

I/I - Sewer Separation - Treatment

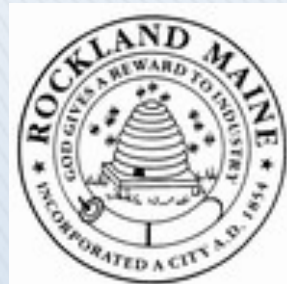
The Trifecta of Integrated Planning

City of Rockland, Maine

Presented by:

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WRIGHT-PIERCE 
Engineering a Better Environment



2015 Specialty Conference
NEWEA

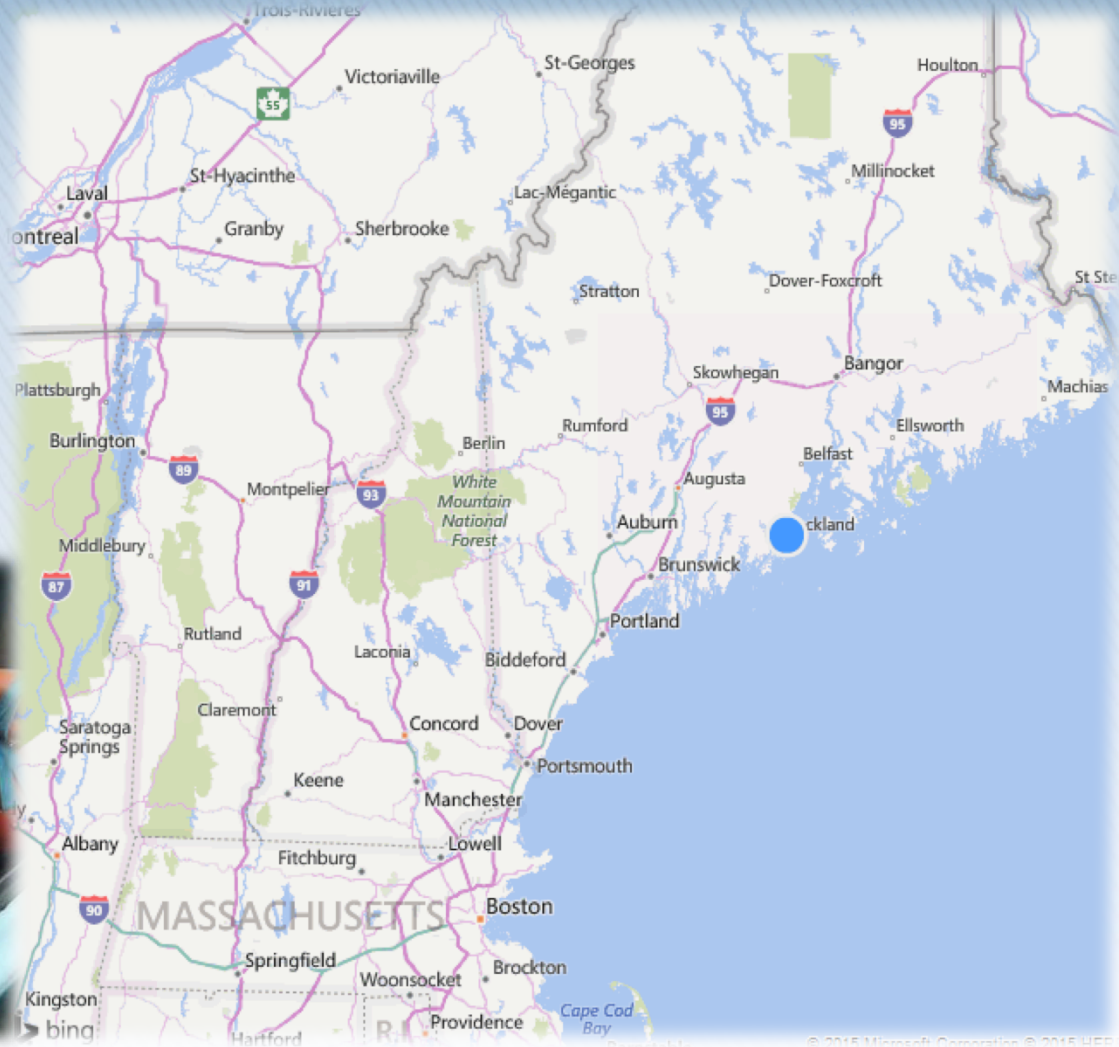
Outline

- **History & System Overview**
- **Existing Conditions**
- **Issues**
- **Integrated Planning Approach**
- **Status**
- **Summary/Next Steps**
- **Q/A**



Where is Rockland?

