Supplemental CSO Team – Session 9

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

October 16, 2018

CLEAN WATERWAYS
Healthy Neighborhoods

Agenda

- Introductions
- Prior Meeting Recap
- CSO Alternative – Bypass

  Presented by Joe Manick, New Jersey Department of Environmental Protection
- No Feasible Alternatives Study and Report

  Presented by Sarah Galst and Paul Saurer, Hazen and Sawyer
- Jersey City MUA Evaluation of Alternatives for CSO Control

  Presented by Mark Del Bove and John Minnett, Arcadis
- Questions
- Adjourn

CLEAN WATERWAYS
Healthy Neighborhoods

Introduction and Recap

CLEAN WATERWAYS
Healthy Neighborhoods

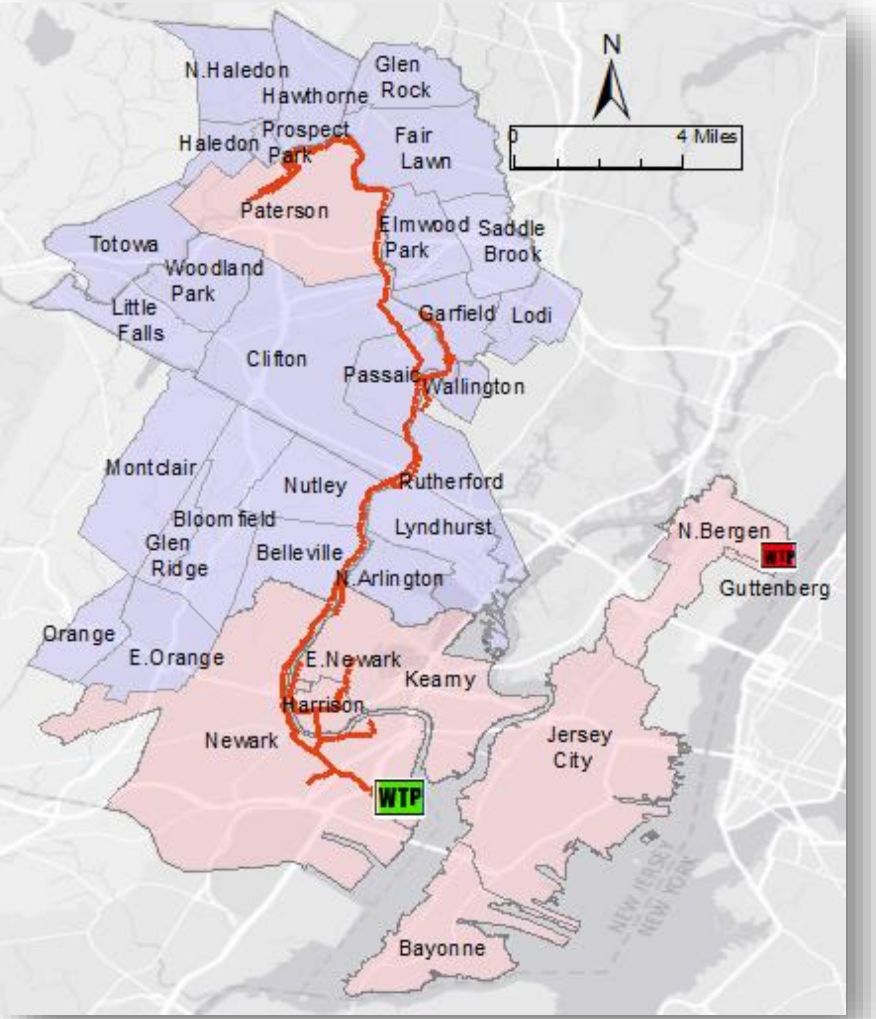
Supplemental CSO Team Members

Member	Organization	Member	Organization
Matt Dorans	Bayonne Chamber of Commerce	Sue Levine	Paterson Smart
TBD	Jersey City Redevelopment Agency	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	TBD	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

Permittees

Permittee	Municipality	WWTP	CSOs
Bayonne MUA	Bayonne	PVSC	30
Borough of East Newark	East Newark		1
Town of Harrison	Harrison		7
Jersey City MUA	Jersey City		21
Town of Kearny	Kearny		5
City of Newark	Newark		18
North Bergen MUA	North Bergen		7
City of Paterson	Paterson		23
PVSC	-		0
Town of Guttenberg	Guttenberg	Woodcliff	1
North Bergen MUA*	North Bergen		1
	Total		114

** North Bergen MUA conveys flows to both PVSC and Woodcliff WWTPs*

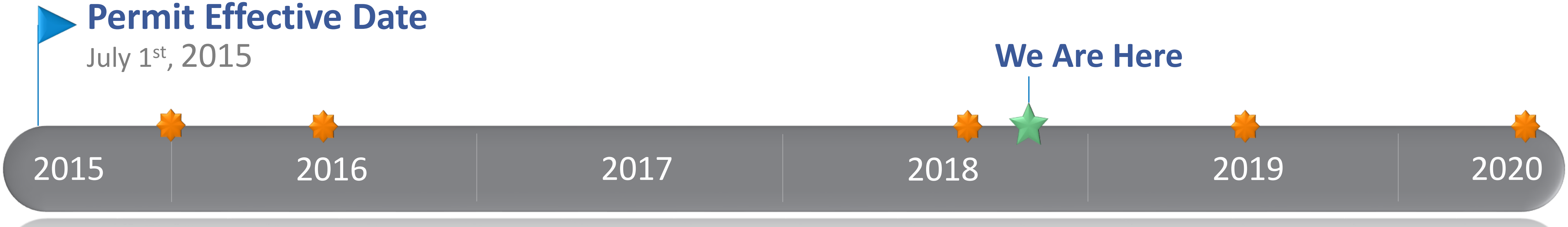


CLEAN WATERWAYS
Healthy Neighborhoods

Project Status Update

CLEAN WATERWAYS
Healthy Neighborhoods

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

July 1, 2018
- ✓ System Characterization Report
- ✓ Public Participation Process Report
- ✓ Compliance Monitoring Program Report
- ✓ Consideration of Sensitive Areas Plan

July 1, 2019

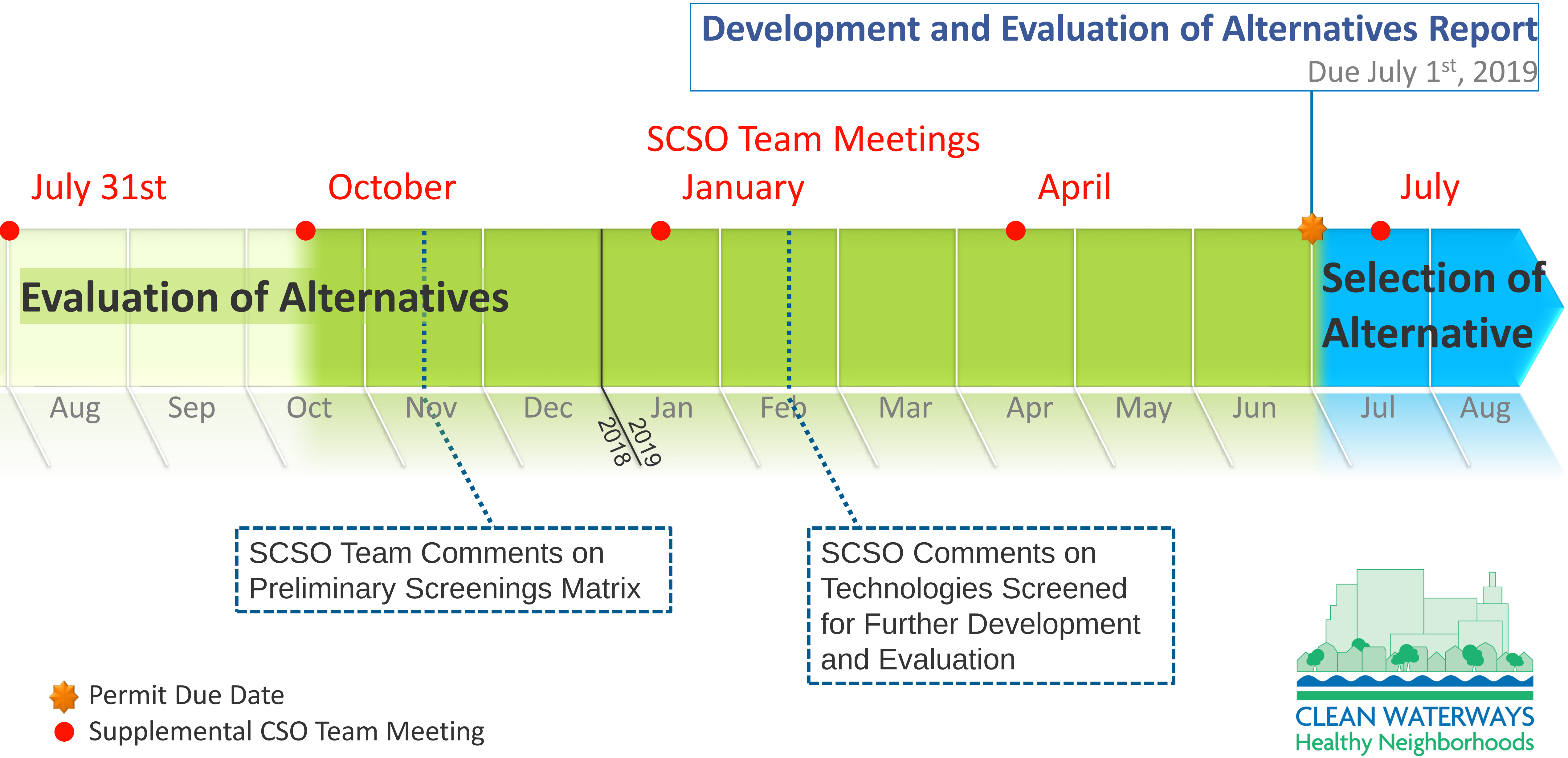
Development and Evaluation of Alternatives Report

June 1, 2020

Selection and Implementation of Alternatives Report in the Final LTCP

Permit Due Date

Timeline for Evaluation of Alternatives



CLEAN WATERWAYS
Healthy Neighborhoods

Preliminary Screening of Technologies

- Screenings Table Definitions
  - Alternatives assigned one of four values based on effectiveness at reaching primary CSO control goals
    - High: The CSO control technology will have a significant impact on this CSO control goal and is among the best technologies available to achieve that goal
    - Medium: This technology is effective at achieving the CSO control goal, but is not considered among the most effective technologies to achieve that goal
    - Low: This technology will have a minor impact on this CSO control goal. These technologies will need other positive attributes to be considered for further evaluation
    - None: The CSO control technology will have zero or negative effect on the CSO control goals

Storage and Treatment Technologies							
Technology Group	Practice	Primary Goals		Implementation & Operation Factors	Consider Combining w/ Other Technologies	Being Implemented	Recommendation for Alternatives Evaluation
		Bacteria Reduction	Volume Reduction				
Linear Storage	Pipeline	High	High	Can only be implemented if in-line storage potential exists in the system; increased potential for basement flooding if not properly designed…….	No		
	Tunnel	High	High	Requires small area at ground level relative to storage basins; disruptive at shaft locations; increased O&M burden.	No		
Treatment-CSO Facility	Vortex Separators	None	None	Space required; challenging controls for intermittent and highly variable wet weather flows. Vortex separators would remove floatables and ……...	Yes		
	Screens and Trash Racks	None	None	Prone to clogging; requires manual maintenance; requires suitable physical configuration; increased O&M burden. Screens and trash racks ………	Yes		
	Fuzzy Filters	None	None	Relatively low O&M requirements; smaller footprint than traditional filtration methods. This technology primarily focuses on TSS removal, ………	Yes		
Treatment-WRTP	Additional Treatment	High	High	May require additional space; increased O&M burden.	No		
	Wet Weather Blending	Low	High	Requires upgrading the capacity of influent pumping, primary treatment and disinfection processes; increased O&M burden. Wet weather blending does not address bacteria reduction, as it is a secondary treatment bypass for the POTW. Permittee must demonstrate there are no feasible alternatives to the diversion for this to be implemented.	Yes		
Treatment-Industrial	Industrial Pretreatment	Low	Low	Requires cooperation with Industrial User's; more resources devoted to enforcement; depends on IU's to maintain treatment standards. May require Permits.	Yes		

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 PVSC**

CLEAN WATERWAYS
Healthy Neighborhoods

CSO Alternative - Bypass

presented by: Joe Mannick, NJDEP

No Feasible Alternatives Study and Report

presented by: Sarah Galst and Paul Saurer, Hazen and Sawyer

JCMUA Evaluation of Alternatives for CSO Control

presented by: Mark Del Bove and John Minnett, Arcadis

CLEAN WATERWAYS
Healthy Neighborhoods

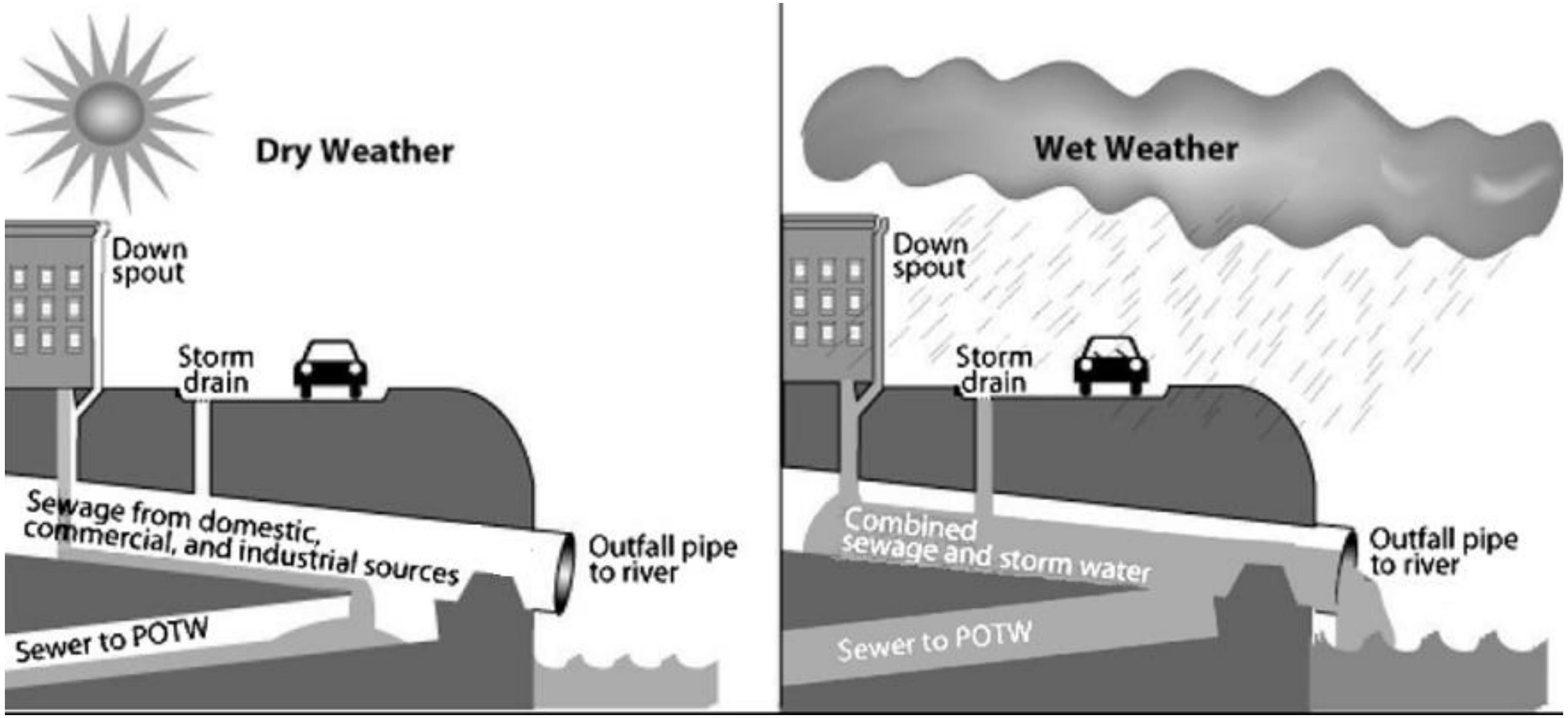
CSO Alternative - Bypass

Joe Mannick, Supervisor and CSO Team Leader
joe.mannick@dep.nj.gov

October 16, 2018

New Jersey DEPARTMENT of ENVIRONMENTAL PROTECTION

What is a CSO?



