Improving the Fort Point Channel
A Challenging IDDE Project in Boston, MA

NEW ENGLAND WATER ENVIRONMENT ASSOCIATION
NEWEA
WORKING FOR WATER QUALITY

2019 NEWEA Annual Conference
Boston, MA – January 28, 2019

Fort Point Channel CSO 070 IDDE Project
By Kleinfelder in partnership with
Boston Water and Sewer Commission

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Purpose of the Project

Evaluate the constructed infrastructure within the combined sewer overflow (CSO) 070 tributary area and identify specific sources causing bacterial contamination in the Fort Point Channel (FPC).

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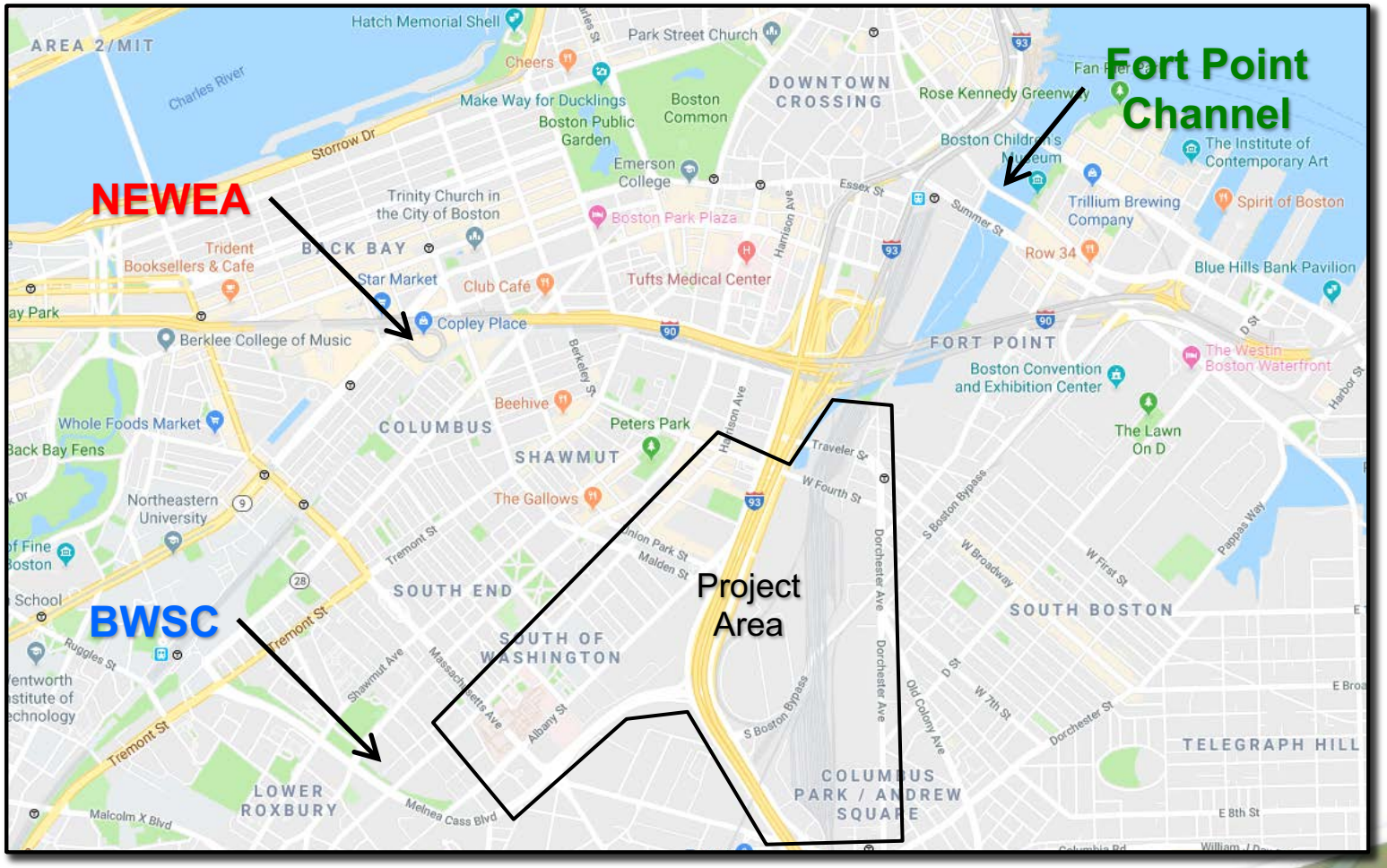
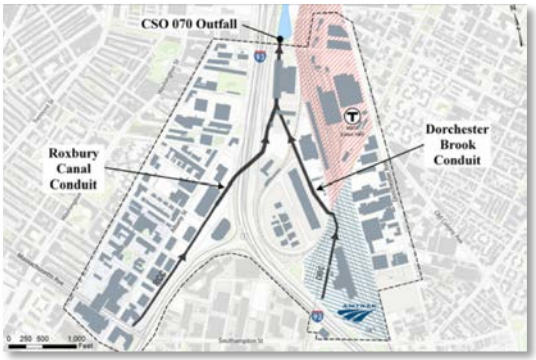
Fort Point Channel Project Location



Fort Point Channel Project Outline

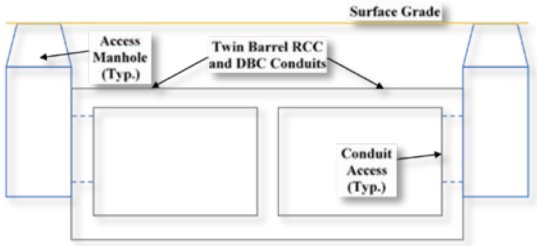
FPC Water Quality Background

CSO 070 System Configuration



Project Objectives & IDDE Approach

Field Investigation Activities



Findings & Recommendations

Project Summary & Visualizations

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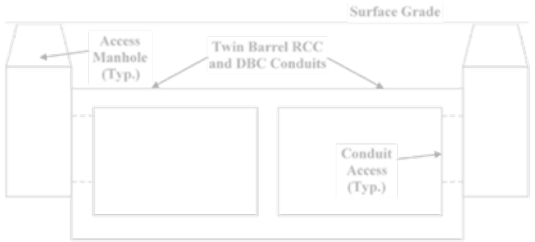

