responses

Before Breakout Session

What is more important: providing affordable alternatives or eliminating CSOs at all costs?



Response options	Correct	Count	Percentage
Providing affordable alternatives that achieve water quality control objectives	✓	31	89%
Eliminate CSOs at all costs	✓	4	11%

97%

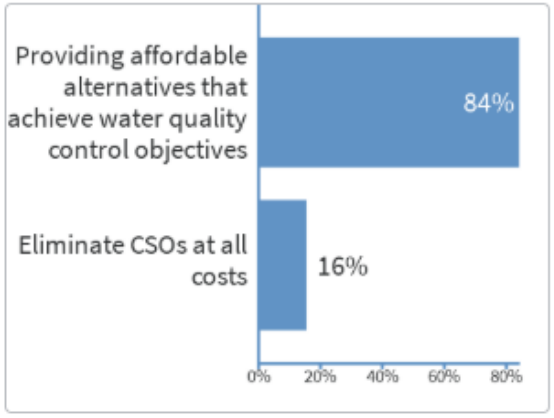
Engagement

35

Responses

After Breakout Session

What is more important: providing affordable alternatives or eliminating CSOs at all costs?



Response options	Correct	Count	Percentage
Providing affordable alternatives that achieve water quality control objectives	✓	27	84%
Eliminate CSOs at all costs	✓	5	16%

100%

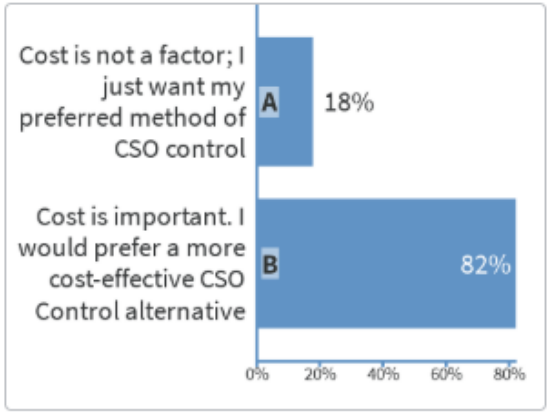
Engagement

32

Responses

Before Breakout Session

Based on your answer to the previous question, how does your response change if a non-preferred CSO control element is more cost-effective?



Response options	Correct	Count	Percentage
Cost is not a factor; I just want my preferred method of CSO control	✓	6	18%
Cost is important. I would prefer a more cost-effective CSO Control alternative	✓	28	82%

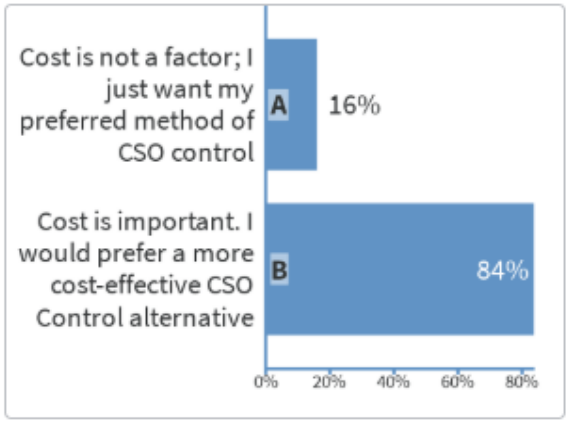
Engagement

34

Responses

After Breakout Session

Based on your answer to the previous question, how does your response change if a non-preferred CSO control element is more cost-effective?



