



PUBLIC INFORMATION MEETING

City of New Haven's
Combined Sewer Overflow Long Term Control Plan Update
Public Information Meeting
Report Prepared by CH2MHill on behalf of the
Greater New Haven Water Pollution Control Authority

DECEMBER 14, 2015

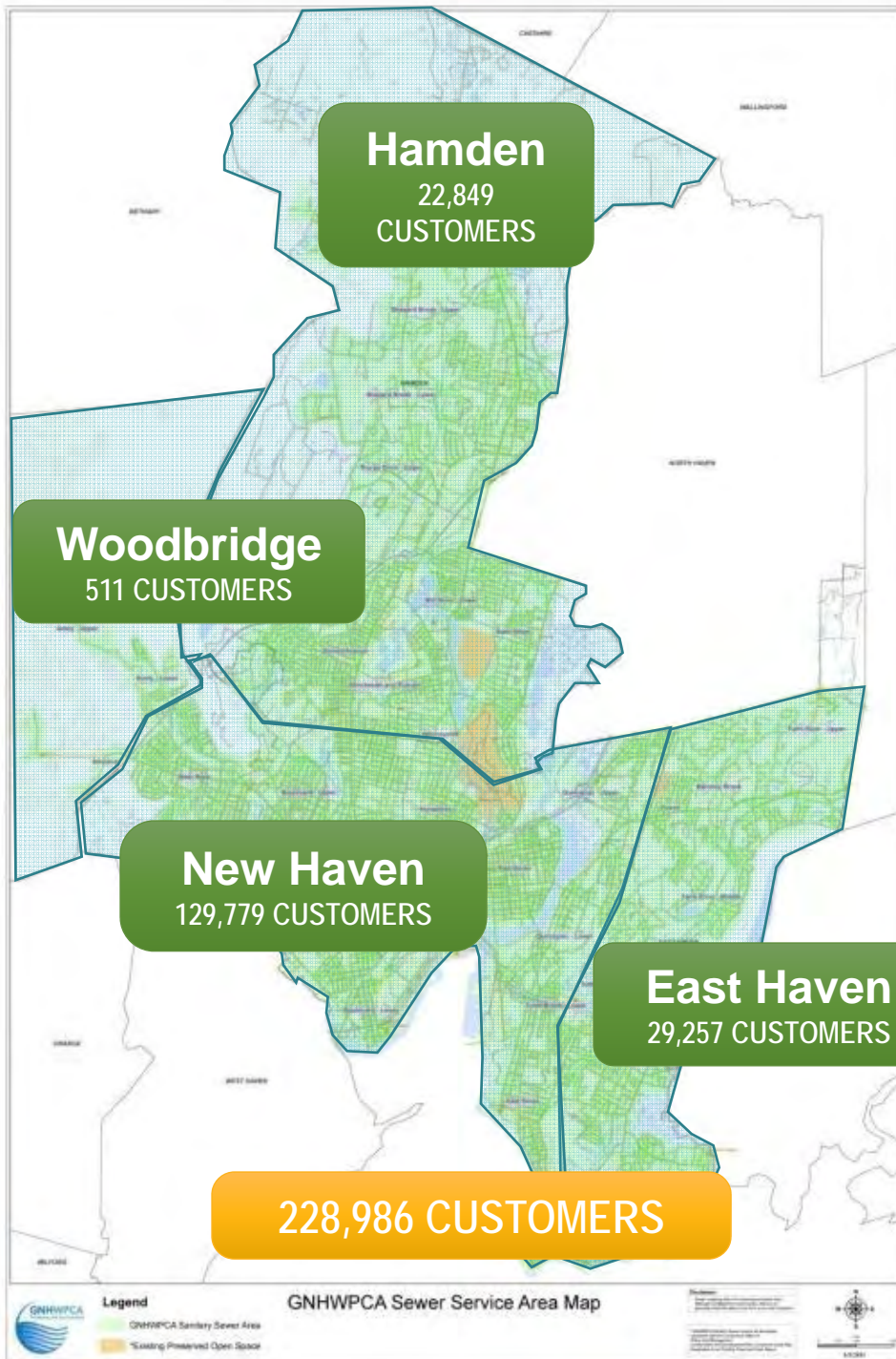


Meeting Agenda

- **About the Authority**
- **Overview of the City of New Haven LTCP Updates**
- **Rainfall Conditions**
 - 2-year, 6-hour Design Storm
 - Typical Year
- **2016 Baseline Conditions Model**
- **Long Term Control Plan Update Recommended Plan:**
 - Short Term Improvements
 - Intermediate Term Improvements
 - Long Term Improvements
- **LTCP Update Project Schedule & Costs**

Greater New Haven Water Pollution Control Authority

WWW.GNHWPCA.COM



- Four Member Communities
 - Hamden
 - East Haven
 - Woodbridge
 - New Haven
- Over 500 Miles of Collections Systems
- 30 Pump Stations
- East Shore Treatment Plant
 - 29 MGD – Average
 - 40 MGD – Secondary Design Flow
 - 100 MGD – Wet Weather Primary

We are not a manufacturing facility!



Rather, we clean whatever you put
down the pipes of your home!

Challenging work!

CUSTOMER
SERVICE

OPERATIONS

FINANCE AND
ADMINISTRATION

INDUSTRIAL
PRETREATMENT
& SAFETY

**TEAM OF 60+
INDIVIDUALS
DEDICATED TO
BETTERING THE
ENVIRONMENT**

ENGINEERING

COLLECTION
SYSTEMS

CONTRACTORS
SYNAGRO, CJ FUCCI,
NATIONAL WATER MAIN





PROTECTING THE ENVIRONMENT

EAST SHORE
WATER POLLUTION
ABATEMENT FACILITY
CITY OF NEW HAVEN

ADMINISTRATION BUILDING

GNHWPCA
COLLECTIONS CREW

GNHWPCA
OPERATIONS CREW



PROTECTING THE ENVIRONMENT



**GNHWPCA
ENGINEERING**



**GNHWPCA
CUSTOMER SERVICE**

HISTORY OF COMBINED SEWERS

Map notes Mayor Henry Lewis who served between 1883-1885

Union Street PS (2016)

East Street PS (2016)

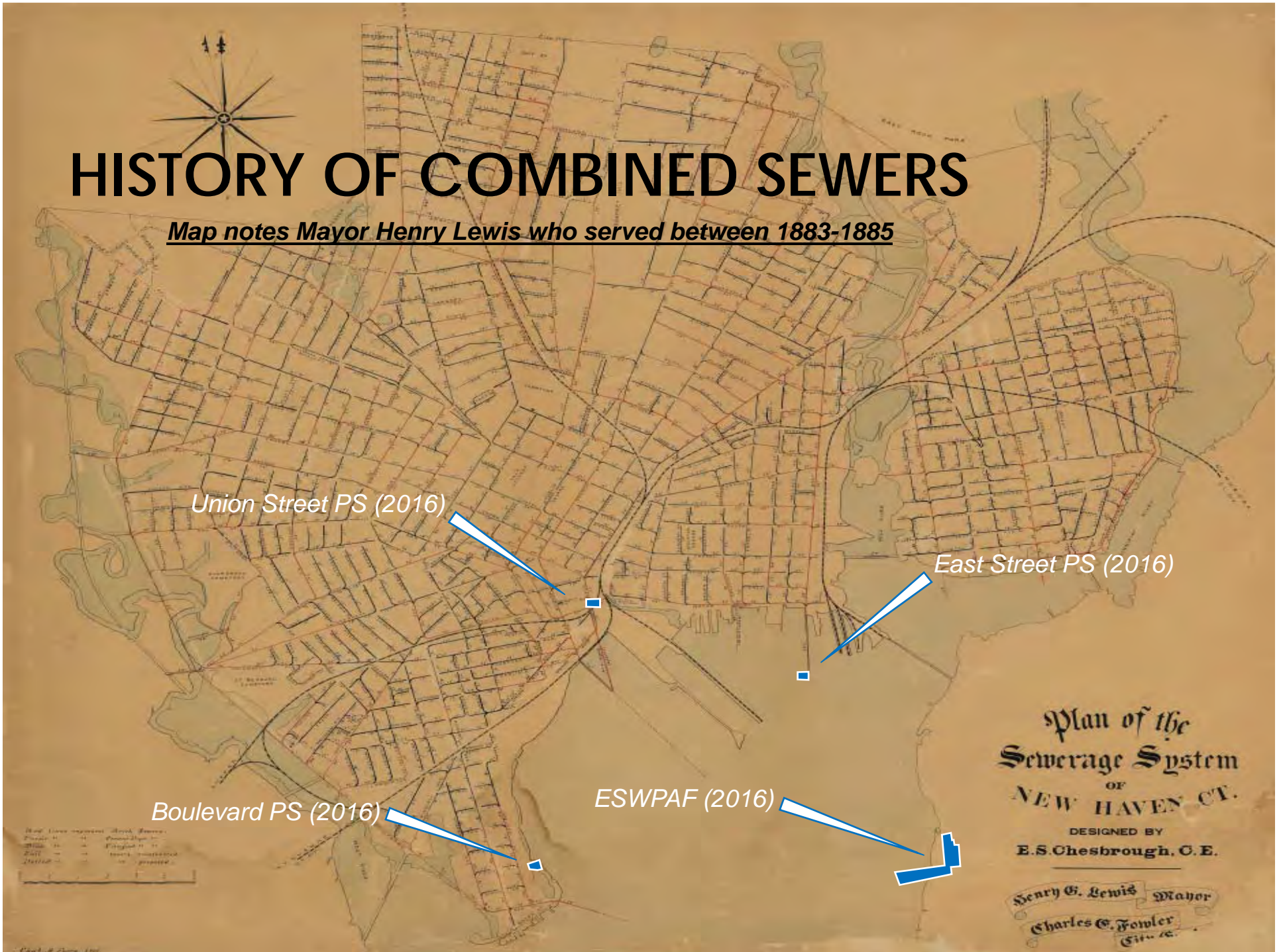
Boulevard PS (2016)

ESWPAF (2016)

Plan of the
Sewerage System
OF
NEW HAVEN CT.

DESIGNED BY
E.S. Chesbrough, C.E.

Henry G. Lewis Mayor
Charles C. Fowler
City C.

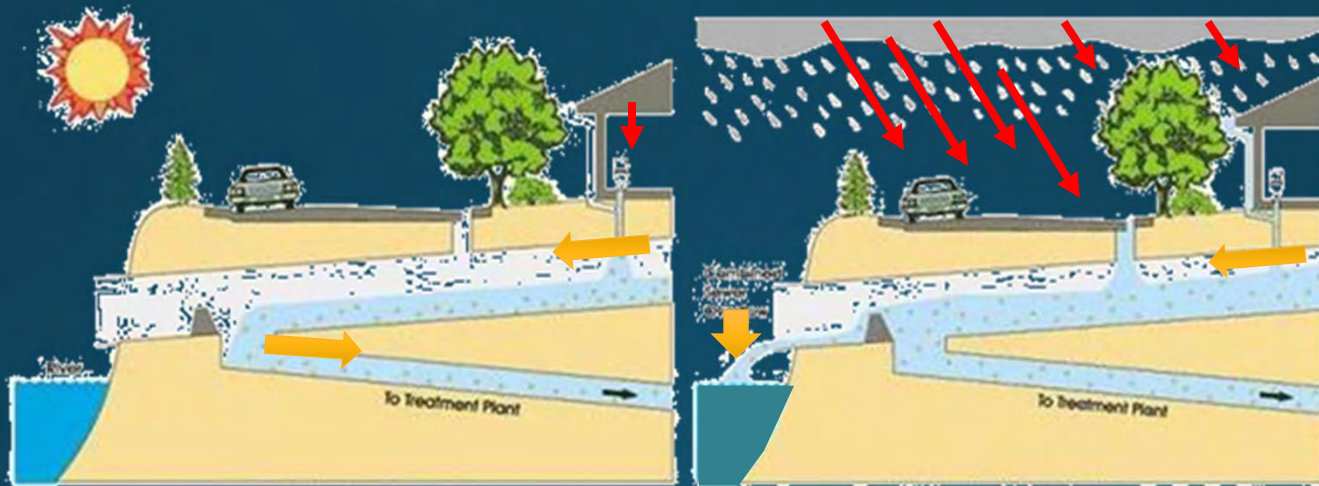


Wastewater Collection and Treatment



What Is A Combined Sewer?

