

# Wastewater Advisory Committee

Boston Water and Sewer Commission  
Charlie Jewell

December 2, 2016

# Agenda

- TMDL
- Consent Decree
- Stormwater Model
- BMP/GI Implementation Plan
- Climate Change

# Boston Stormwater Management

- Total Maximum Daily Load (2007)
  - Phosphorus: Upper & Middle/Lower Charles River
- Consent Decree (2012)
  - Update Stormwater Model
  - Create BMP Implementation Plan
  - Implement 3 Pilot Green Infrastructure
    - Central Square, Audubon Circle, City Hall Plaza





# Stormwater Model

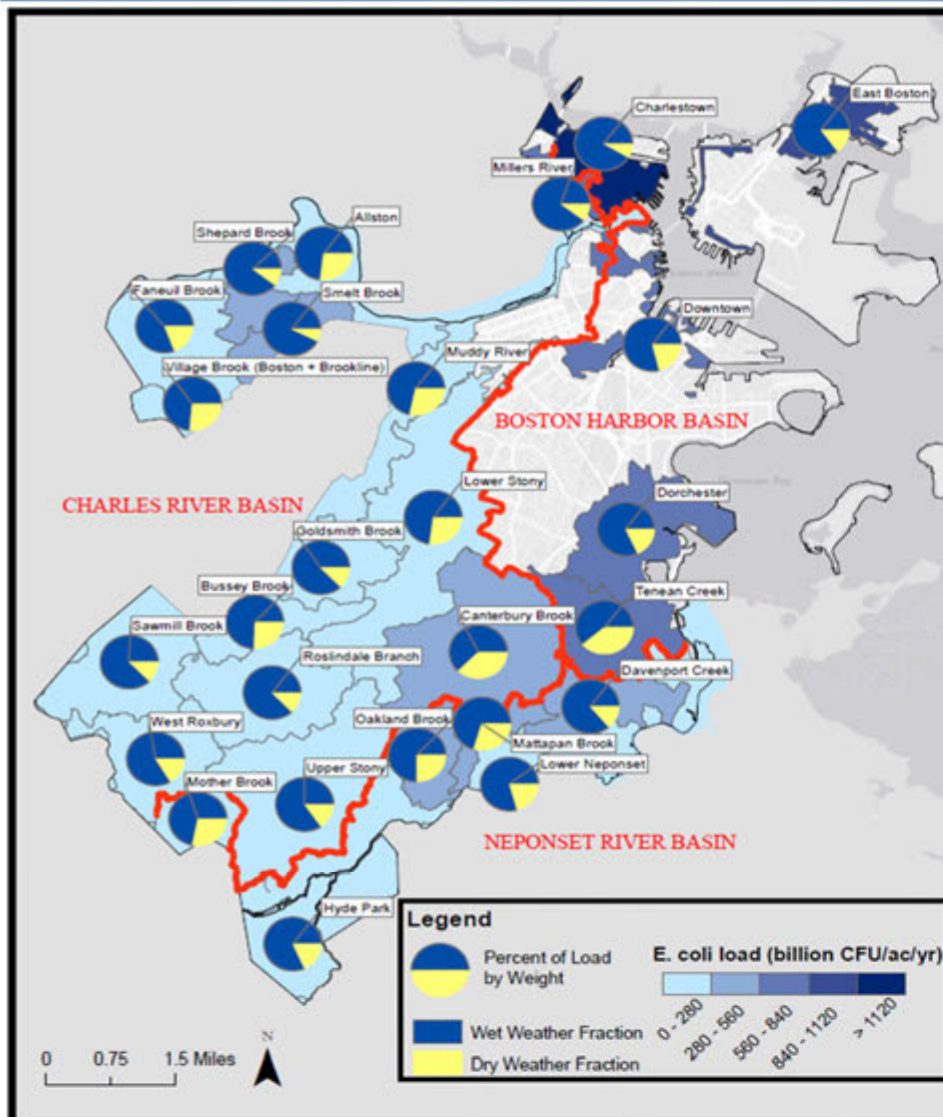
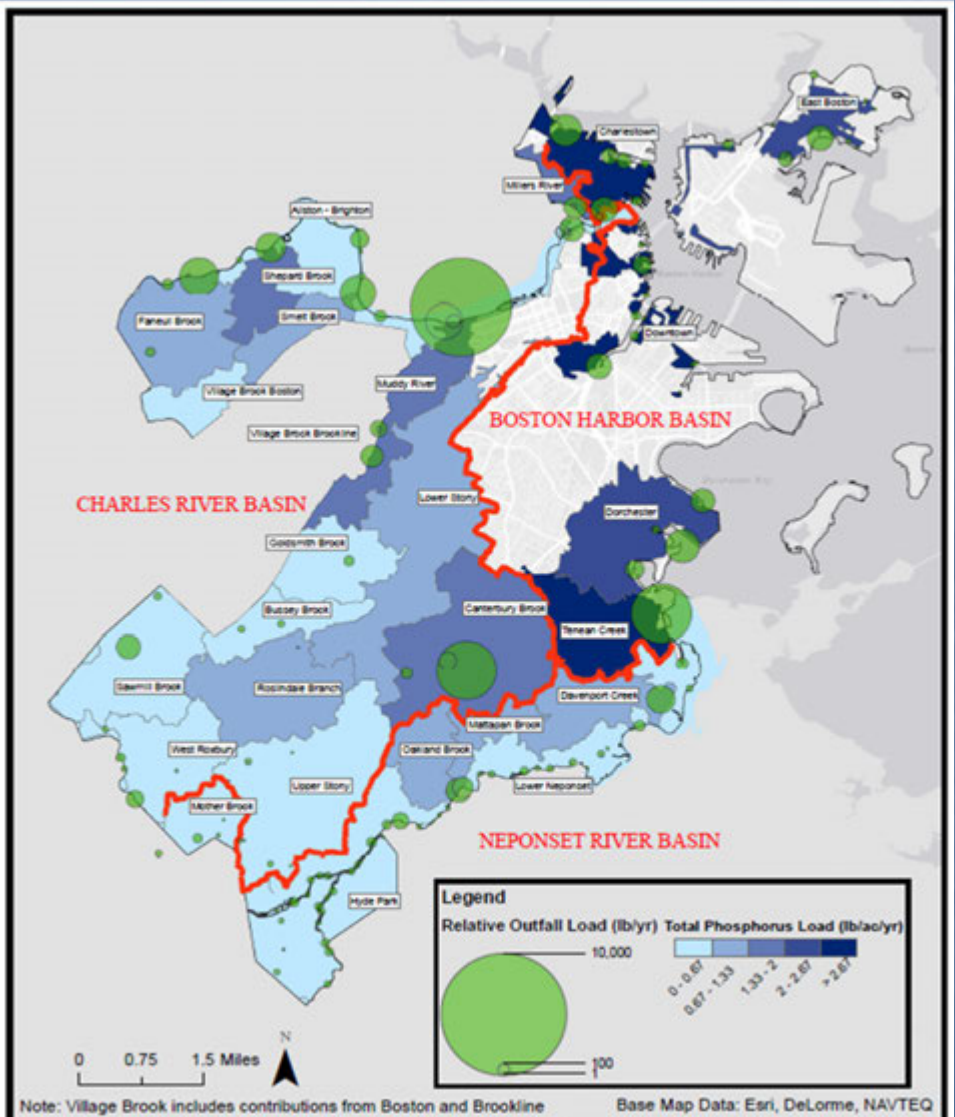