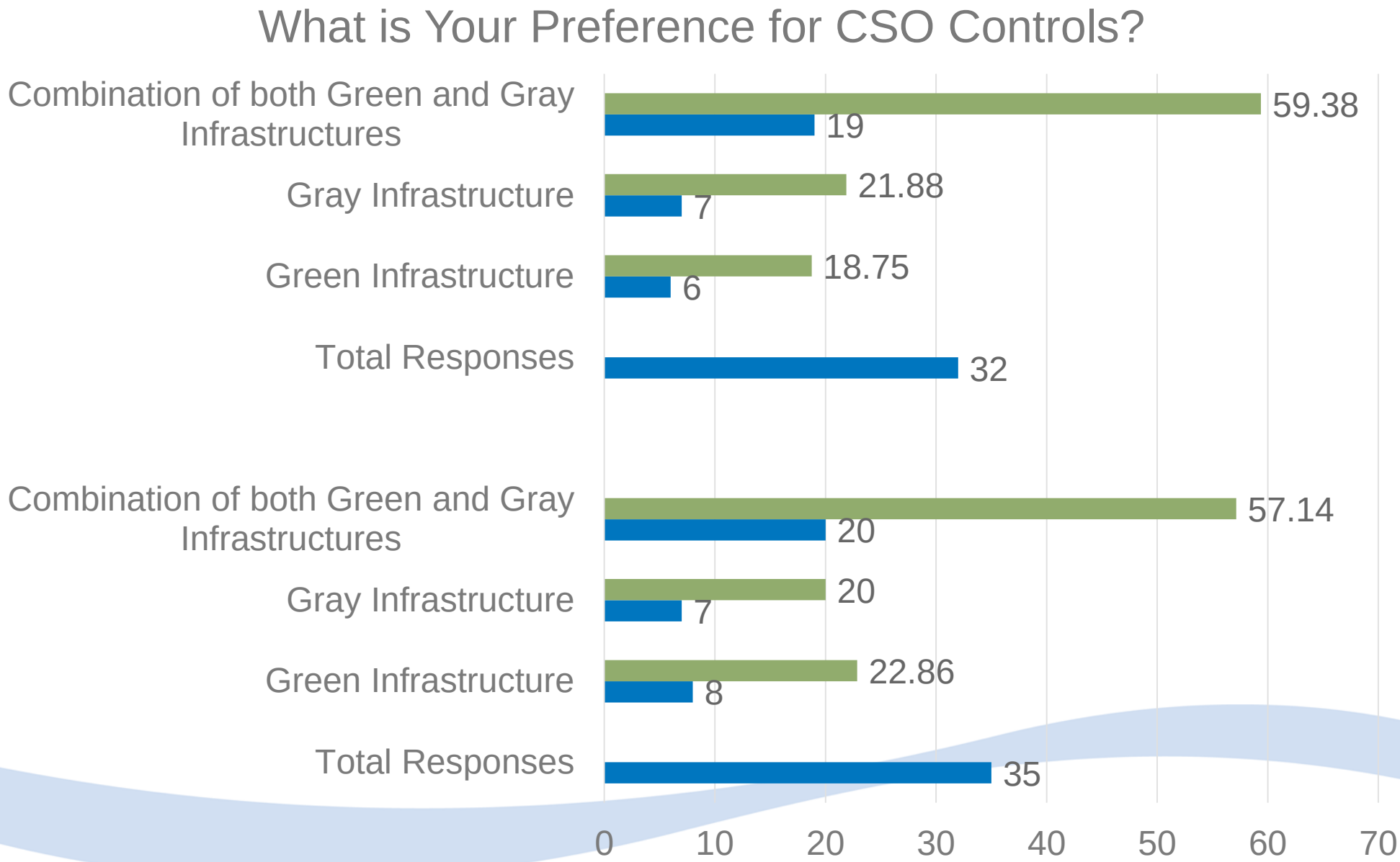
Response options	Correct	Count	Percentage
Cost is not a factor; I just want my preferred method of CSO control	✓	5	16%
Cost is important. I would prefer a more cost-effective CSO Control alternative	✓	26	84%