Combined Sewer Overflow Diagram

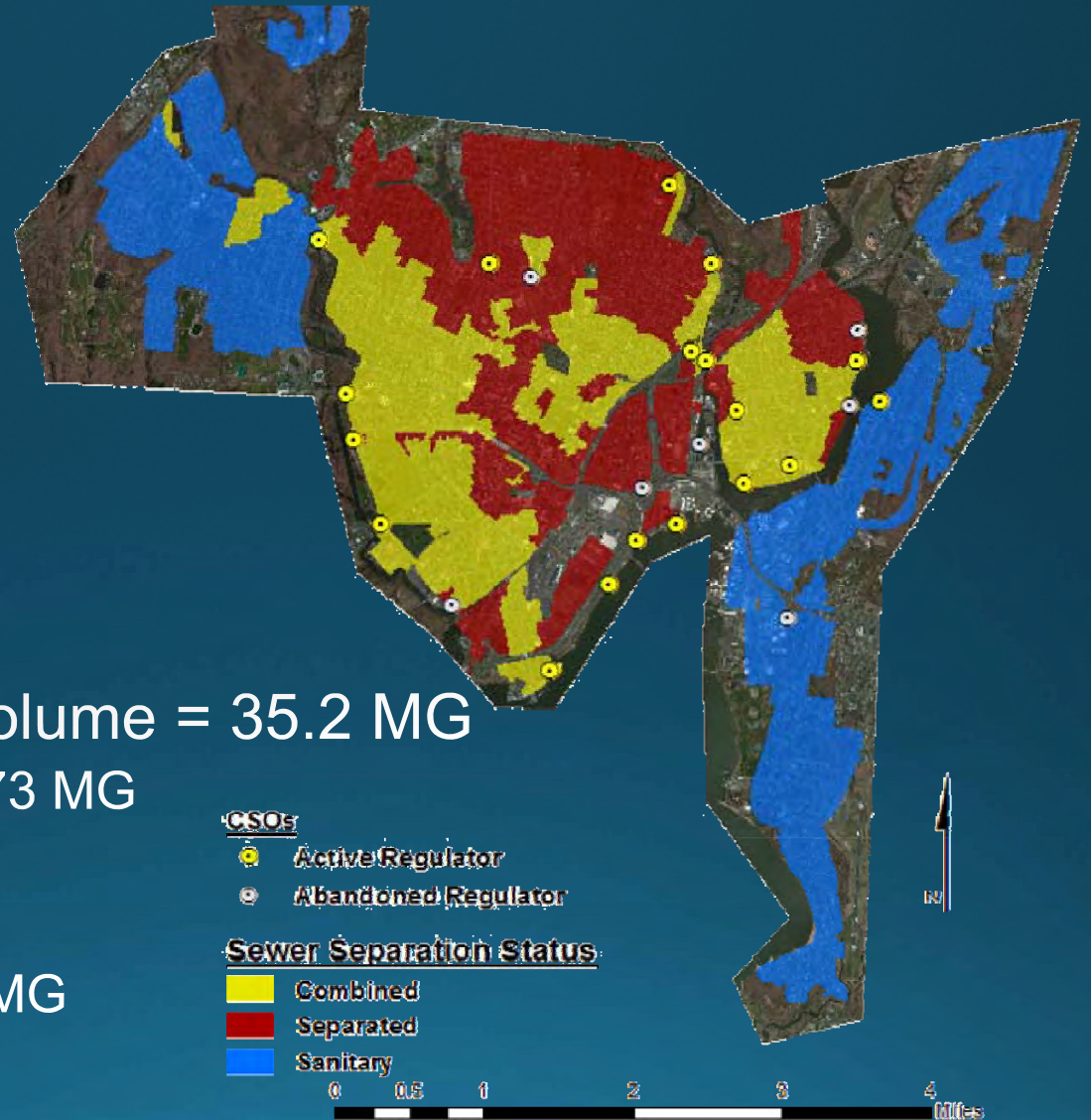


Dry Weather: Weir Wall
Directs Flow To Treatment
Plant

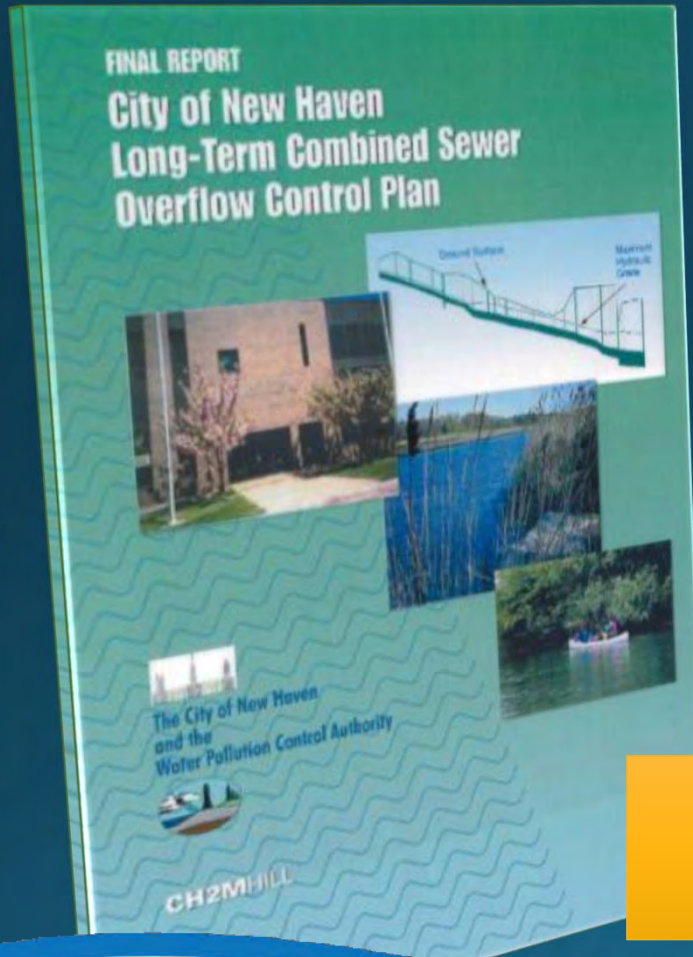
Wet Weather: Some Flow
Passes Over Weir Wall

Where are The GNHWPCA CSO's?

- 13 CSO Outfalls
 - 3 New Haven Harbor
 - 4 West River
 - 3 Mill River
 - 3 Quinnipiac River
- 2016 Annual Metered Volume = 35.2 MG
 - New Haven Harbor = 15.73 MG
 - West River = 6.16 MG
 - Mill River = 2.22 MG
 - Quinnipiac River = 11.11 MG



CONNECTICUT DEEP APPROVED CITY OF NEW HAVEN'S LONG TERM CONTROL PLAN (LTCP)



- ORIGINAL LTCP APPROVED IN 2003
- LAST UPDATED IN 2011
- 2015 DEEP AMENDED CONSENT ORDER REQUIRES AN UPDATE EVERY 5 YEARS (NEXT DUE BY THE END OF 2016)

Goal:

The ultimate objective is to provide measures necessary to achieve zero discharge from all CSO outfalls during the 2-year, 6-hour storm by 2040



LTCP Work Completed

- The City of New Haven and, since 2005, GNHWPCHA have made improvements to the combined sewer system that have reduced CSO frequency, duration and volume
 - Sewer separation projects
 - Truman CSO Storage Tank
 - Phase I Wet Weather Capacity Improvements at the ESWPAF
 - To be complete in 2017 at a cost of \$60 M
 - Regulator improvement projects
 - Utilizing data from CSO Flow Monitoring and Hydraulic Modeling
- Between 1997 and 2015, CSO volume has effectively been reduced by
 - 46% during the design storm from 26 MG to 14 MG
 - 66% during the typical year from 126 MG over 51 events to 43 MG over 30 events

This LTCP Update and Future LTCP Updates

SUMMARY OF DISCUSSION

- This LTCP update is focused on Intermediate Term projects listed here:
 - Capacity Upgrades to East Street Pump Station
 - Yale Campus/Trumbull St. Phase 2A Sewer Separation
 - Capacity Upgrades to Union Pump Station and Force Main
 - Capacity Upgrades to Boulevard Pump Station
- The next LTCP update (2022) will focus on ESWPAF Phase II capacity improvements
- The 2028 LTCP update will focus on ESWPAF Phase III improvements and initial phases of sewer separation in Fair Haven
- The 2034 LTCP update will focus on the final phases of sewer separation in Fair Haven, CSO storage tanks and any additional projects to manage any remaining CSOs during the 2-year, 6-hour Storm
- Each future LTCP update will evaluate the effectiveness of the components of the plan in terms of CSO reduction and consider alternatives to incorporate lessons learned and new technologies that may become available in order to eliminate CSOs for the 2-year 6-hour storm by 2040

2016 LTCP UPDATE FOCUS

MAXIMIZE FLOW TO THE EAST SHORE ABATEMENT FACILITY BY:

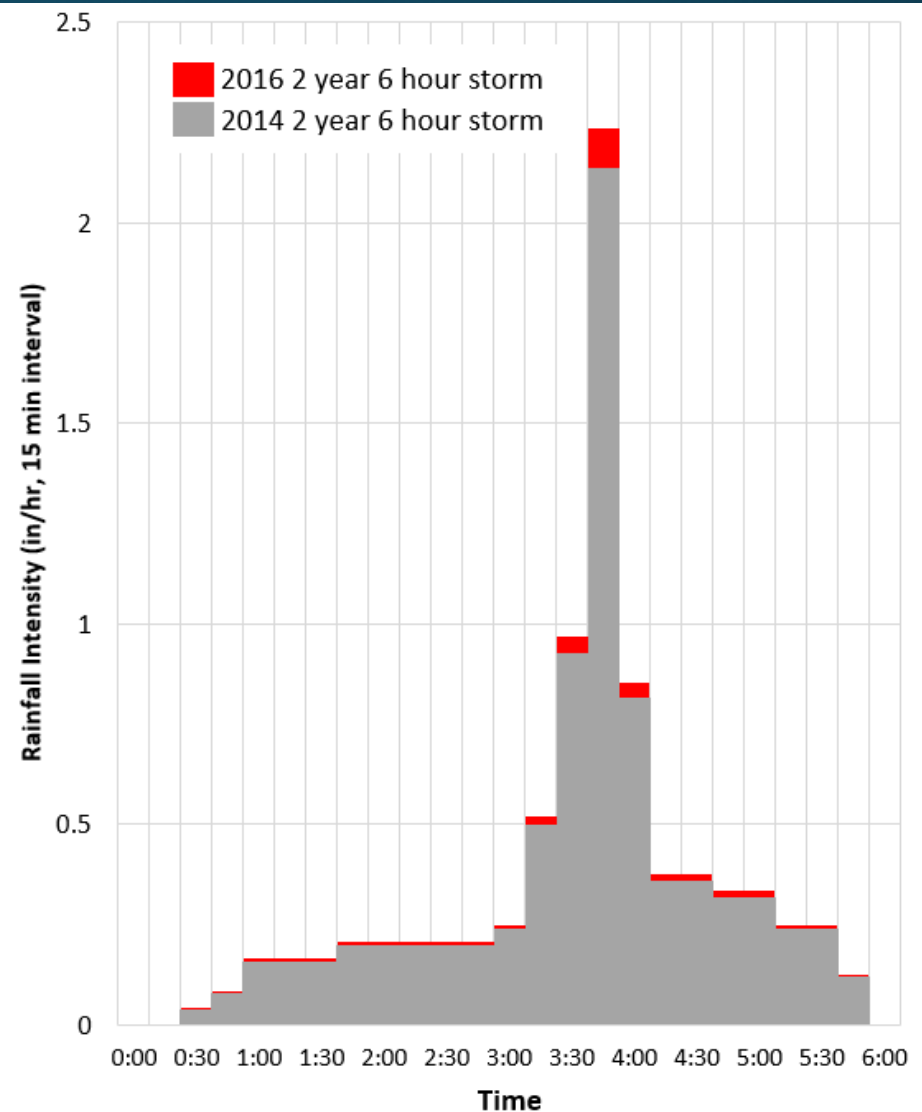
- ❖ **MAXIMIZING USE OF STORAGE AND CONVEYANCE**
- ❖ **IMPROVEMENTS TO KEY PUMP STATIONS**
- ❖ **GREEN INFRASTRUCTURE**



Rainfall Conditions

2-year 6-hour Design Storm

- The 2-year, 6-hour design storm represents the level of control required in the Consent Decree
- During the 2001 LTCP, the rainfall depth was **2.05 inches** (used during the 2015 Hydraulic Model Update)
- Due to climate change and increased extreme weather, storm frequencies change overtime and need to be reevaluated
- Rainfall depth increased to **2.13 inches** (Cornell, NRCC)
- Change has some effect on system performance
 - 2.05 in: 12.9 MG of Overflow (2016 model)
 - 2.13 in: 14.3 MG of Overflow (2016 model)