Dry Weather
Down spout
Storm drain
Sewage from domestic, commercial, and industrial sources
Outfall pipe to river
Sewer to POTW
Wet Weather
Down spout
Storm drain
Combined sewage and storm water
Outfall pipe to river
Sewer to POTW

What Has NJDEP Done?

- NJDEP issued individual permits requiring a **Long Term Control Plan** (LTCP).
- The LTCP is due 2020.
- LTCP must show a path to compliance with the Clean Water Act.
- This path requires an Alternatives Analysis.
- The Alternatives Analysis is due 2019.

LTCP - Alternatives Analysis

- Required to evaluate seven CSO Control Alternatives:

1. Bypass of Secondary Treatment

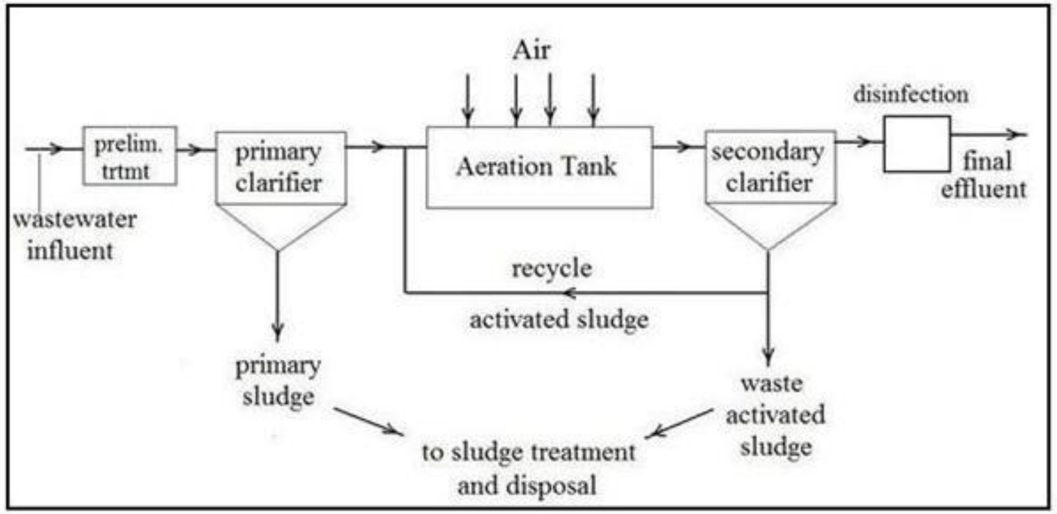
2. Green Infrastructure
3. Storage
4. Sewage Treatment Plant Expansion
5. Infiltration/Inflow (groundwater/stormwater) reduction
6. Sewer Separation
7. Satellite Treatment

What is Secondary Treatment?

- Secondary Treatment is the **standard minimum treatment** required for every sewage treatment plant.
- It is defined by numeric limits for specific parameters such as Total Suspended Solids.

The Stages of Secondary Treatment

1 Preliminary	2 Primary	3 Secondary	4 Disinfection
• Removes big, heavy waste • Mechanical	• Removes floating & settled waste • Mechanical	• Removes suspended waste • Biological	• Removes microbes • Chemical



Activated Sludge Wastewater Treatment Flow Diagram

Diagram credit to engineeringexcelspreadsheets.com

Preliminary Treatment (1 of 4)

- Removes large and/or heavy solids

- Bar screen provides *physical* treatment

Primary Treatment (2 of 4)

- Removes solids that settle on the bottom of a tank and skims floating material from the surface
- Primary is *physical* treatment

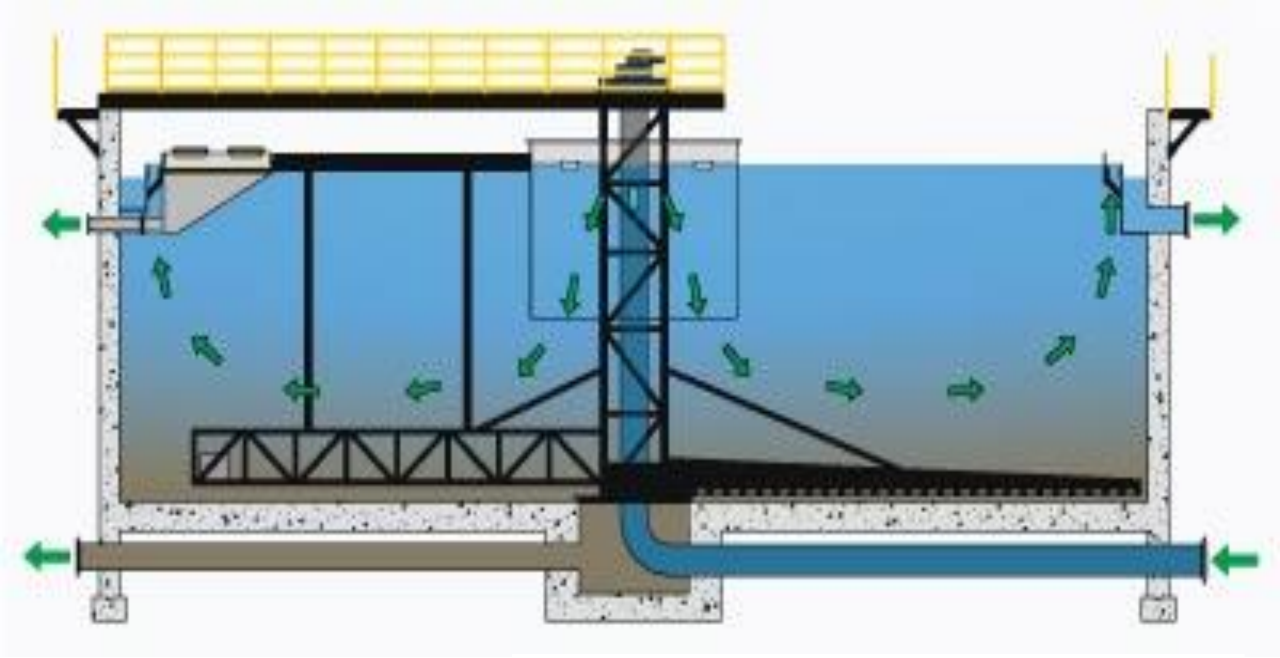
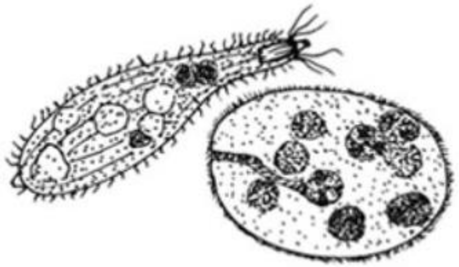


Diagram credit to monroeenvironmental.com

Secondary Treatment (3 of 4)

- Removes waste (biodegradable organic pollutants/ suspended solids) by using microbes
- Secondary is *biological* treatment



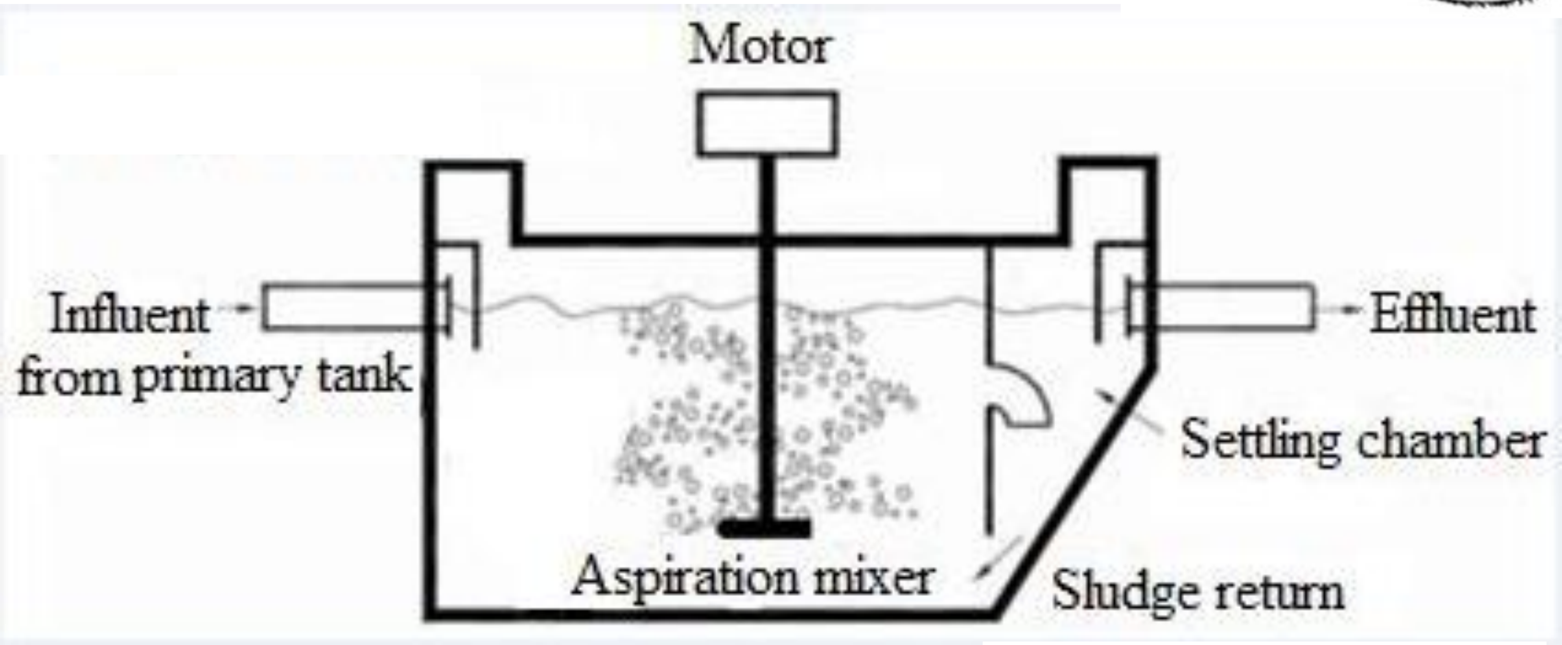
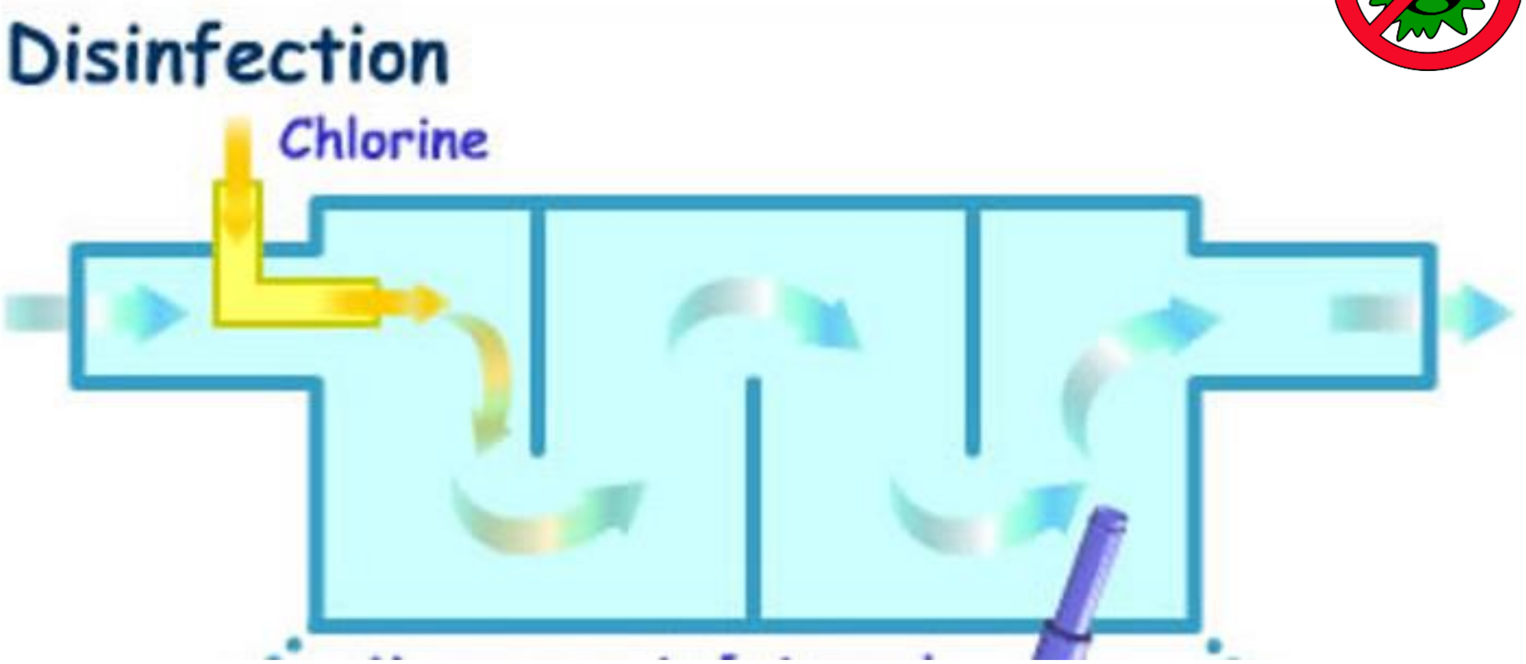


Diagram credit to researchgate.net

Disinfection Treatment (4 of 4)

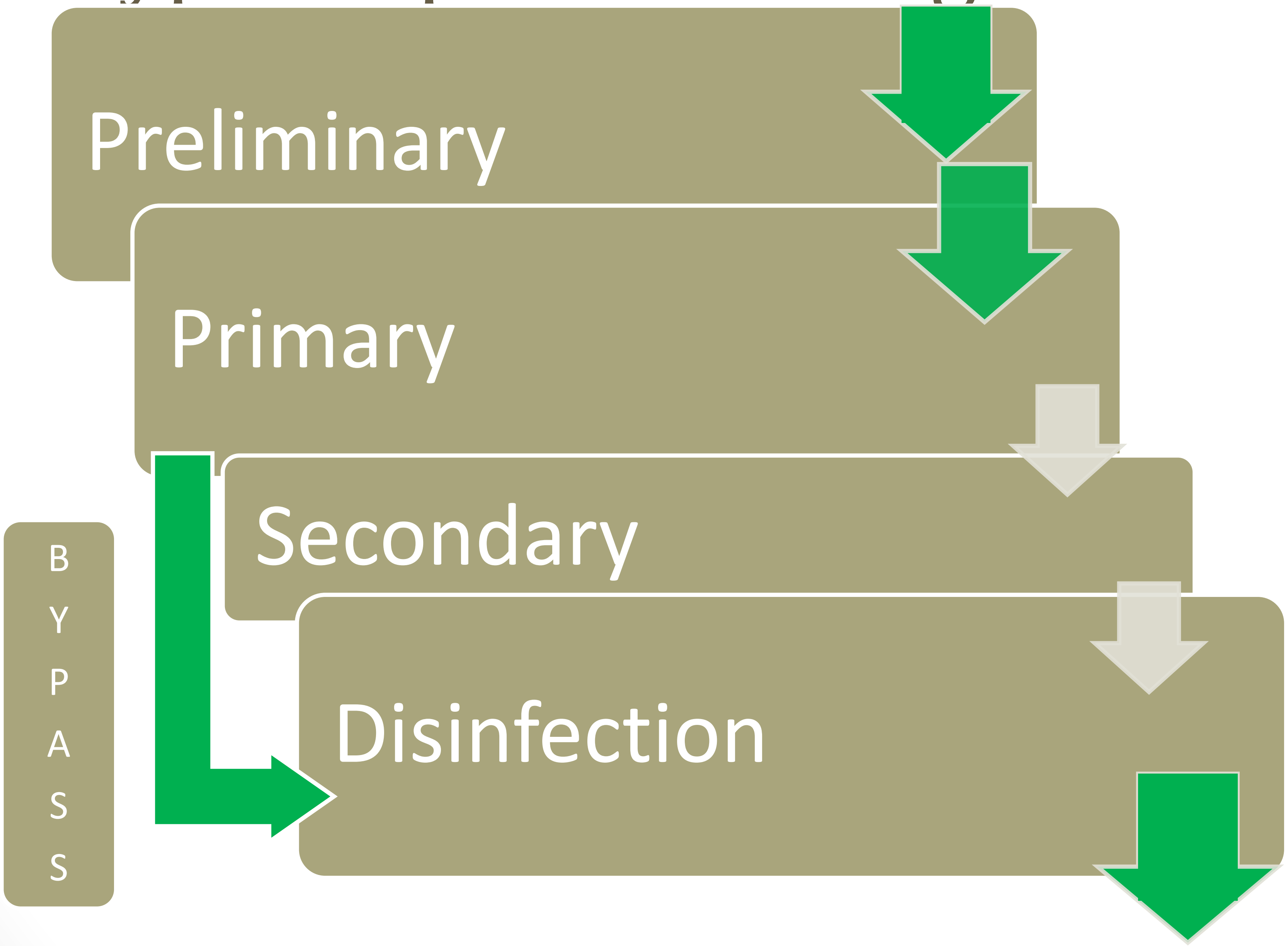
- Removes microbes created by the biological process
- A disinfectant is introduced into the wastewater
- Disinfection is *chemical* treatment