- Population: 7,300
 - ▶ 1970's – 2,000
- Area: 15 sq.mi.
- Elevation: 23'
- Knox County, ME
- Maine Lobster Festival
August 3-7, 2016



History

Sanitary, Storm, and Combined

- Sewers constructed in 1890's
- Wastewater/stormwater discharged untreated to Rockland Harbor
- Several improvements: sewer extensions, reconstruction, sewer separation (1977-2012)
- Lining to reduce infiltration



History

Water Pollution Control Facility

- 1971 - Originally constructed
- Secondary treatment, 3.3 mgd
 - 85% removal of organic matter, suspended solids, plus disinfection
- Untreated discharge to 9 licensed CSOs

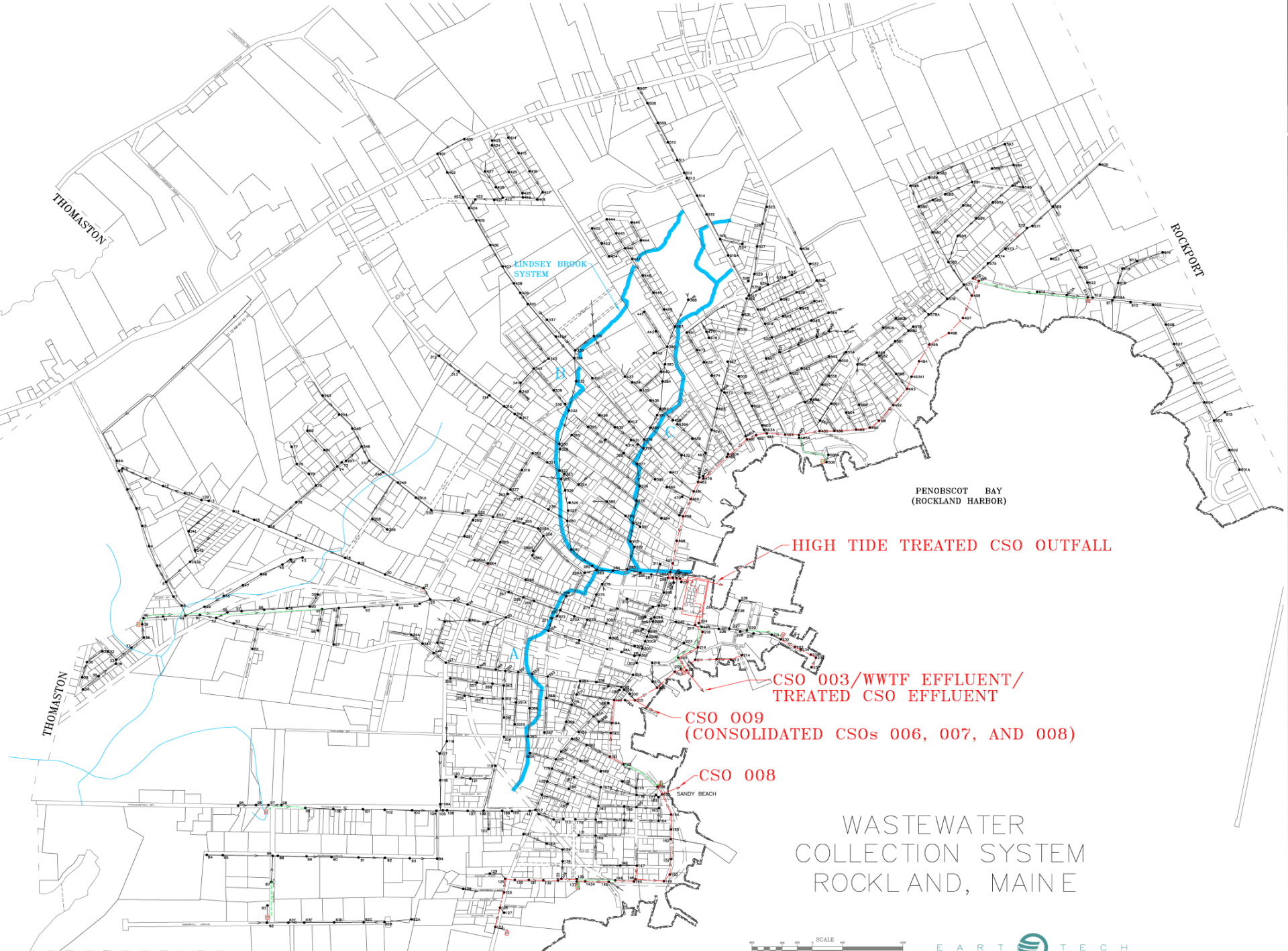
Collection System Overview

- 24 miles of separate sanitary sewer
 - 50,000-100,000' service connections
- 11 miles of combined sewer
- 13 miles of separate storm sewer
- 3.5 miles of replaced/rehabilitated pipes



WPCF Overview

- Convey & Treat: 6 mgd
- Rest discharged untreated to Rockland Harbor
- State/federal CSO regulations prompted
 - CSO closures & WPCF to receive >30 mgd
 - Flows > 6 mgd discharged with minimal treatment
 - 1998 - Stormwater treatment unit, 33 mgd
 - 2005 - CSO disinfection facility
- Sewer system capacity not increased



THOMASTON

ROCKPORT

LINDSEY BROOK SYSTEM

PENOBSCOT BAY
(ROCKLAND HARBOR)

HIGH TIDE TREATED CSO OUTFALL

CSO 003/WWTF EFFLUENT/
TREATED CSO EFFLUENT

CSO 009
(CONSOLIDATED CSOs 006, 007, AND 008)

