



Achieving Long-Term CSO Control at the Narragansett Bay Commission

*A Small State Agency's
Robust Solution*

David C. Bowen, P.E.

September 29, 2021

PANEL DISCUSSION

Presentation Overview

Introduction

NBC Facilities

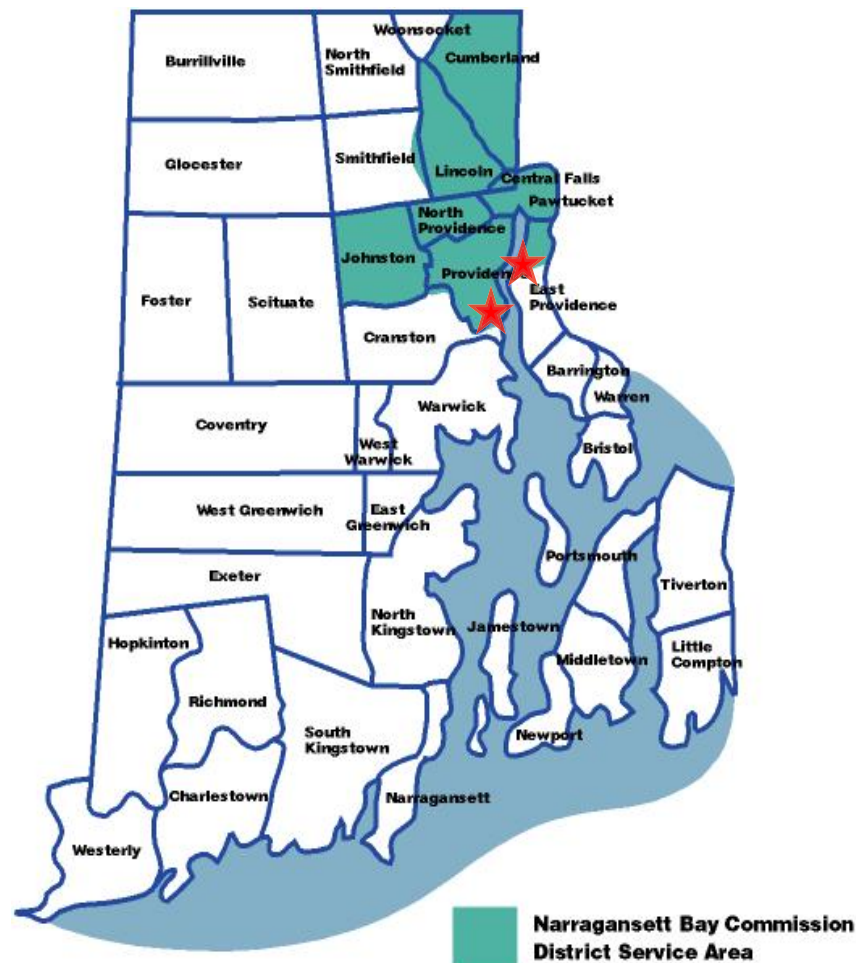
NBC's CSO Control Program

Challenges

Questions

Narragansett Bay Commission

- Quasi-public agency
- Largest wastewater authority
- Own, Operate and Maintain:
 - Two largest WWTFs
 - 110 miles of interceptor pipes
 - CSO tunnel
 - Six pumping stations
 - Septage Receiving Facility
- Ten Communities
 - ≈ 70,000 customers (34% RI)



Mission Statement

*To maintain a leadership role in the **protection and enhancement of water quality in Narragansett Bay** and its tributaries by providing safe and reliable wastewater collection and treatment services to its customers at a reasonable cost.*



Protecting over 400 miles of coastline

Rhode Island's most valuable resource

Field's Point Wastewater Treatment Facility Providence, RI

- Largest WWTF in RI
- Serves: Providence, Johnston, North Providence, Lincoln (Cranston, Smithfield)
- 77 MGD Advanced Secondary Treatment capacity
- Wet Weather Treatment for an additional 123 MGD
(200 MGD total)
- 38 CSOs