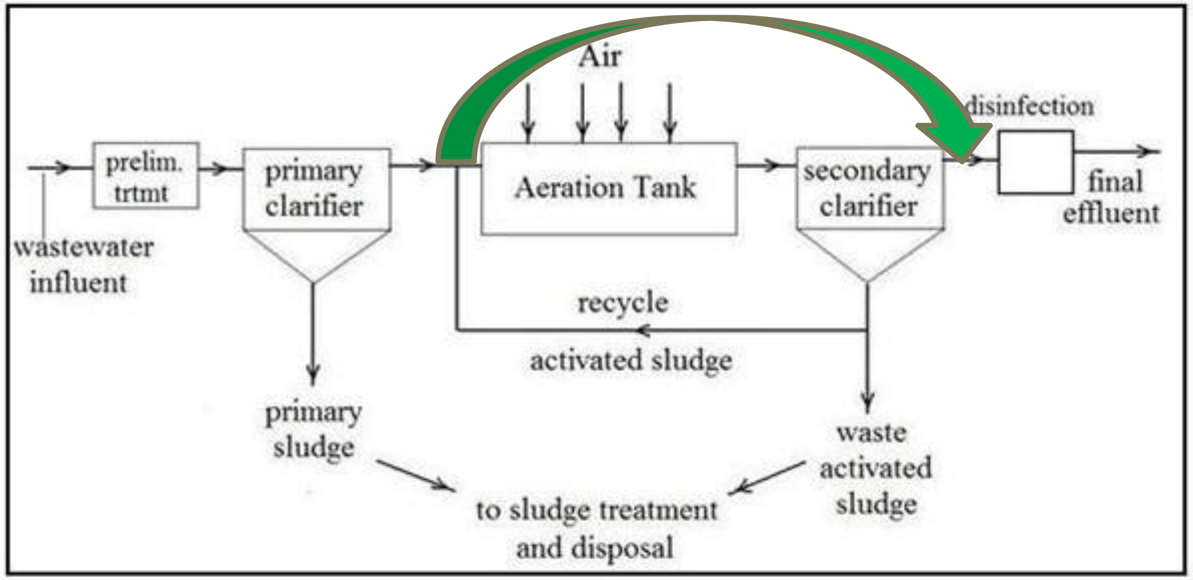
Normal Operations Diagram

- Preliminary
- Primary
- Secondary
- Disinfection

Bypass Operations Diagram



Bypass Operations Schematic



Activated Sludge Wastewater Treatment Flow Diagram

Diagram credit to engineeringexcelspreadsheets.com

Important Bypass Details

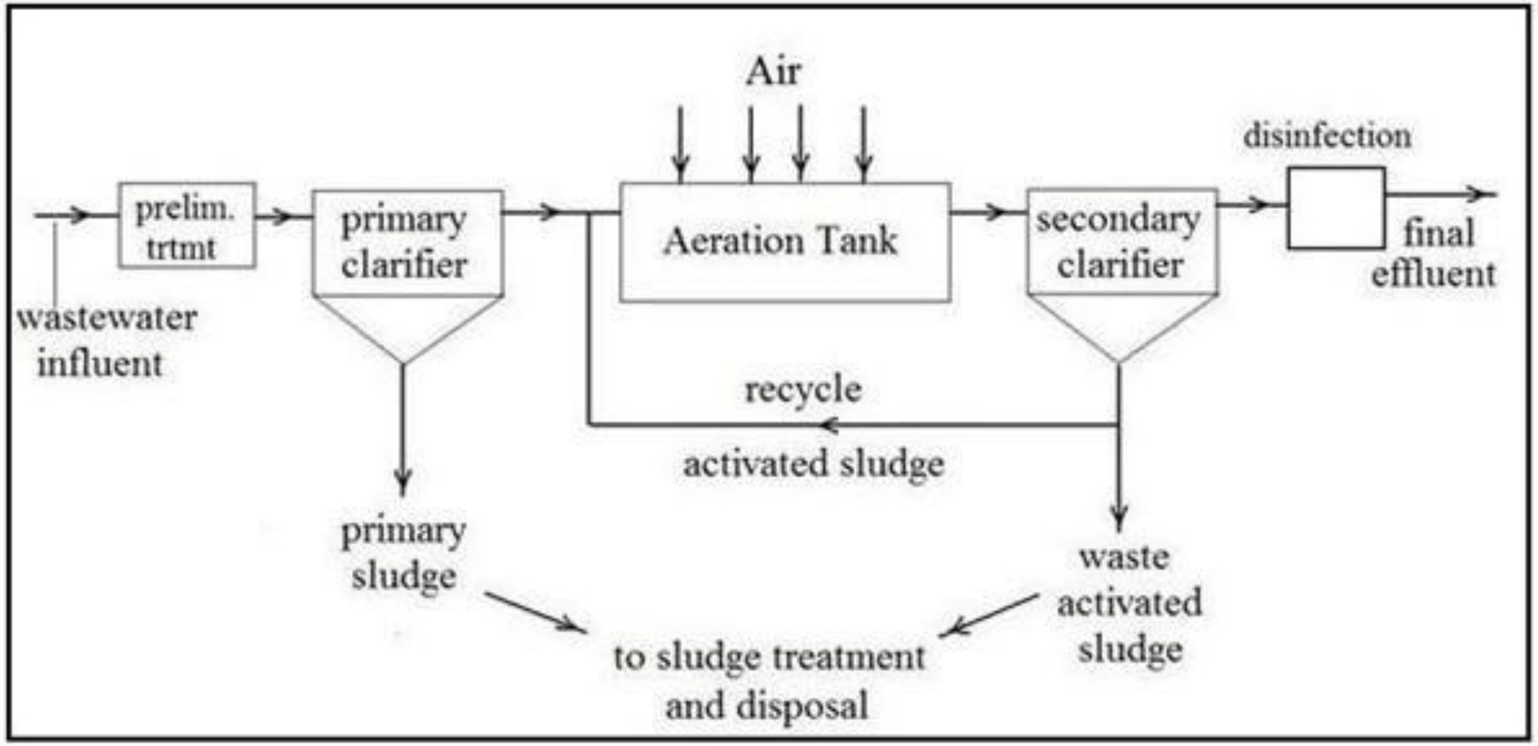
- Uses existing infrastructure (mostly)
- Permit specifies when bypass can happen
- Permit specifies exactly what treatment units can be bypassed
- ***Mixed flow must meet all permit limitations***
- Discharge is through the STP outfall
- Enables minimization or elimination of CSO discharges
- Notification required through monthly forms

Questions?

- Joe Mannick
- joe.mannick@dep.nj.gov

Poor Example of Green Infrastructure

Normal Operations Schematic



Activated Sludge Wastewater Treatment Flow Diagram

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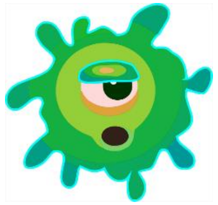
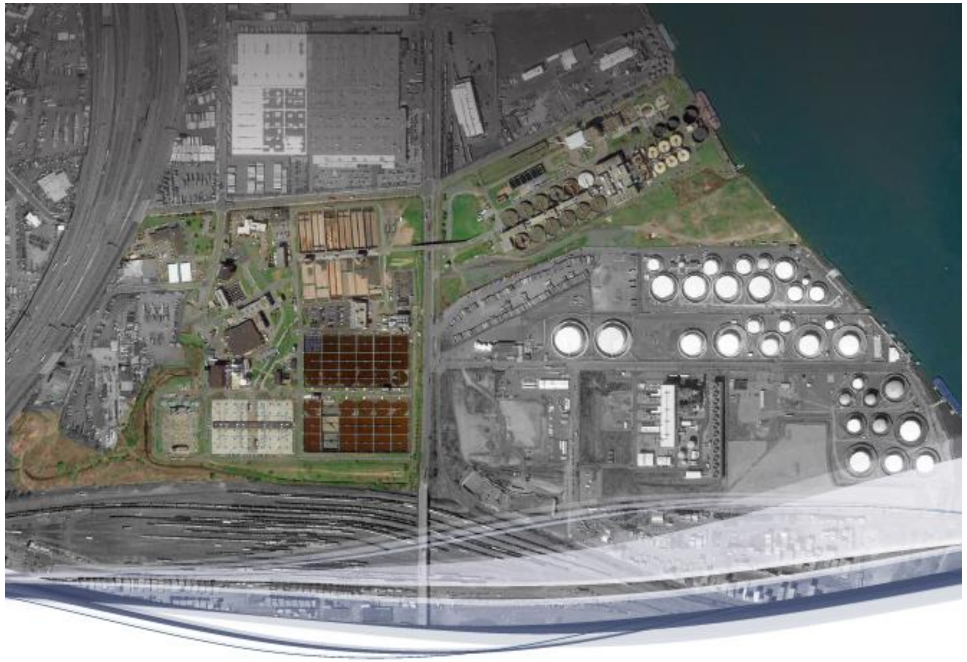
Disinfection Tanks



Hazen



CSO Long Term Control Plan
No Feasible Alternatives Study and Report

Supplemental CSO Team Meeting

October 16, 2018

Outline

Passaic Valley Sewerage Commission (PVSC) Existing Capacity and Limitations

No Feasible Alternatives (NFA) Analysis Goal

Methods of Analysis

Alternatives

Recommendations

PVSC Capacity and Limitations

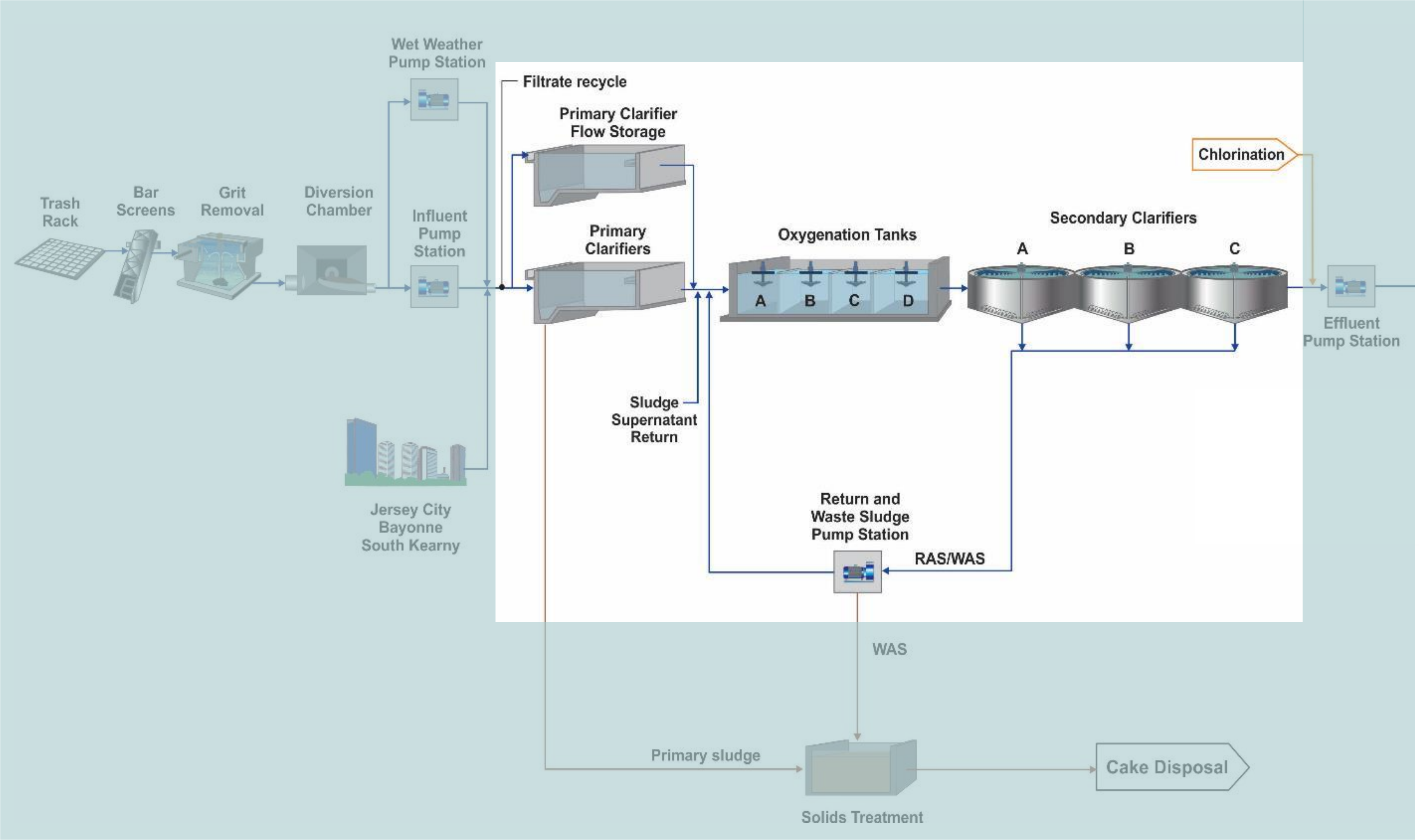
Hazen

PVSC WWTP

330 mgd Annual Average design flow

Pure Oxygen Activated Sludge

Process Flow Diagram



Existing Capacity and Limitations

Secondary Treatment Process Capacity **limited to 400 mgd**

- High influent flows ‘push’ biosolids responsible for wastewater treatment into the Final Clarifiers (FCs)
- Solids loading capacity of the FCs limiting

NFA Goals

No Feasible Alternative Analysis Goals

Evaluate alternatives to **expand wet weather treatment capacity to 720 mgd** while:

- Maintaining compliance with effluent permit
- Consideration for costly, complex, lengthy upgrades

Methods of Analysis

Hazen

NFA Analysis Procedure

Existing Data/Analyses

Influent/Effluent	Previous studies	Operational Conditions

Sophisticated, Calibrated Modeling Tools

Hydraulics (Infoworks)	Biological Process (BioWin)	Final Clarification (3D Computational Fluid Dynamics)