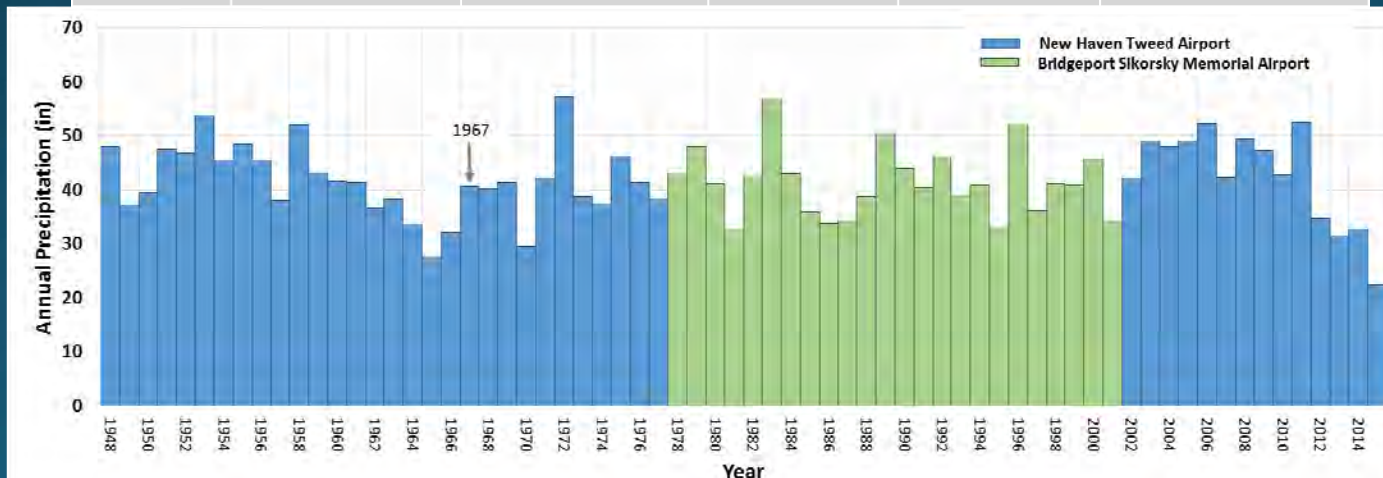


Rainfall Conditions

Typical Year Rainfall

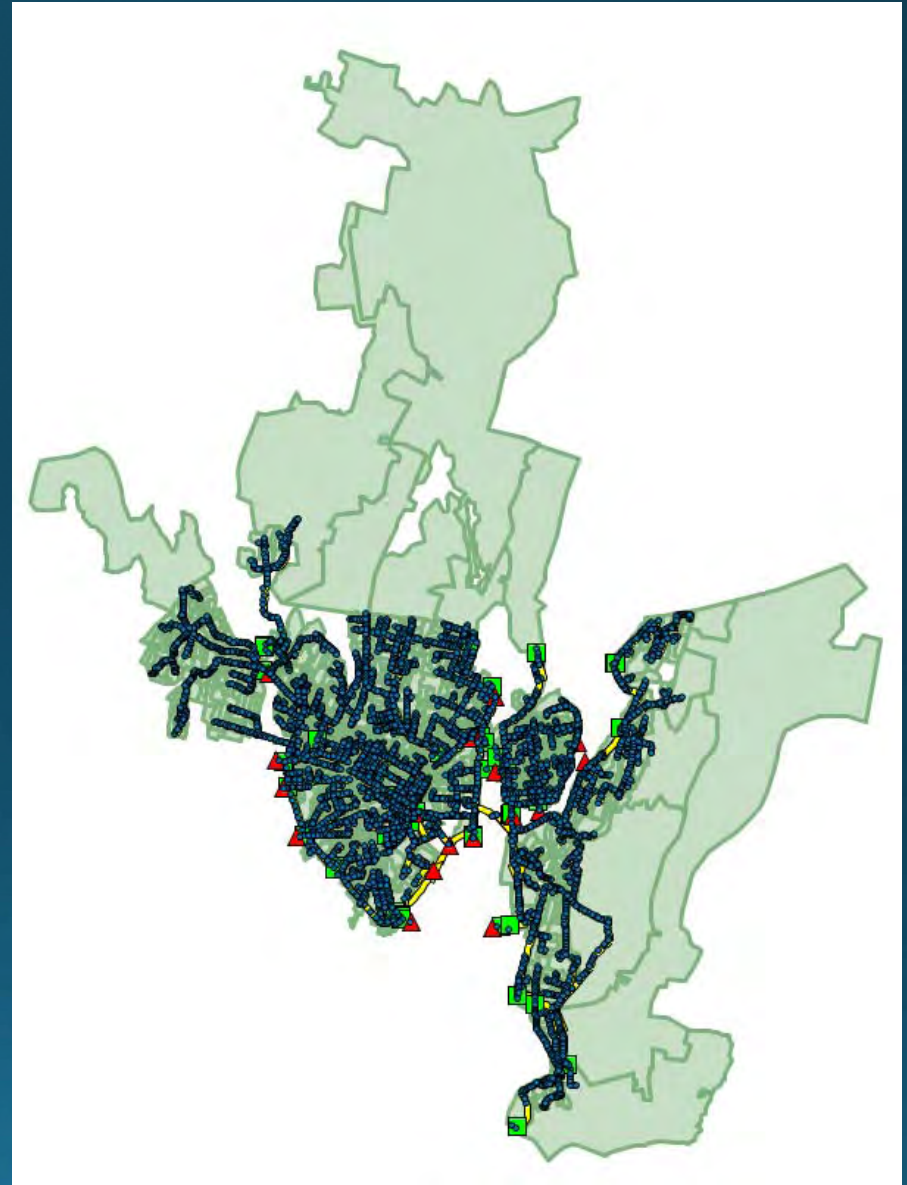
- During the 2001 LTCP, 1967 was determined as a typical year of rainfall from the Tweed-New Haven Airport
- Due to climate change, increased extreme weather, and more available data, a typical year was reevaluated
- 1967 still the most typical year of rainfall in New Haven

Year	Annual Precipitation	Monthly Precipitation	Number of Events	Maximum Event Volume	Maximum Event Intensity
1967	✓	✓		✓	✓
1991	✓		✓		✓
2007	✓		✓		



2016 Baseline Conditions Model Overview

- The baseline conditions model is used as the standard in which all control strategies are measured against
- The baseline conditions model reflects existing conditions to avoid inaccurate benefits of the control strategies
- The 2014 Condition Model was updated to reflect 2016 Conditions
- Model calibration was validated with historic flow monitoring data collected from 30+ meters within the CSO system.



EPA SWM Hydraulic Model 5

How Did We Get Immediate Benefits?

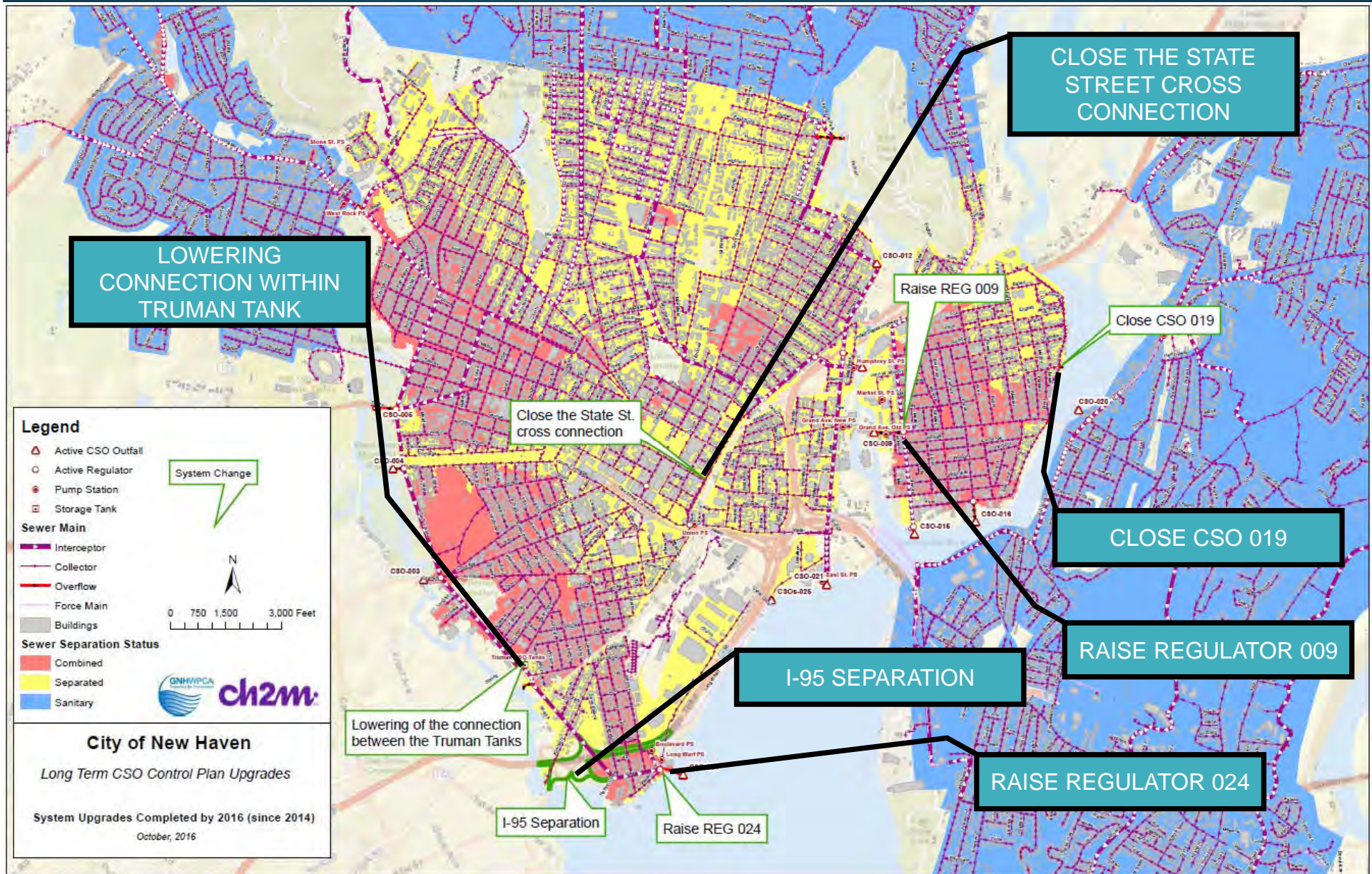
KNOWLEDGE IS POWER!

- Near-term solutions
 - Reduce CSOs by modifying existing regulator structures
 - Maximize conveyance and storage in the Boulevard Trunk Sewer
- Maximize/Optimize use of the Truman Tank
- Maximize use of the Boulevard Pump Station
- Green Infrastructure Redevelopment Requirements