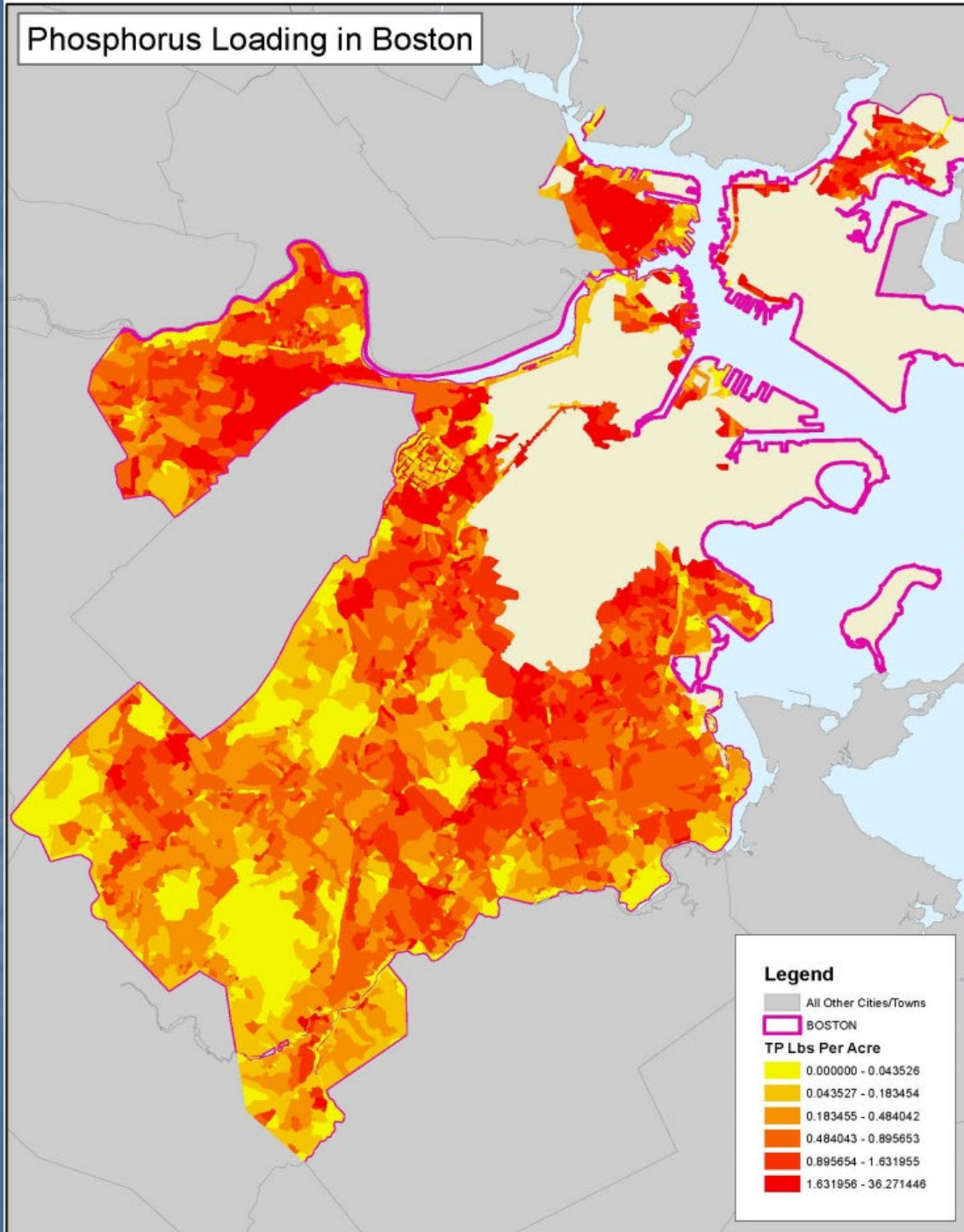
Figure G-11: E. coli Dry and Wet Weather Loads



Note: Village Brook includes contributions from Boston and Brookline Base Map Data: Esri, DeLorme, NAVTEQ

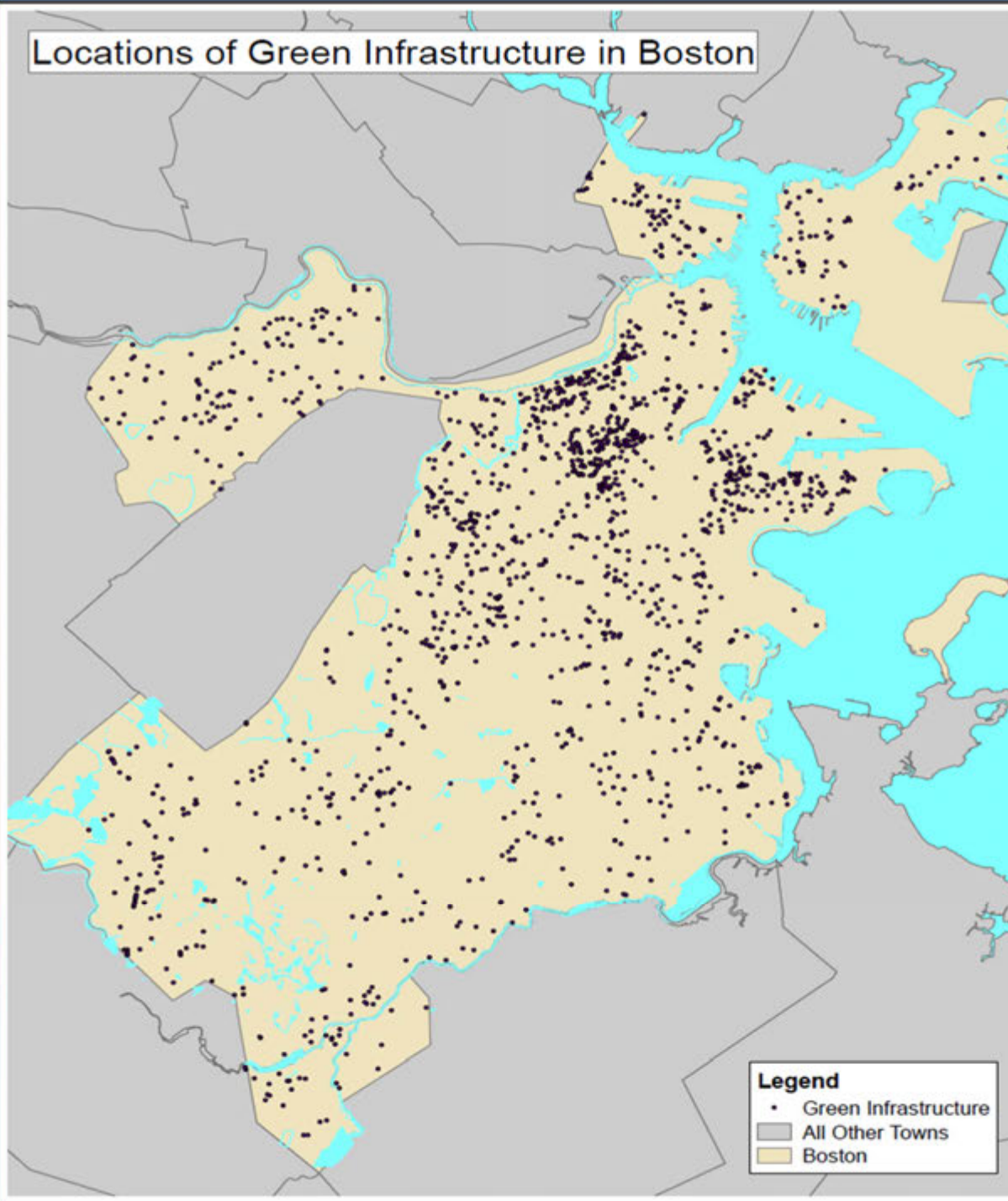
Figure 1-4: Relative Total Phosphorus Outfall Loads