Effectiveness and feasibility of alternatives

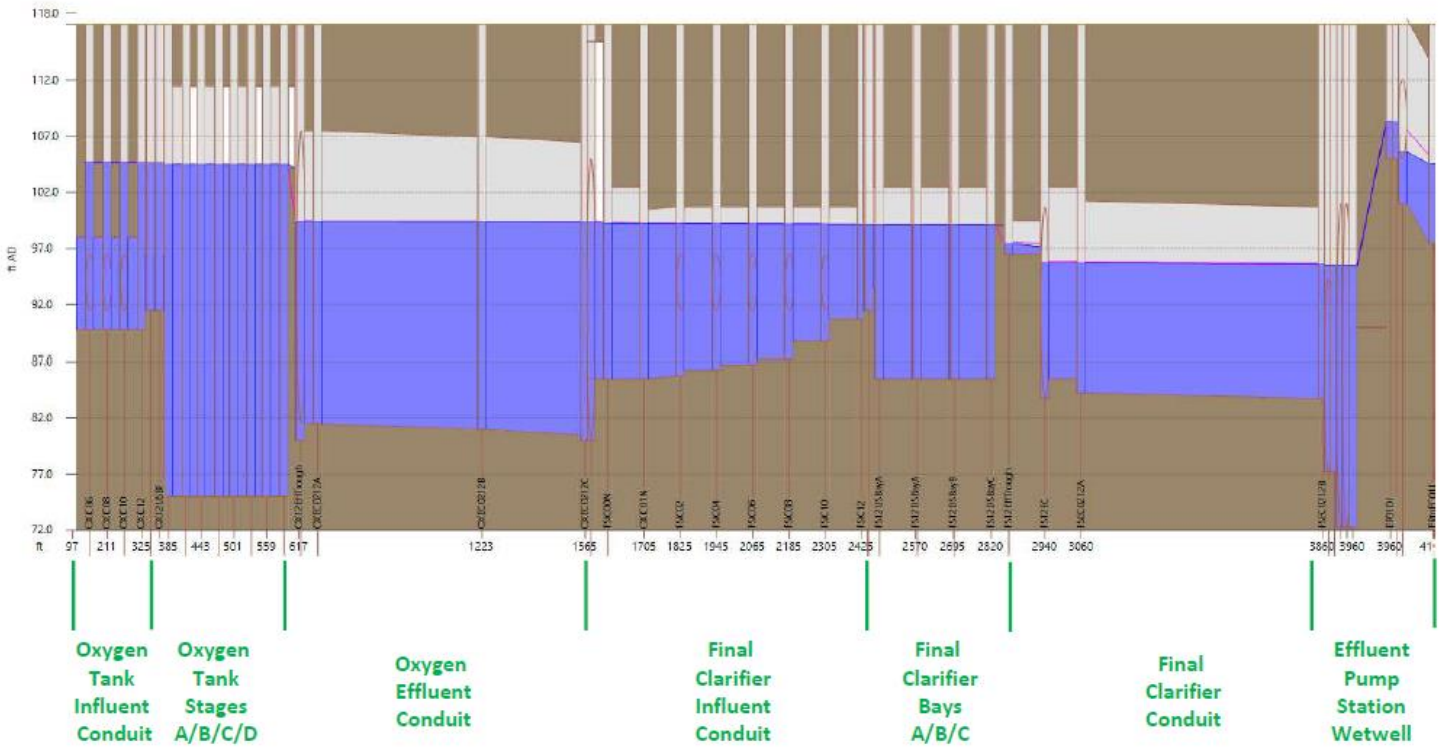
Modeling findings	Construction Cost Estimates

Modeling Tools

Infoworks

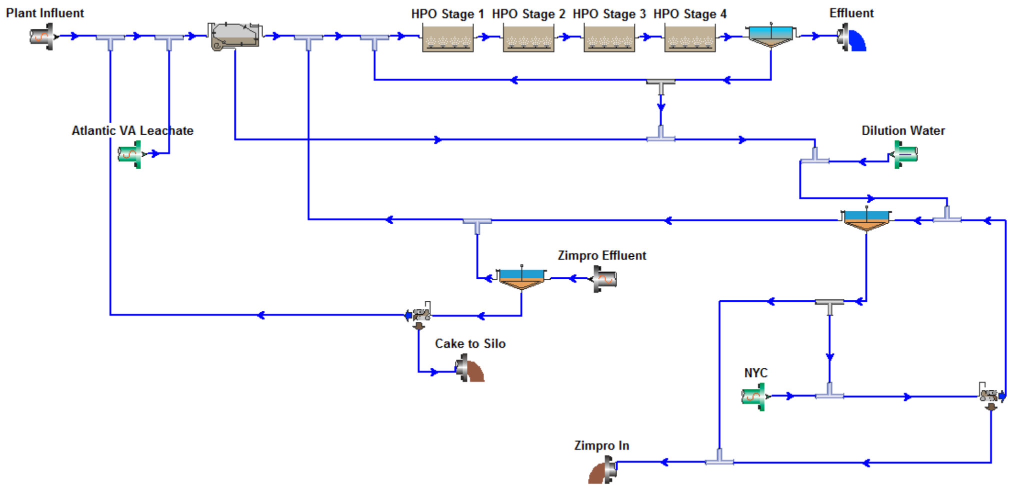
Ensure hydraulic feasibility of alternatives

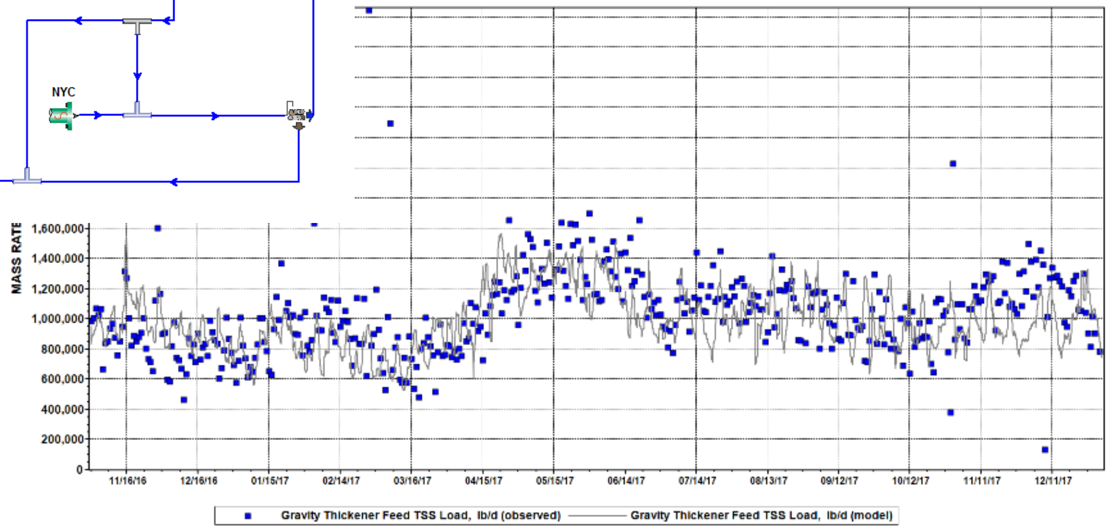
Example Model Output



BioWin process model

Predict loading to Final Clarifiers (FCs) under various alternatives





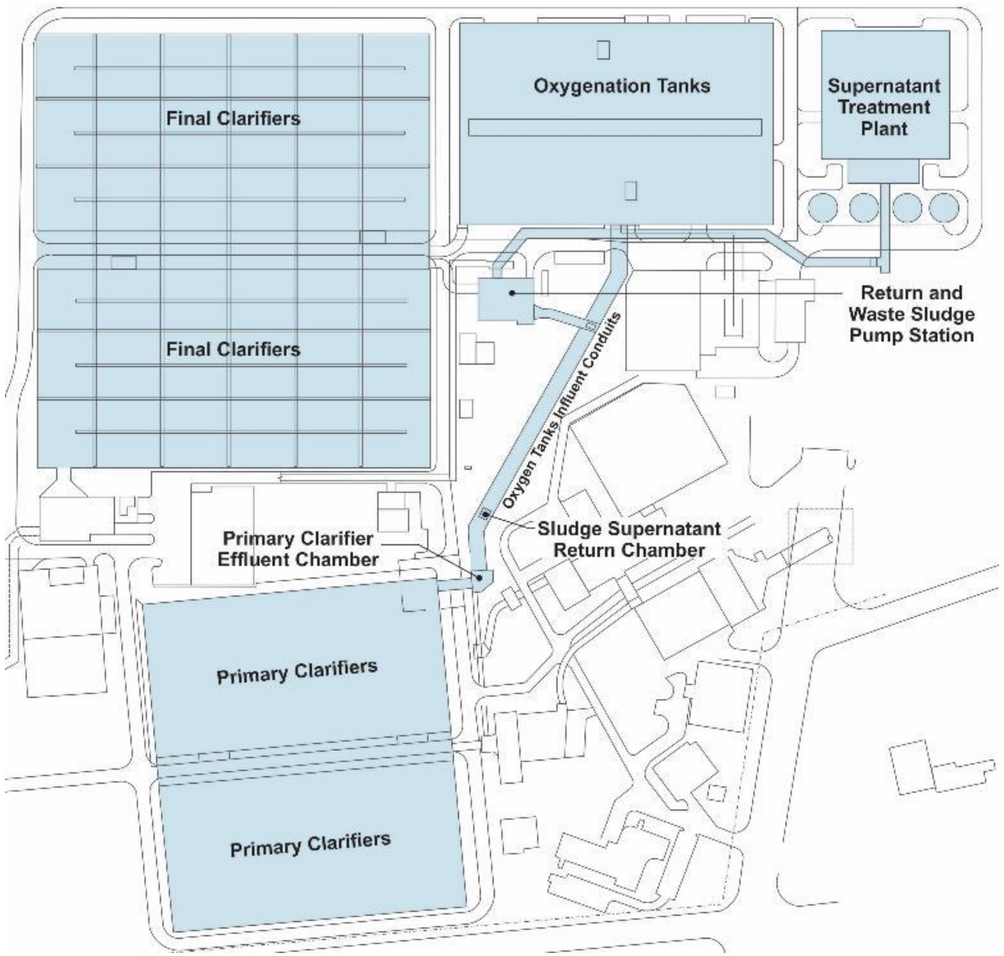
Computational Fluid Dynamics

Predict effluent quality from FCs for alternatives

Alternatives

Alternatives Considered

	Alternative
Operational Modifications	Step-Feed
	Chemically Enhanced Primary Treatment (CEPT)
Modifications to Infrastructure	Secondary Bypass
	Step-Feed
	BioActiflo
	Return Activated Sludge (RAS) Storage
	Rerouting Recycle Streams
	Structural Modifications to the FCs



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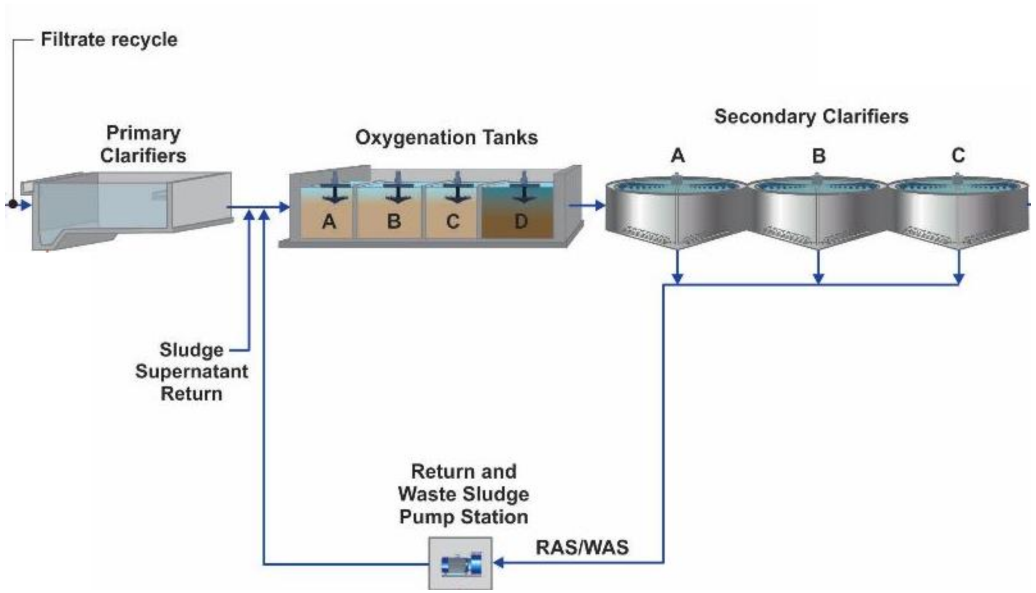
Operational Step-Feed



Operational Step-Feed

Store solids in treatment train, avoiding overloading FCs

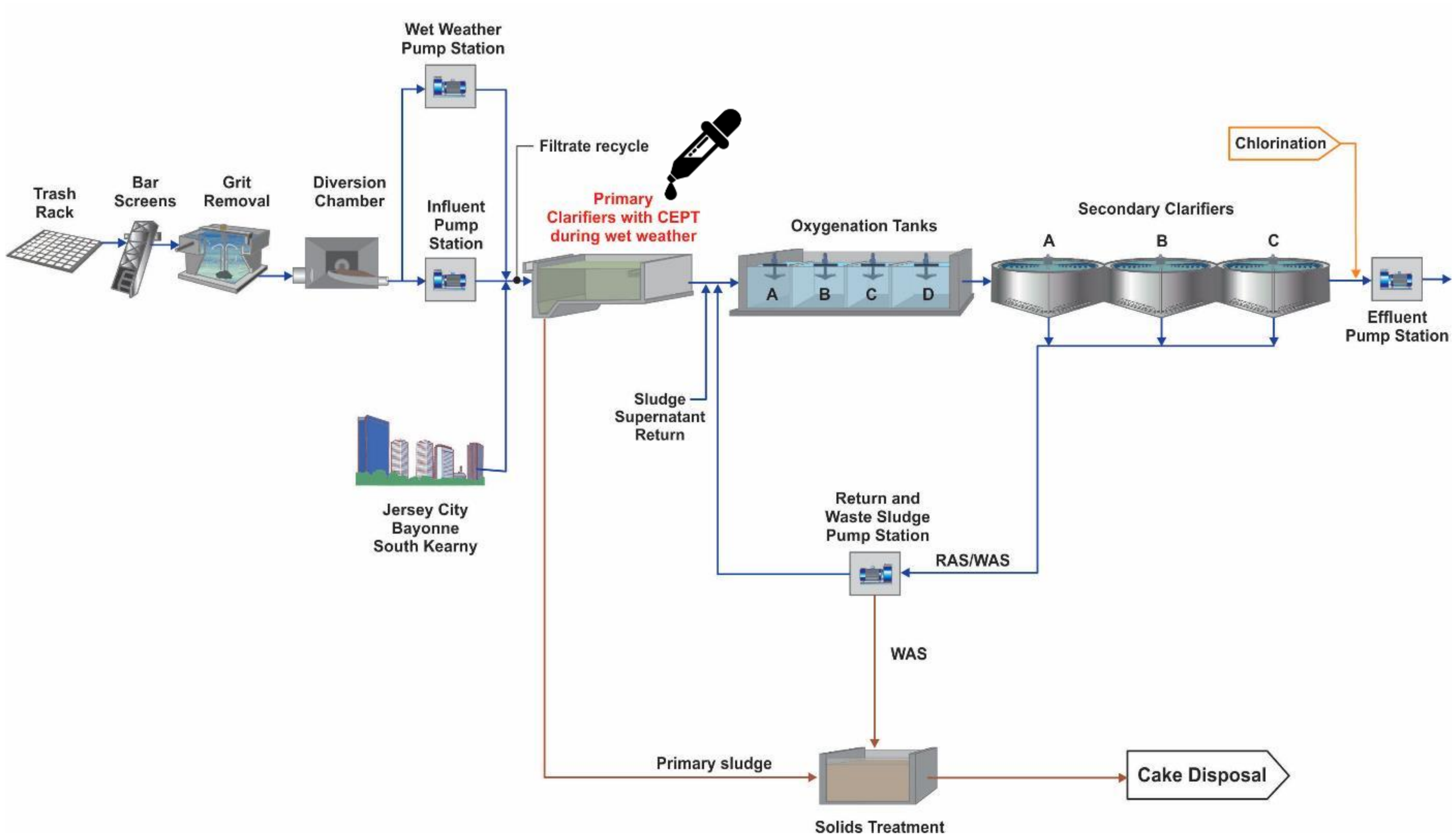
At 720 mgd, >45 mg/L effluent Total Suspended Solids (TSS)