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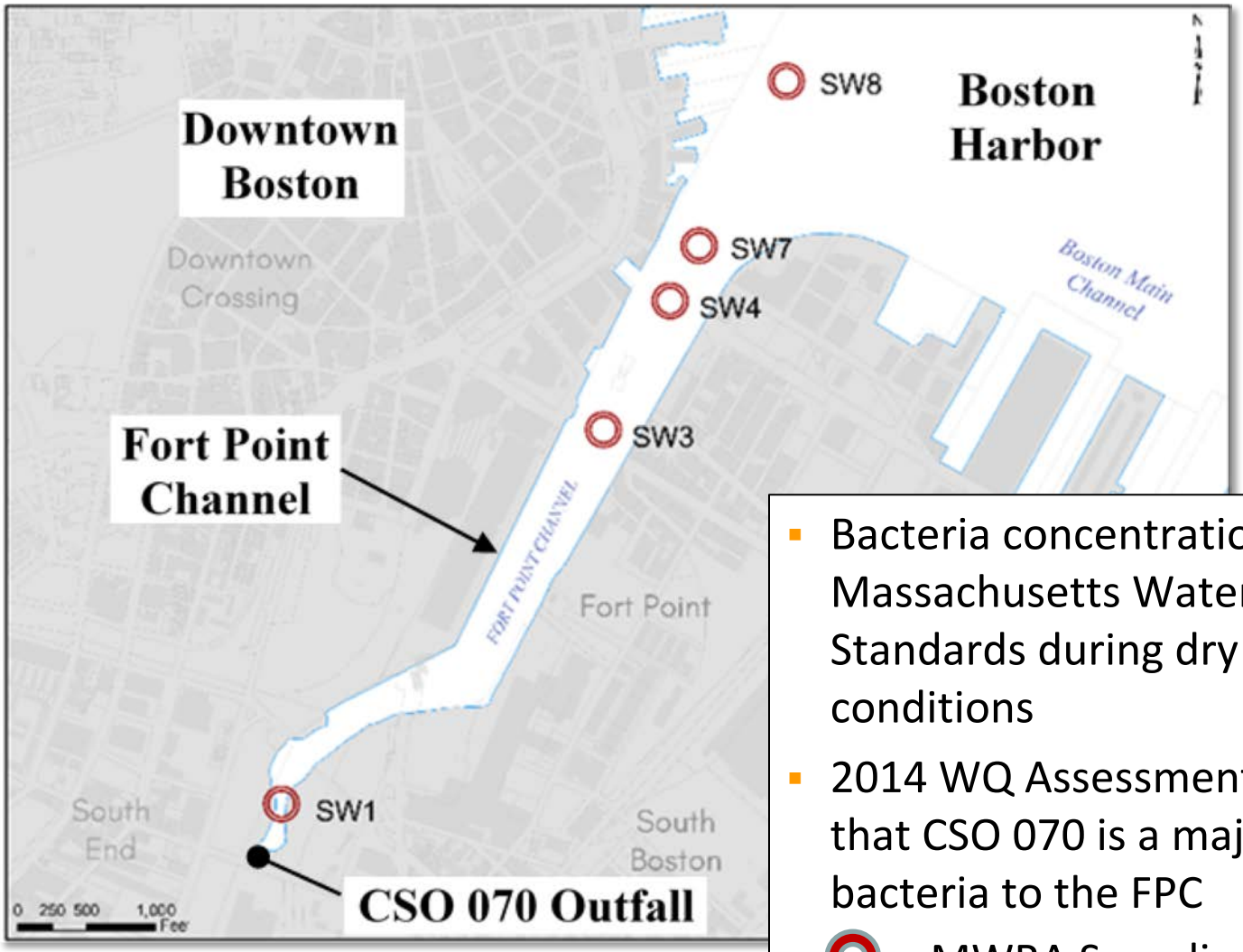
FPC Water Quality Background



- Bacteria concentration in FPC exceeds Massachusetts Water Quality (WQ) Standards during dry weather conditions
- 2014 WQ Assessment determined that CSO 070 is a major contributor of bacteria to the FPC
- = MWRA Sampling Stations

FPC Pathogen WQ Standard Exceedances During Dry and Wet Weather

- MWRA water quality data indicates improved water quality in the Fort Point Channel
- What is causing these dry weather exceedances???

MWRA Sample Location	Percent of DRY Weather Samples Exceeding 104 MPN/100mL		Percent of WET Weather Samples Exceeding 104 MPN/100mL	
	2003 - 2013	2014 -2016	2003 - 2013	2014 -2016
SW1	65%	36%	89%	59%
SW3	8%	1%	40%	25%
SW4/SW7	6%	0%	49%	15%
SW8	1%	1%	9%	6%

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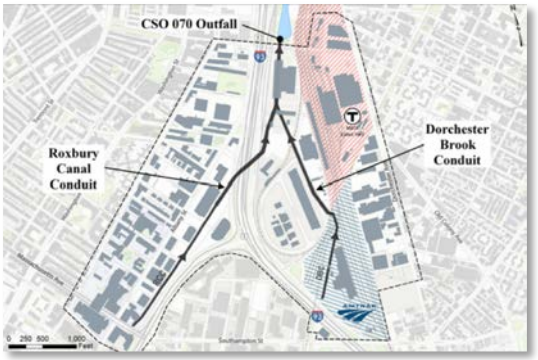

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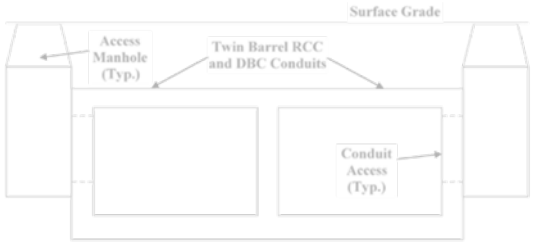