# Phosphorus Loading in Boston





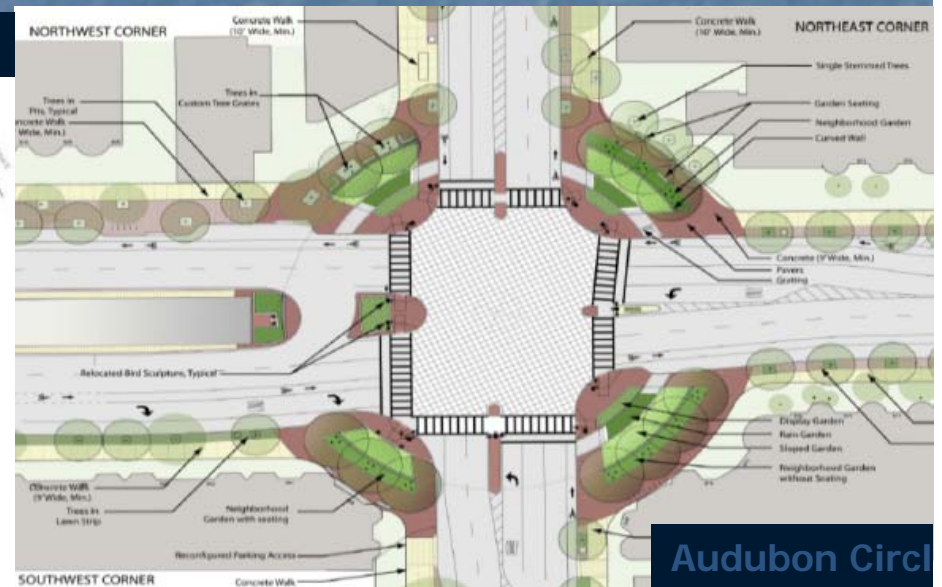
# Locations of Green Infrastructure in Boston



# BWSC GI/LID Projects

- Central Square – East Boston
- Audubon Circle
- City Hall Plaza
- 5 Boston Public Schools
- Daisy Field Conceptual Exercise
- Three Tributary Areas
  - Canterbury Brook, Lower Stony Brook, North Beacon

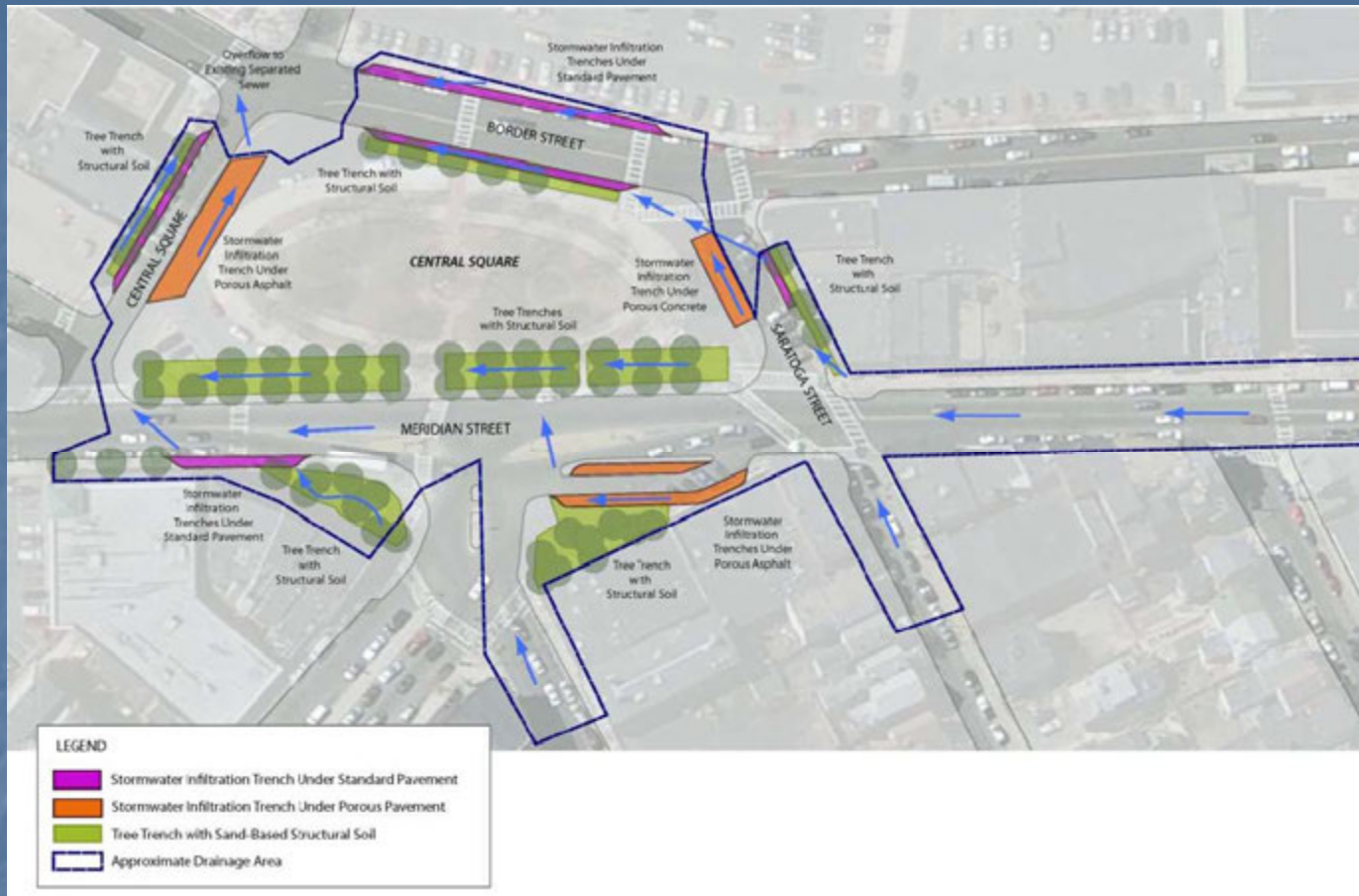
## BPS Kennedy Health Careers Academy GI/LID Improvements



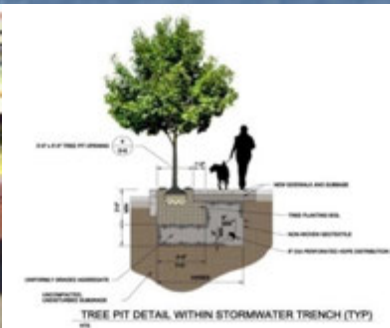
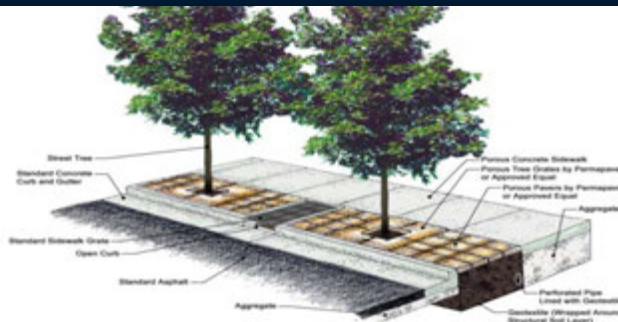
Audubon Circle