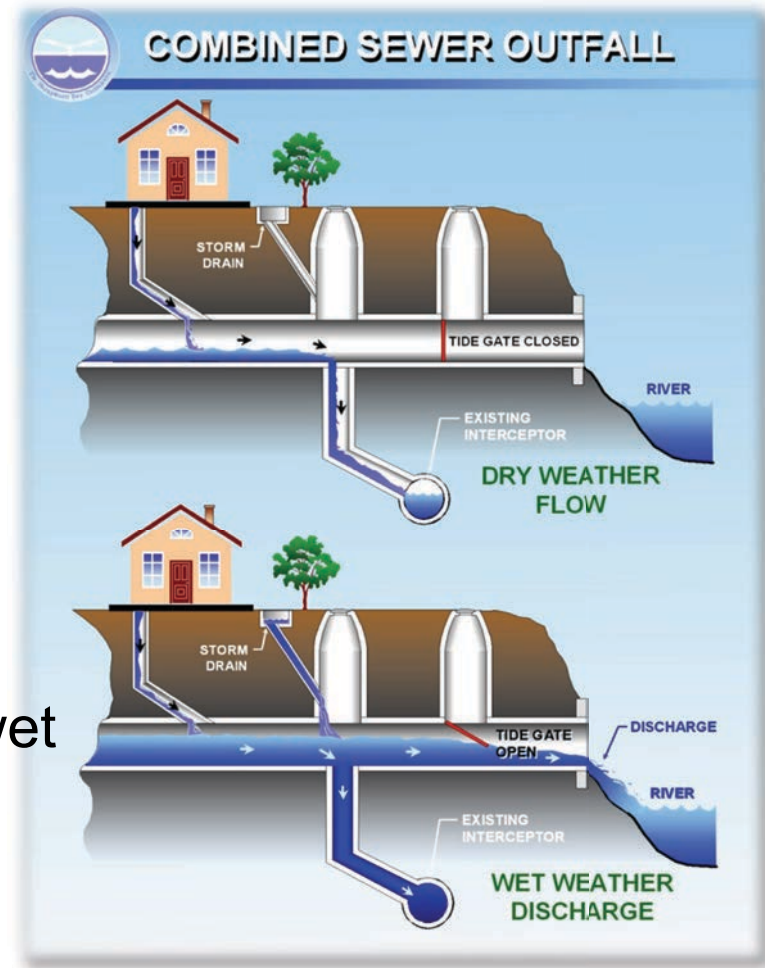
Bucklin Point Wastewater Treatment Facility East Providence, RI

- Second largest WWTF in RI
- Serves: Pawtucket, Central Falls, Cumberland, Lincoln, (East Providence and Smithfield)
- 46 MGD Advanced Secondary Treatment capacity
- Wet Weather Treatment for an additional 116 MGD
(162 MGD total)
- 27 CSOs



Combined Sewer System Challenges

- Dry Weather – system works
- Wet Weather - overflows occur
 - Excess combined sewage discharges into nearby receiving waters
- Public health & water quality issues
- Discharges violate Clean Water Act
 - CSOs are a major source of fecal coliform
- CSO Abatement Project: reduce illicit wet weather discharge activity



Aging infrastructure system with 65 Combined Sewer Overflows

CSO Compliance Challenges



NBC CSO Control Program

- 1992: NBC Embarked on federally mandated CSO Control Program
 - Consent Agreement with RIDEM to address CSOs in Field's & Bucklin Point Service areas
- 1996-1998: Program Reevaluation with Stakeholders Group input
 - 1994 EPA CSO Policy change - provide more flexibility
 - Cost (capital and rate increase)
 - Technical Concerns
- 1998: NBC defined a three-phase CSO Control Program
- Program Goals:
 - 98% reduction annual CSO volume
 - 80% reduction in shellfish bed closures
 - < 4 overflows per year



NBC CSO Control Program

■ Phase I CSO Program

- Construction: 2001 to 2008
- Cost: \$360M
- Deep rock storage tunnel, tunnel pump station, drop shafts, and consolidation conduits
- Addresses 40% of the CSO volume