Findings & Recommendations

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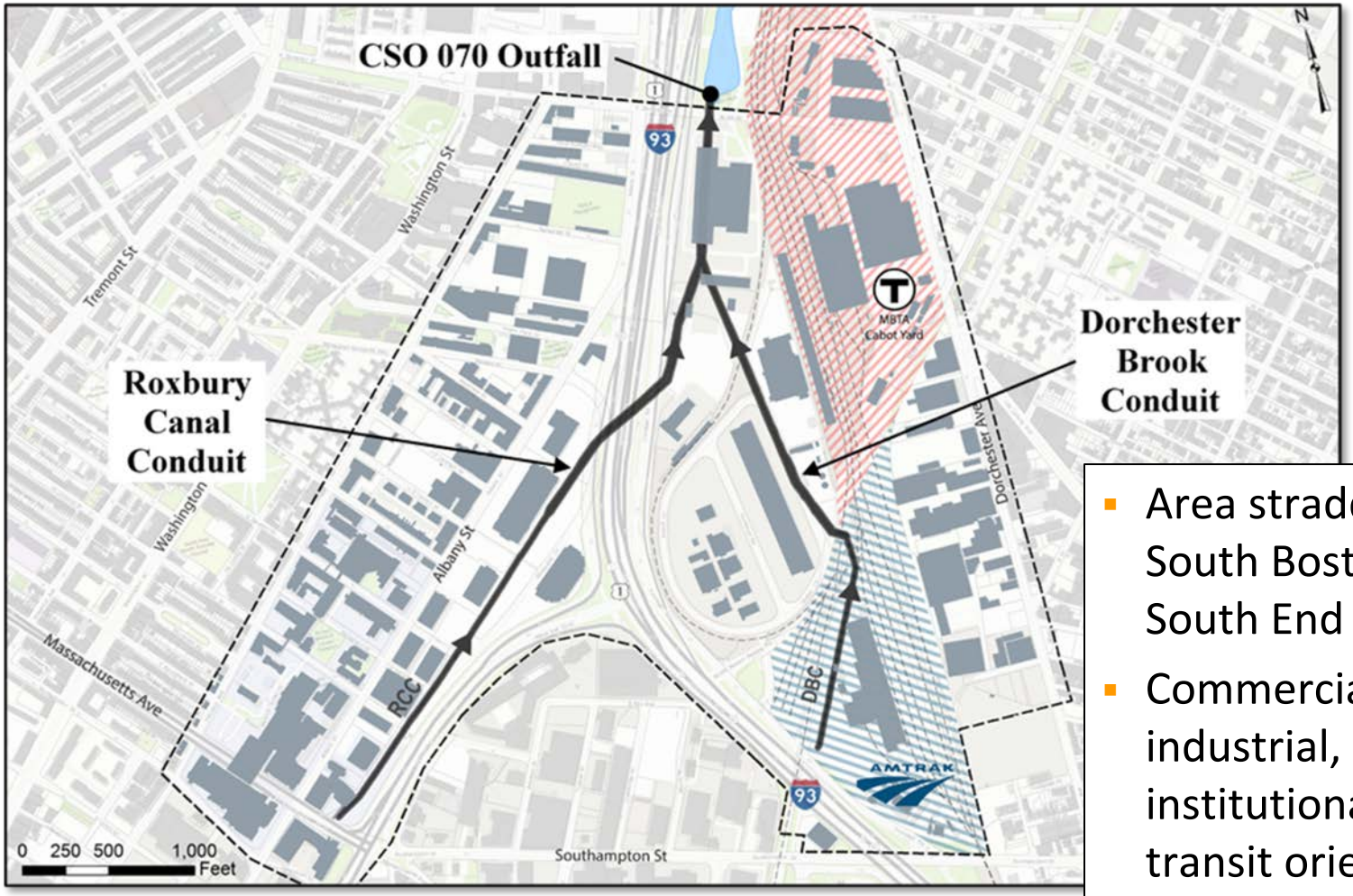
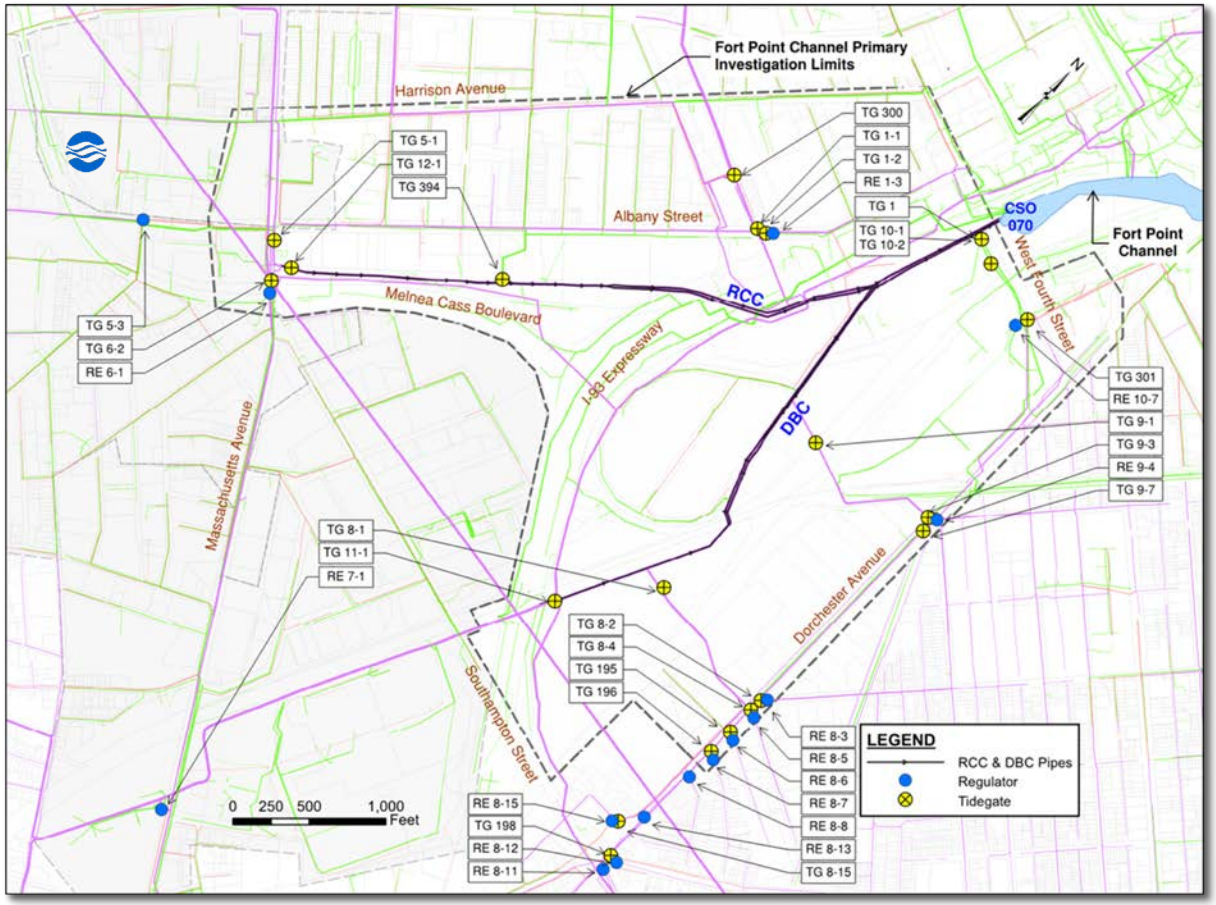
Project Area



- Area straddles South Boston and South End
- Commercial, industrial, institutional, and transit oriented urban project area

Project Area Infrastructure Overview

- Roxbury Canal and Dorchester Brook Conduits (RCC/DBC)
- Built in the 1960s
- Over 12,000 LF of RC conduits
- Primarily stormwater conveyance with CSO activity from local interceptors
  - 15 Regulators (RE)
  - 23 Tide Gates (TG)
- Tidally-influenced



LEGEND

combined sewer

storm drain

project area boundary

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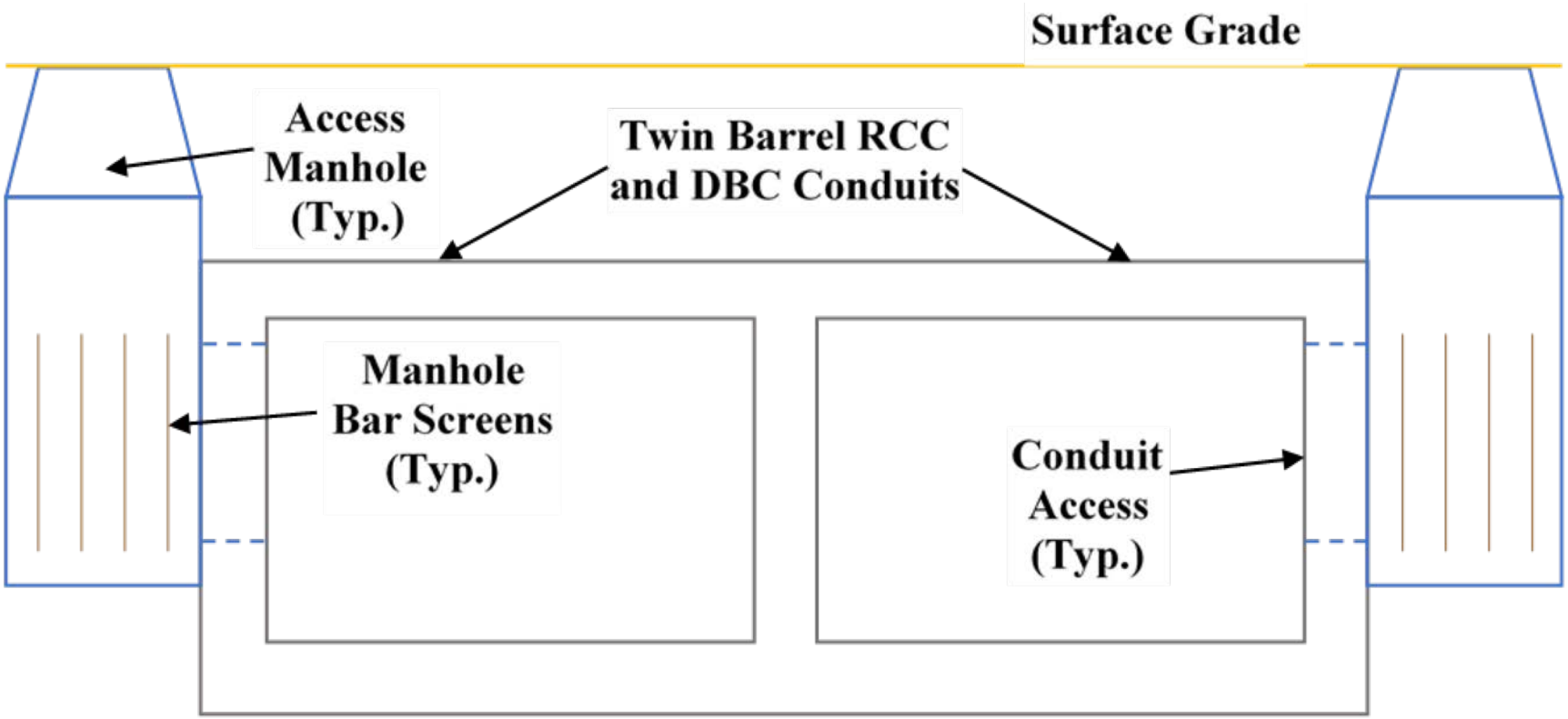
CSO 070 Conduit Configuration