# Central Square



## Tree trenches with porous pavers



Porous asphalt for parking and porous concrete for sidewalks over

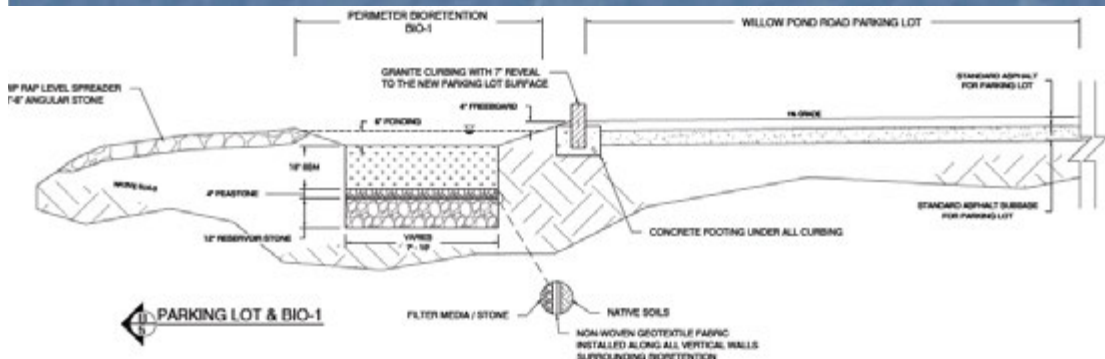
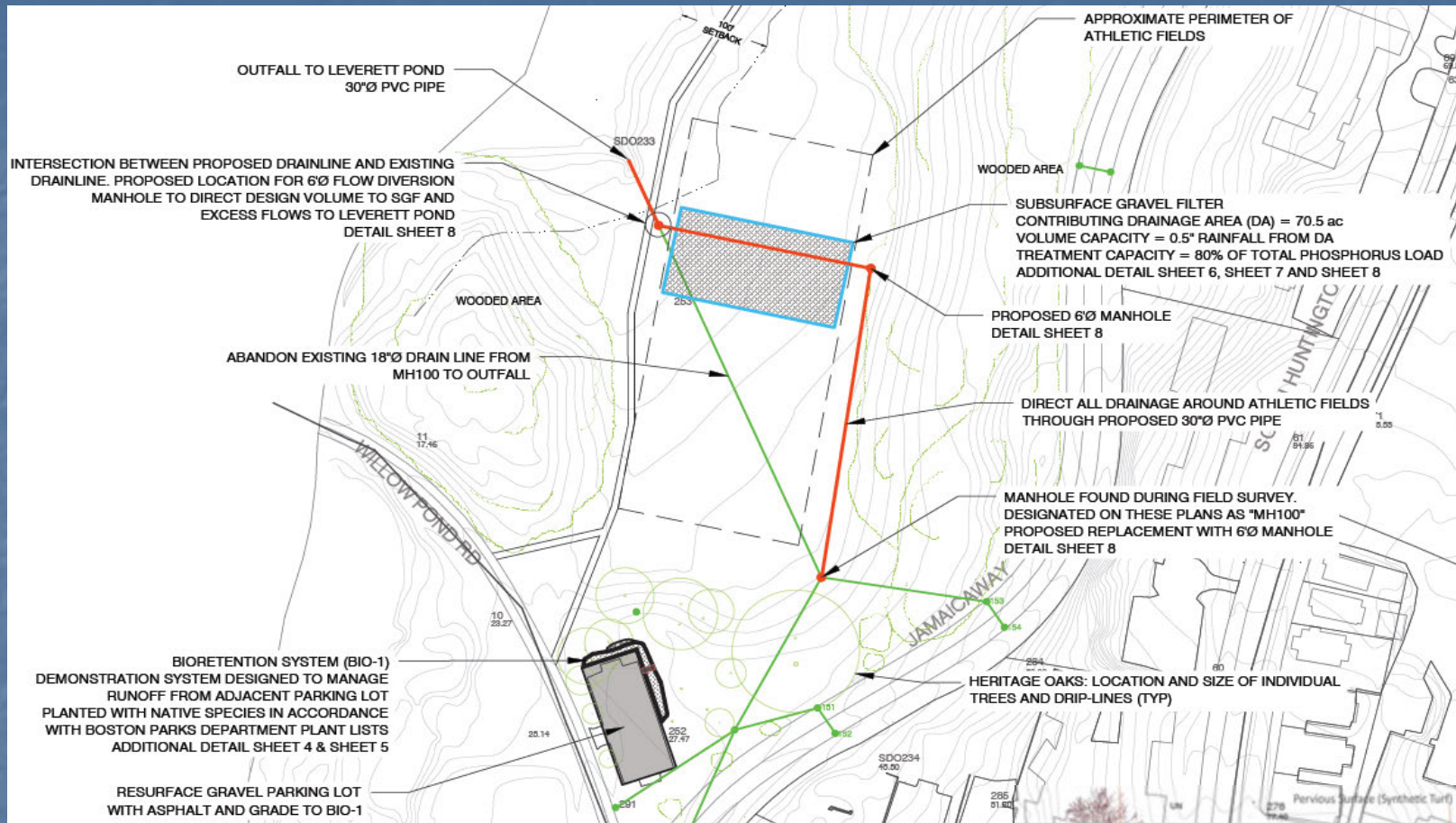


# 5 Boston Public Schools

- Washington Irving Middle School
- Rafael Hernandez K-8 School
- Ellis Elementary School
- Jackson/Horace Mann K-8 School
- Kennedy Health Careers Academy