■ Phase II CSO Program

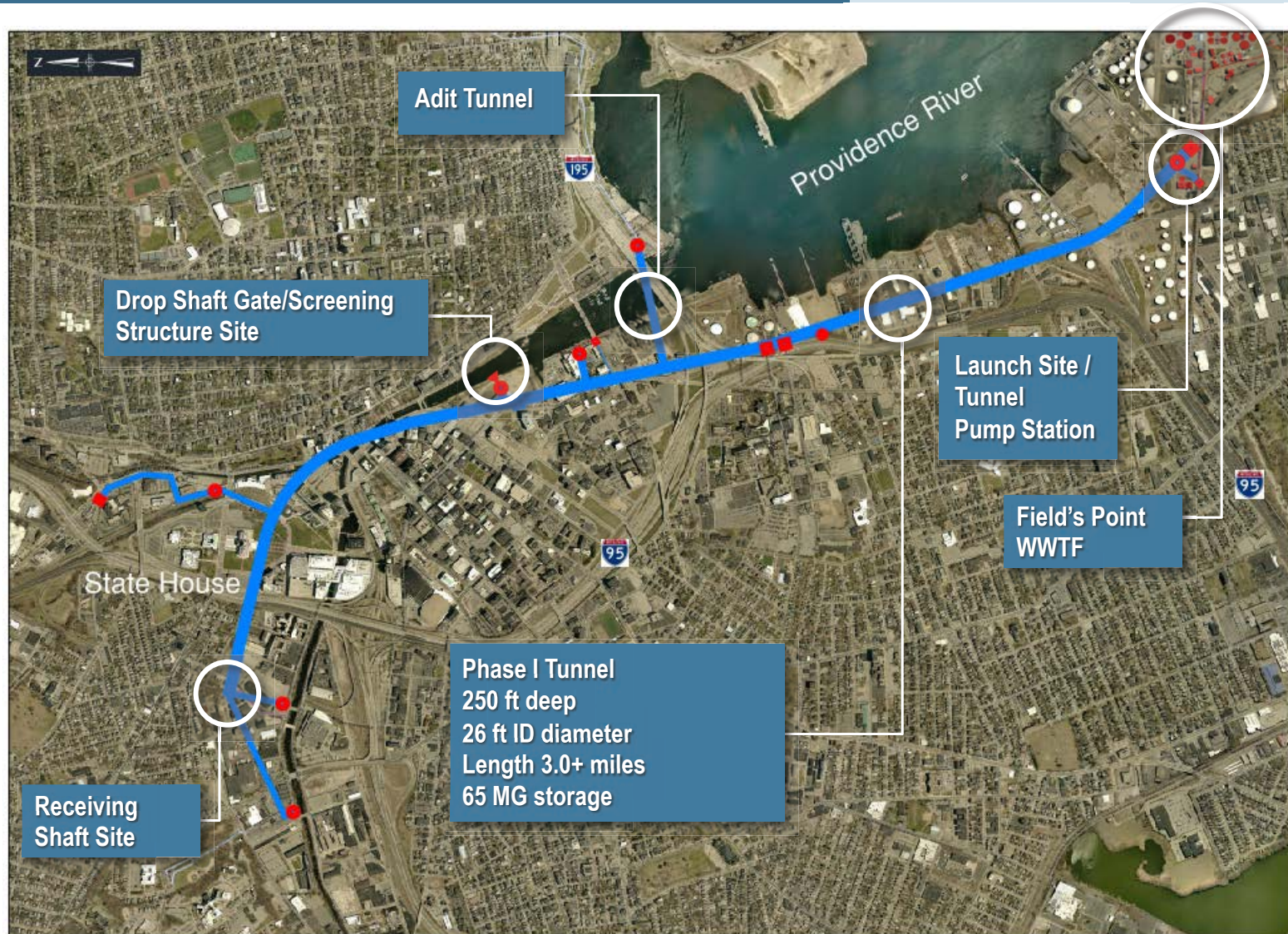
- Construction: 2011 to 2015
- Cost: \$197M
- CSO interceptors, sewer separation, and storage/wetlands facility