- **Roxbury Canal** & **Dorchester Brook** Conduits (RCC/DBC)
- 2 miles of reinforced concrete culverts built in the 1960s
- Stormwater outfall with CSO activity

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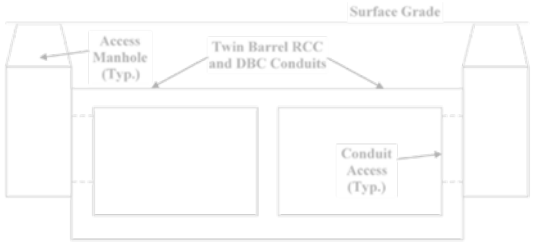

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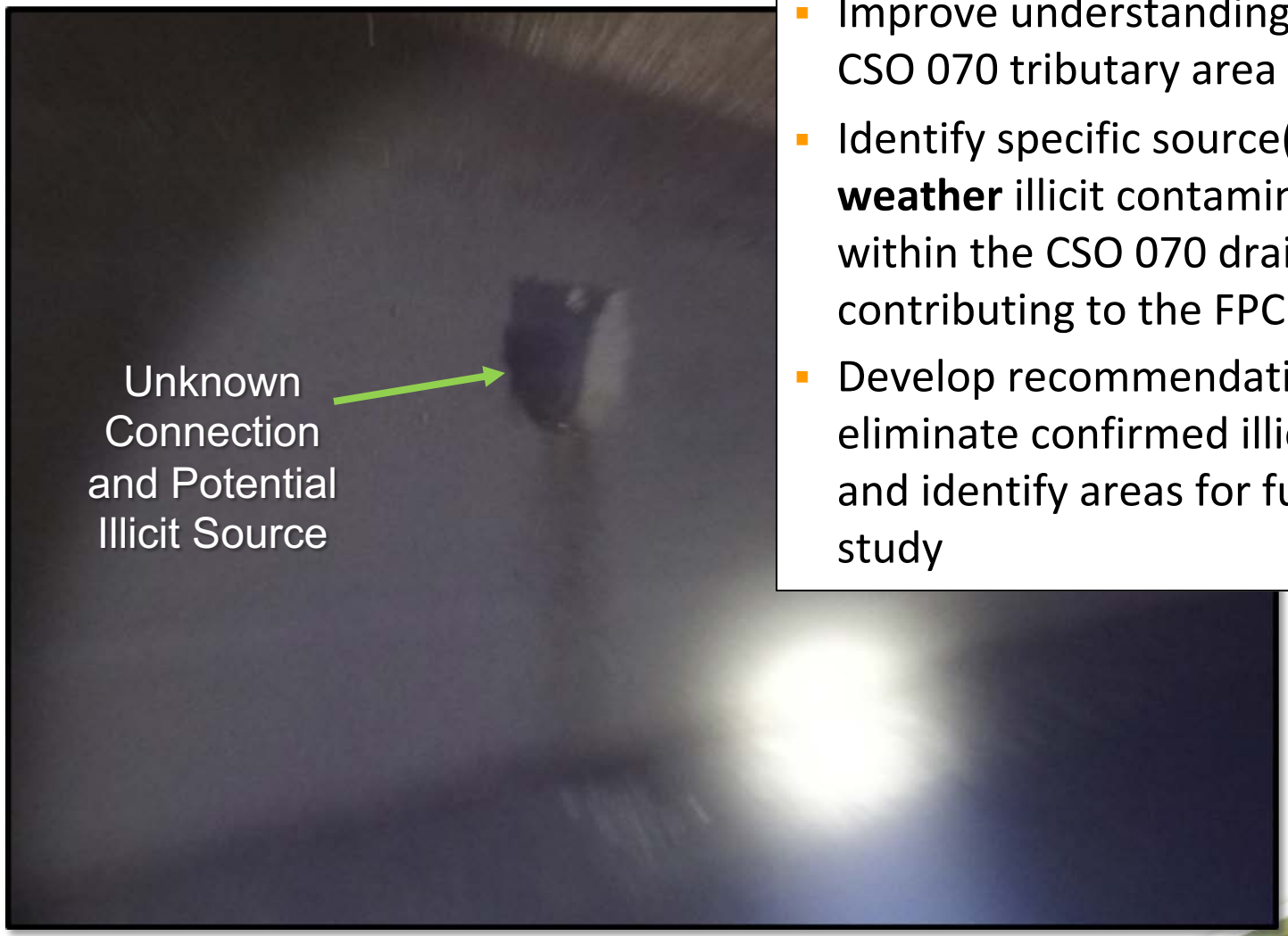
Project Objectives



- Improve understanding of the CSO 070 tributary area
- Identify specific source(s) of **dry weather** illicit contamination within the CSO 070 drainage contributing to the FPC WQ issues
- Develop recommendations to eliminate confirmed illicit sources and identify areas for further study

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Project IDDE Approach

Field inspections to verify system connectivity:

- Dyed Water Tracing
- 147 Manhole Inspections
- 191 building Inspections
- 126 water quality samples
- 12,360 feet pipeline CCTV inspections (includes RCC/DBC)

METHODS	IDDE COMPONENT
Top-Down	Building Inspections
	Dye Testing
Bottom-Up	Manhole Inspections
	Grab Sampling
Split Network	CCTV Inspection
	Dyed Water Tracing

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Conduit CCTV Inspection Methods

- Multi-Sensor Pontoon
- Manned Entry
- Piloted Drone
- Radio Controlled Boat

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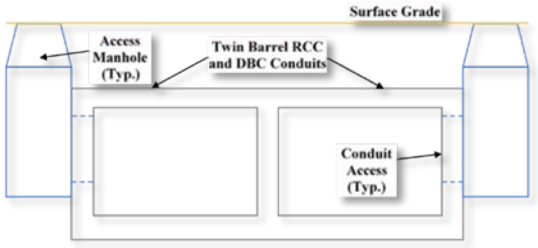

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Field Reconnaissance

- Locate manholes and access panels
- Identify access constraints at various sites
- GPS infrastructure and confirm alignment
- Coordinate with property owners and other city agencies

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Field Inspections

- Confined-space entry inspection of regulators and RCC/DBC conduits
- Pole-camera inspection of manholes to verify connectivity

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Field Assessment

- Water quality grab sampling of dry weather flow from area drainage
- Sampled for the following criteria:
  - pH
  - Ammonia
  - Surfactants
  - Chlorine
  - Temperature
  - Conductivity
  - Salinity
  - Dissolved Oxygen
  - Enterococcus

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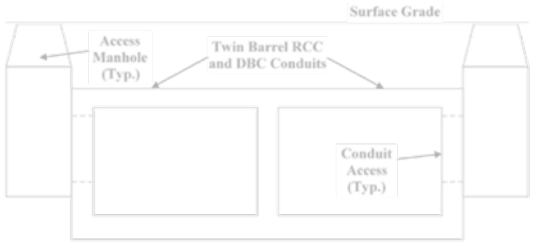