2016 Baseline Conditions Model

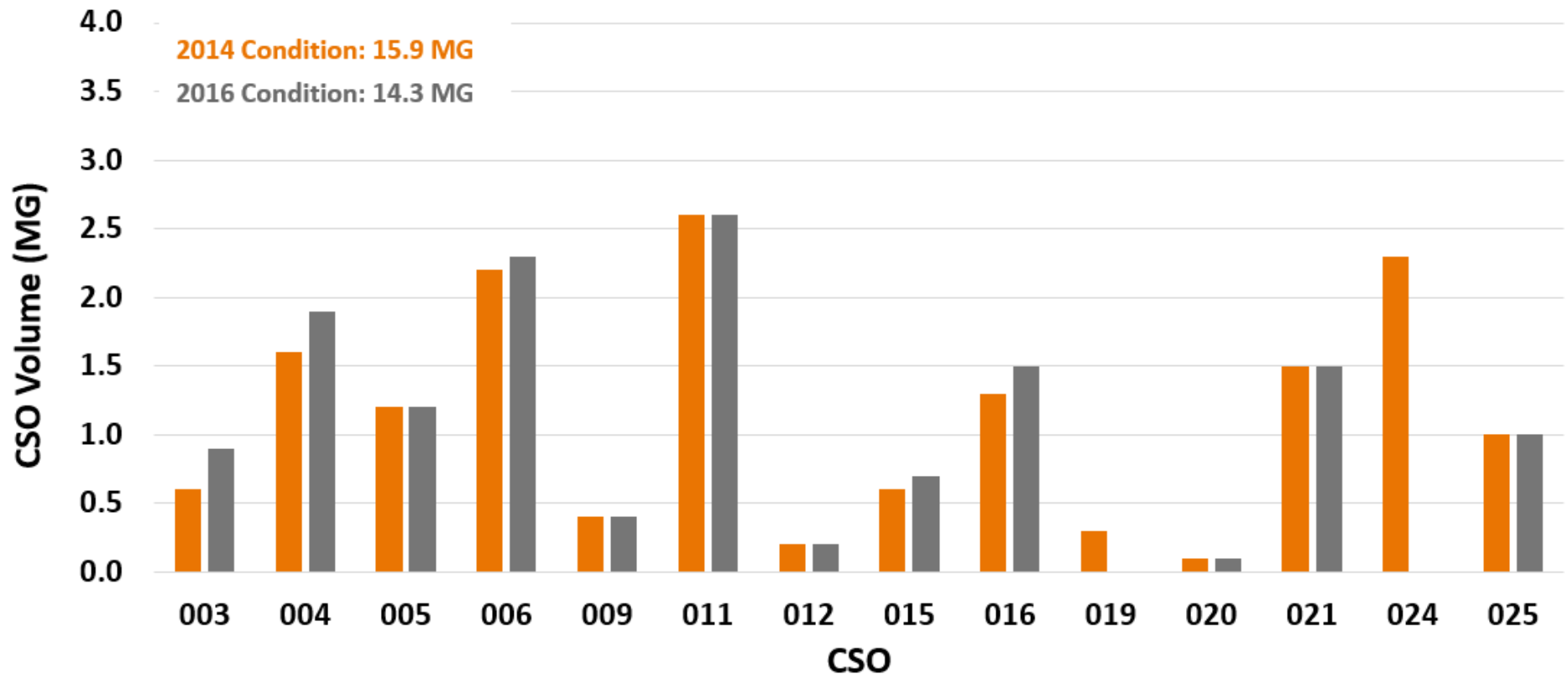
Completed Projects Since 2014



2016 Baseline Conditions Model

System Performance: 2-year, 6-hour Design Storm

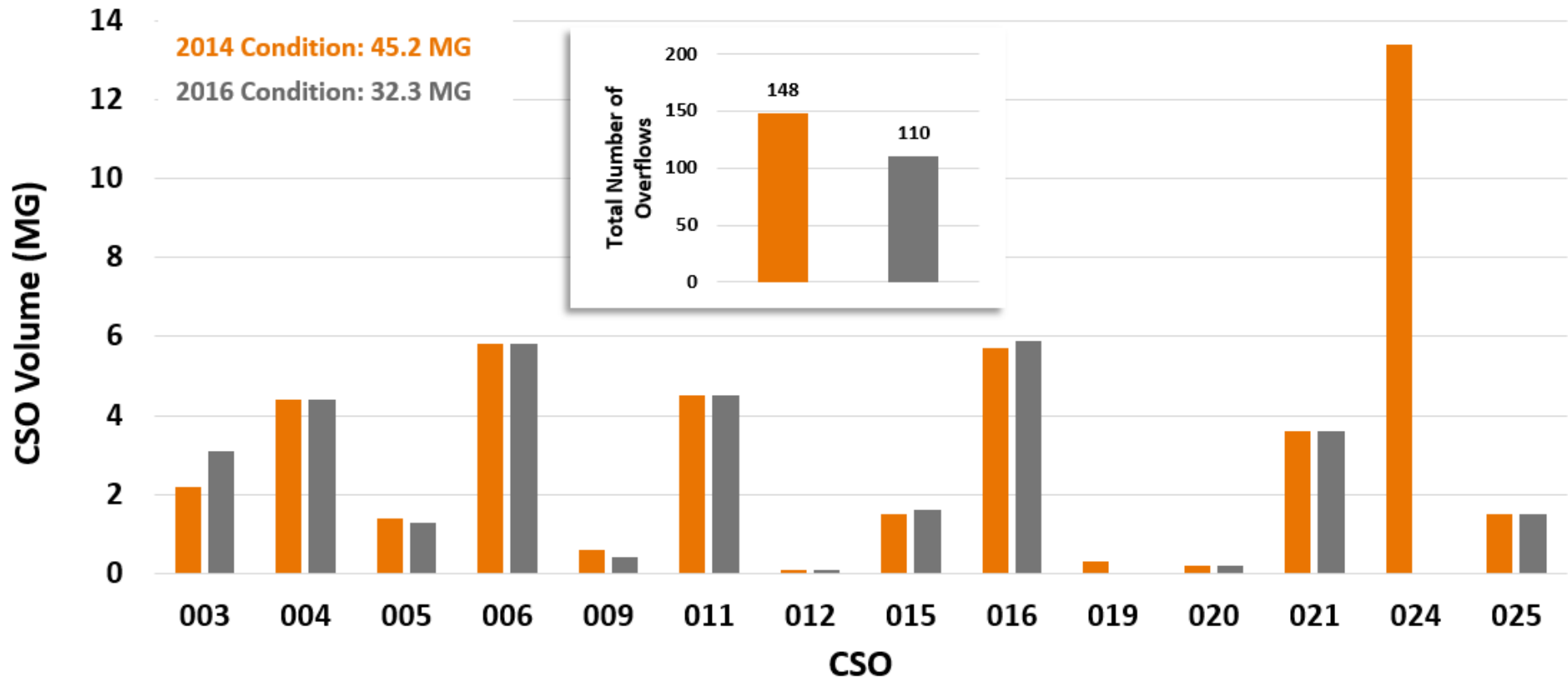
- 2014 total CSO volume: **15.9 MG**
- 2016 total CSO volume: **14.3 MG**
- CSO volume reduction: **1.6 MG**



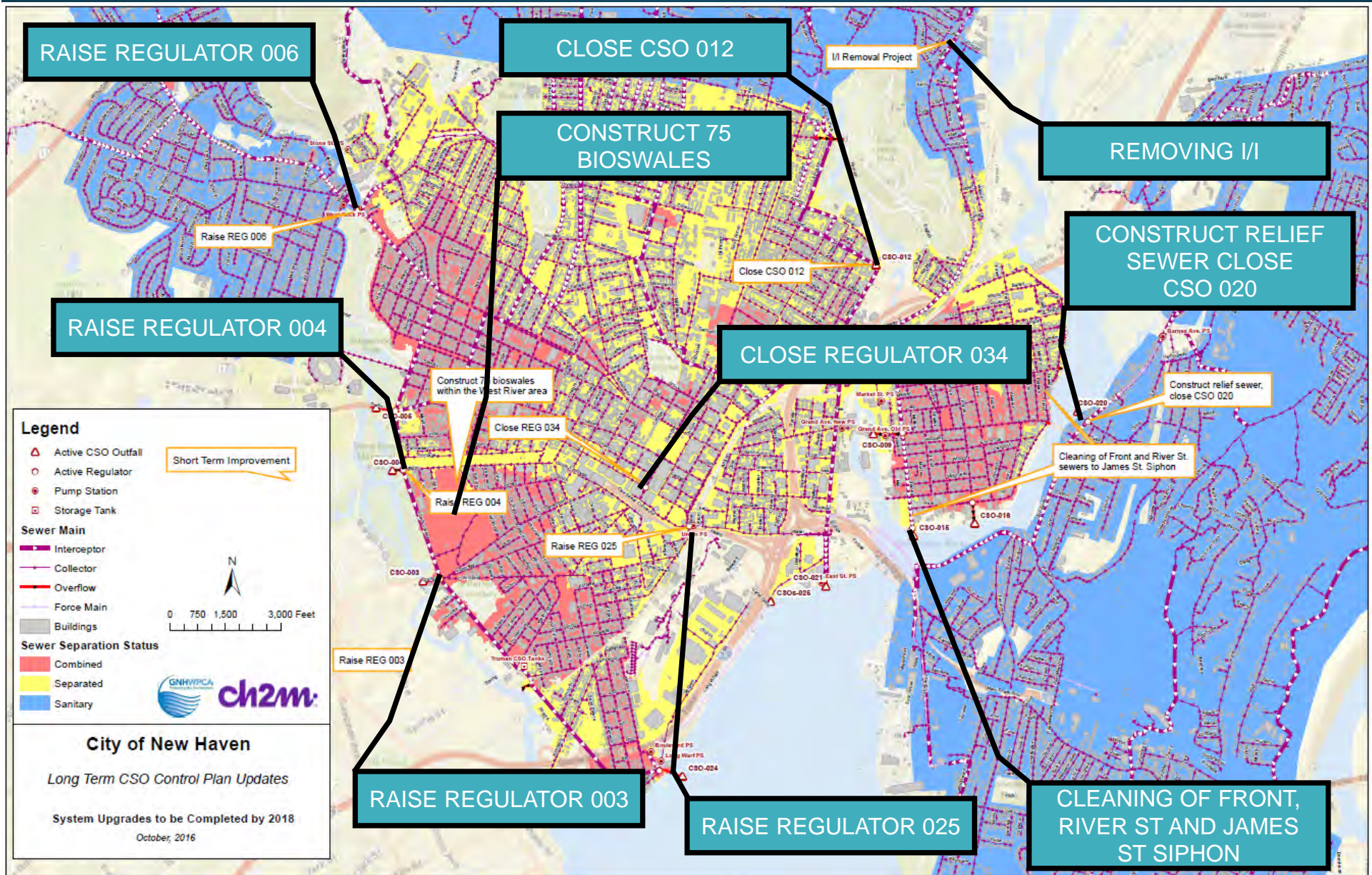
2016 Baseline Conditions Model

System Performance: Typical Year

- 2014 total CSO volume: **45.2 MG**
- 2016 total CSO volume: **32.3 MG**
- CSO volume reduction: **12.9 MG**