At 550 mgd, <45 mg/L effluent TSS

Increases flow through secondary treatment, but does not provide capacity for 720 mgd

Testing and demonstration would be needed for this operational alternative

Chemically Enhanced Primary Treatment



CEPT

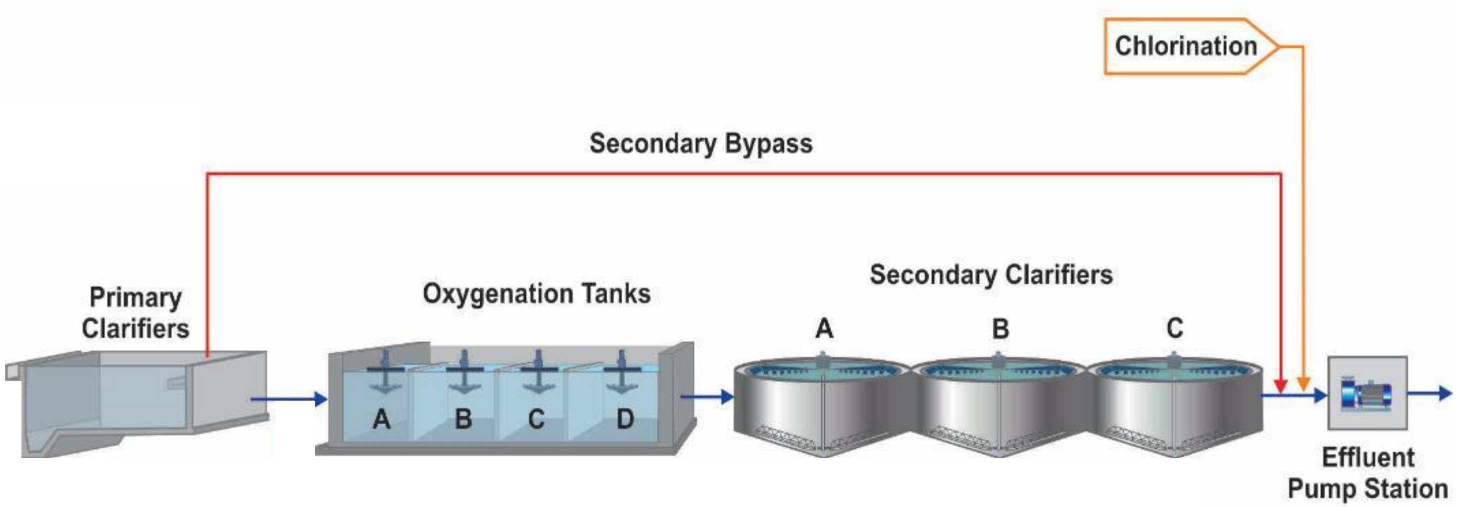
Reduce loading to secondary system by improving PC removals

At 720 mgd, >45 mg/L effluent TSS

At 400 mgd, <45 mg/L effluent TSS

Bench scale testing needed to refine dosage

Secondary Bypass

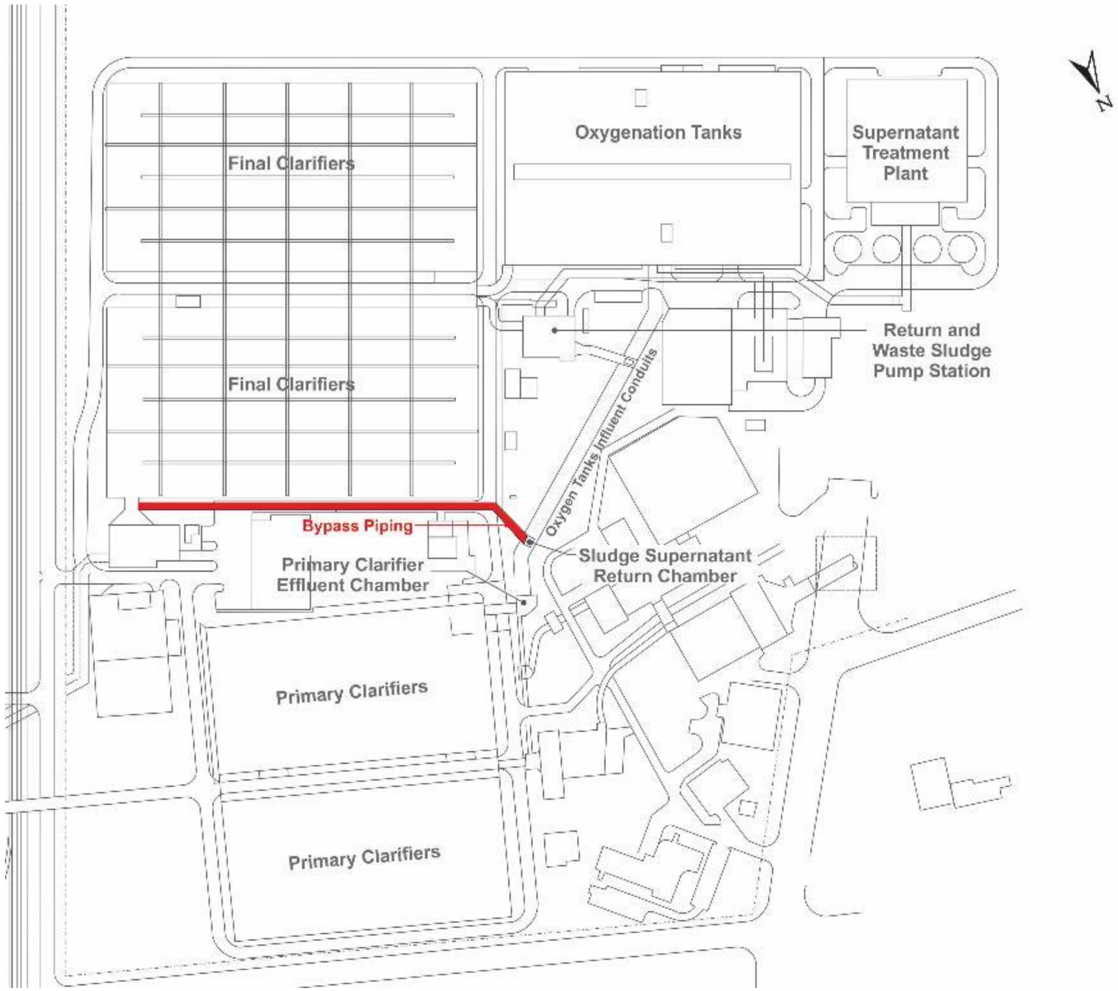


Secondary Bypass

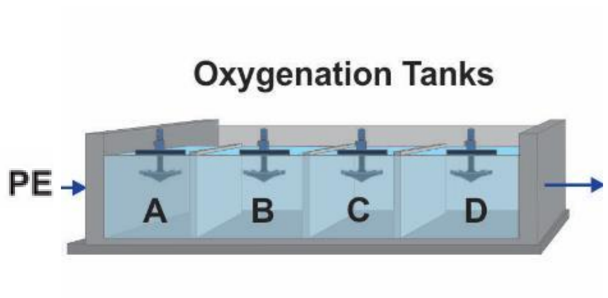
Bypass flow over 400 mgd around secondary treatment

At 720 mgd, <45 mg/L effluent TSS

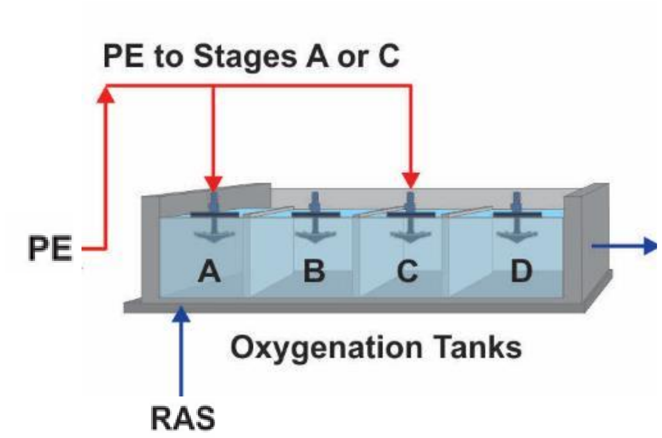
Allows for treatment (primary and disinfection) of an additional 320 mgd (720 mgd total plant influent)



Step-Feed



Oxygenation Tanks
PE
A
B
C
D



PE to Stages A or C
PE
A
B
C
D
Oxygenation Tanks
RAS

Step-Feed

Store solids in treatment train, avoiding overloading FCs

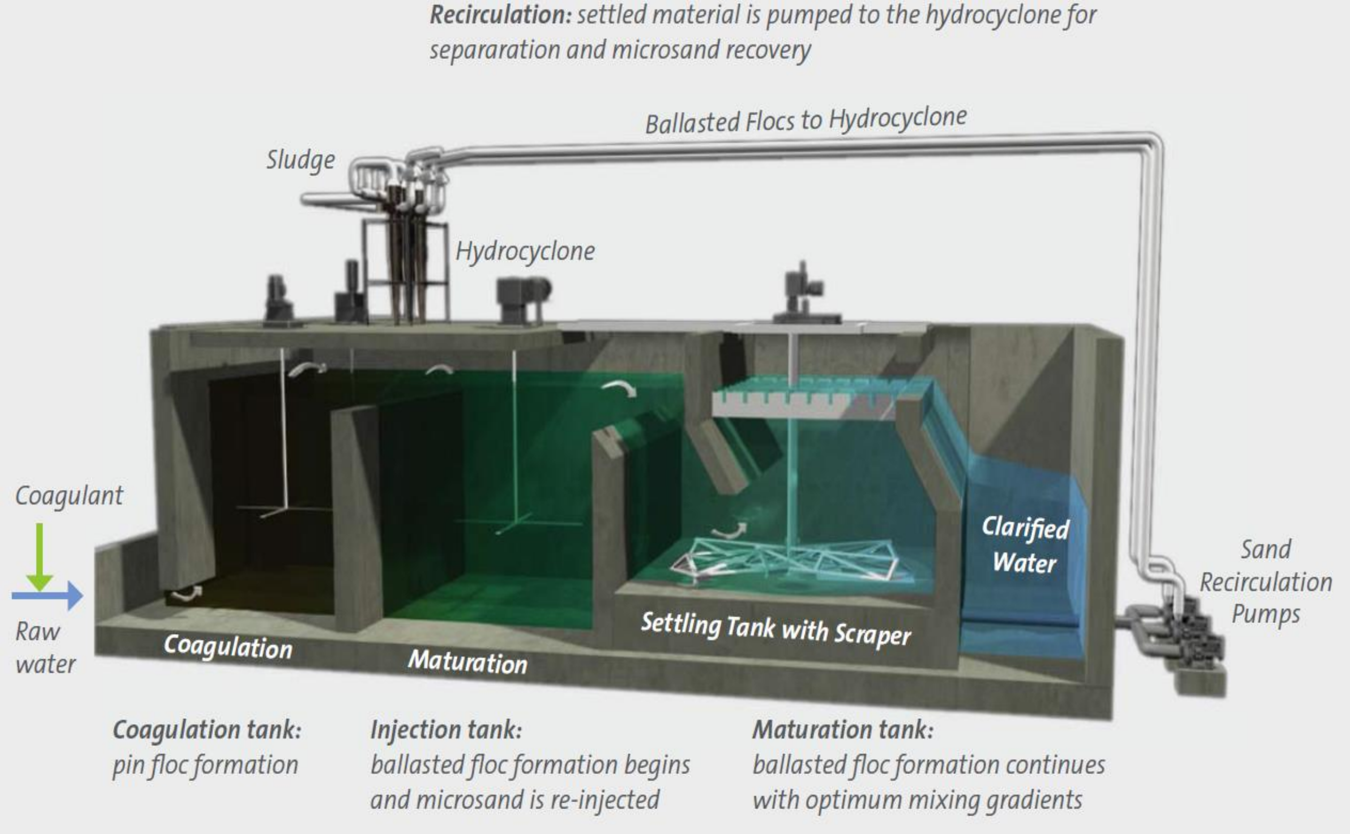
At 720 mgd, >45 mg/L effluent TSS

At 550 mgd, <45 mg/L effluent TSS

Increases flow through secondary treatment, but does not provide capacity for 720 mgd

Uncommon operational practice in HPOAS plants

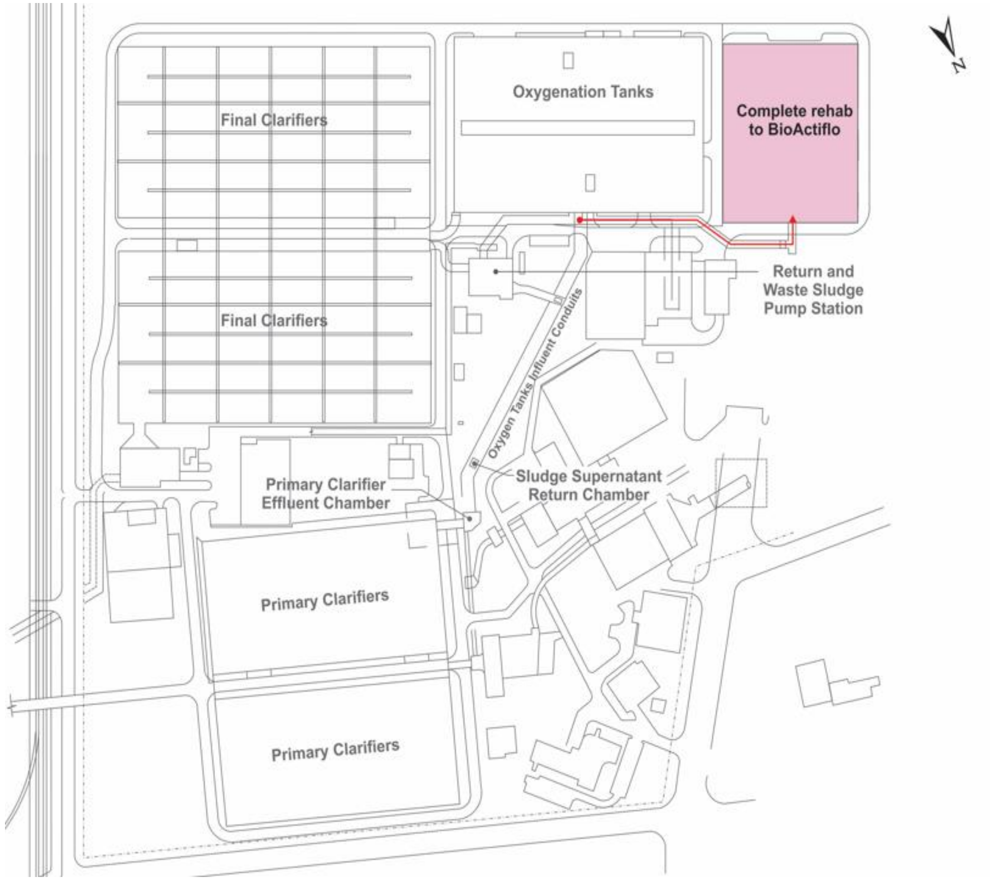
BioActiflo



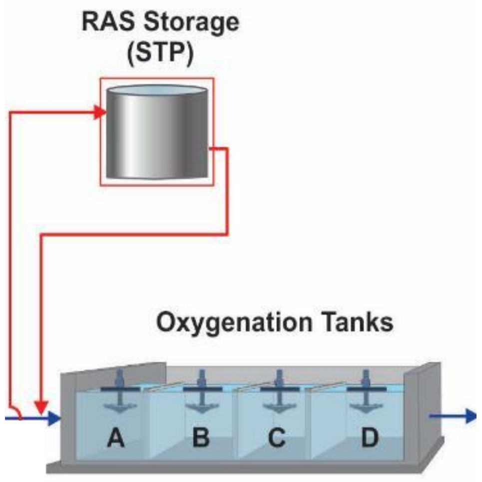
High Rate Clarification (HRC) using ballasting material to enhance settling and a biological treatment component to improve soluble BOD removal