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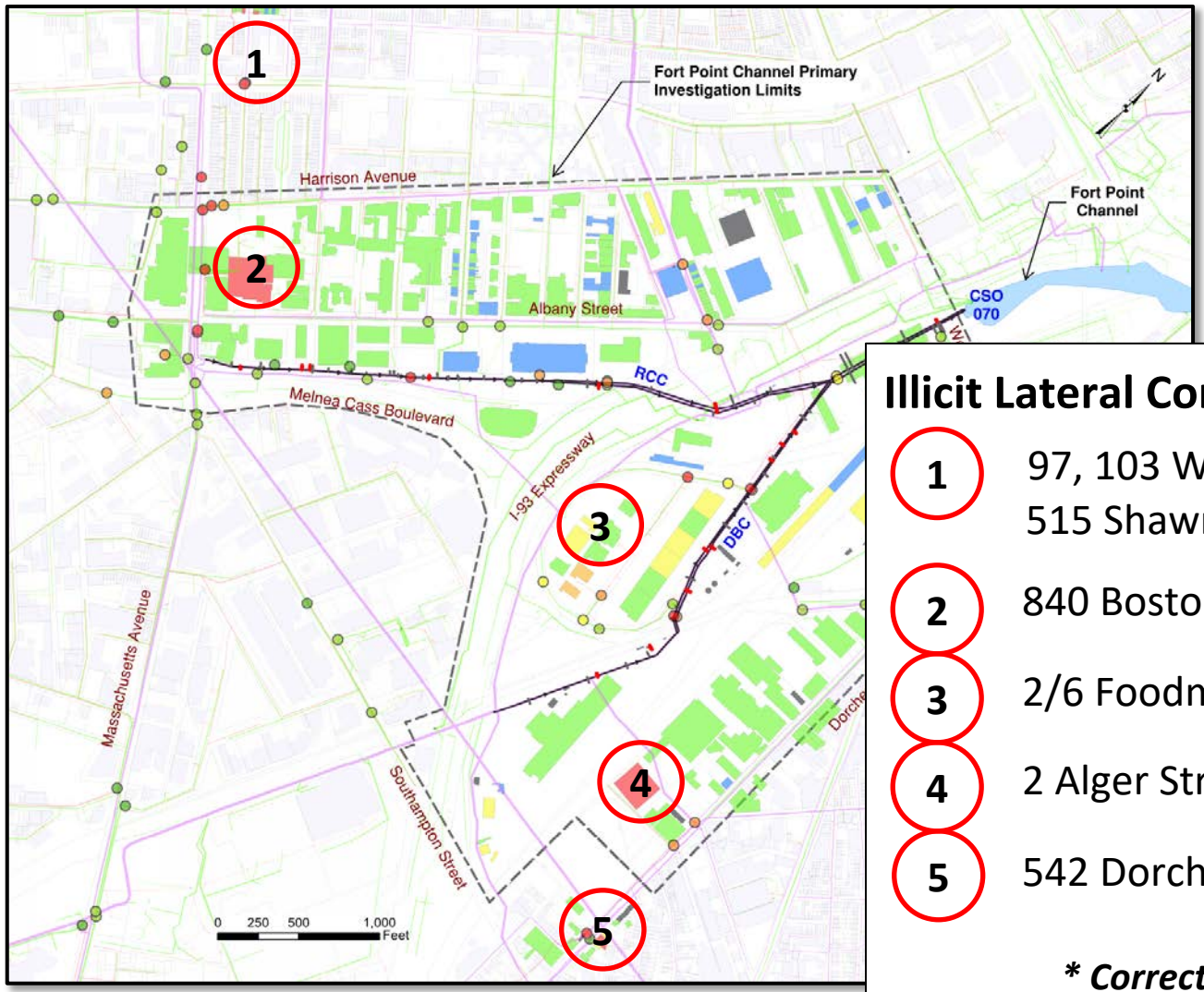
Findings – Building Inspections



Illicit Lateral Connections Identified

1. 97, 103 West Springfield St & 515 Shawmut Avenue*
2. 840 Boston Medical Place
3. 2/6 Foodmart Rd **(corrected)****
4. 2 Alger Street **(corrected)****
5. 542 Dorchester Avenue

**** Correction pending Spring 2019***

***** 10,774 gpd removed from FPC***

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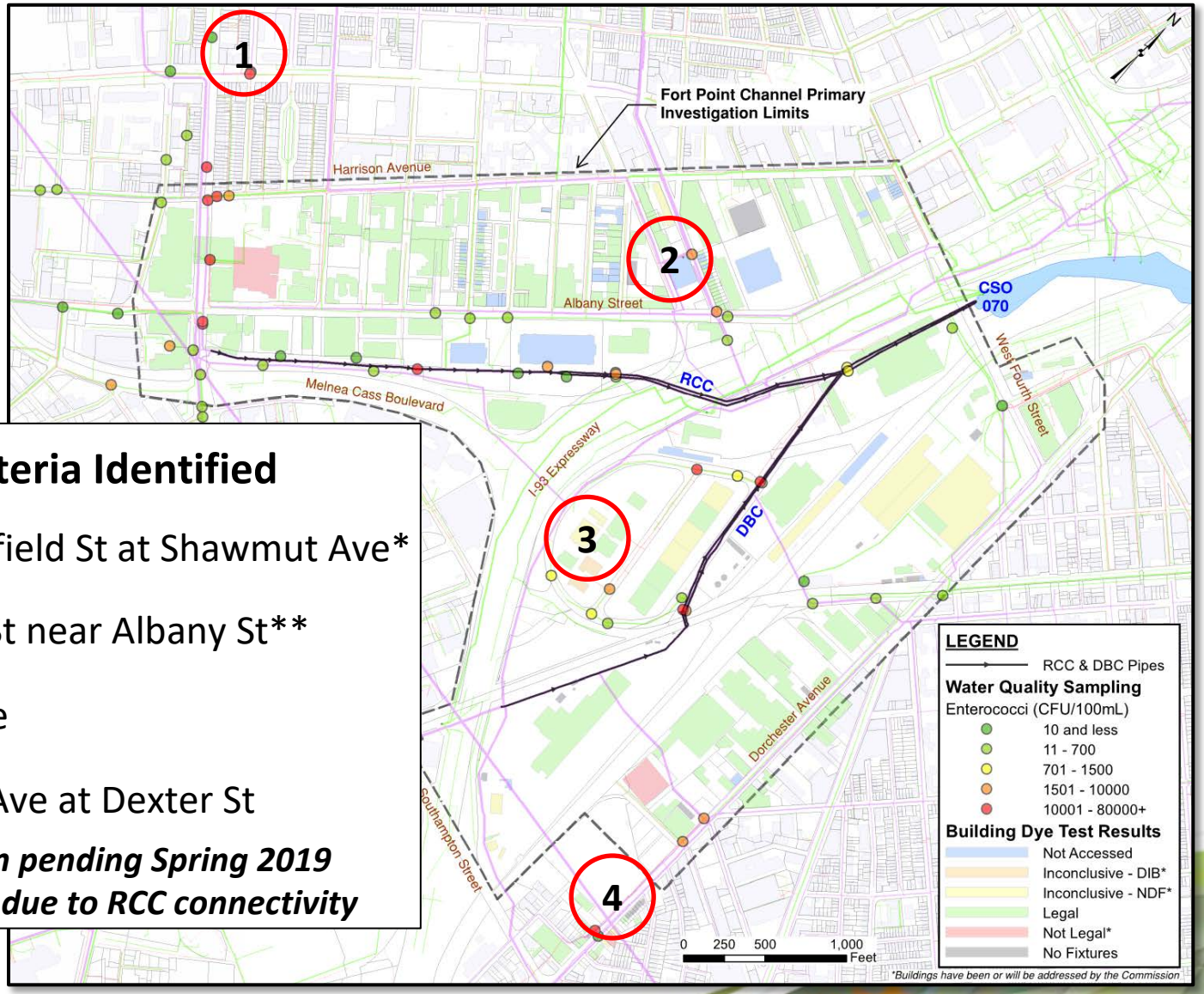
Findings – Water Quality Sampling



Areas of High Bacteria Identified

1. West Springfield St at Shawmut Ave*
2. Union Park St near Albany St**
3. Widett Circle
4. Dorchester Ave at Dexter St

**** Correction pending Spring 2019***

***** Possibly due to RCC connectivity***

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Findings – Dyed Water Tracing

- **West Springfield Street** - Verified direct connectivity of sanitary sewer to RCC
- **West Fourth Street** – Confirmed connectivity to the RE 10-7 regulator
- **2/6 Foodmart Road** – Indirect illicit connection was found using dyed water tracing