CSO 008

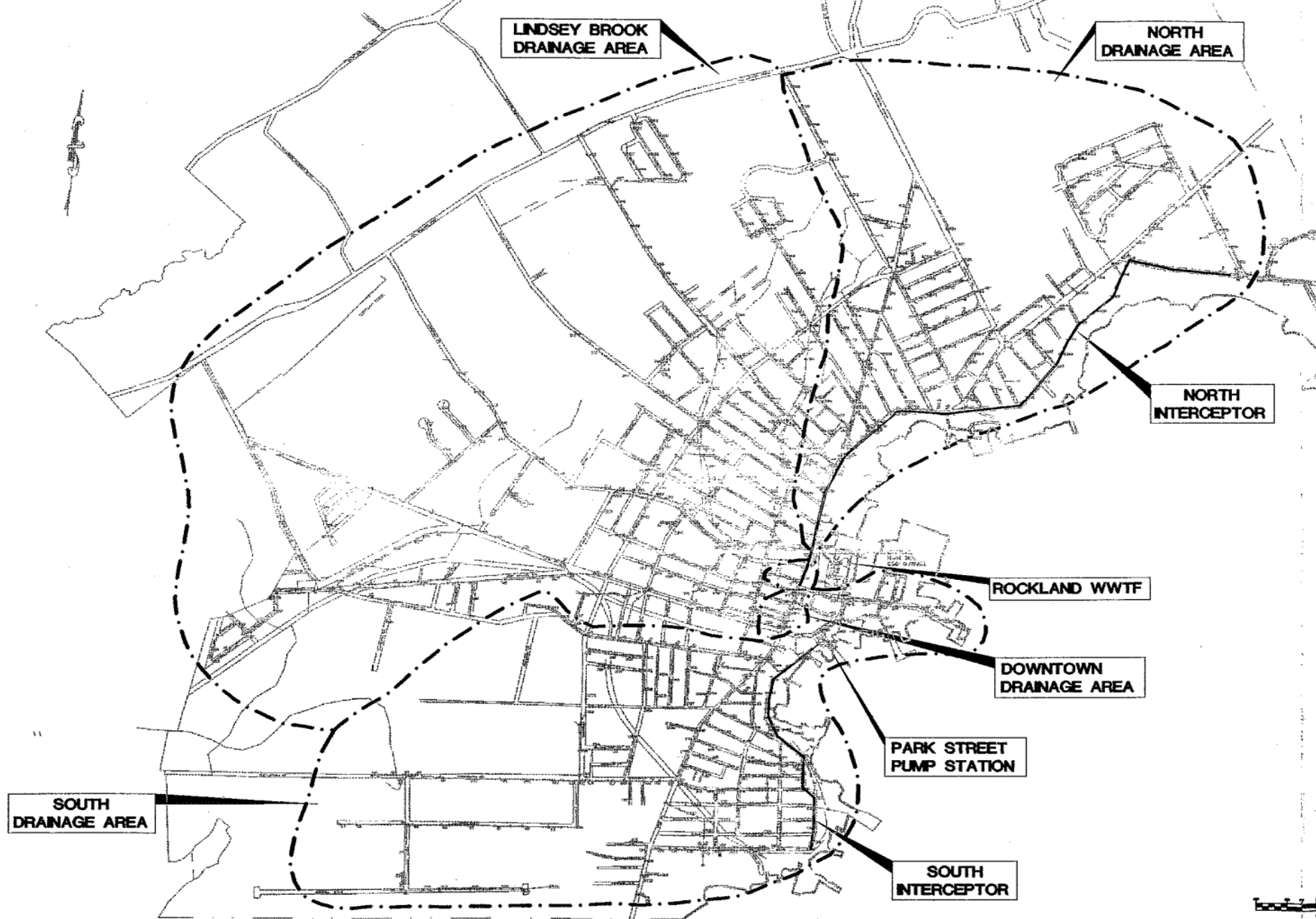
SANDY BEACH

WASTEWATER
COLLECTION SYSTEM
ROCKLAND, MAINE

OWLS HEAD



EARTH TECH



Existing Conditions: Sewer System

- System in need of rehabilitation
- Mostly combined sewers
- Drawings show combined & sanitary sewers, but not separate storm sewers
- Combined sewer overflows (CSOs)
eliminated



Existing Conditions: Lindsey Brook, Stormwater

- 3 tributaries: 2.9 miles
- Downtown flooding
- Parallel gravity sewers: 1.5 miles
- “Brook” sewers: 20+ crossings
- Direct stormwater discharges: 90+
- Drainage interceptor built in 2011 to divert flows from Lindsey Brook and reduce downtown flooding





Existing Conditions: WPCF

- Dry Flows: < 2 MGD
- Wet Flows: > 30 MGD
- Annual Budget: \$3.6M
- Est. cost to treat stormwater: \$660K (18%)
- \$4.1M - process, electrical, instrumentation upgrades