■ Total Costs: ≈\$557M

- ✓ ***Over the past 10 years, Phase I and II facilities prevented more than 10 BILLION gallons of combined sewerage from entering Narragansett Bay***



NBC CSO Control Program Providence Tunnel Overview



Facing Change – The Optimized Plan

Phase III Reevaluation Process

- 2014: NBC Reevaluated its Phase III CSO Control Program
- Reevaluation Process
 - ✓ Prioritize water quality benefits
 - Significant improvements from first two phases
 - ✓ Evaluate affordability issues
 - ✓ Reduce costs
 - ✓ Optimize approach
 - ✓ Investigate “green” technologies
 - ✓ Extend Implementation Schedule to reduce impact on rate payers



Collaboration with Stakeholders and Regulators

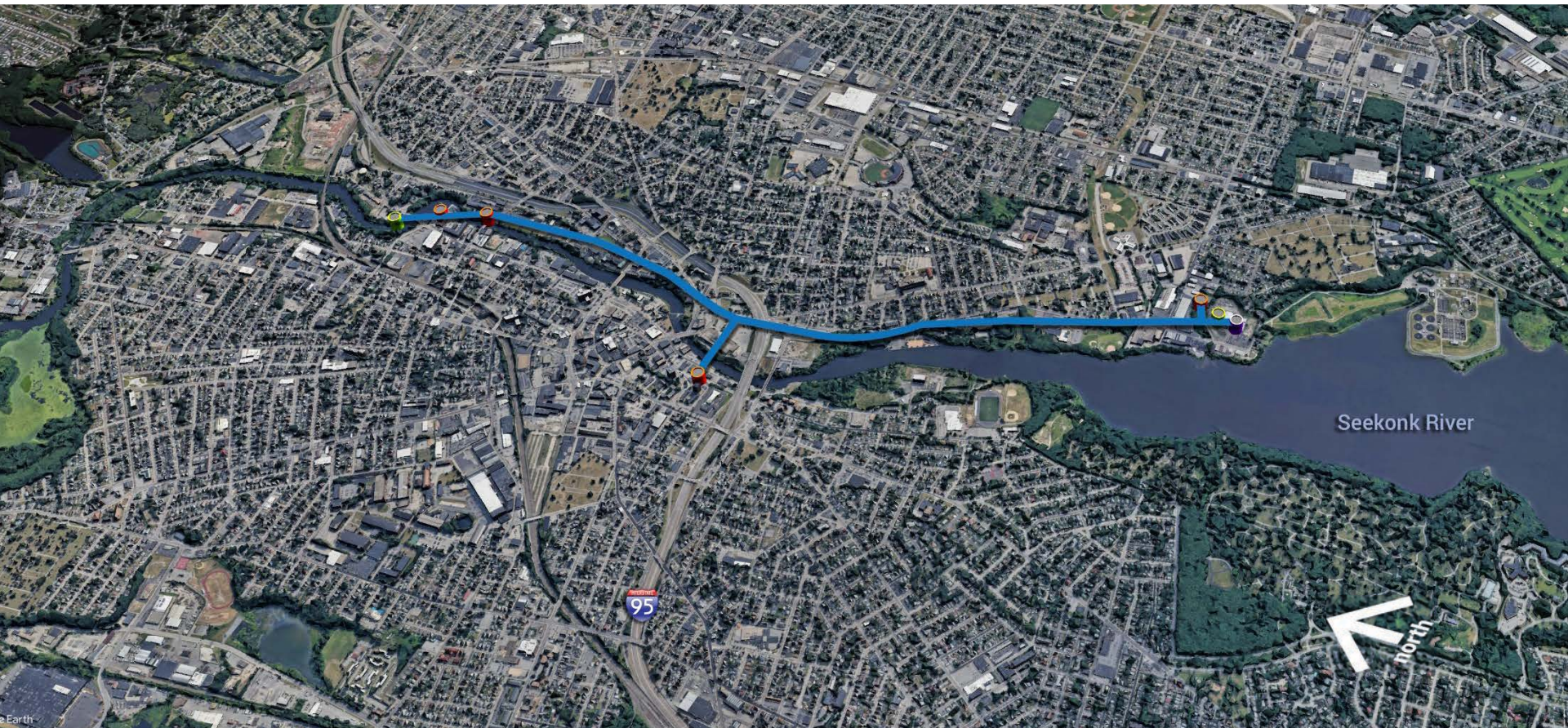
NBC CSO Control Program

■ Phase III CSO Program

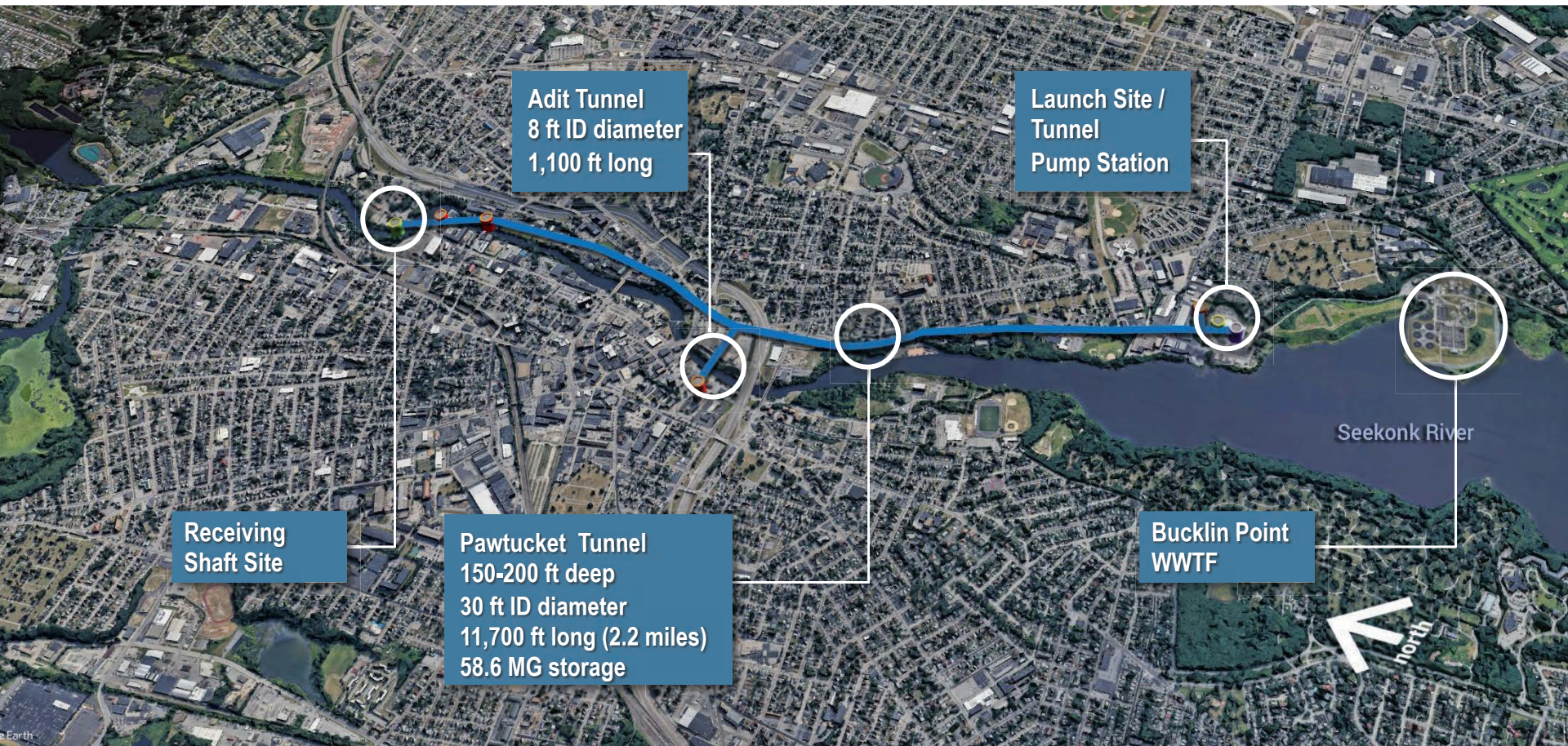
- Reevaluation Process
 - » *Water Quality and Affordability*
 - » *Four Phases (A – D)*
 - » *Incorporate Green Infrastructure (GSI)*
(\$10M per Phase)
- Construction: 2019 to 2041 (*two decades*)
- Cost: \$1B (2018) (*includes “soft costs”*)
- Key Elements:
 - » *Deep rock storage tunnel, tunnel pump station, drop shafts, and consolidation conduits*
 - » *Sewer Separation*
 - » *GSI*