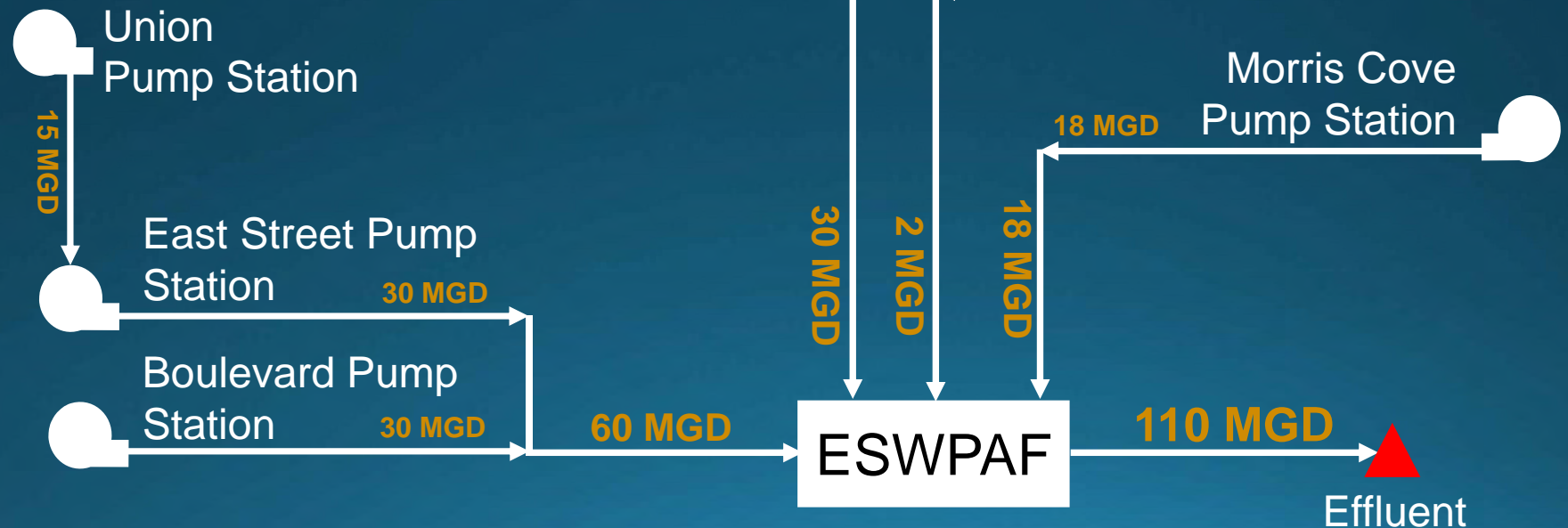


Short Term Control Plan Components



Short Term Control Plan STCP Flow Diagram

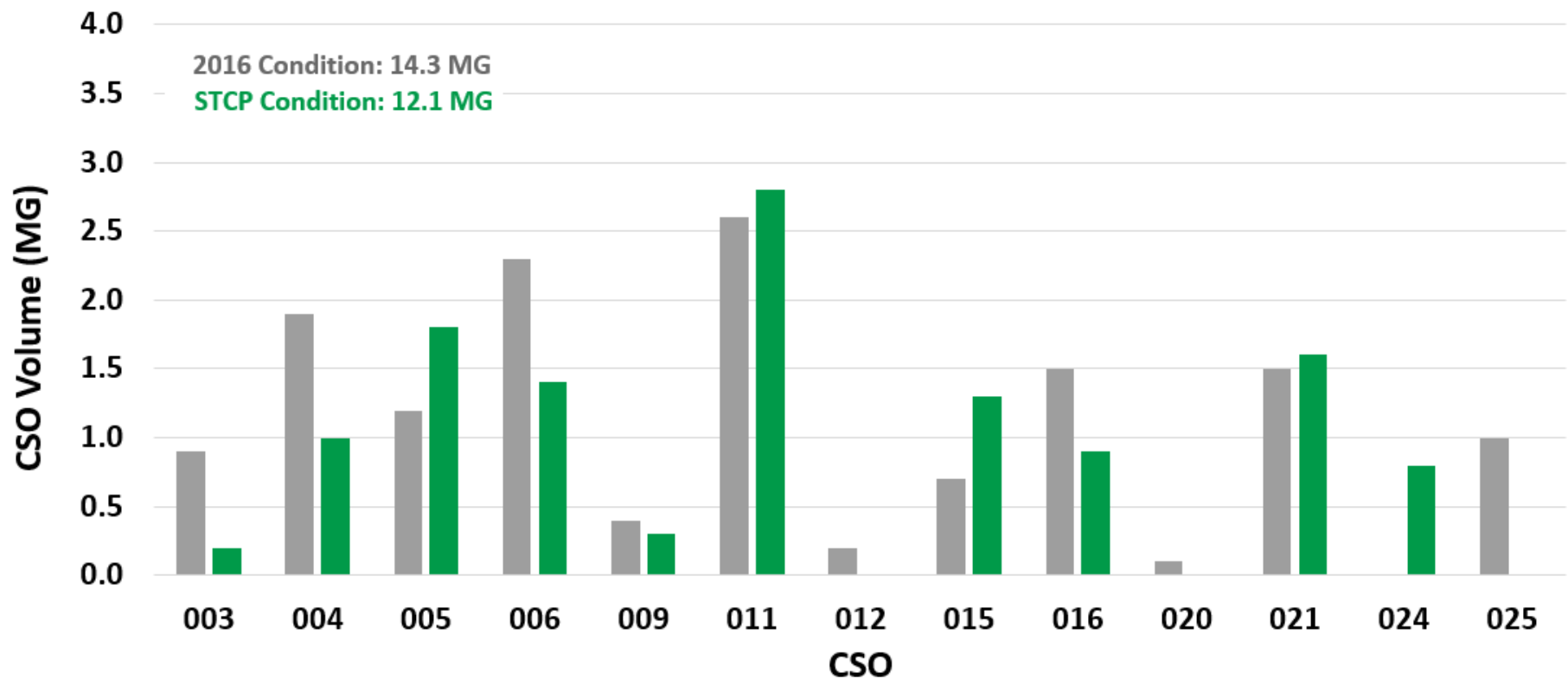
2-yr 6-hr. Design Storm



Short Term Control Plan

System Performance: 2-year, 6-hour Design Storm

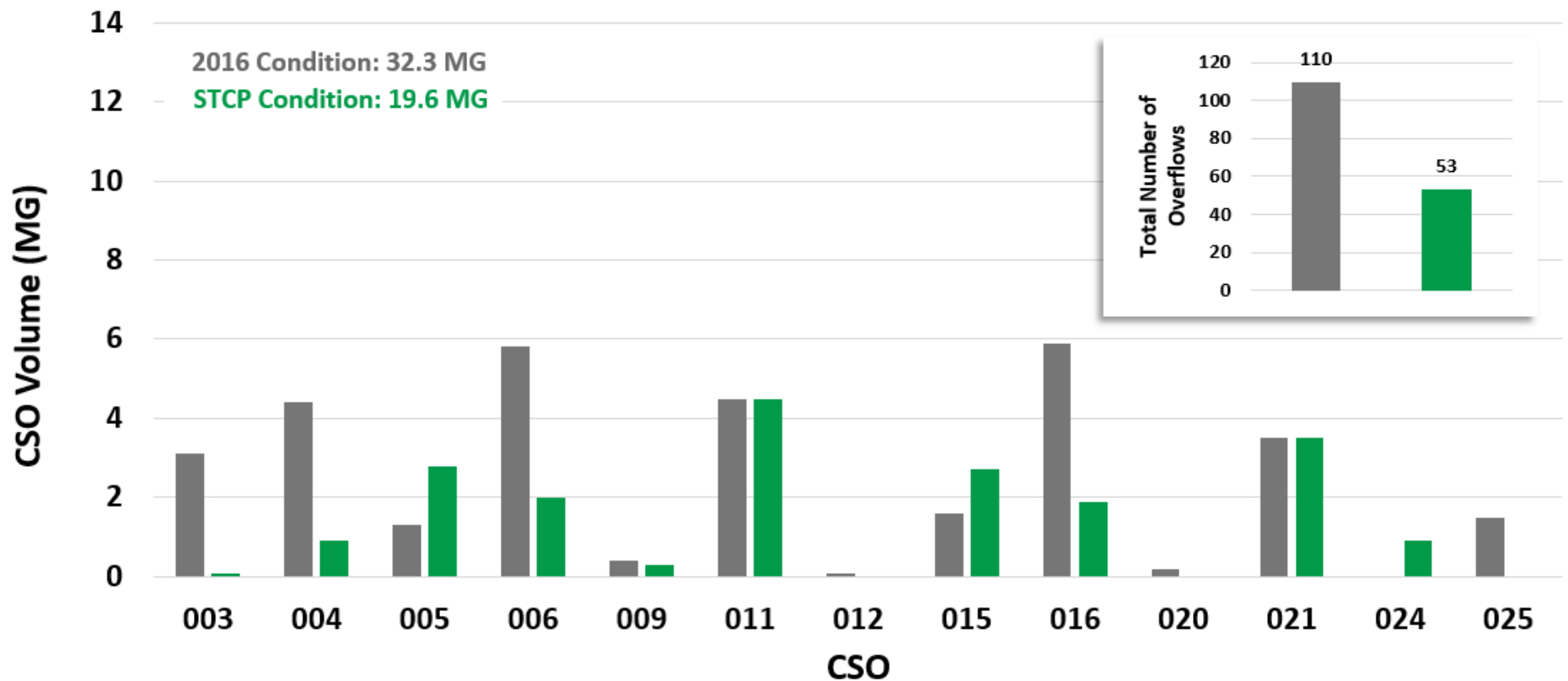
- 2016 Total CSO Volume: **14.3 MG**
- STCP Total CSO Volume: **12.1 MG**
- CSO volume reduction: **2.2 MG**



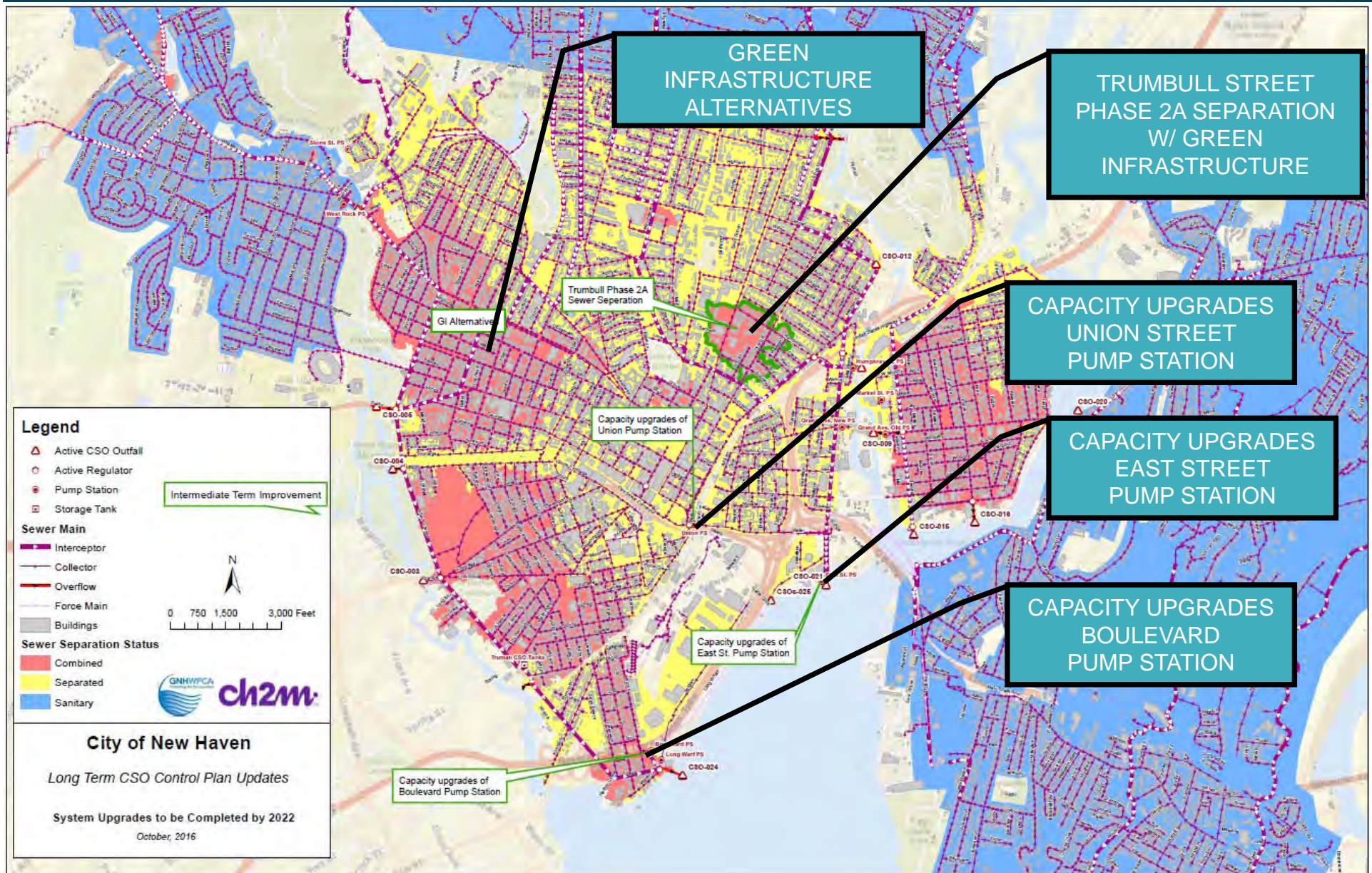
Short Term Control Plan

System Performance: Typical Year

- 2016 Total CSO Volume: **32.3 MG**
- STCP Total CSO Volume: **19.6 MG**
- CSO volume reduction: **12.7 MG**



Intermediate Term Control Plan Components



East Street Pump Station Upgrades:

- # East Street Pump Station Upgrades:
- Capacity upgrades
 - Flood resiliency
 - Improved reliability
-
- The site plan for the East Street Pump Station includes the following labeled components and features:
- Buildings and Structures:**
 - EXISTING UPPER LEVEL CONTROL ROOM
 - OPERATIONS BUILDING AND PUMPING STATION (F.F. = 10.70)
 - EXPANDED UPPER LEVEL FOR NEW ELECTRICAL SWITCHGEAR/CONTROL ROOM
 - LANDSCAPED AREA CONC. RAMP - SEE TYP CONC. DRIVEWAY DETAIL
 - VALVE CHAMBER
 - 18" R.C.P.
 - SCREENING WALL (SEE SHT. NO. S-8)
 - GARAGE (F.F. = 10.7)
 - Tanks and Vessels:**
 - 10' DIA ACTIVATED CARBON VESSEL (TYP)
 - 550 GAL. U.G. SODIUM HYDROXIDE STORAGE TANK (SEE DETAIL SHEET, M-2)
 - 30" FOUL AIR DUCTWORK (TYP) (F.F. 10.70)
 - 36" FOUL AIR DUCTWORK (TYP)
 - Infrastructure and Utilities:**
 - FORCE MAIN
 - DWF SUBMERSIBLE PUMP STATION
 - NEW ELEVATED UI TRANSFORMER PAD
 - ODOR CONTROL FAN UNIT SOUND ENCLOSURE
 - LOAM & SEED
 - STORM MH. (N.12) (T.F. = 9.70, INV. 18" IN = 3.85)
 - BIT PAV'T
 - REMOVE HYD.
 - REMOVE CONC. APRON
 - REMOVE CO. PLUG PIPES
 - PAVED DITCH (S = 0.05%)
 - LANDSCAPED AREA
 - PARKING AREA
 - DIVERSION CHAMBER
 - PAINT STALLS
 - Elevations and Dimensions:**
 - 10+00, 11+00, 12+00, 13+00 (stationing)
 - 10.95, 9.85, 9.10, 9.5, 10.65, 10.05, 10.5, 10.45, 10.8, 10.5, 10.35, 9.5, 11.2, 10.38, 9.80, 11.0, 10.65, 10.5, 10.0, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 11.0, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8, 11.9, 12.0, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9, 13.0, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, 13.9, 14.0, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 15.0, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 16.0
- NOTES:**
1. BASE FLOOD ELEV. = 13.0
 2. ALL ELEVATIONS SHOWN ARE NAVD 88
 3. DESIGN RESILIENCY PROTECTION ELEV. = 16.0
- EAST STREET PUMP STATION SITE PLAN**