- \$5.8M in CIP for plant

The Issues

- Lack of mapping
- I/I, stormwater/Lindsey Brook, tidal influence
- Reduced effluent quality during peak flows
–occasionally unable to meet permit limits
- Discharge permit renewal may require higher level of treatment for combined flows



The Issues

- Substantial capital improvements to achieve required levels of treatment
- Address on-going CIP needs
- Admin. Agreement or final permit may necessitate additional improvements



Integrated Planning Approach

Address Infiltration and Inflow (I/I)

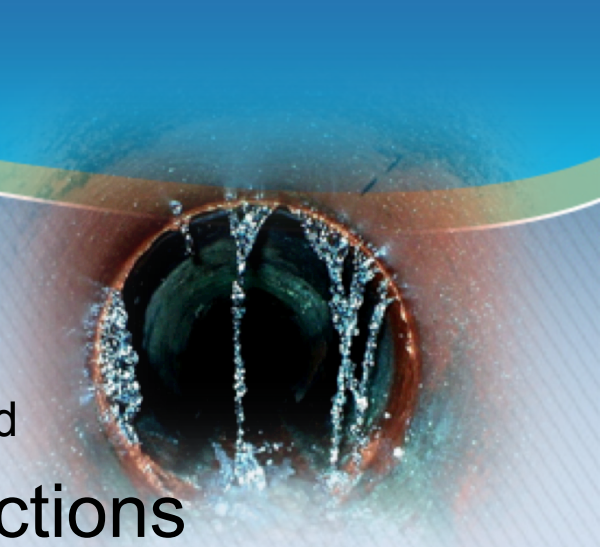
- Perform SSES tasks
- Perform inspections on older, not previously inspected pipes
 - Review connectivity
 - Update GIS
- Perform system-wide flow monitoring
 - “Narrow the playing field” – high I/I areas
 - Identify capacity constraints