BioActiflo

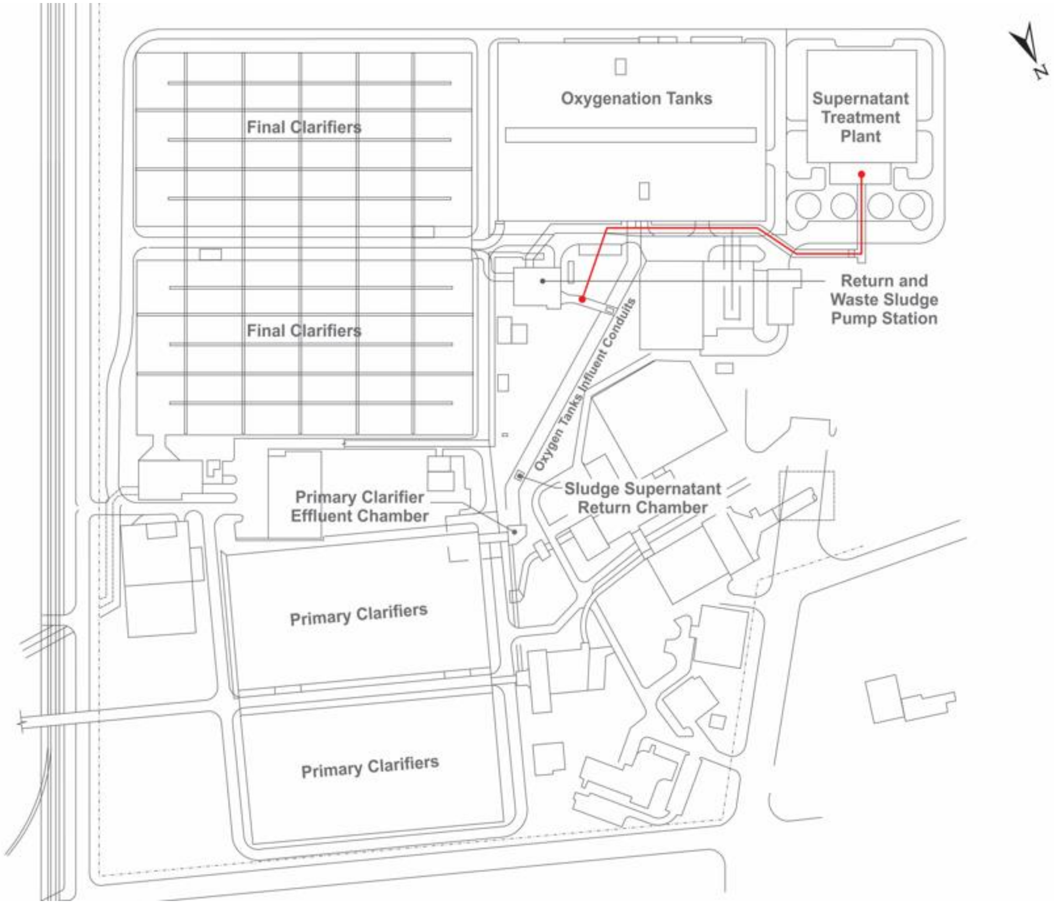
- High Rate Clarification (HRC)
- At 720 mgd, <45 mg/L effluent TSS
- Dry and Wet weather operation required
- Largest current installation (of five US installations) is 36 mgd
- Proposed infrastructure location is reserved for future oxygen production plant



RAS Storage



RAS Storage
(STP)
Oxygenation Tanks
A
B
C
D



Final Clarifiers
Oxygenation Tanks
Supernatant
Treatment
Plant
Final Clarifiers
Return and
Waste Sludge
Pump Station
Oxygen Tanks Influent Conduits
Primary Clarifier
Effluent Chamber
Sludge Supernatant
Return Chamber
Primary Clarifiers
Primary Clarifiers
N

RAS Storage

Store solids in treatment train, avoiding overloading FCs

At 720 mgd, >45 mg/L effluent TSS

At 550 mgd, <45 mg/L effluent TSS

Increases flow through secondary treatment, but does not provide capacity for 720 mgd

Proposed infrastructure location is reserved for future oxygen production plant

Reroute Recycle Streams

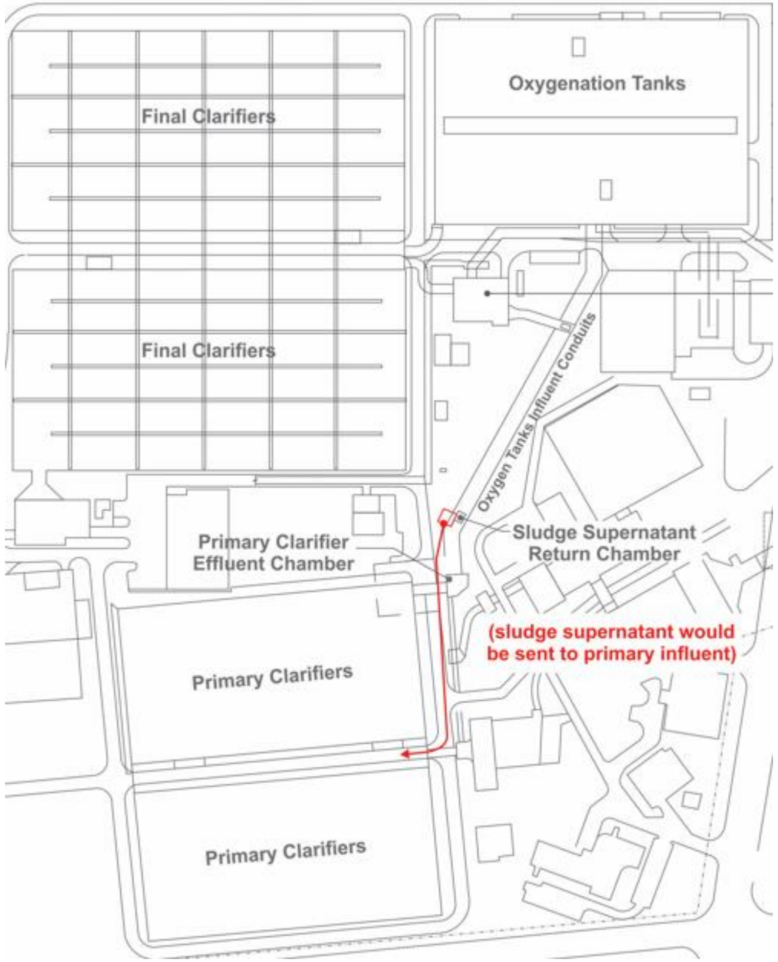
Reduce loading to secondary system

At 720 mgd, >45 mg/L effluent TSS

At 500 mgd, <45 mg/L effluent TSS

Increases flow through secondary treatment, but does not provide capacity for 720 mgd.

Improvement in treatment for both dry and wet weather



FC Modifications

Allows for greater loading rates to FCs

At 720 mgd, >45 mg/L effluent TSS

At 600 mgd, <45 mg/L effluent TSS

Increases flow through secondary treatment, but does not provide capacity for 720 mgd.

Costs

Alternative	Capital Costs ($ Million)	Operational Costs*	20-year Net Present Value ($ Million)
Operational Step-Feed	$8	negligible	$8
CEPT	$8	$500,000	$15
Secondary Bypass	$23	negligible	$23
Step-Feed	$74	negligible	$74
BioActiflo	$115	$300,000	$119
Temporary RAS Storage	$66	$100,000	$67
Rerouting of Recycle Streams	$4	negligible	$4
Modifications to FCs	$182	negligible	$182

*Chemical, power costs

Recommendations

Hazen

Priorities for recommendation

Priority 1: Permit compliance

Priority 2: Time needed for implementation

Priority 3: Cost

Alternative	Permit compliance	Time needed for implementation	Cost
Operational Step-Feed	No	Short	Low
CEPT	No	Short	Low
Secondary Bypass	Yes	Short	Low
Step-Feed	No	Long	Medium
BioActiflo	No	Long	High
Temporary RAS Storage	No	Long	Medium
Rerouting of Recycle Streams	No	Short	Low
Modifications to FCs	No	Long	High

Alternatives for recommendation

As an interim measure, install a **secondary bypass** for flows over 400 mgd and a **sludge recycle reroute** to the PCs

- Projected Cost - $27 M
- Short time needed for implementation

Impact on CSO volume

Decrease in CSO volume due to a secondary bypass:

- 1,400 MG per year
- 37% decrease

ARCADIS Design & Consultancy for natural and built assets

JERSEY CITY MUNICIPAL UTILITIES AUTHORITY

Development and Evaluation of Alternatives for CSO Control

October 16, 2018

ARCADIS Design & Consultancy for natural and built assets

AGENDA

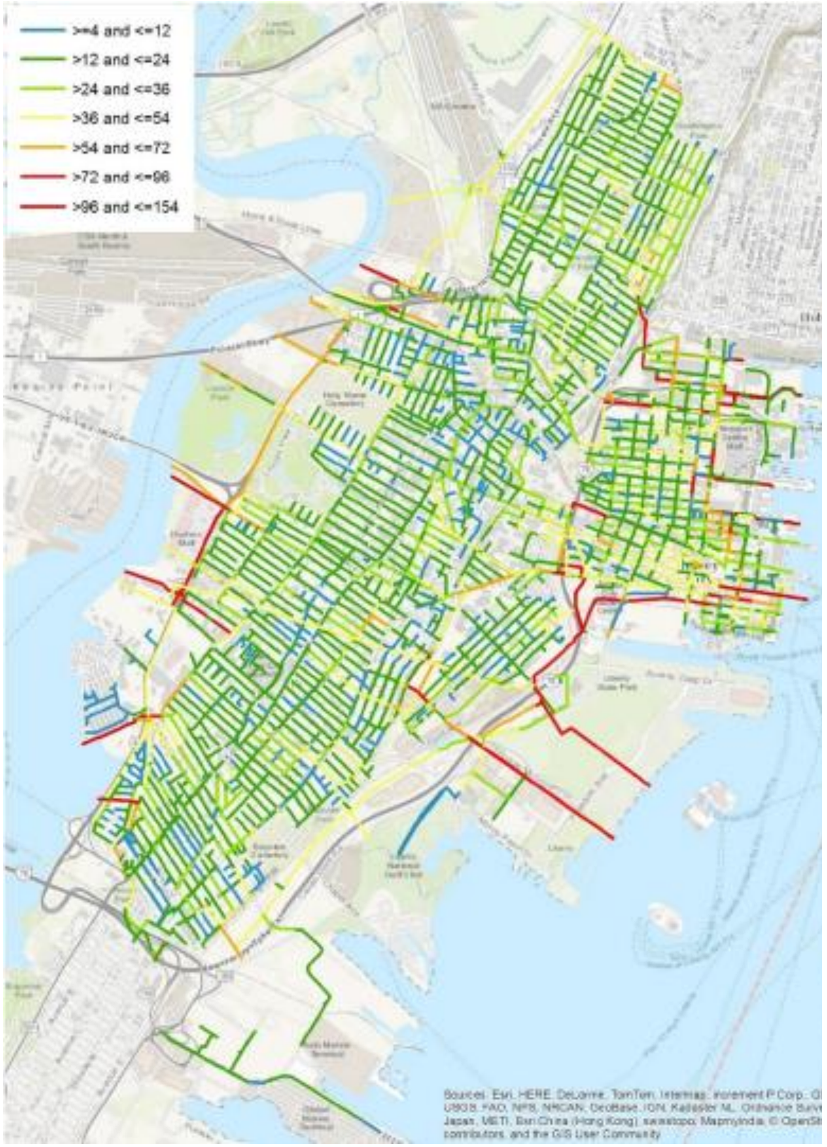
- Overview of JCMUA Combined Sewer System (CSS)
- Overview of Long Term Control Plan (LTCP) Requirements
- The Process for Development and Evaluation of CSO Control Alternatives
- Next Steps

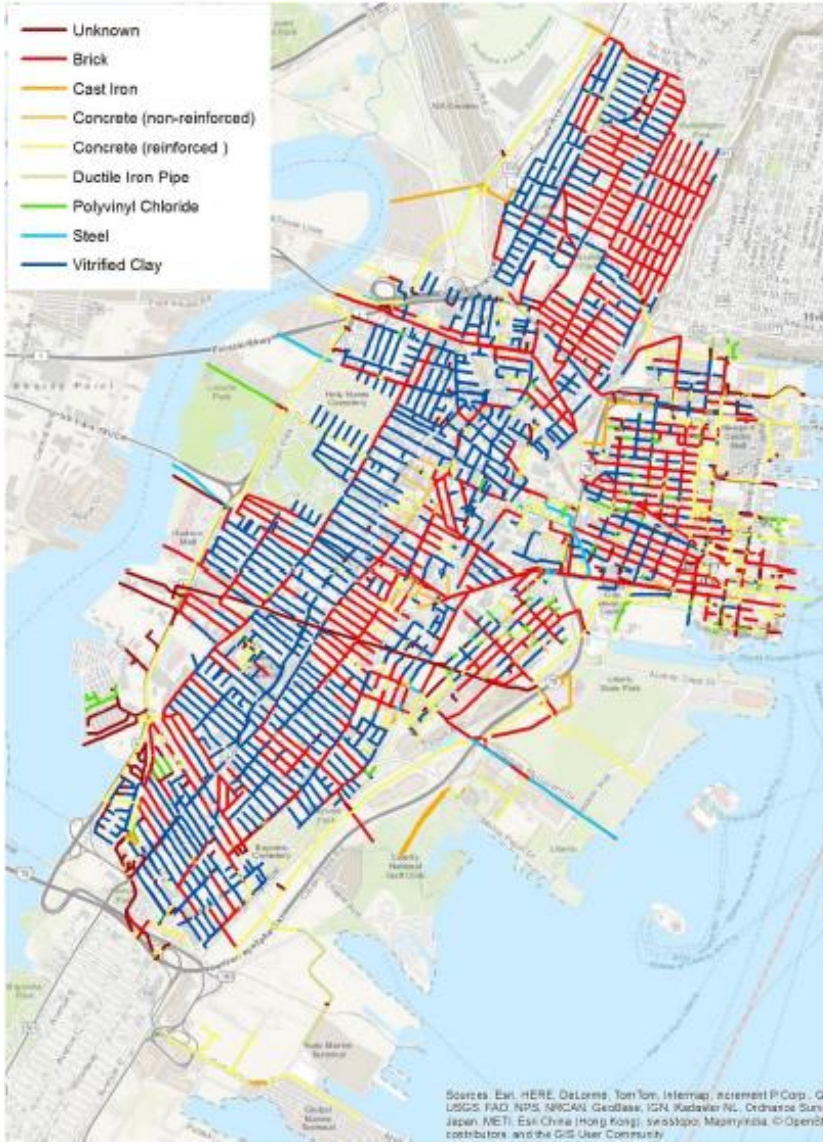
Overview of JCMUA Combined Sewer System (CSS)