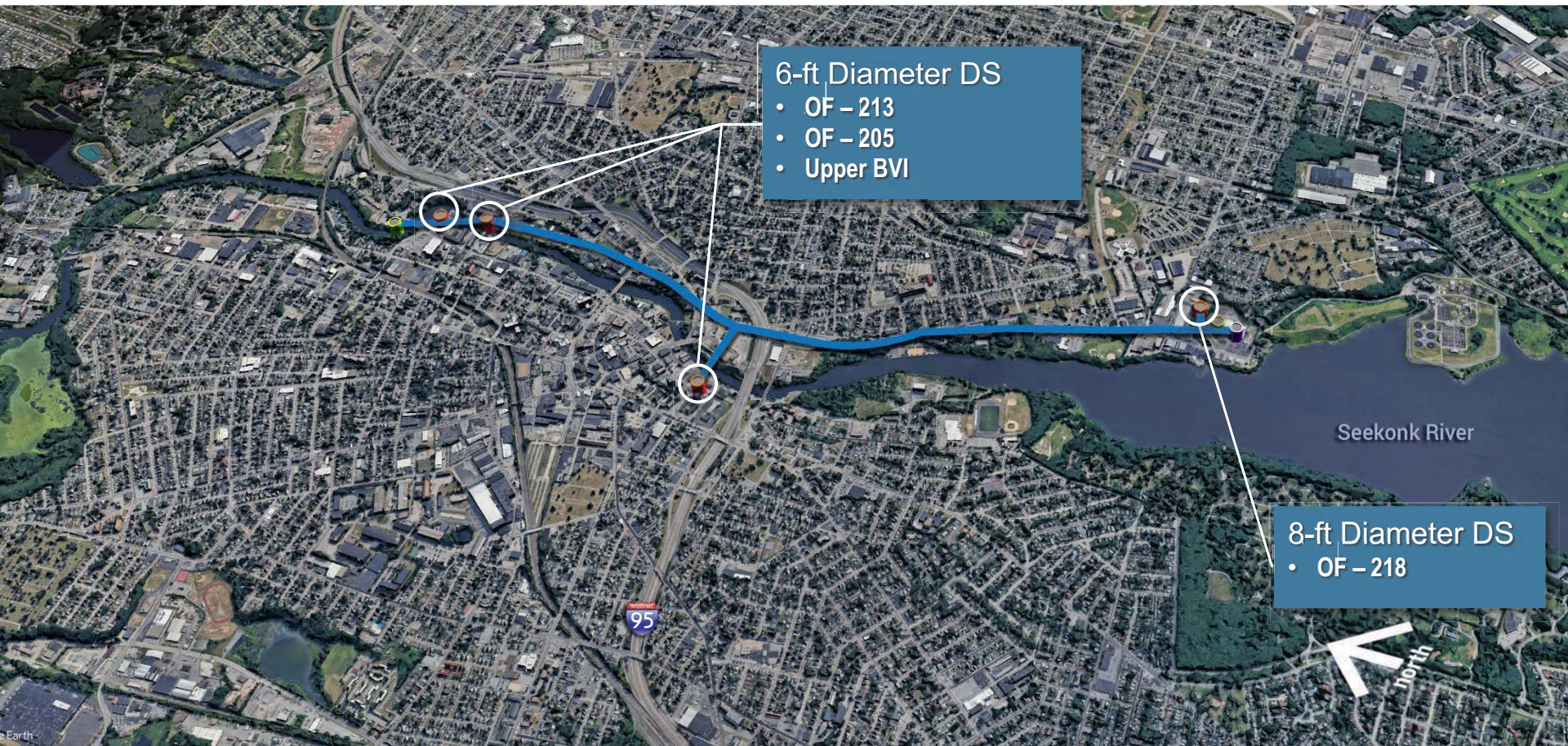
Pawtucket Tunnel Overview



Pawtucket Tunnel



Pawtucket Tunnel



Pawtucket Tunnel Project

■ Phase IIIA CSO Tunnel Project

– Design Build Procurement Process:

» Contractor: CBNA/ Barletta Design-Build Team (CB3A) – December 2020 NTP

» Engineer: AECOM

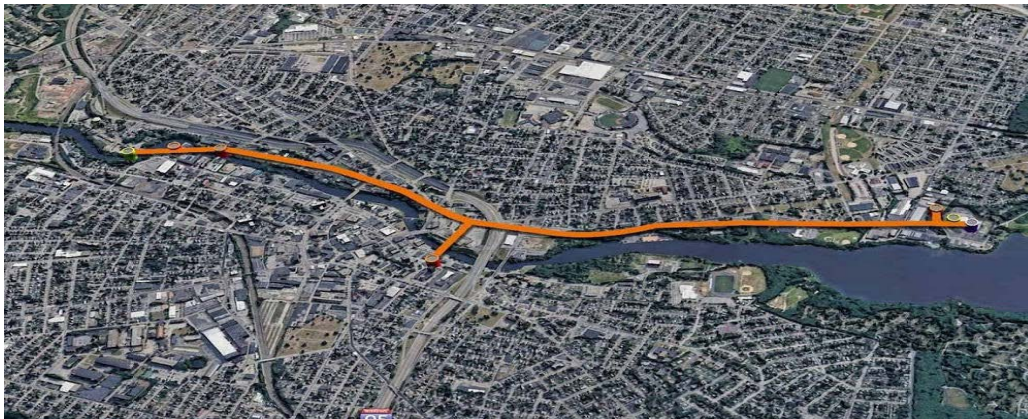
» PM/CM: Stantec/ Pare Engineering/ MWH Constructors

– Construction: 2020 to 2024

» Substantial Completion – December 2024

» Final Completion – within 12-months of Substantial Completion

– Cost: \$449.8M



Green Stormwater Infrastructure (GSI)

■ Phase III CSO Program

- Four sub-Phases, each with a \$10 million investment in GSI

■ Challenge(s)