Integrated Planning Approach

Address Infiltration and Inflow (I/I) continued

- Schedule immediate corrective actions
- Cost-effective, selective sewer rehab
- Consider private source elimination
 - City fully funds from property taxes
 - Cost share
 - Property owner fully responsible
 - Redirection by rerouting discharge to yard or existing stormwater infrastructure (pipe, swale, rain garden)



Integrated Planning Approach

Evaluate Stormwater Management Alternatives

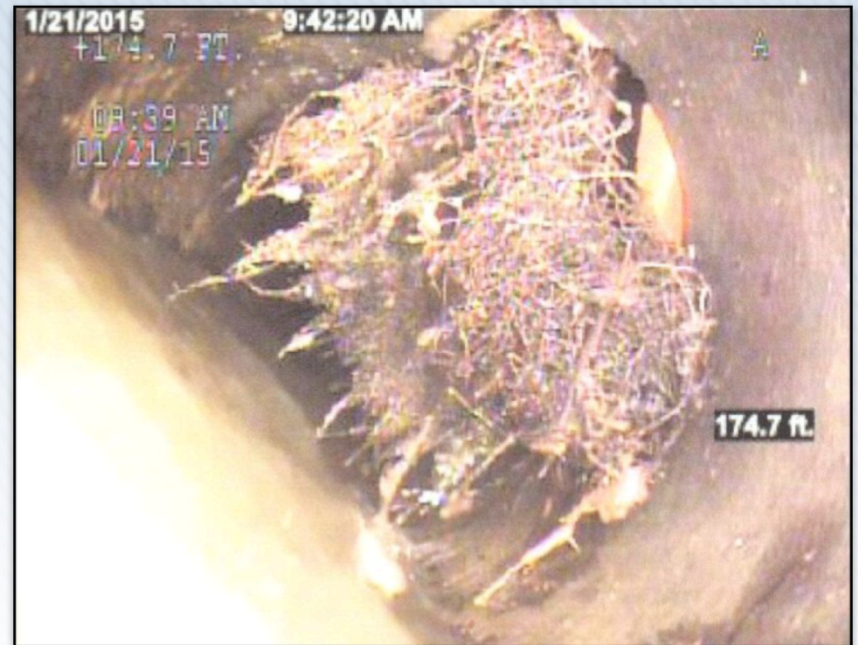
- Completed projects
 - Partial North End separation
 - Lindsey Brook projects
 - Localized monitoring/sampling
- Proposed projects
 - Lindsey Brook grant
 - South End Sewer Separation
- Additional sewer separation
 - Integrated wastewater and stormwater modeling



Integrated Planning Approach

Evaluate Stormwater Management Alternatives

- Direct discharge standards
- Development/redevelopment standards
- Minimize discharges to Lindsey Brook
- Reduce flows in Lindsey Brook
- Develop stormwater discharge alternatives to Lindsey Brook



Integrated Planning Approach

Address stormwater and treatment issues at WPCF

- Finalize draft NPDES/MEPDES permit
- Finalize pending Admin. Consent Agreement
- Reduce stormwater treated or develop equitable revenue source for stormwater treatment at WPCF
- Evaluate improvements to address potentially more stringent effluent limits and other permit requirements
- Develop revised CIP & schedule

Status

- Significant GIS updates
- Smoke testing, Aug. 14'
- System-wide flow monitoring, Nov. 15'
- Condition assessment of pipes and manholes



Observations	Number of Occurrences
Smoke coming from Catch Basin	235
Smoke coming from Ground (broken lateral)	25
Smoke coming from Ground (Cleanout, Vent Pipe)	15
Smoke coming from Ground (unknown)	11
Smoke coming from within a Structure (foundation)	13
Smoke coming from within a Structure (sump)	1
Smoke coming from within a Structure (floor drain)	8
Smoke coming from within a Structure (faulty piping/seal)	16
Smoke coming from within a Structure (unknown)	27
Smoke coming from a Private Drain	6
Smoke coming from a Roof Leader	10
Smoke exiting from a Manhole Cover (cover with holes)	25
Smoke exiting from a Manhole Cover (defective cover/frame)	13
Smoke exiting from pump stations/equipment	5
Other (see below)	11