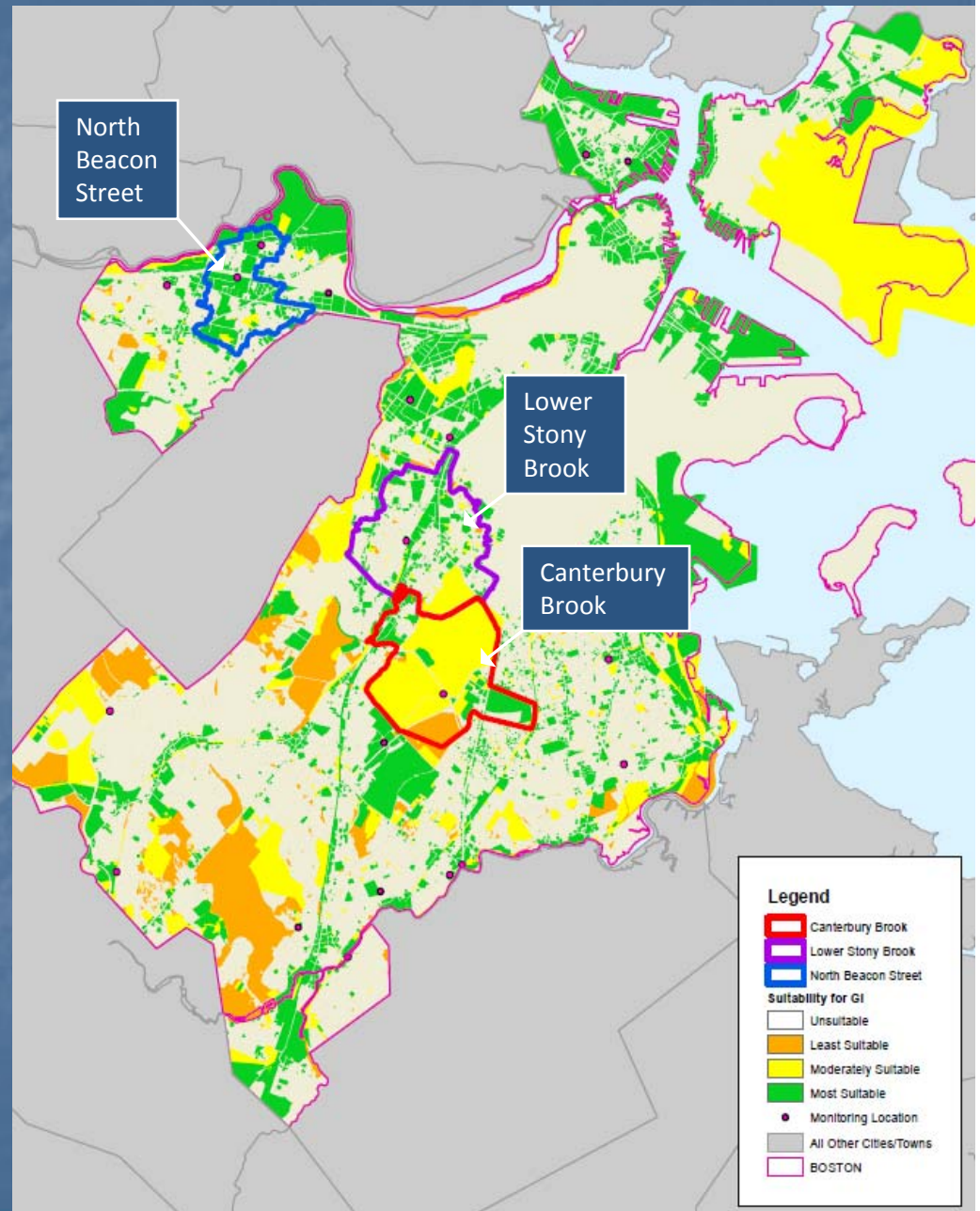
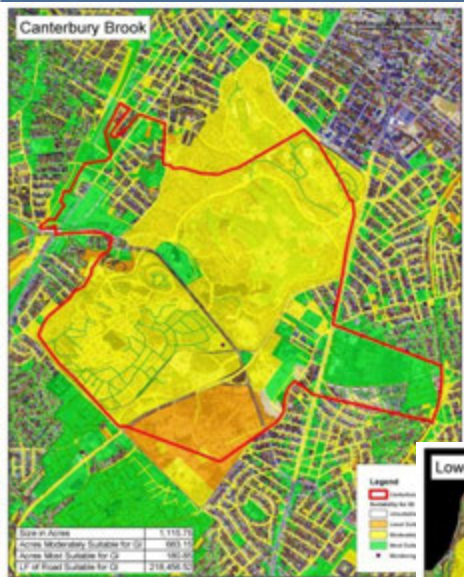


# Daisy Field





# Three Tributary Areas



# GI/LID Obstacles in Boston

Commission does not own land for GI/LID

- Need to work with other agencies and entities
  - Department of Public Works
  - Department of Transportation
  - Boston Parks and Recreation Department
  - Boston Public Schools
  - Boston Planning and Development Agency
- Need to work with private property owners



# Challenge: extreme precipitation

## Forecasted 10-year, 24-hour Design Storm

Scenario	Total Storm Volume (inches)			Peak Hourly Intensity (inches per hour)		
	2035	2060	2100	2035	2060	2100
Medium (B2)	5.55	5.76	6.08	1.76	1.83	1.93
Precautionary (A1FI)	5.60	6.03	6.65	1.78	1.91	2.11

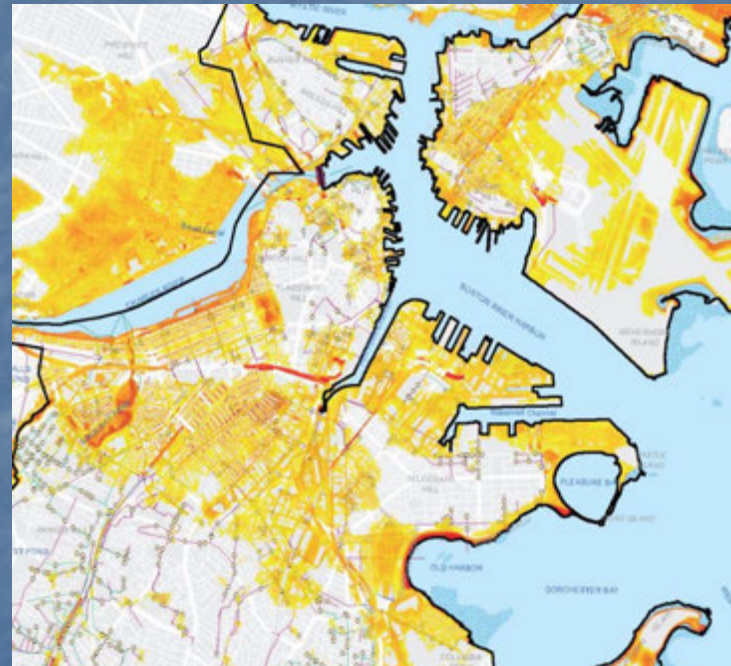
BWSC's current design standard is 4.8 inches