EAST STREET PUMP STATION SITE PLAN

Intermediate Term Control Plan

East Street Pump Station Dry and Wet Weather Pumps

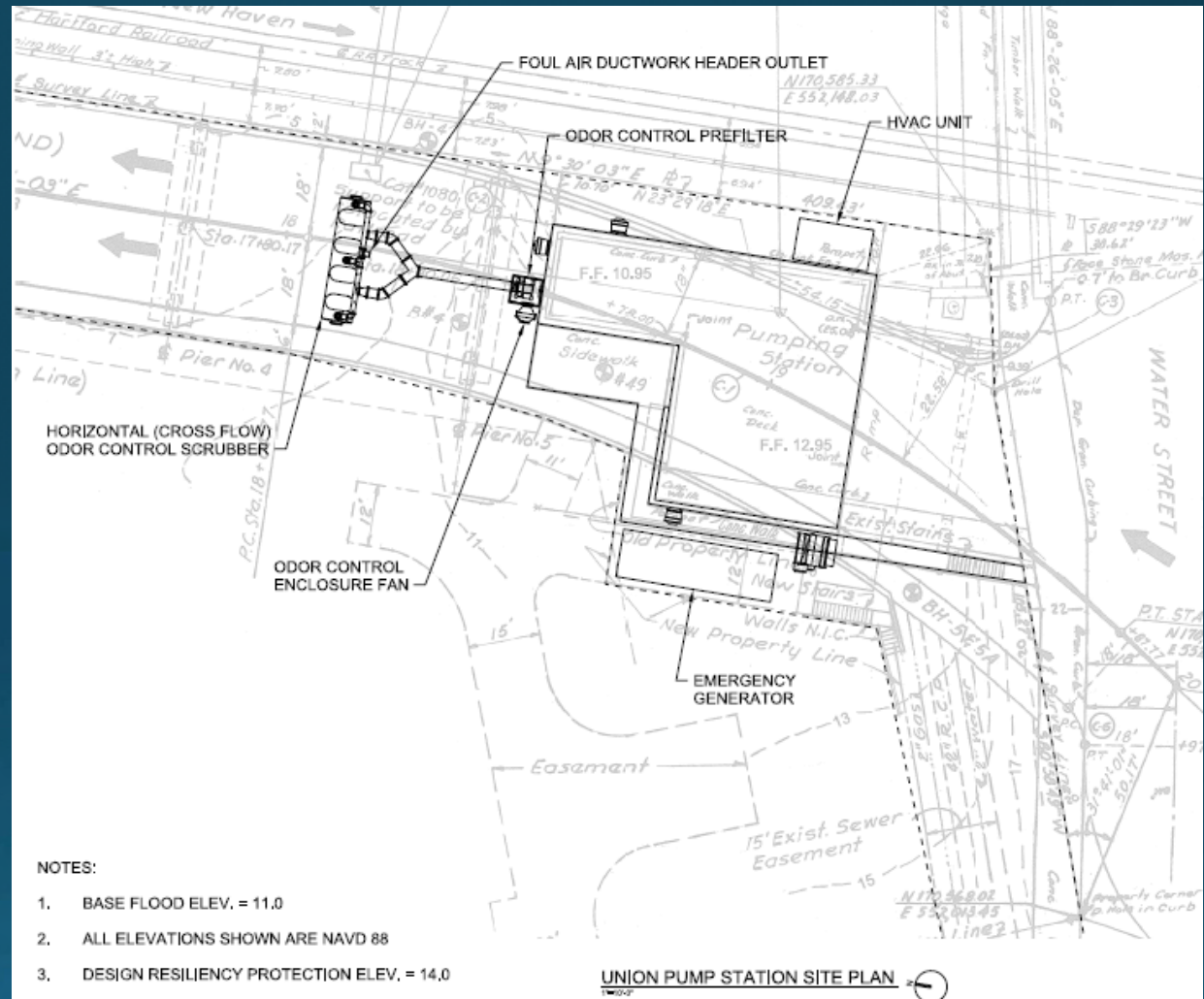
Design Criteria	Dry Weather	Wet Weather
Number of pumps	3	5
Max flow	8.4 MGD	16.25 MGD
TDH at max flow	42.4-ft	145-ft
Efficiency at max flow	81%	84%
Motor	90 HP	500 HP
Speed	900 RPM	900 RPM

Intermediate Term Control Plan

Union Pump Station Site Plan

Union Pump Station Upgrades:

- Capacity upgrades
- Flood resiliency
- Improved reliability



Union Pump Station Dry and Wet Weather Pumps

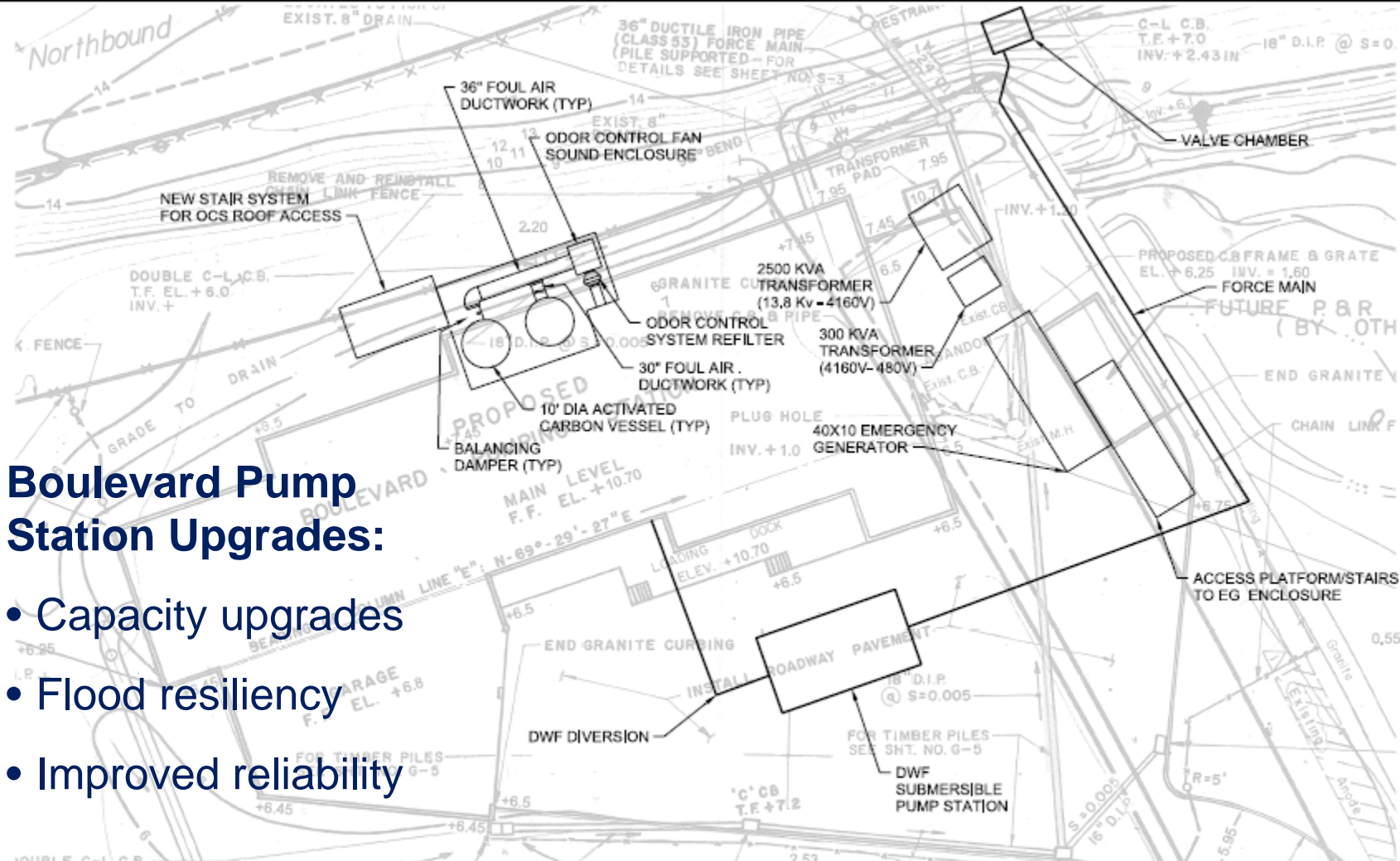
Design Criteria	Dry Weather	Wet Weather
Number of pumps	2	3
Max flow	6.2 MGD	17.5 MGD
TDH at max flow	31-ft	55-ft
Efficiency at max flow	80%	81%
Motor	50 HP	250 HP
Speed	600 RPM	900 RPM

Intermediate Term Control Plan

Union Pump Station Force Main Replacement and Pipe Bridge Rehabilitation

- Existing 24-in Force main to be replaced
 - Union Pump Station will require bypass pumping
 - Railroad to require casing over new 24-inch force main
 - Structural Evaluation to Consider Increased Load – Rehab to Address
- Rehabilitate existing pipe bridge over railroad
- Consider RR track shutdown requirements and permitting requirements with RR
- The Gas Company added a gas main to the original bridge structure
 - Structural evaluation conducted by the Gas Company
 - The Gas Company responsible for maintenance of added truss system
- The Gas Company will remove and re-install their gas main on the rehabilitation pipe bridge

Intermediate Term Control Plan Boulevard Pump Station Site Plan



Boulevard Pump Station Upgrades:

- Capacity upgrades
- Flood resiliency
- Improved reliability

NOTES:

1. BASE FLOOD ELEV. = 12.0
2. ALL ELEVATIONS SHOWN ARE NAVD 88
3. DESIGN RESILIENCY PROTECTION ELEV. = 15.0

BOULEVARD PUMP STATION SITE PLAN



Intermediate Term Control Plan

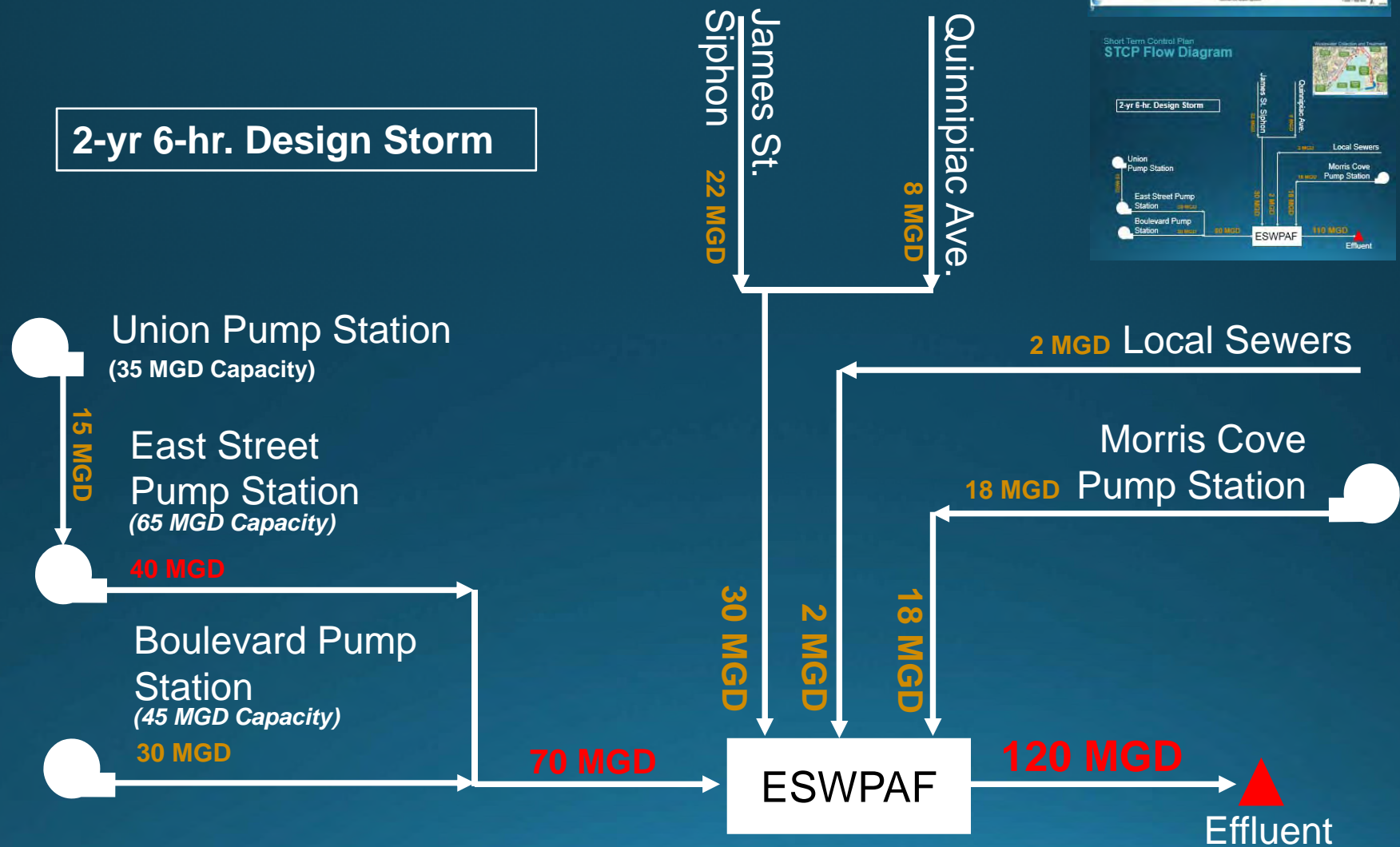
Boulevard Pump Station Dry and Wet Weather Pumps

Design Criteria	Dry Weather	Wet Weather
Number of pumps	3	4
Max flow	9.08 MGD	15 MGD
TDH at max flow	64-ft	198-ft
Efficiency at max flow	80%	82%
Motor	215 HP	700 HP
Speed	1200 RPM	900 RPM