City of Rockland
Sewer System Map

Immediate Corrective Actions

- Disconnect sump pumps
- Replace vented covers
- Perform pipe replacements and point repairs



Corrective Action	Estimated Unit Cost	Estimated Quantity	Estimated Cost
Replace Vented Cover	\$500/ea	35	\$ 17,500
Manhole Rehab	\$750/ea	15	\$ 11,250
Disconnect Sump Pump, Private Drains, Roof Leaders	\$1,500/ea	20	\$ 30,000
Point Repair of Laterals	\$1,250/ea	22	\$ 27,500
Pipe Replacement	\$125/lf	4 laterals (100' each)	\$ 50,000
Engineering & Contingencies	25%		\$ 34,000
Immediate Corrective Actions Estimated Total			\$ 170,250

What's ahead...

- Evaluate flow monitoring data – I/I results
- Finalize Admin. Agreement/discharge permit
- Continue inspections, corrective actions
- Complete engineering evaluations at WPCF to address new permit requirements
- Evaluate stormwater management alternatives – develop system hydraulic model
- Prepare capital and operating costs
- Develop Integrated CIP/Implementation schedule

Schedule and Estimated Cost

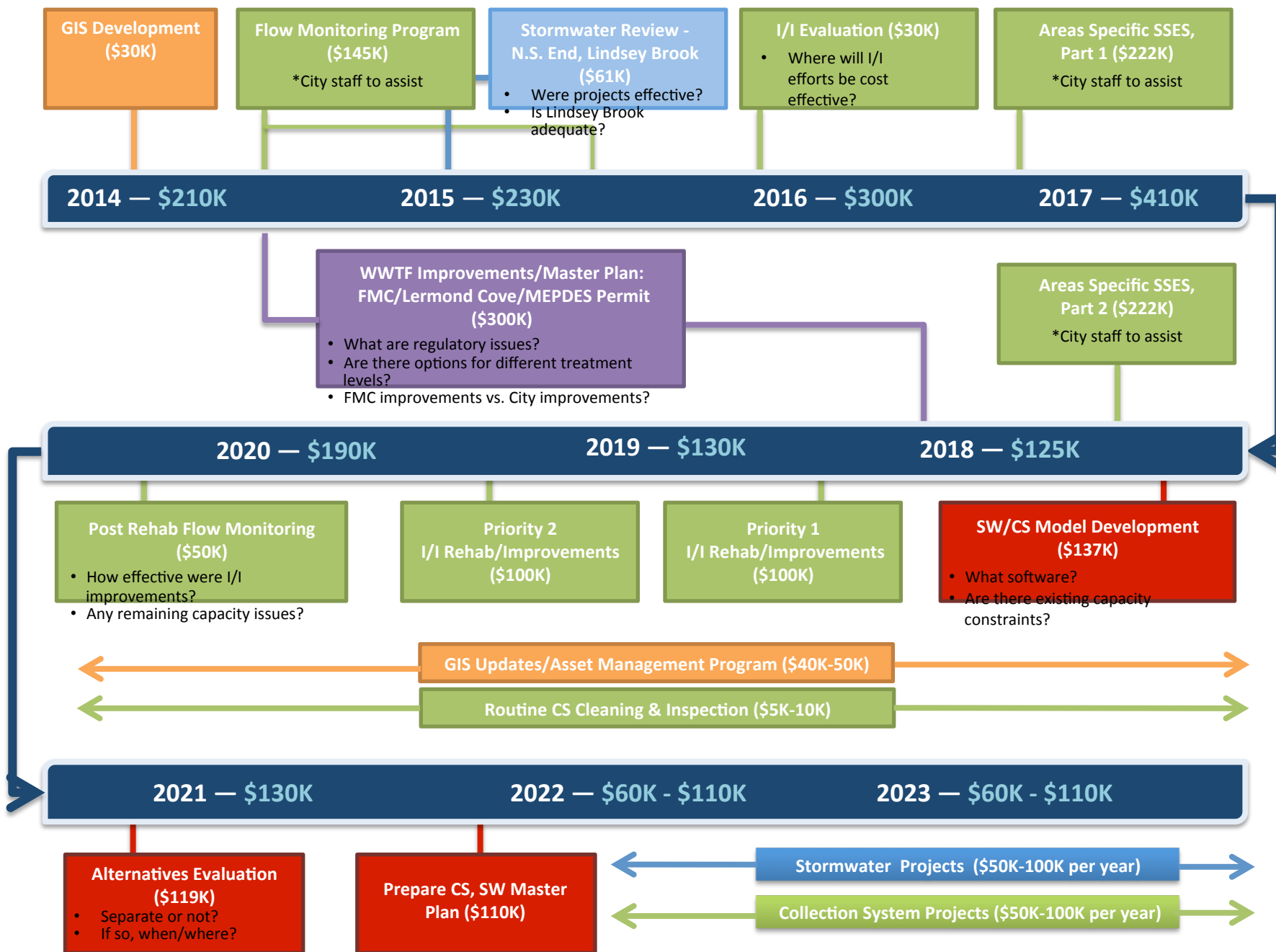
Schedule

- Assessment and plan development 2014 - 2017
- Plan implementation 2017 - ???

Estimated Cost

- Assessment and plan development \$1.4M
- Plan implementation ???

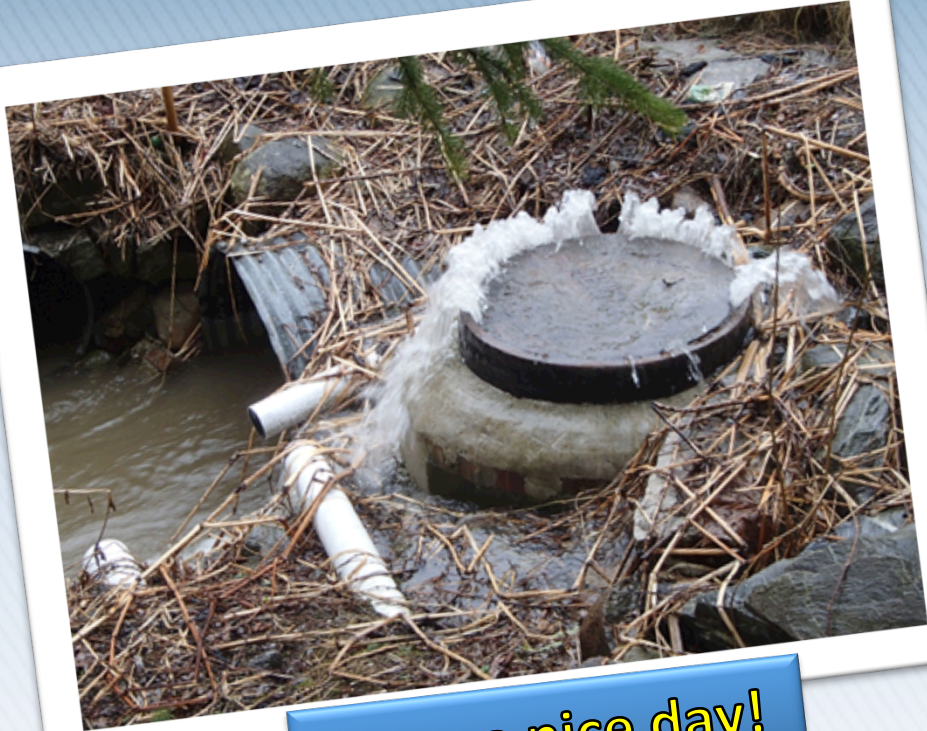
INTEGRATED SYSTEM PLANNING, CITY OF ROCKLAND, MAINE



Summary

- Challenges across all systems
- Systematic, cost-effective approach
- Assessment work sets stage for next decade
- Compliance with existing & future regulations
- Integrated system planning – look at all systems concurrently for long-term solutions

Questions?



Have a nice day!

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