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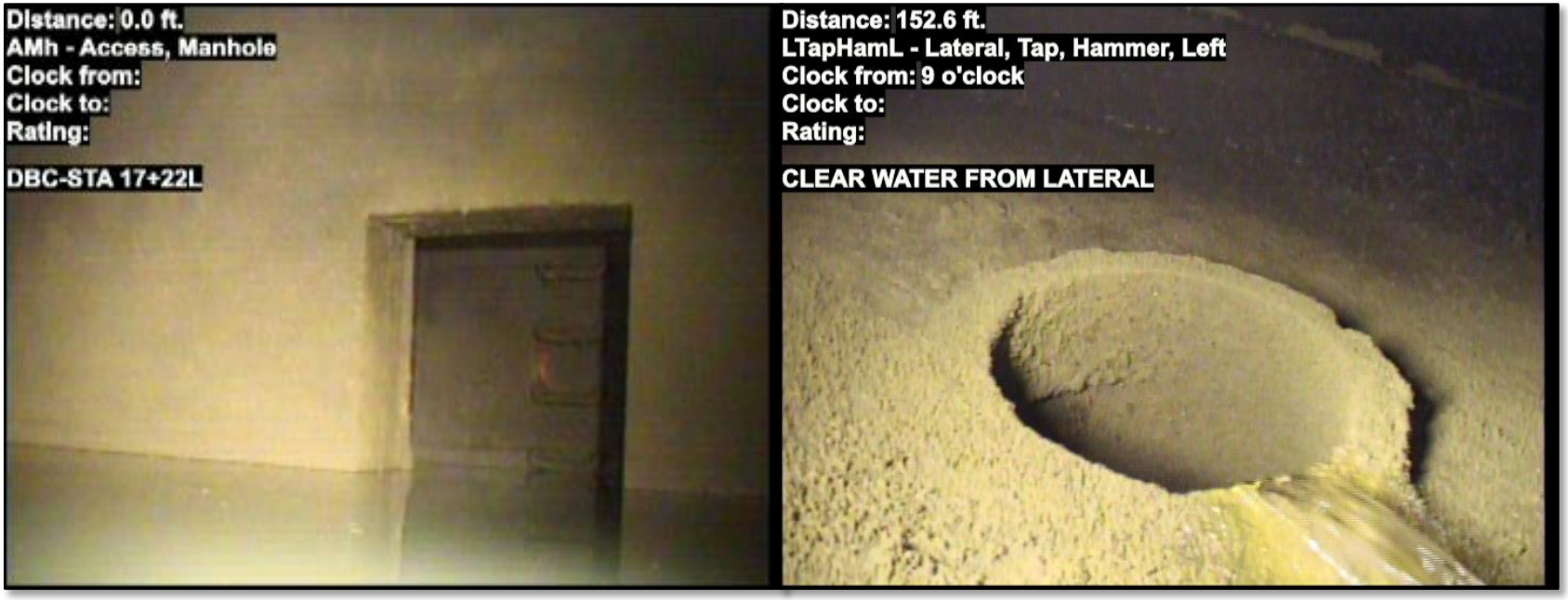
Findings – RCC/DBC Pipe Inspections



- 12,360 feet of conduits inspected
- RCC/DBC are in good condition
- 82 RCC/DBC connections identified
- 60 connections to be added to the BWSC GIS
- 6 abandoned connections
- 15 with unknown sources

Although based on additional field investigations, these 15 are not suspected to be contributors to FPC WQ issues.

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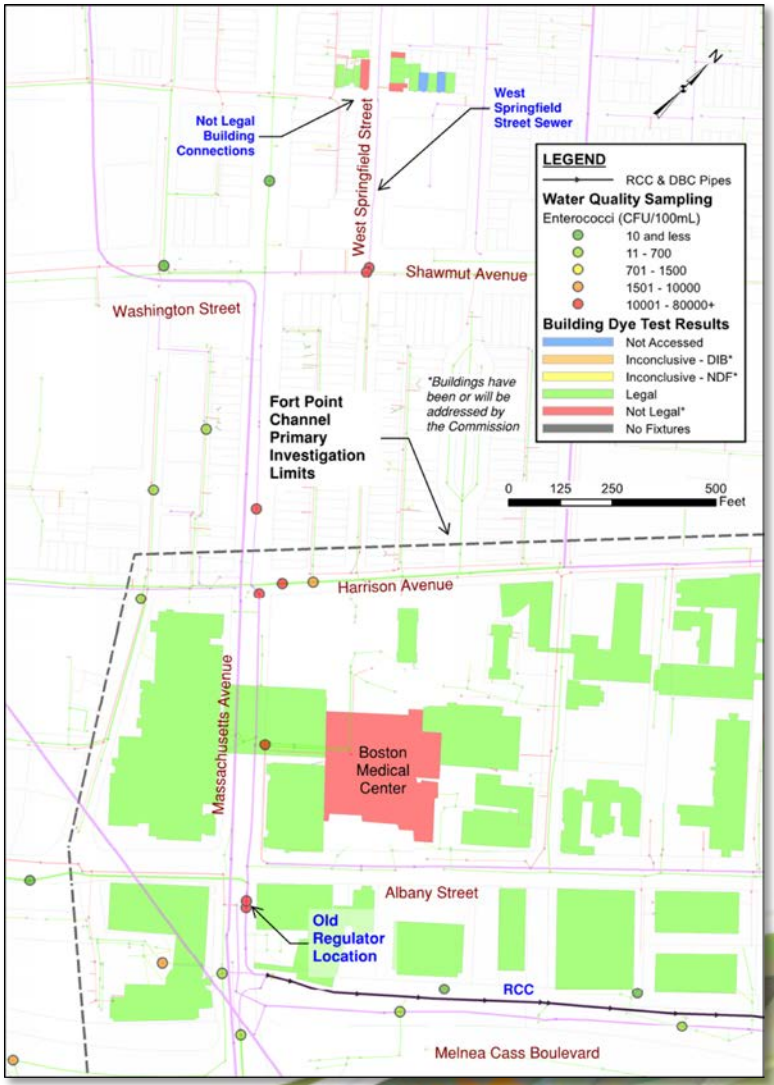
Short-Term Recommendations to Improve Water Quality

1. Investigate connectivity to eliminate illicit discharges from West Springfield Street and Shawmut Avenue
2. Conduct additional inspections at 840 Boston Medical Center Place to identify source of NOT LEGAL dye test result
3. Eliminate illicit connection from 542 Dorchester Avenue



Long-Term Recommendations to Improve Water Quality

1. Validate the GIS mapping issues identified through this study and update the GIS as appropriate
2. Conduct CCTV inspection of the 15-inch sewer within Boston Public Works lot
3. Inspect sewers along Widett Circle and Foodmart Road, regularly clean the catch basins, and install tide gates to prevent tidal water from backing up into the local drainage
4. Once the South Boston Sewer Separation Project is complete, conduct post-construction sampling to reassess water quality in the DBC and FPC

Pipe Connection Sizes (Diamter in Inches)	Count of Undocumented Pipes	
	RCC	DBC
0 to less than 12	1	0
12 to less than 24	5	7
24 to less than 48	1	1
48 and greater	0	0
TOTAL	7	8

5. If water quality issues persist, consider the cost-benefits of the following:
   - Removing sediment from the RCC and DBC
   - Separation of the combined sewers upstream of the Dorchester Brook Sewer