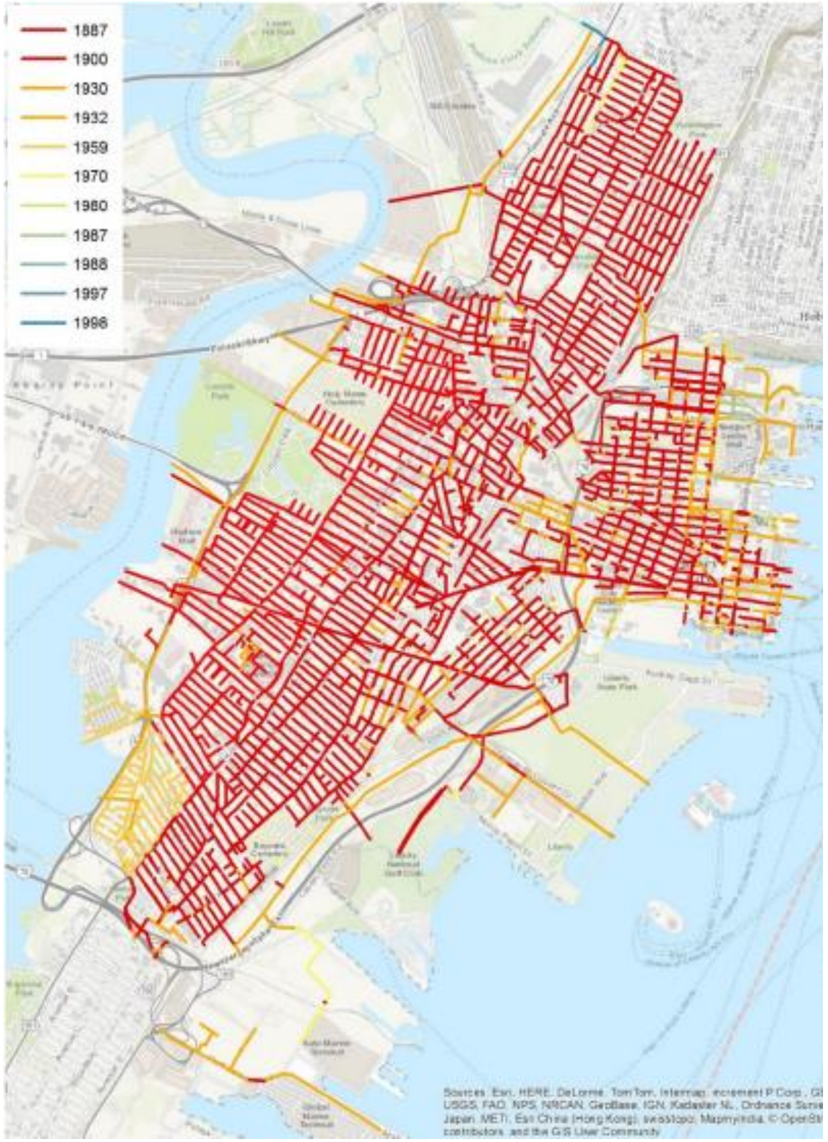
Overview of JCMUA CSS

- Population Served: 247,597 (2010) to 270,753 (2017)
- 230 miles are in the Combined Sewer System
- Ninety Percent of the Sewers are 88 to 131 years old
- Collection area encompasses approximately 6,209 acres
- 21 Combined Sewer Overflow (CSO) discharge points
  - 1 discharge to Penhorn Creek
  - 11 discharges to the Hackensack River, Newark Bay
  - 9 discharges to the Hudson River
  - SE 2 or SE 3 Water Classification
- Normally Pumped to PVSC

Pipe Size, Material, and Age Distributions







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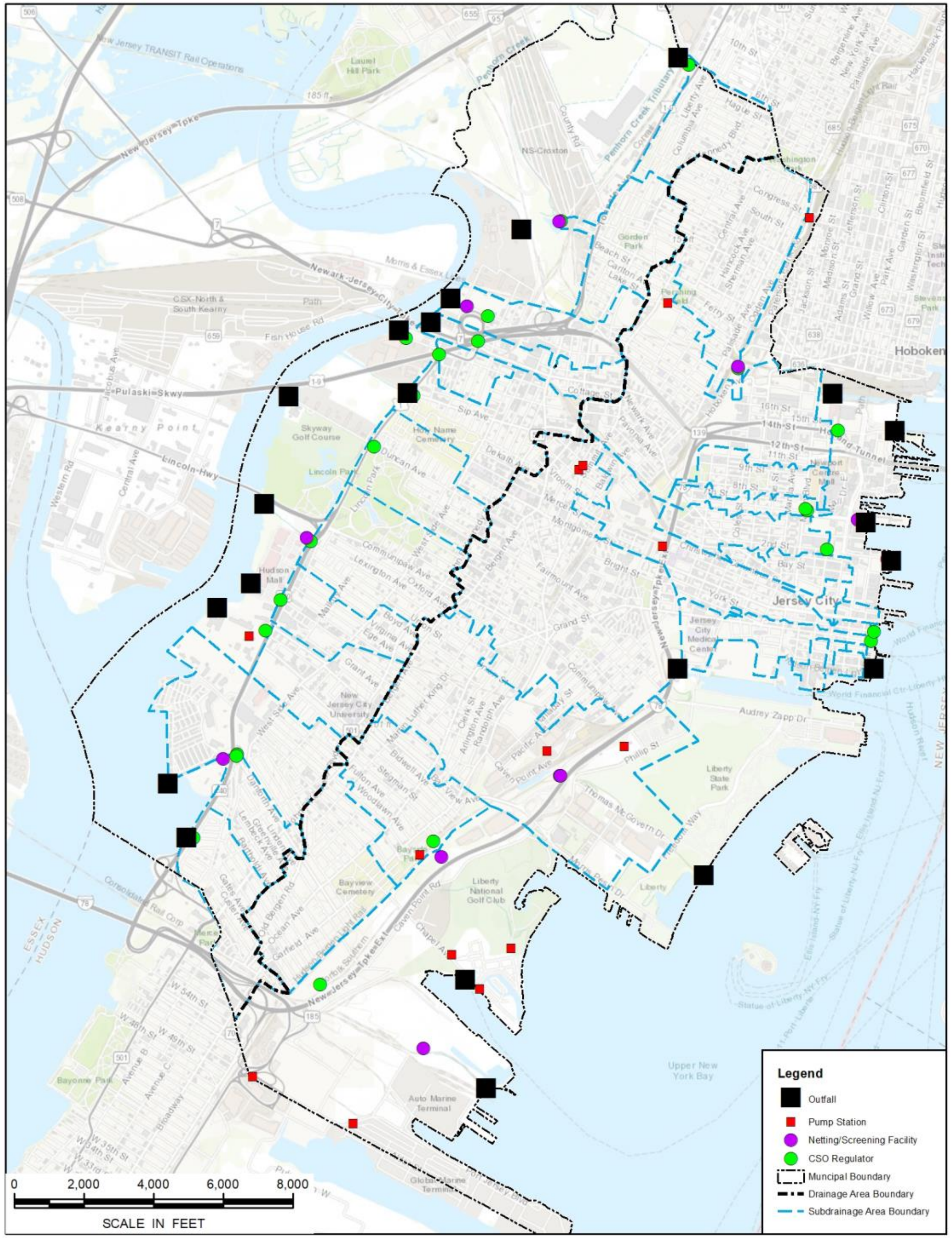
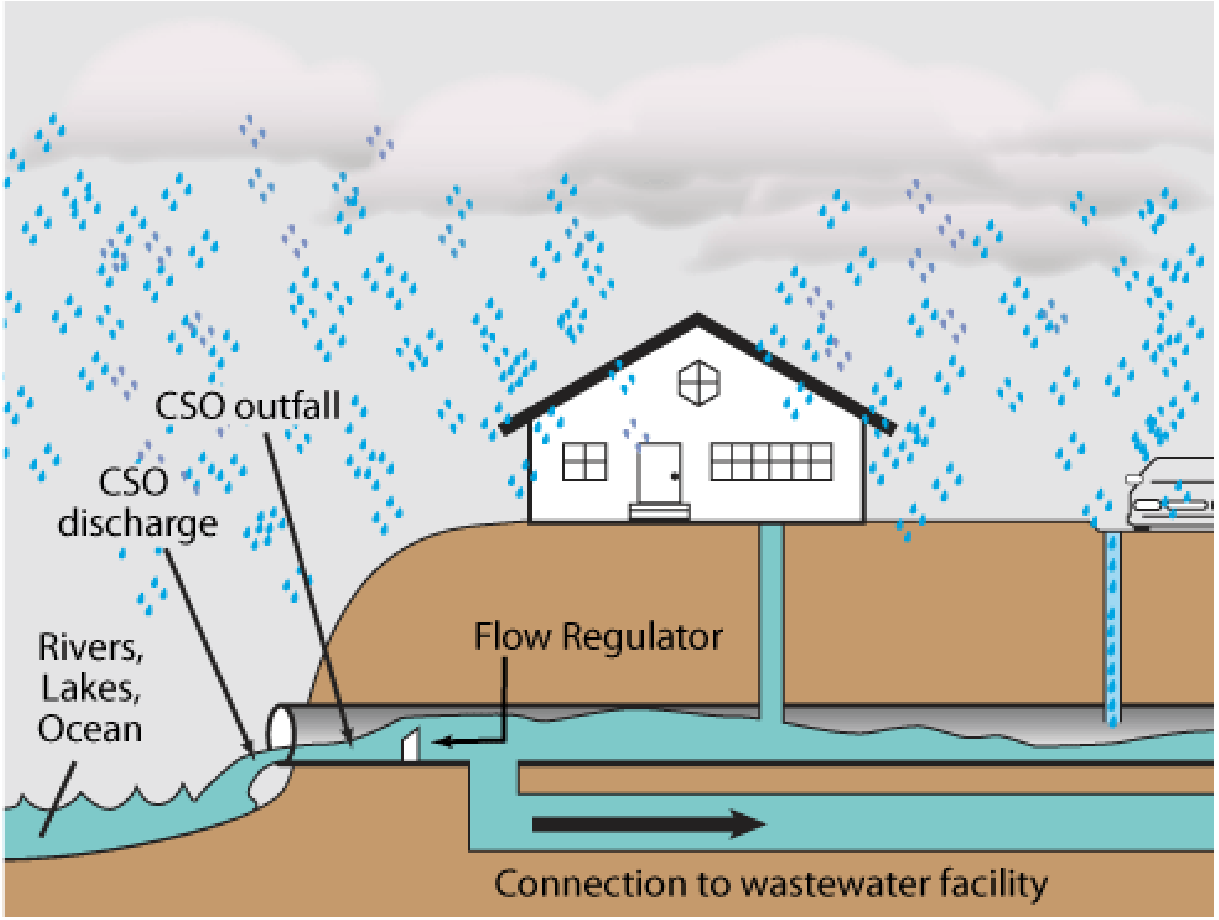
CSO Location Map



JCMUA CSO Control Facilities

Wet Weather Flow Discharged as Combined Sewer Overflows



Overview of CSO LTCP Requirements

LTCP Overview – NJDEP Approach

System Characterization – Identify Current CSS Assets and Current Precipitation, Overflow, and Water Quality Characteristics.

Development and Evaluation of Alternatives for CSO Control

Selection and Implementation of the Long-Term Plan

Overview of Milestones to Date
NJPDES Permit No. NJ0108723 for Combined Sewer Management

REPORTS TO BE SUBMITTED TO NJDEP	DUE DATE	COMPLETE
DMRs – Solids/Floatables and Precipitation	7/1/2015	Ongoing
DMR – Duration of Discharge	12/30/2015	Ongoing
GPS Lat/Long for Pump Stations, Regulators, Outfalls	12/30/2015	Y
Map of Combined and Separate Sewer Areas	6/30/2016	Y
System Characterization Work Plan	12/30/2015	Y
System Characterization Report	6/30/2018	Y
Joint Public Participation Process Report	6/30/2018	Y
Joint Consideration of Sensitive Areas Plan	6/30/2018	Y
Development and Evaluation of Alternatives	6/30/2019	In Progress
Selection and Implementation of Alternatives	5/30/2020	TBD
Compliance Monitoring Program Work Plan	12/30/2015	Y
Compliance Monitoring Program Report	6/30/2018	Y
Progress Reports	quarterly	Ongoing

Overview of Development and Evaluation of Alternatives for CSO Control

Develop Alternatives for CSO Control

- Define Water Quality and CSO Control Goals
- Identify CSO Control Alternatives (update 2007 Cost and Performance Report)
  - Source Controls
  - Collection System Controls
  - Storage Technologies
  - Treatment Technologies

Overview of Development and Evaluation of Alternatives for CSO Control (continued)

- Evaluate CSO Control Alternatives
  - Costs
  - Performance
  - Environmental Considerations
  - Technical Considerations
  - Implementation Considerations
- Financial Capability Assessment – Start Gathering Facts

The Process for Development and Evaluation of CSO Control Alternatives

The Process for Development and Evaluation of CSO Control Alternatives

- Public Participation and Agency Interaction at each Milestone
- Define LTCP Approach: Demonstration vs. Presumption
- Development and Evaluation of the CSO Control Alternatives

Public Participation and Agency Interaction

Tasks Completed:

- Developed Informational Brochures
- Conducted Public Meetings as part of CSO Supplemental Team
- Developed Public Participation Report

Tasks to be Completed:

- Develop Additional Brochures
- Continue Public Meetings – Like today - as part of CSO Supplemental Team

The Process for Development and Evaluation of CSO Control Alternatives

- Public Participation and Agency Interaction at each Milestone

- Define LTCP Approach: Demonstration vs. Presumption

- Development and Evaluation of the CSO Control Alternatives

Overview of Development and Evaluation of Alternatives for CSO Control

- Define LTCP Approach: Demonstration vs. Presumption

DEMONSTRATION APPROACH	PRESUMPTION APPROACH
Demonstrate that plan is adequate to meet the water quality-based requirements of the CWA.	Implement minimum level of treatment (e.g., primary clarification of 85% of collected CSO) to meet water quality-based requirements of the CWA.
Generally appropriate where sufficient data are available to demonstrate an appropriate level of CSO control.	Generally appropriate where data don’t provide a clear picture of the level of CSO controls necessary to protect water quality standards (WQS)

The Process for Development and Evaluation of CSO Control Alternatives

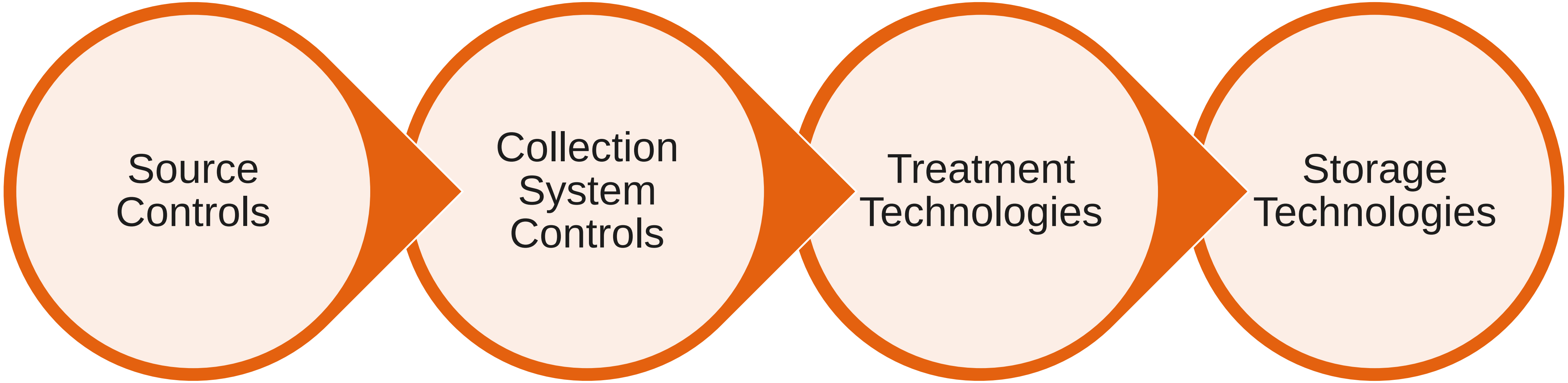
- Public Participation and Agency Interaction at each Milestone
- Define LTCP Approach: Demonstration vs. Presumption
- Development and Evaluation of the CSO Control Alternatives

Development and Evaluation of CSO Alternatives

- Pre-screening of Alternatives in the 2007 Cost and Performance Report
- Resizing Facilities Based on the New PCSWMM model
- Updating Project Costs of the 2007 Cost and Performance Report
- Greater emphasis on “Green” Infrastructure
- Investigate New Technologies
- Cost/Performance Evaluations
- Non-Monetary Issues: Environmental, Technical, and Implementation
- Rating and Ranking of Alternatives

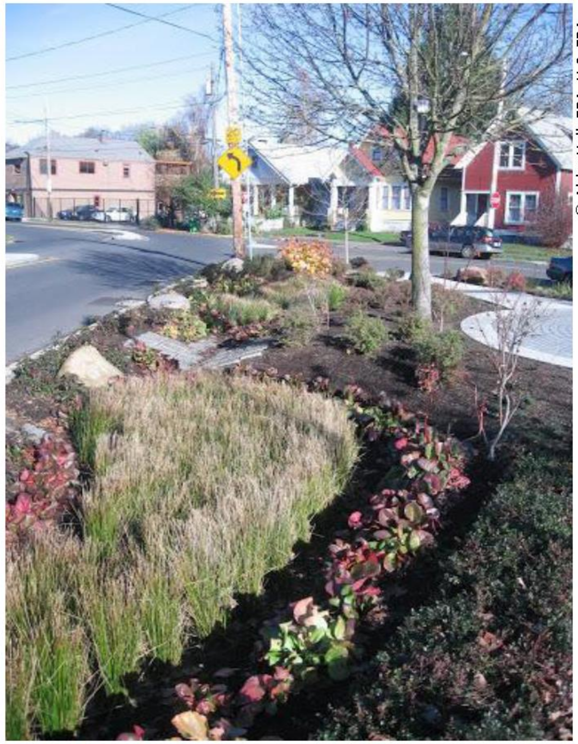
Develop Alternatives for CSO Control

Identify CSO Control Alternatives



Source Controls - Green Infrastructure – 2007 to Date

- Jersey City SWMP promotes Green Roofs, Rain Barrels, Rain Gardens/Bioswales
- Intercepts, Stores, Absorbs & Uses Storm Water Runoff
- Included in 2007 Cost and Performance Report but on a voluntary basis
- Demonstration Projects



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Curbside raingarden installation in Portland, Oregon.