# Challenge: Risks Of Flooding With Sea Level Rise And Storm Surge – Year 2060

Year 2060 Rain  
Sea Level Rise, No Storm Surge

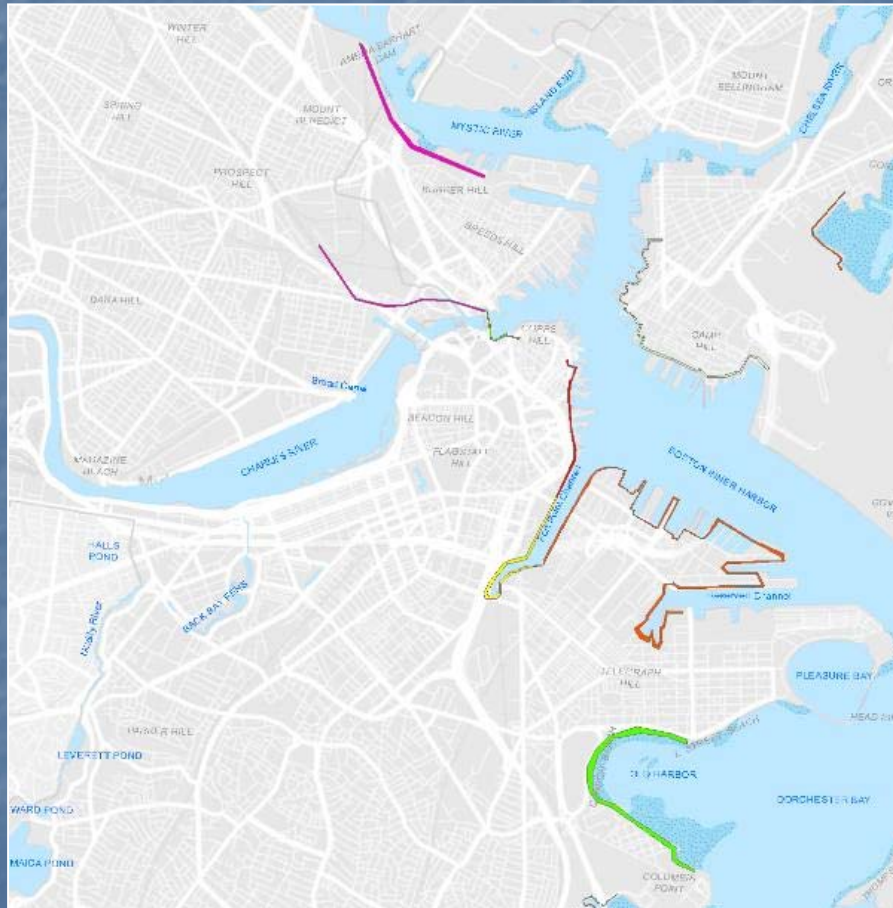


Year 2060 Rain  
Sea Level Rise, With Storm Surge

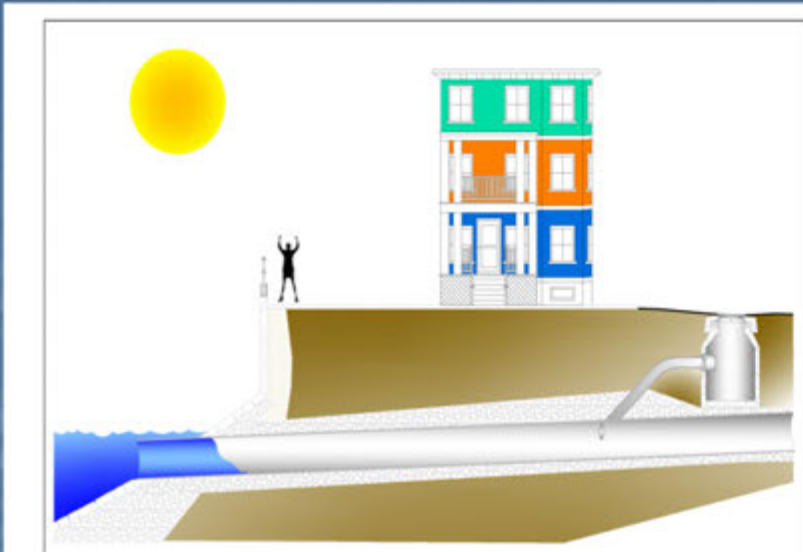




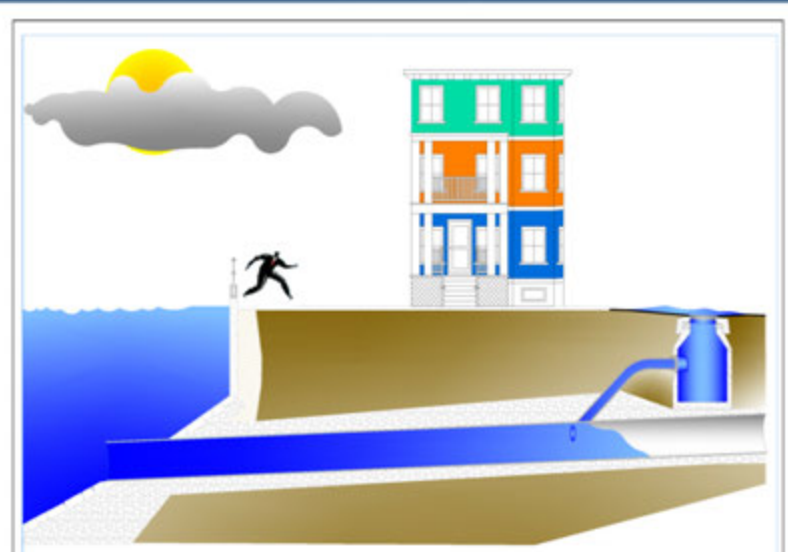
# Regional Flood Walls Concept to Prevent Flooding



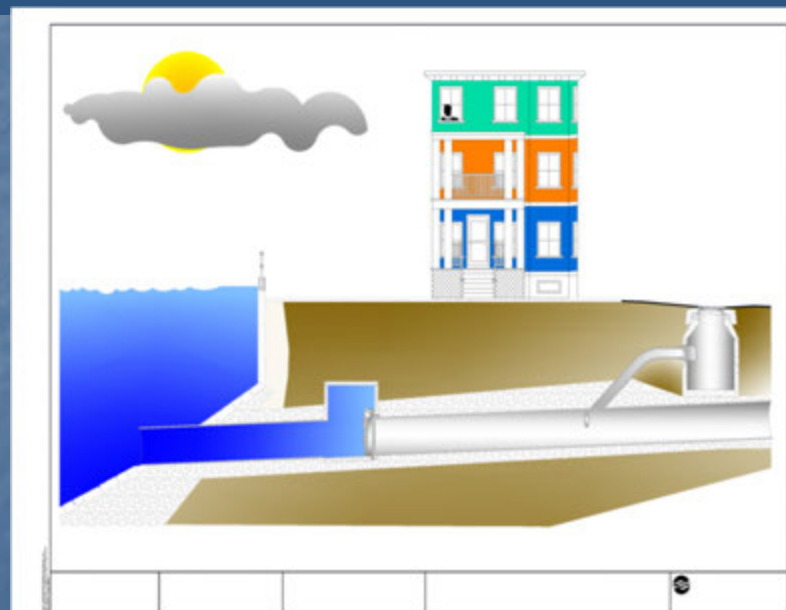
- Series of flood walls strategically located in Boston to block the major flood pathways from the north and south of the New Charles River Dam.
- The New Charles River Dam would have to be raised to prevent overtopping by storm surge.
- Additional walls:
  - Along the Mystic River to protect a pathway to the Charles River via Cambridge,
  - On the North Side of Logan Airport
  - Along the south shore of East Boston along the Inner Harbor
  - From the North End along the Inner Harbor to the Reserved Channel in South Boston.