- NBC needed area or space for GSI construction

■ Municipal Partnering

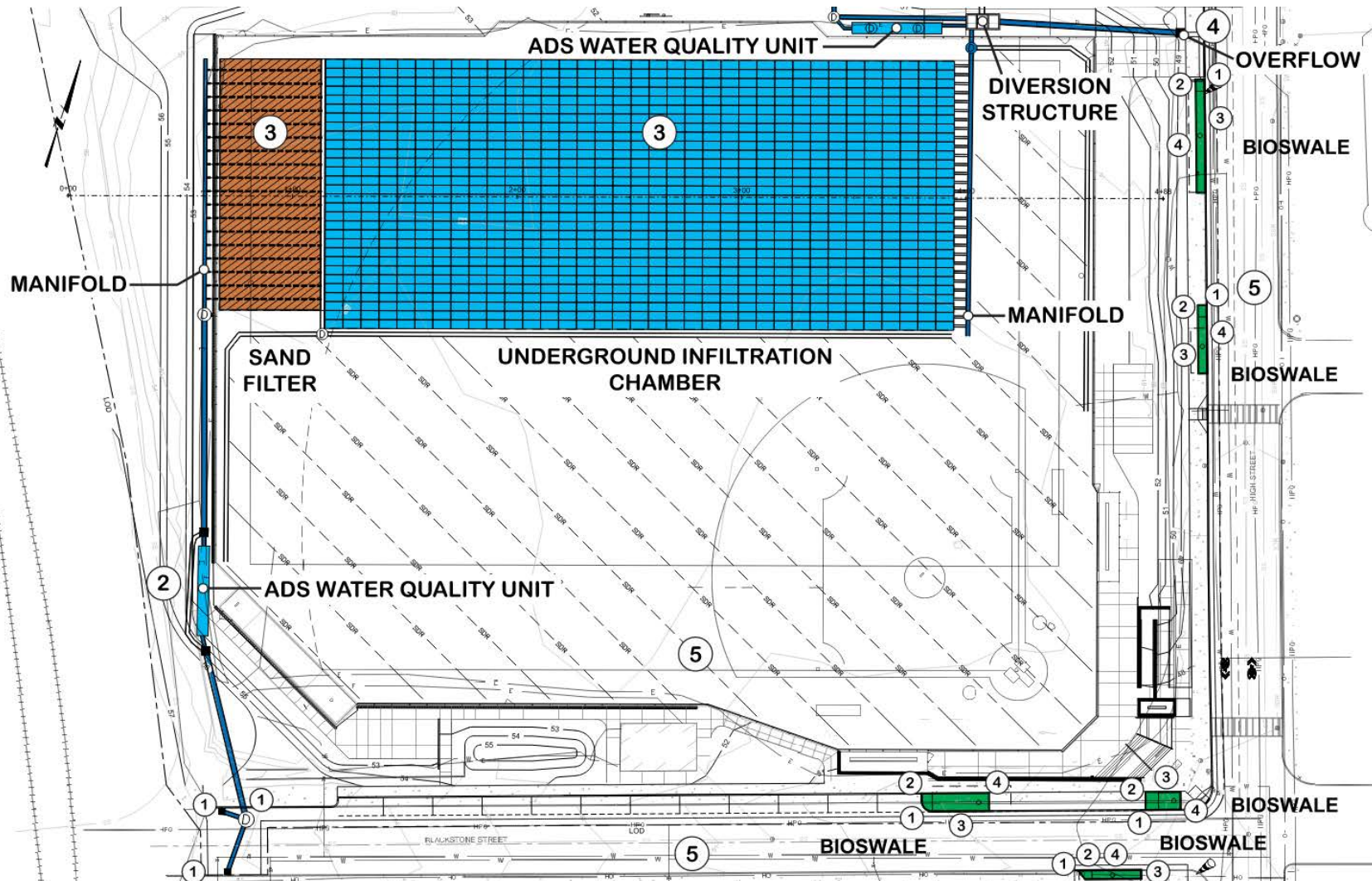
- Collaborative effort between NBC Leadership and the Mayor of Central Falls

■ Win–Win Solution:

- Athletic Fields not suitable for use
- Community Benefit



Macomber Field GSI



Macomber Field GSI



Macomber Field GSI



CSO Program Challenges

- Project Costs

- Competing Demands: CSO Program and other Capital Projects

- *Phase III A Facilities (FY 2022 – 2027) ≈ \$575.3M*

- *CIP (FY 2023 – 2027) identifies 51 projects at an estimated cost of ≈ \$894.3M*

- Increasing Costs and Needs

- COVID 19 Global Pandemic

- Aging Infrastructure



CSO Program Challenges

Affordability and Financing

- Federally-mandated CSO Program accounts for nearly 88% of the five-year CIP
- Phase IIIA Construction Projects:
 - CSO Tunnel at \$450M
 - CSO Tunnel Pumping Station at \$80.6M
 - BPWWTF Clarifiers and Upgrades at \$51.9M
 - CSO Overflow Facilities (6 total) at \$40.7M
 - CSO Regulator Modifications at \$4M
 - GSI Projects at \$10M
- Customer Affordability?
- EPA WIFIA (*Water Infrastructure Finance and Innovation Act*) Program loans for \$398.5M (funds 49% of Phase A Improvements)



✓ ***Low interest rate and payment terms will save NBC's ratepayers nearly \$100M***

Questions



NEWEA
WORKING FOR WATER QUALITY



David C. Bowen, P.E.
Engineering Manager
Narragansett Bay Commission
dbowen@narrabay.com