Source Controls - Green Infrastructure – Future

2018/2019 Plan greater emphasis:

- Continue Rain Barrel/Cistern Program
- Promote green/blue roofs and on lot storage for New Developments
- Retain or treat up 1.0 inch of impervious area runoff
- Maximize Rain Gardens/Bioswales with 6 to 10 foot limits for :
  - Ground Water Levels
  - Bedrock

Program Objectives Drive Design Standards

Implementation Approach
Standardized designs

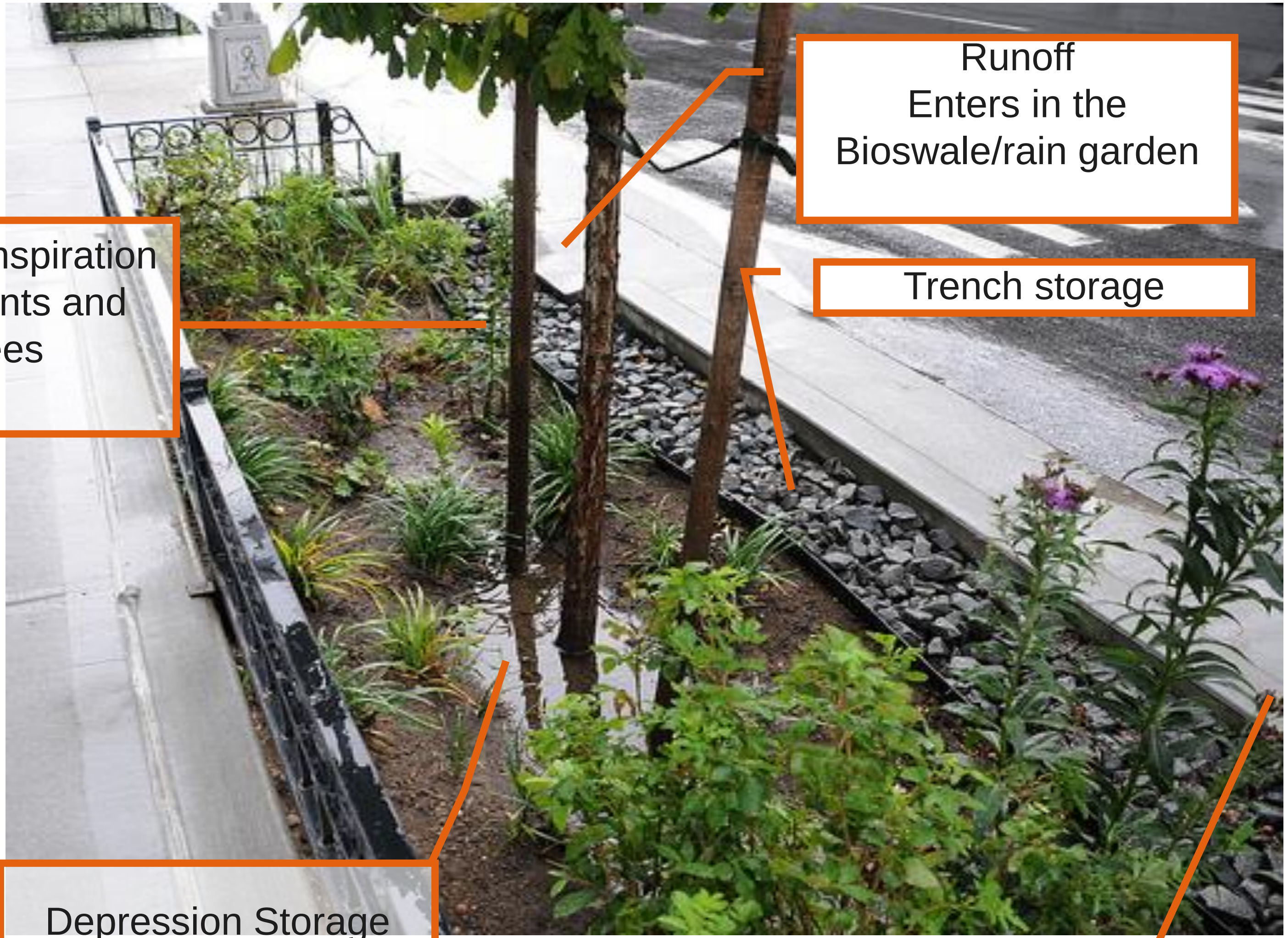
Design Methodology
Systems designed for storage/infiltration; underdrain connections

Site Considerations
Focus on street projects and schools, public housing and other city properties

Landscape
Standardizing plant palette based on performance

Construction
Oversight is key

Maintenance
Consideration during design



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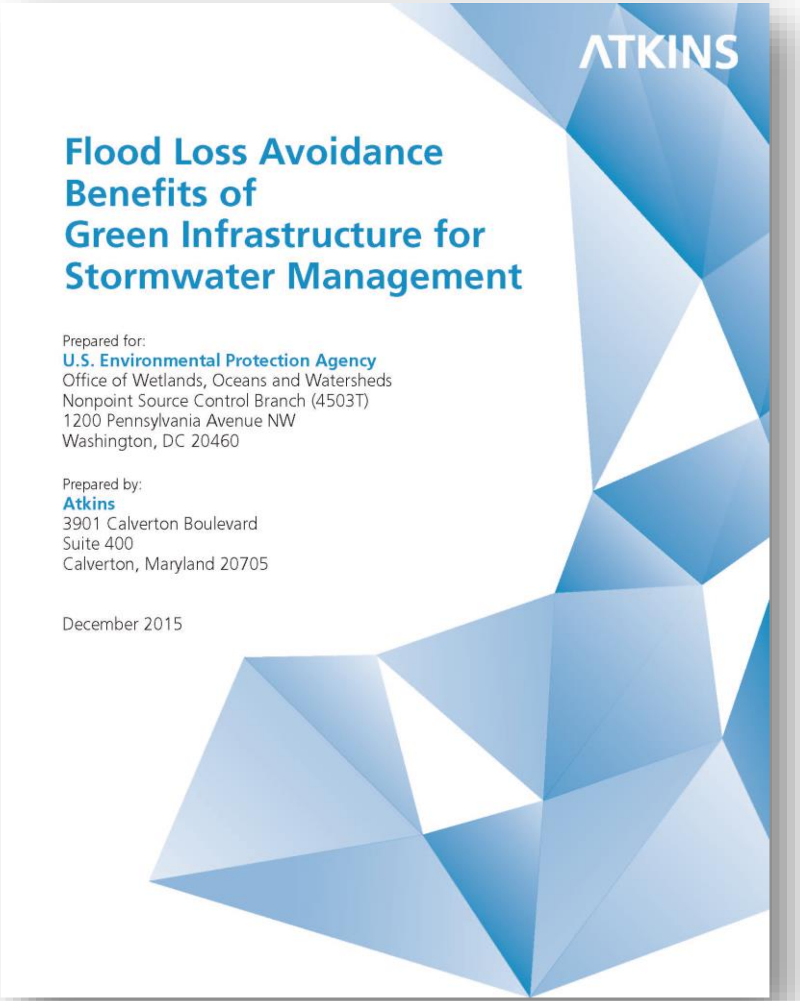
Use of Green Infrastructure to Mitigate Flooding

- USEPA document “Flood Loss Avoidance Benefits of Green Infrastructure for Stormwater Management”
- U.S. could save $5 billion in avoided flood losses if GI used for new development


ATKINS

Flood Loss Avoidance Benefits of Green Infrastructure for Stormwater Management

Prepared for:
U.S. Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds
Nonpoint Source Control Branch (4503T)
1200 Pennsylvania Avenue NW
Washington, DC 20460

Prepared by:
Atkins
3901 Calverton Boulevard
Suite 400
Calverton, Maryland 20705

December 2015

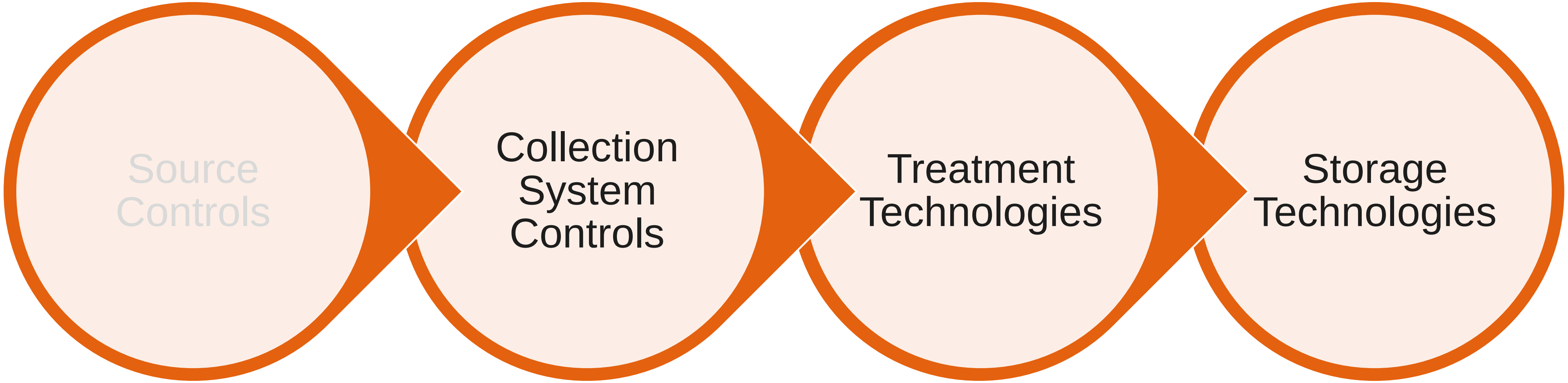
Program Objectives Drive Design Standards

New York City Program: Manage 1” stormwater runoff from 10% of impervious surfaces in combined sewer areas system-wide, focus on high concentration in CSO priority areas

Philadelphia Program: Manage runoff from ~40% of impervious surface in combined sewer areas

Develop Alternatives for CSO Control

Identify CSO Control Alternatives

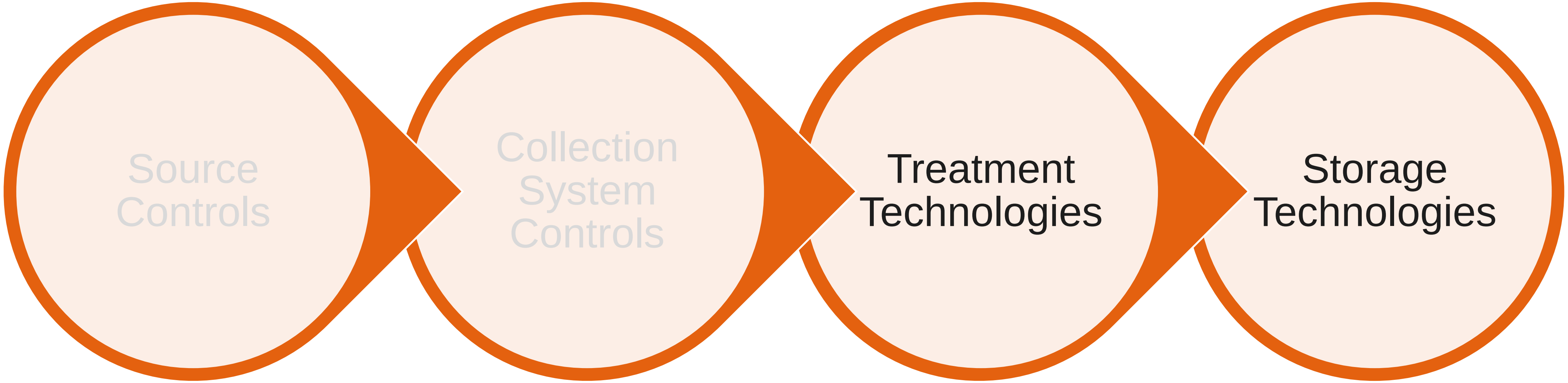


Collection System Controls

Sewer Separation

Infiltration/Inflow Control

Develop Alternatives for CSO Control
Identify CSO Control Alternatives



2007 Treatment Technologies Evaluated

Screening:

- JCMUA's CSO facilities are currently equipped with netting facilities

Treatment Alternatives (High Costs):

- Storm King Vortex Separation
- CDS Floc-sep Vortex Separation
- Ballasted Flocculation using Actiflo
- Ballasted Flocculation using Densa-deg

Disinfection Alternatives:

- Sodium Hypochlorite
- Chlorine Dioxide
- Ultraviolet Disinfection
- Peracetic Acid

Develop Alternatives for CSO Control

Identify CSO Control Alternatives

Source Controls

Collection System Controls

Treatment Technologies

Storage Technologies

2007 Storage Technologies Evaluated

In-Line Storage

- No or limited In-line storage capacity available in JCMUA system. Based on modeling, new in line storage not realistic.

Off-Line Storage

- Off-line storage diverts all or a portion of wet weather combined flows and stores them in large off-line storage tanks or deep tunnels.
- Stored flows are returned to the interceptor once system capacity is available.
- East and West Side Pumping Stations and Force Main System has capacity for 2 times average dry weather peak flow.

Summary of Prior Alternatives Total Present Worth

Pretreatment and Disinfection		**Millions**
• *(Floc-Sep/Actiflo)*		$690 to $2,700
• *Peracetic Acid/UV)*		$40 to $610
Centralized Treatment *(Floc-Sep/ Actiflo)******		$390 to $550
Centralized Treatment (CEPT)*		$540
Tunnels *		
• 0 Overflows/yr	$460	
• 3 Overflows/yr	$380	
• 7 Overflows/yr	$350	
Off-Line Storage *	**(21 outfalls)**	**(9 groups)**
• 0 Overflows/yr	$1,900	$1,200
• 3 Overflows/yr	$1,100	$820
• 7 Overflows/yr	$900	$810
Sewer Separation	$1,900	

* Costs include pumping and disinfection

Evaluate Alternatives for CSO Control Cost/Performance Evaluations

- **Plan should evaluate controls necessary to achieve**
  - 0 overflow events per year
  - 1 to 3 overflow events per year
  - 4 to 7 overflow events per year
  - 8 to 12 overflow events per year
- **To achieve X % for Capture and Treatment**
  - 90% capture
  - 85% capture
  - 80% capture
  - 75% capture

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Next Steps

2018-2019 Development and Evaluation of Alternatives for CSO Control

Next Steps
Development and Evaluation of Alternatives for CSO Control

- Initiate Work
- Present to PVSC to Coordinate JCMUA LTCP Approach

Questions and Final Discussion

CLEAN WATERWAYS
Healthy Neighborhoods