Engagement

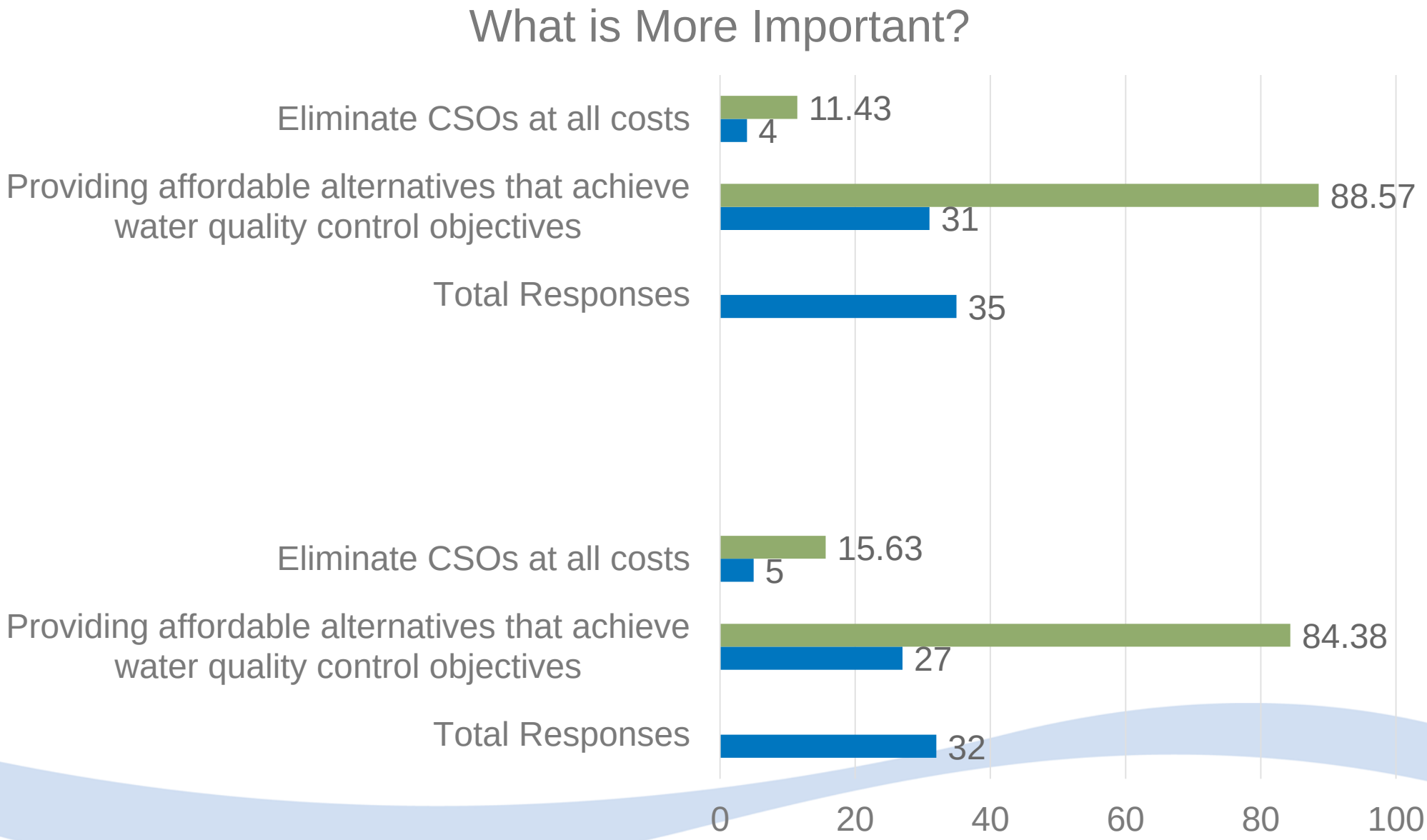
31

Responses

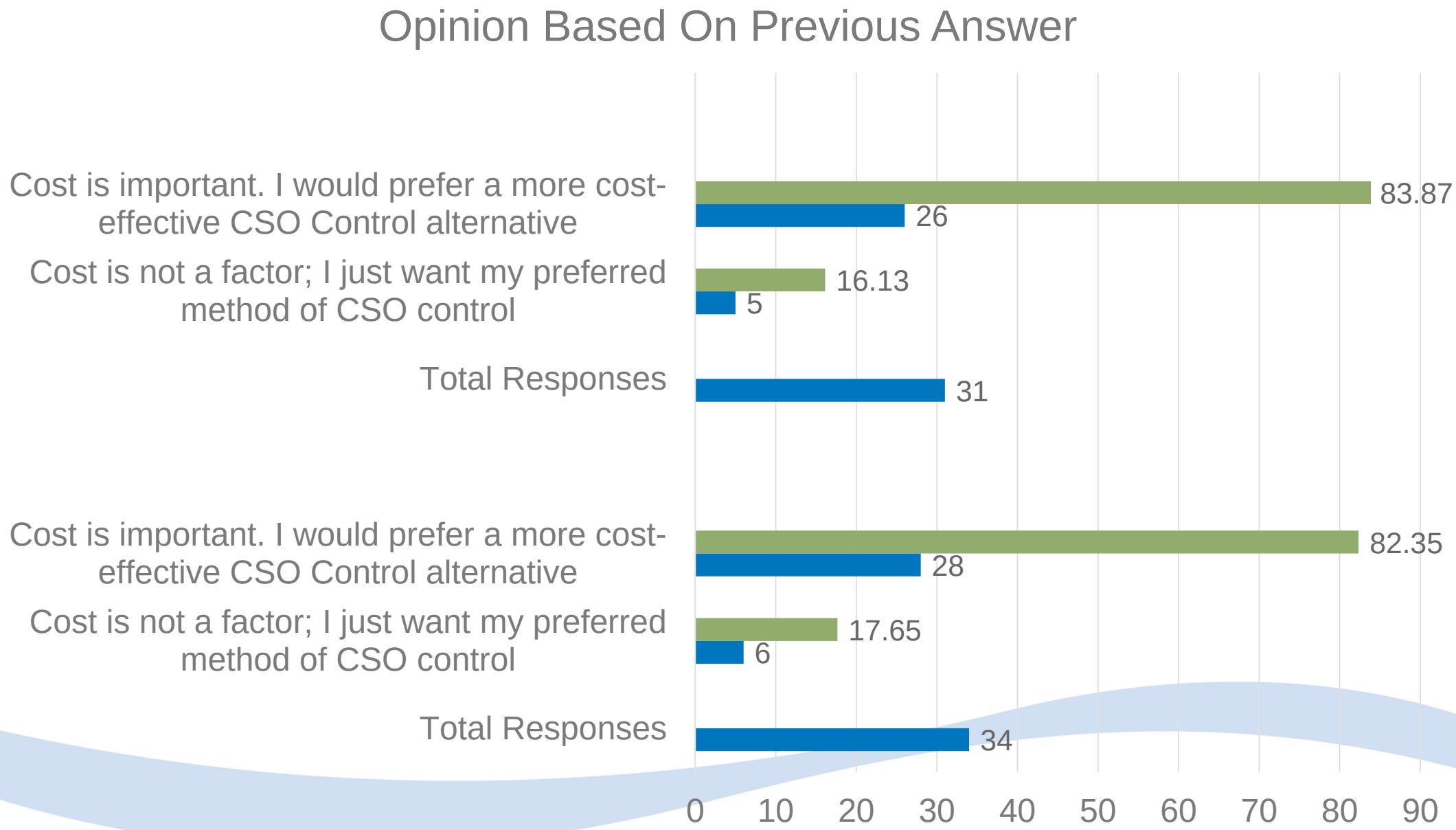
Result: Question #1



Result: Question #2



Result: Question #3



Questions and Final Discussion

CLEAN WATERWAYS
Healthy Neighborhoods