Intermediate Term Control Plan ITCP Flow Diagram

Maximizing Use of Our Existing Infrastructure

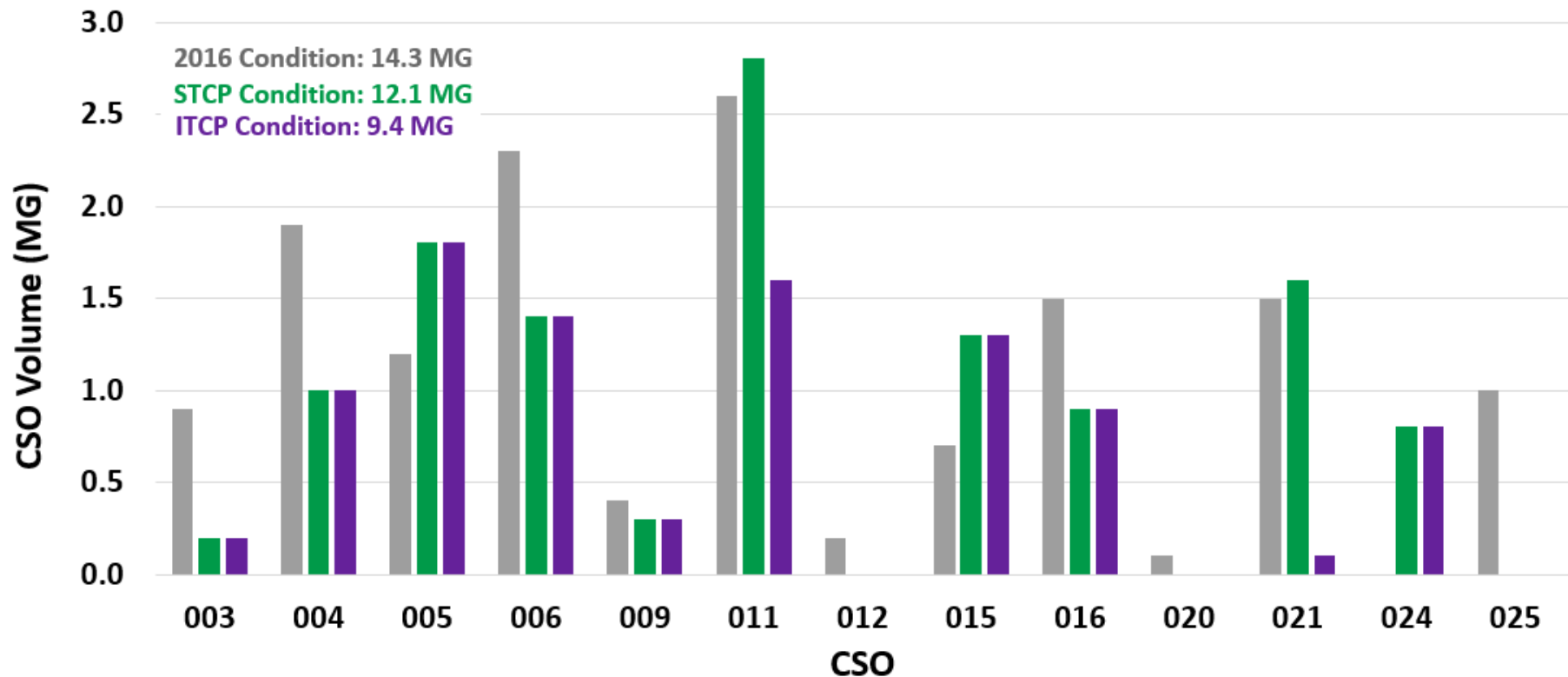
2-yr 6-hr. Design Storm



Intermediate Term Control Plan

System Performance: 2-year, 6-hour Design Storm

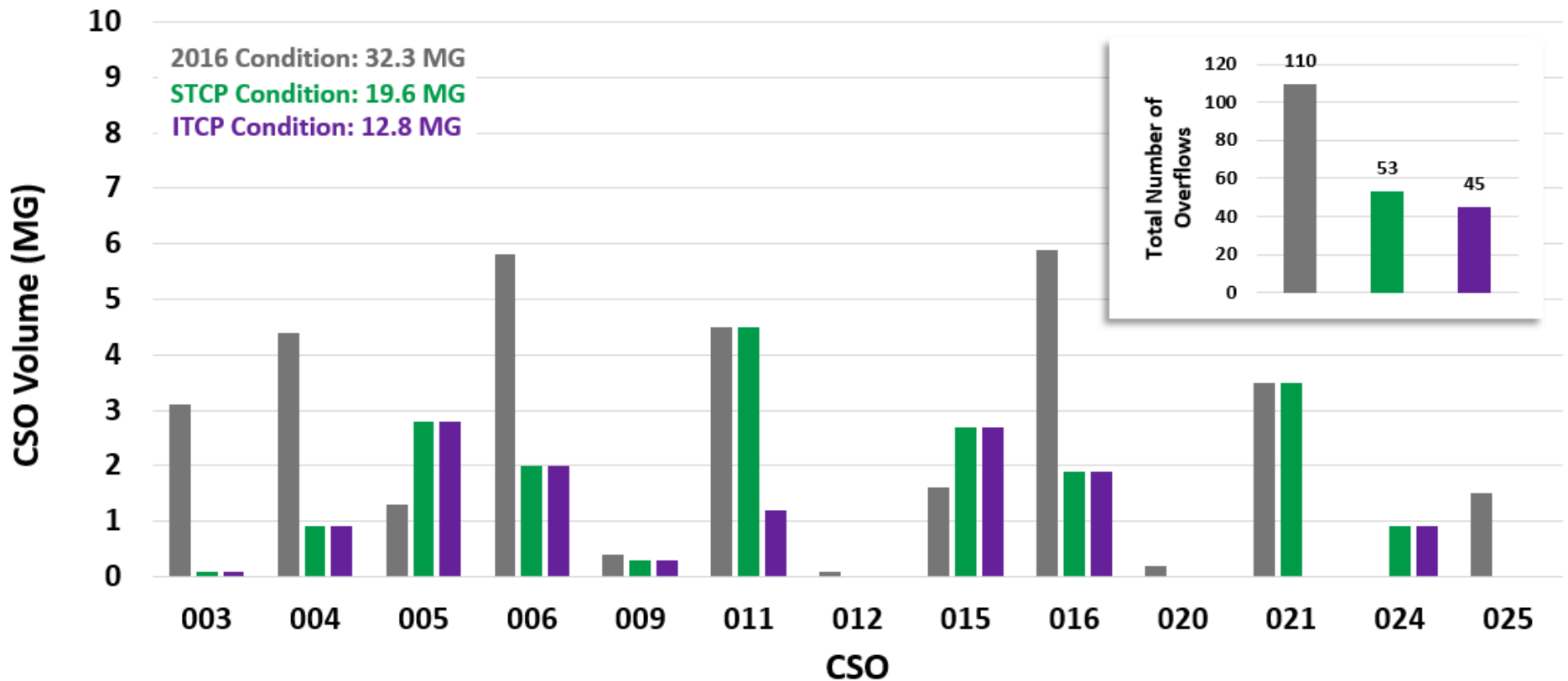
- STCP Total CSO Volume: **12.1 MG**
- ITCP Condition: **9.4 MG**
- CSO volume reduction: **2.7 MG**



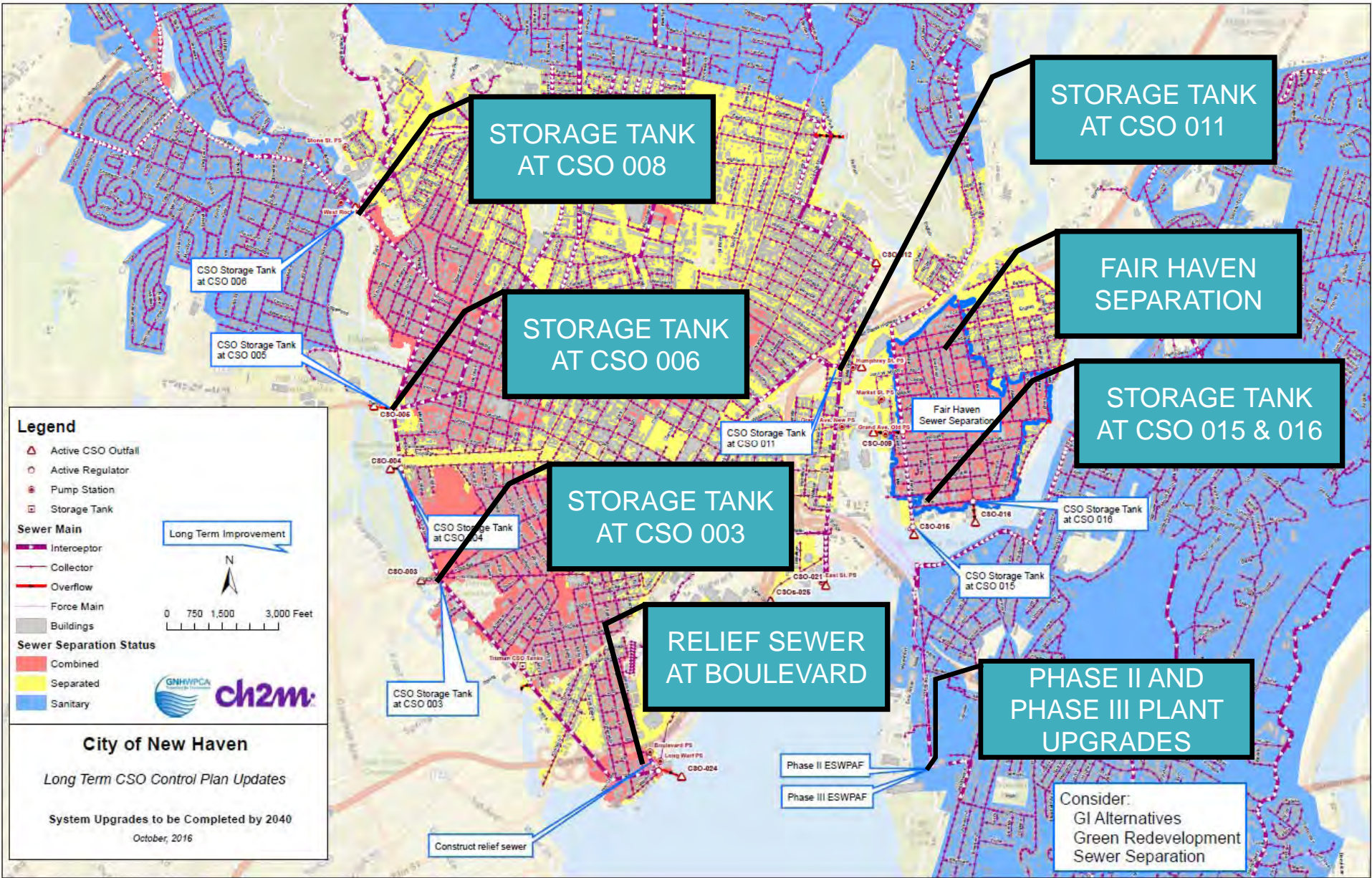
Intermediate Term Control Plan

System Performance: Typical Year

- STCP Total CSO Volume: **19.6 MG**
- ITCP Total CSO Volume: **12.8 MG**
- CSO volume reduction: **6.8 MG**

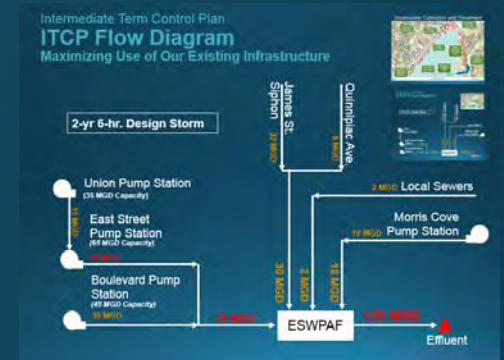
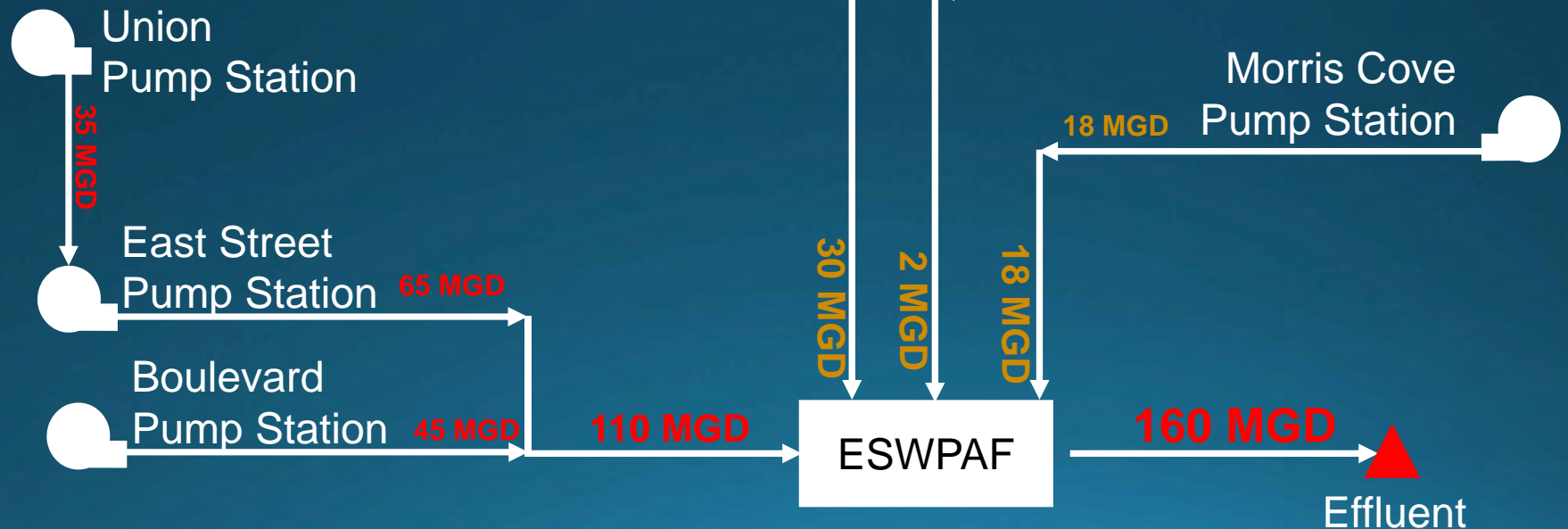