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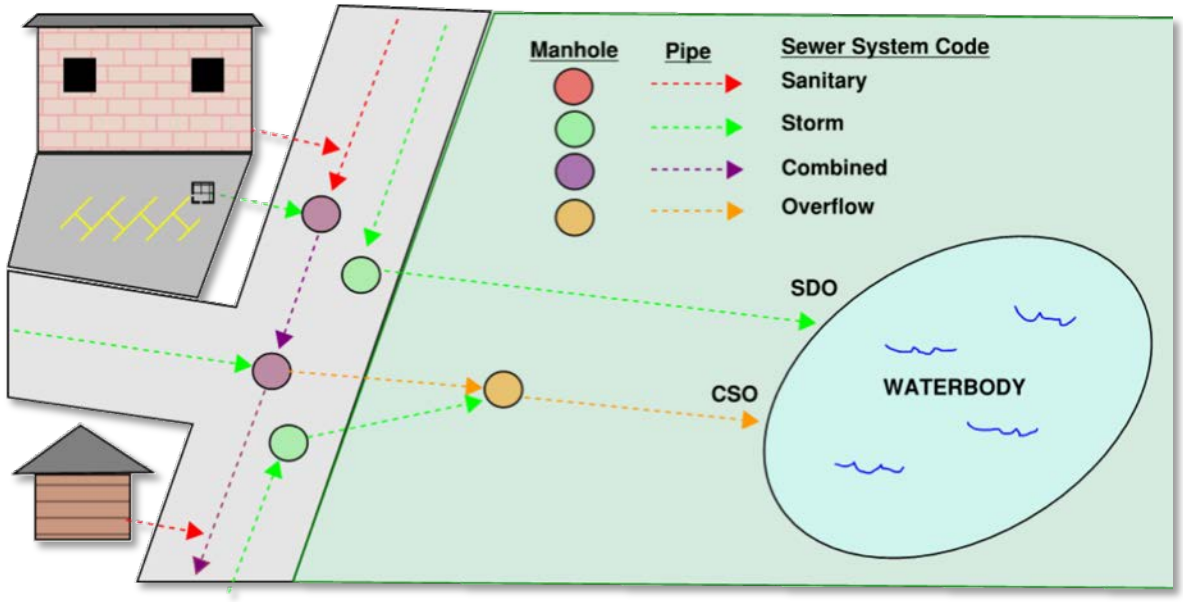
Recommendations Unrelated to Water Quality Improvements

- Replace RCC/DBC access panels
- Raise buried manholes
- Inspect RCC/DBC bar screens
- Coordinate with Boston Flower Exchange development



- Consider new GIS color for combined sewer overflow pipe downstream of regulators

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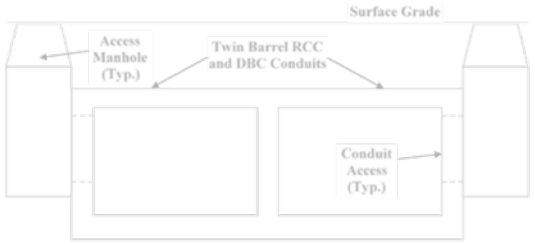

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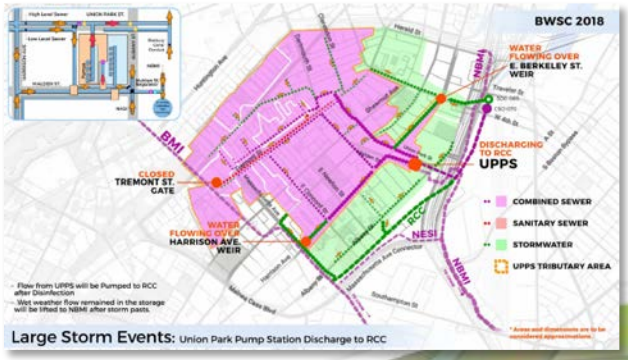

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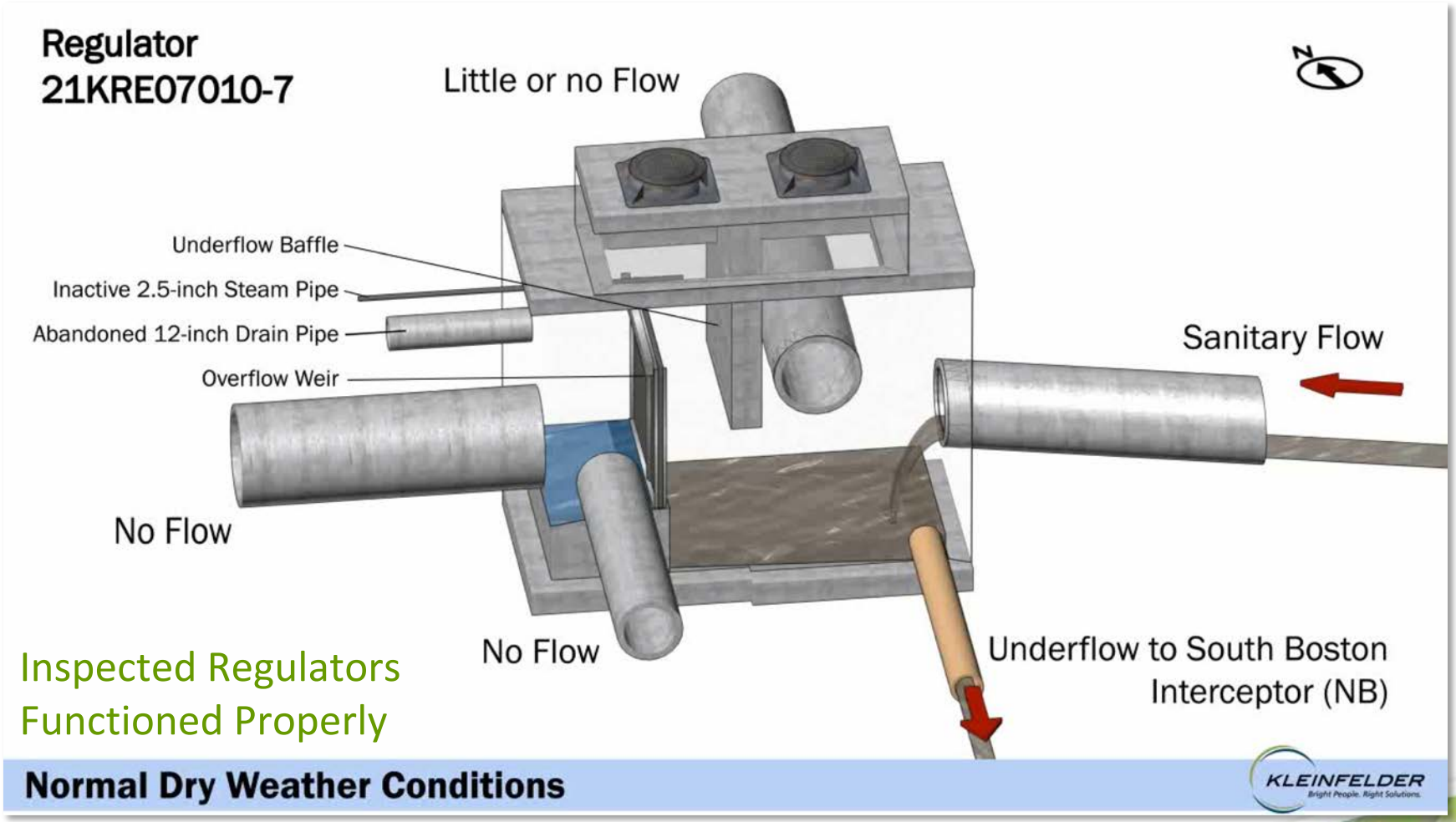
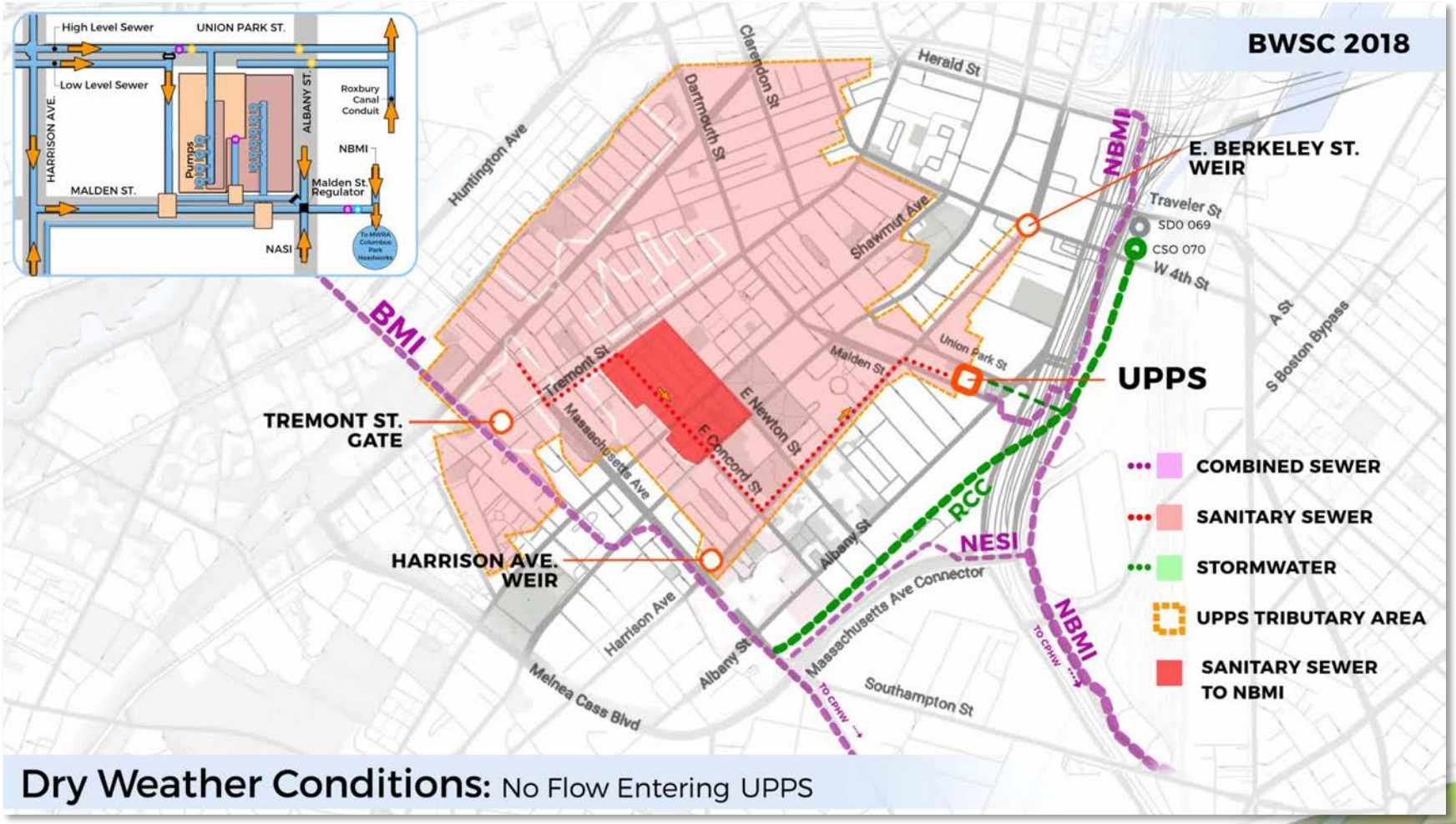
Regulator 10-7 Animation