Storm Drain Outfall at Low Tide



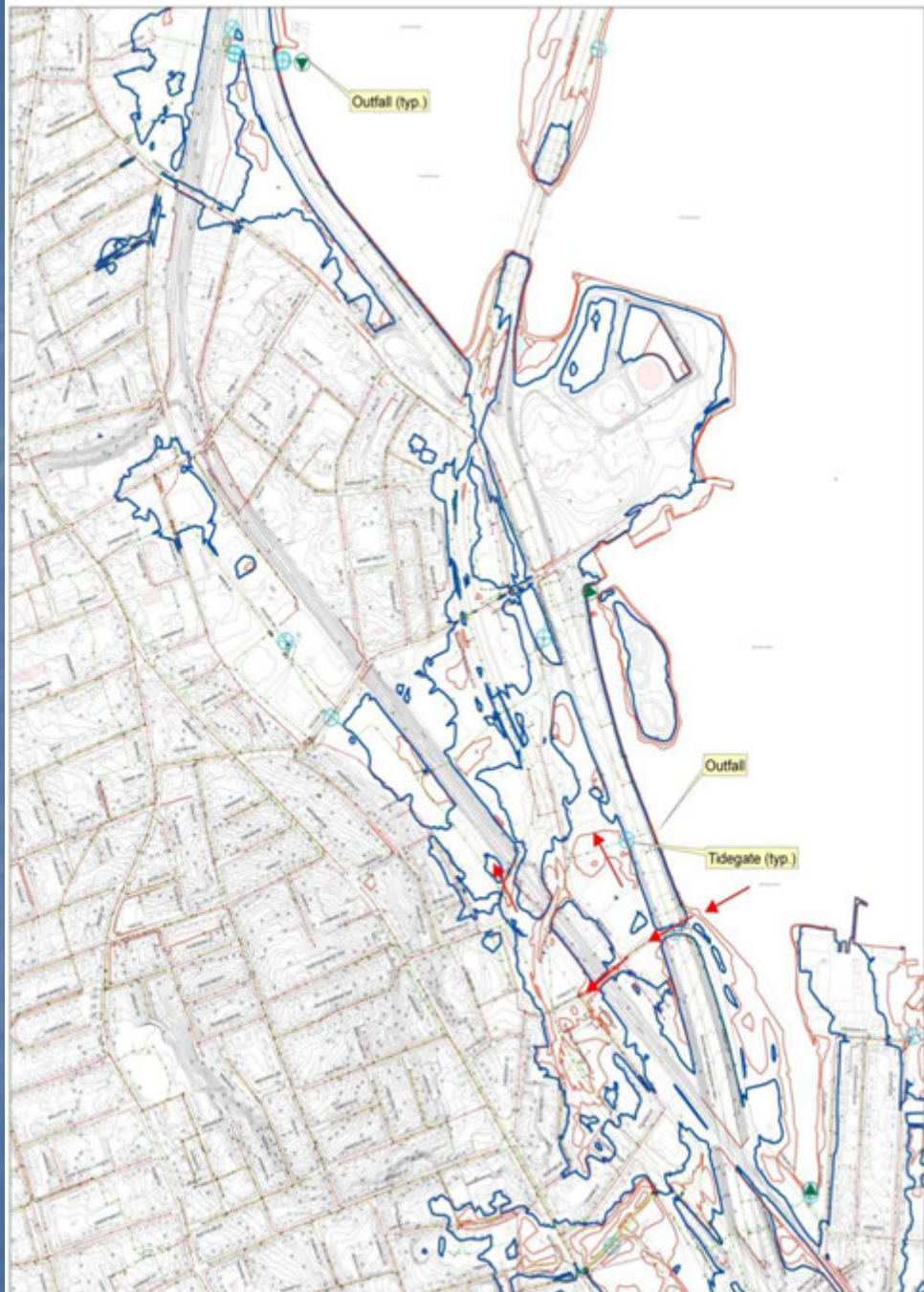
Storm Drain Outfall at High Tide without Tide Gate