Long Term Control Plan Components



Long Term Control Plan LTCP Flow Diagram

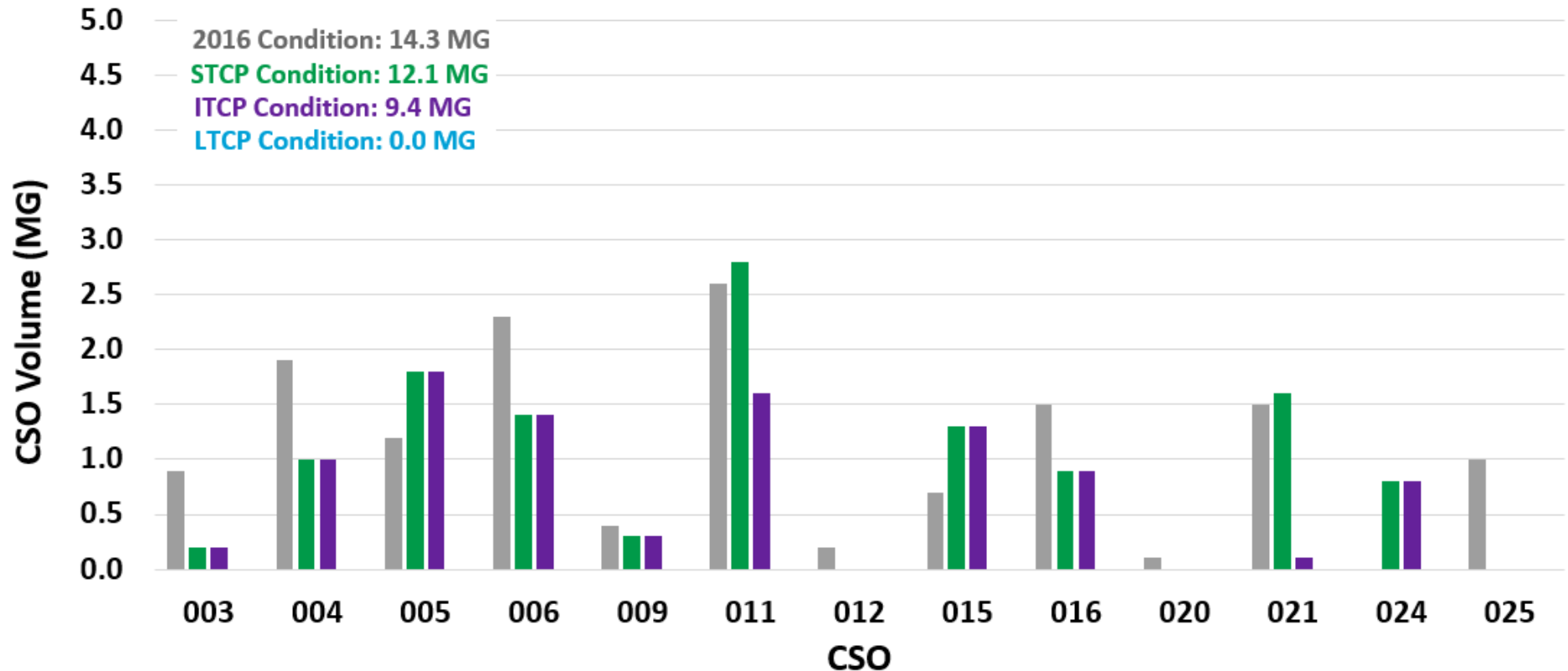
2-yr 6-hr. Design Storm



Long Term Control Plan

System Performance: 2-year, 6-hour Design Storm

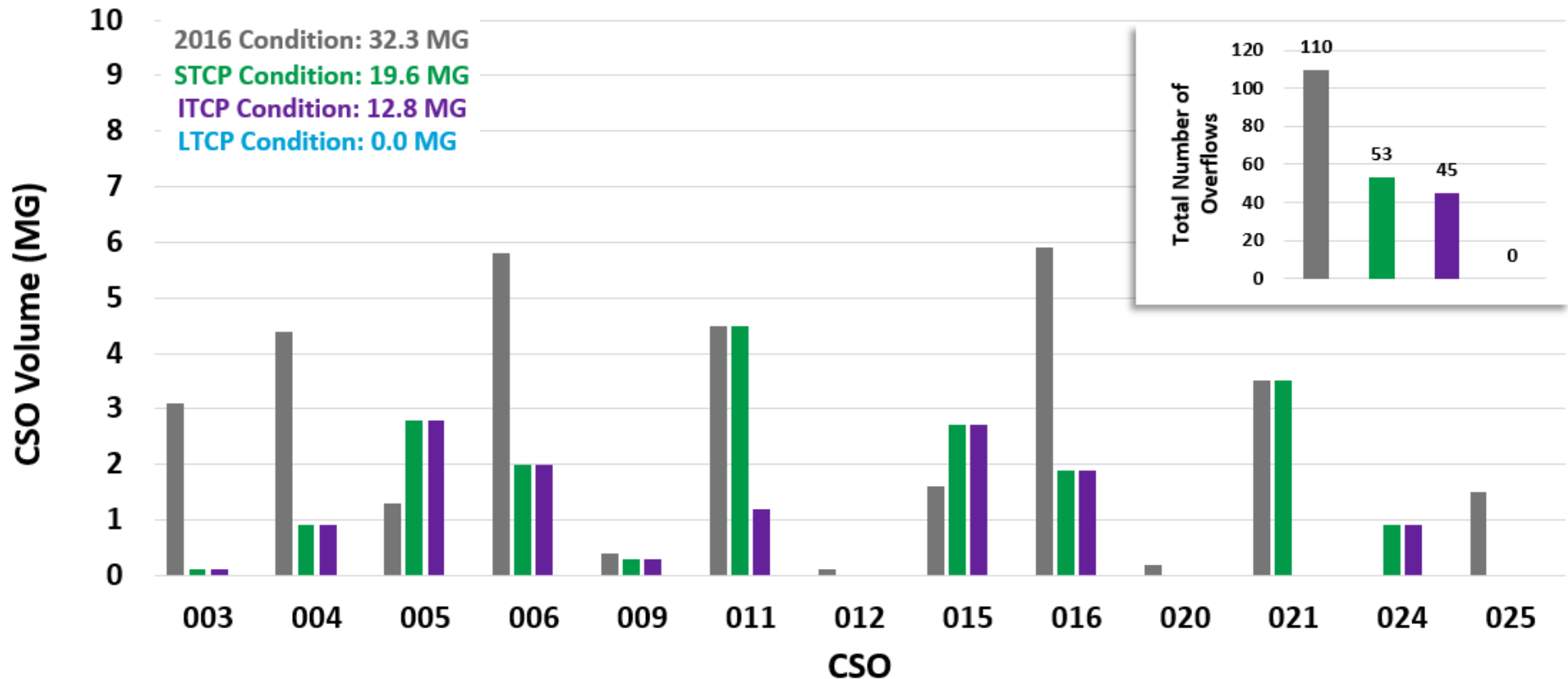
- ITCP Total CSO Volume: **9.4 MG**
- LTCP Total CSO Volume: **0.0 MG**



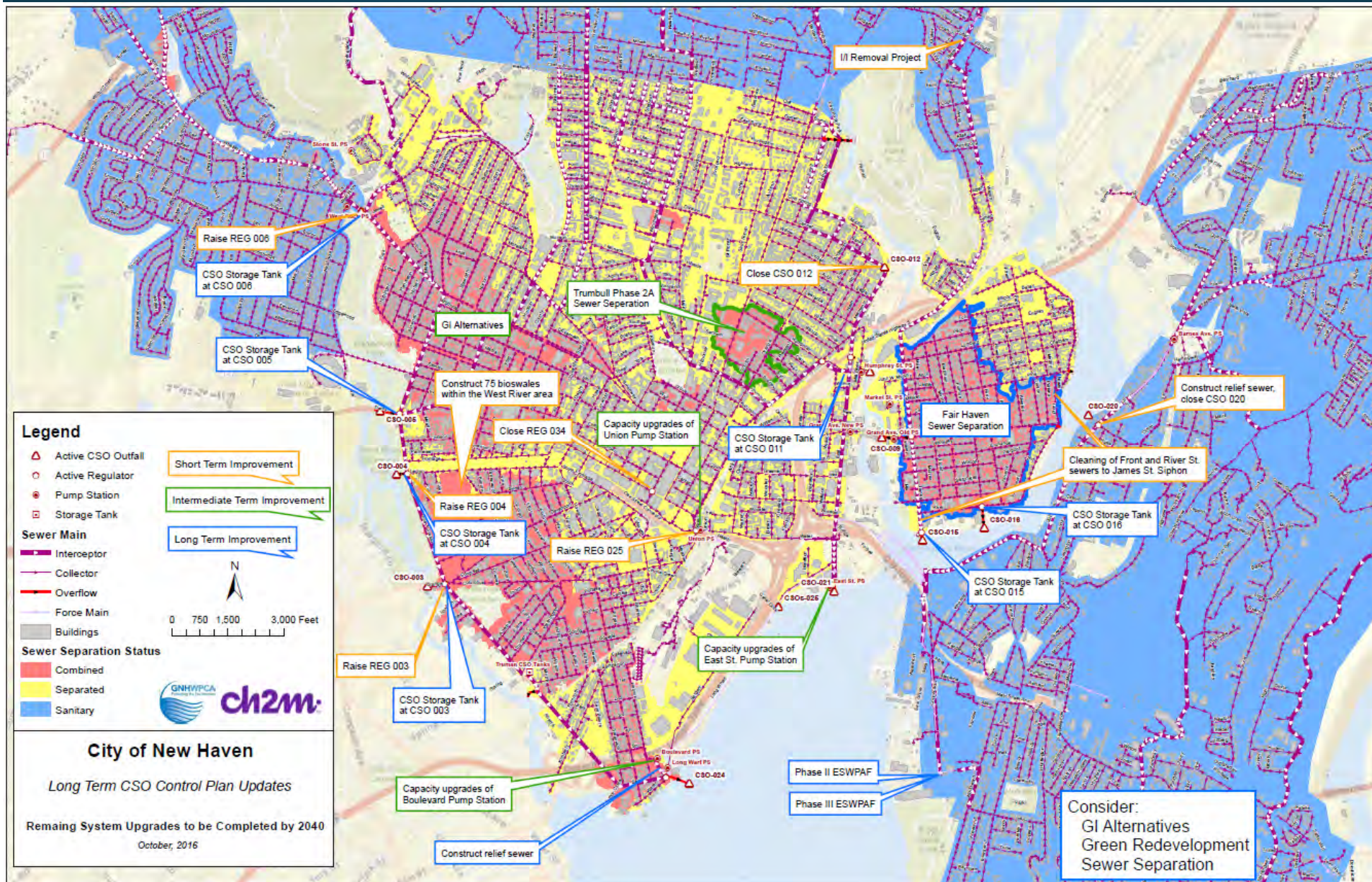
Long Term Control Plan

System Performance: Typical Year

- ITCP Total CSO Volume: **12.8 MG**
- LTCP Total CSO Volume: **0.0 MG**



CSO Long Term Control Plan Components



Evaluate Additional Methods to Minimize CSOs

- Evaluate Green Infrastructure alternatives within the Boulevard sewer tributary area – can they reduce CSOs?
- Do we continue sewer separation in CSO sewersheds?
- Do we need to site CSO storage tanks in the future?

Each decisions will be based on a combination of all solutions evaluated on a sub-sewershed basis



CSO Long Term Control

Project Cost Estimate Basis

- Project Costs are Expressed in 2016 Dollars and Include
 - Construction Cost Estimates
 - Contingency – 20 to 35%
 - Engineering and Administration Allowance - 20%

See Long-Term Section

[illegible]

We Stay Engaged With Our Community



Facility Tours



Hamden Middle School Tour



Peabody Museum
Public Outreach



Coats for Tots



Kayaking
West River

Please Stay Engaged with us!

- Additional Information and Periodic Updates:
www.gnhwpca.com
- GNHWPCA Board Meetings
- Community Activities
- Community Environmental Benefit Fund
- Contact Us – Engineering Department
Telephone: (203) 466-5280 ext 321
email to: Engineering@GNHWPCA.com
- 24 hour **Emergency** number: (203) 466-5260