Union Park PS Animation



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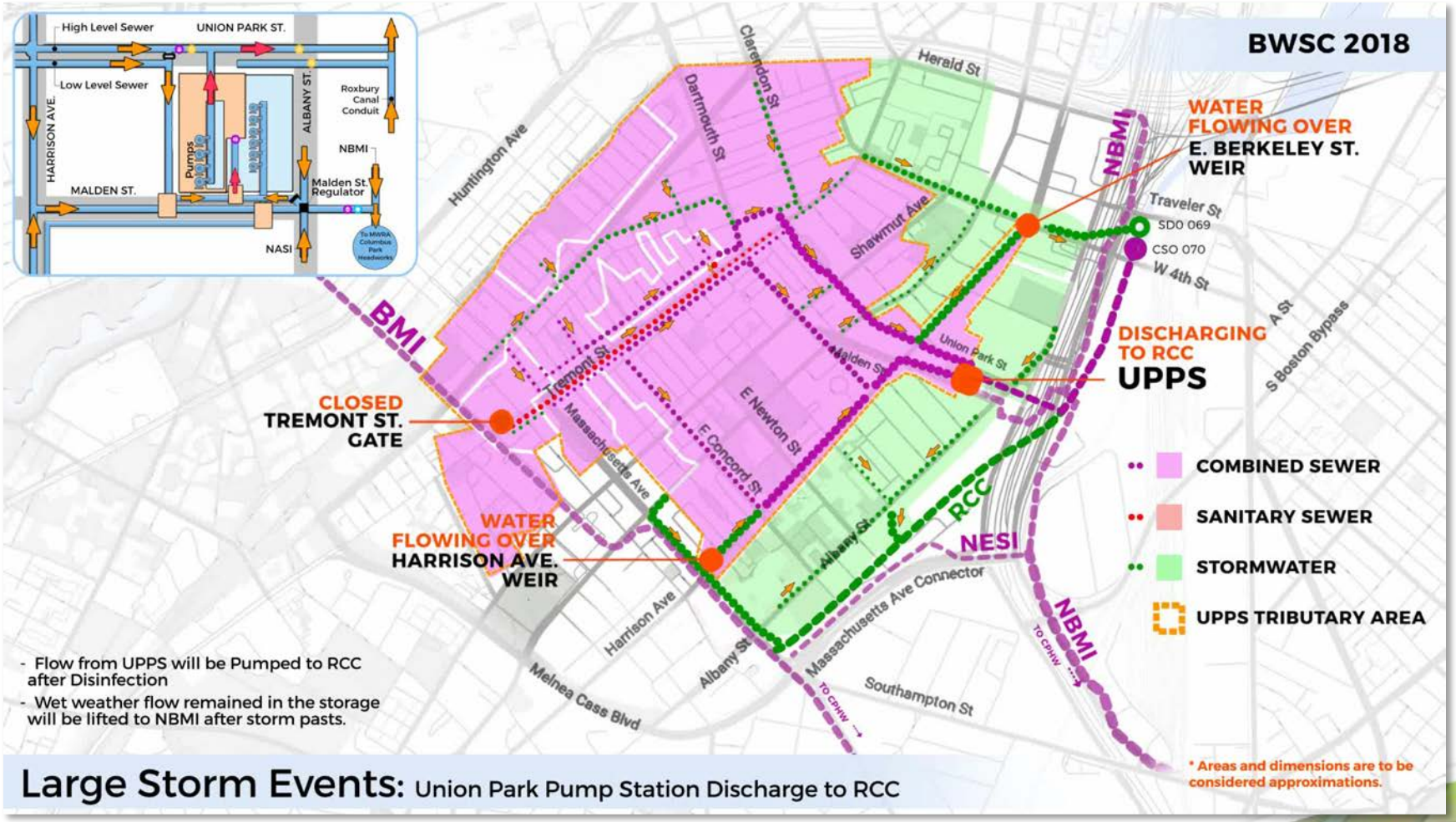

Project Summary

- MWRA WQ sample data indicates improved WQ within the FPC since 2014
- RCC and DBC are in good condition, though tidally-influenced and containing sediment/debris deposits
- Illicit sources have been identified and 10,774 gpd of illicit flow has so far been removed through correction efforts
- Understanding of the CSO 070 drainage area is greatly improved and recommendations are underway

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Thank You!

Acknowledgements

- **Boston Water and Sewer Commission:**
  - Charlie Jewell, Amy Schofield, Paul Keohan, Demetrios Vidalis
- **Kleinfelder Team:**
  - David T. Peterson, Rita Fordiani, Dingfang Liu, Daniel Scott
  - PEER Consultants, National Water Main, ADS Environmental, Stacey DePasquale, Inc.

QUESTIONS???

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