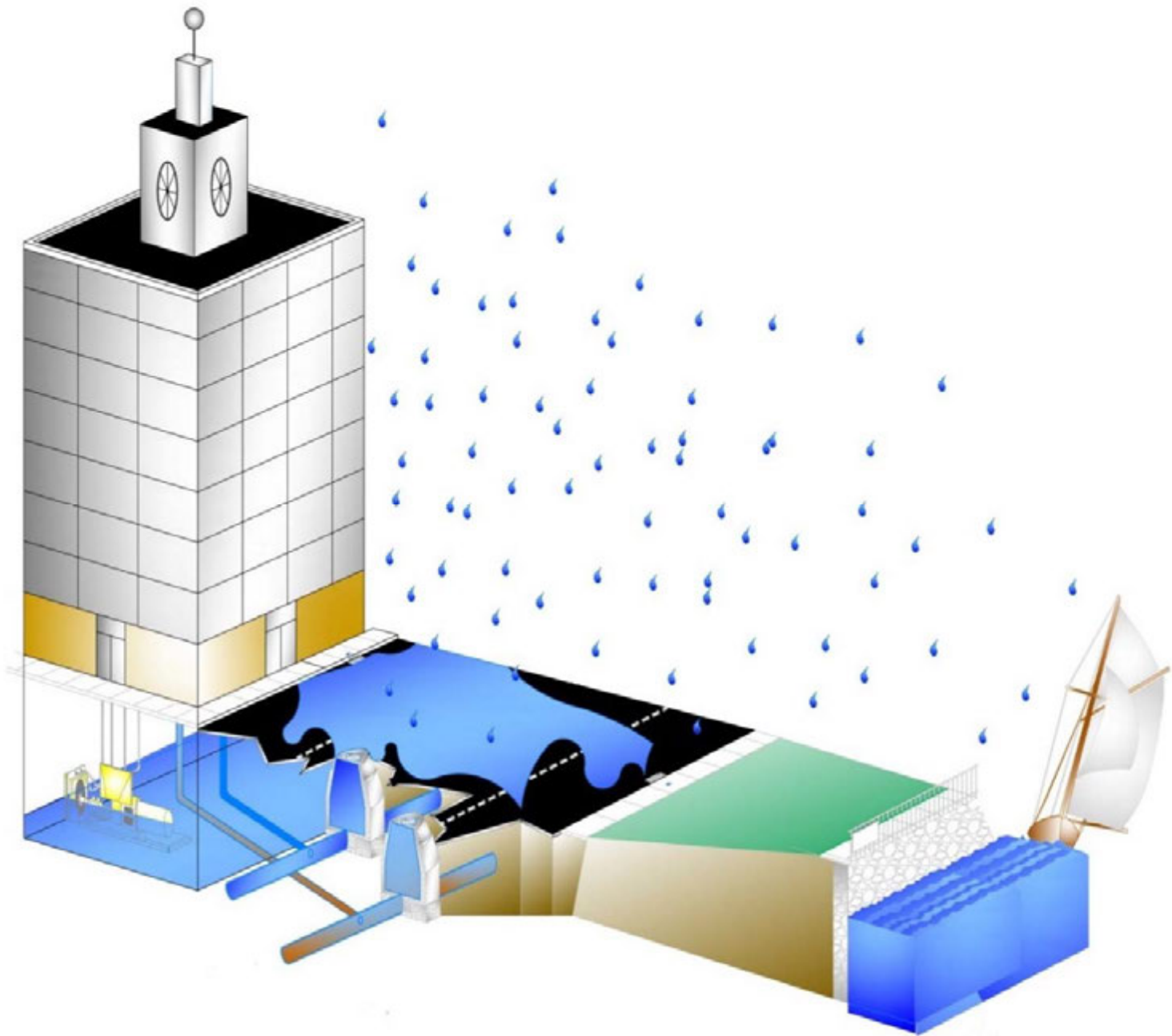


Storm Drain Outfall at High Tide with Tide Gate

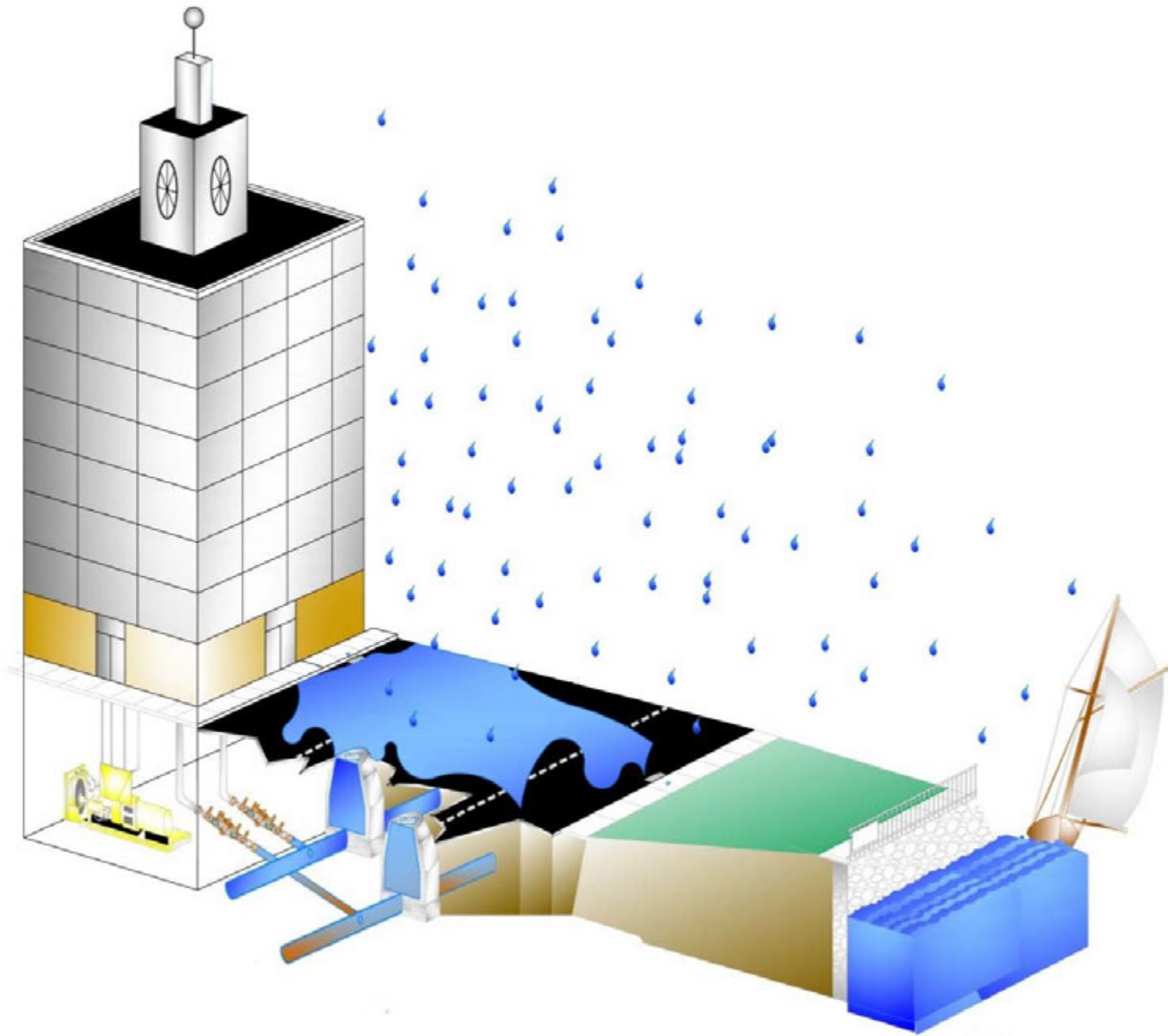


# Outfall Screening

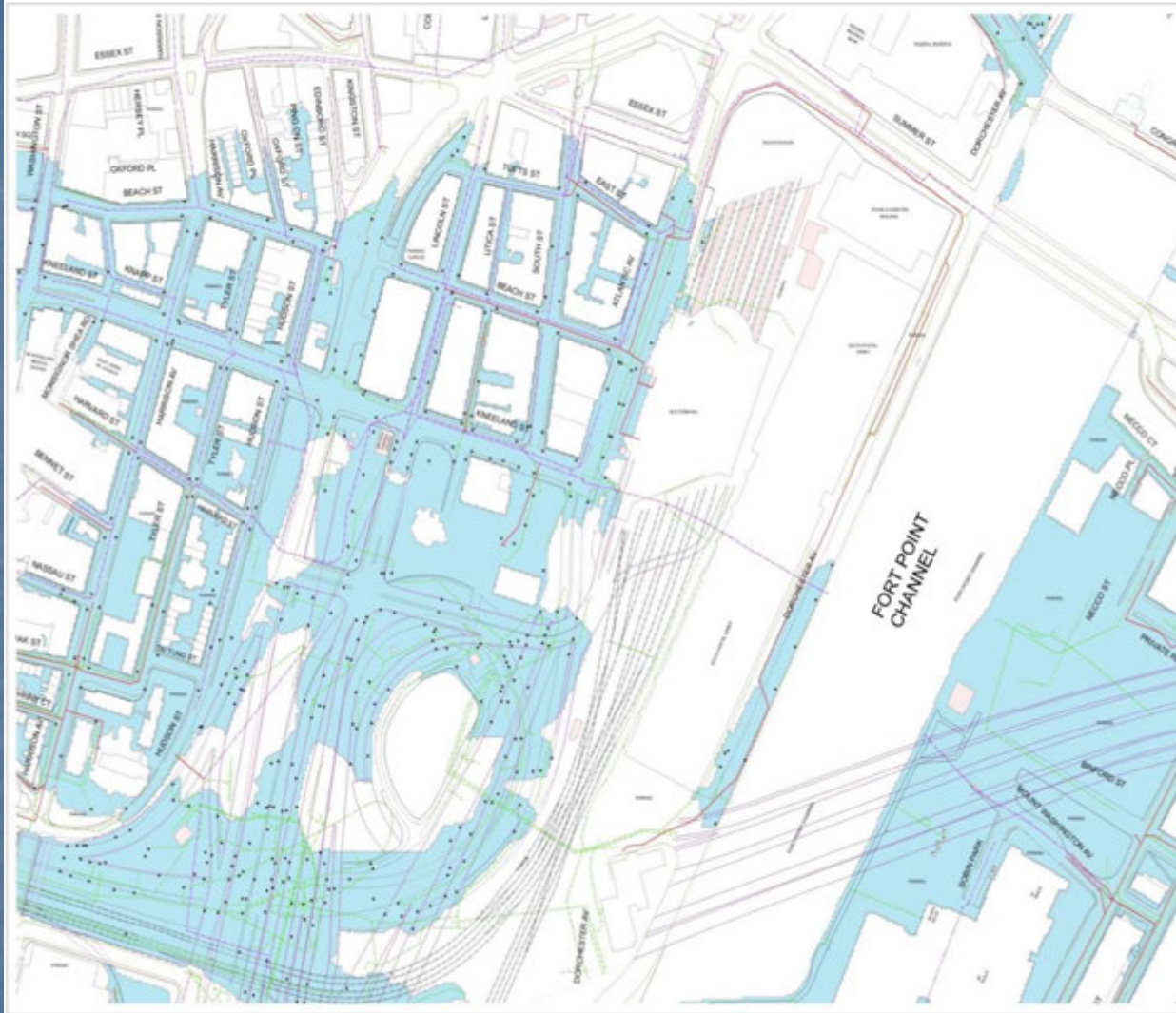








### Potential Inundation Area



# Plan – 2015: BWSC Wastewater and Storm Drainage System Facilities Precautionary - 2035

## Legend

### Sewer Line

#### SEWER\_SYSTEM\_CODE

- Combined
- Combined Sewer Overflow
- Sanitary
- Storm



# Recommendations

- **Modify CSO and storm drain outfall operations**
  - Determine if backflow prevention is required on storm drain outfalls and investigate private outfall vulnerability
  - Install tide gates using recommended design flood elevations
  - Reevaluate tide gate maintenance and replacement procedures with rising tidal conditions
- **Develop and pilot alternatives to cover catch basins or isolate areas flooded by storm surge**
- **Identify drainage, conveyance and control alternatives to alleviate hydraulic stresses on sewer and storm drain systems**
- **Pursue regional solutions to protect assets and operations from coastal flooding**

# Stormwater GI/LID Recommendations

- Complete demonstration projects
- Establish 25 year BMP implementation Plan
- Review three tributary area study results
- Work with Parks and Public Works to establish schedule for GI during their CIP (20 year schedule)
- Learn from other cities and adjust program
- What additional information needed
- Maintenance program



Questions?