Drainage & Wastewater (DWW) Major Programs

December 14, 2016

Ben Marré,

DWW Planning & Program Mgmt. Division Director

Julie Crittenden,

DWW CMOM Program Manager

Seattle Public Utilities

Objectives

Present large programs that are

- Critical to achieving SPU's Promise and DWW's Mission
- Significant drivers of 2018-2023 rates

There may be choices to change the impact on rates - we will want your input in the new year.

Seattle Public Utilities

Agenda

- DWW Mission
- 2015-2017 major projects completed
- 2018-2023
- Large programs
  - CMOM - Taking care of what we have (pipe rehabilitation)
  - Ship Canal Water Quality Project

Seattle Public Utilities

DWW Mission

- Collect and convey wastewater in our public sanitary and combined sewer systems to protect public health and the environment by preventing sewer back-ups and overflows
  - ➢ Keep it in the pipe

- Manage stormwater and drainage to reduce flooding and improve public safety, and to protect and improve receiving water and sediment quality
  - ➢ Reduce pollution

Seattle Public Utilities

Major Capital Programs & Drivers

Regulatory, prescriptive

- Green Storm Water Infrastructure
  - Natural Drainage System Partnering
  - RainWise
- Combined Sewer Overflow Program
- Sediments

Regulatory, performance based

- Capacity, Management, Operation and Maintenance (CMOM)
  - Rehabilitation – Pipe, pump station, outfall

Discretionary

- Localized Sewer Capacity
- Facilities
- Localized Flooding
- Stream Culverts
- Landslide (asset protection in landslide zones)

- Major Interagency Projects (e.g., Move Seattle, SR 99/Alaskan Way Viaduct) – Degrees of must do

Seattle Public Utilities

Major Projects Completed, 2015-2017

- Venema Creek Natural Drainage System
- Thornton Confluence Improvements
- Ballard and Delridge Natural Drainage Systems
- Dallas Ave South Drainage Improvements & Remediation
- Windermere CSO Control Facility
- Genesee CSO Control Facilities
- Henderson Pump Station 9 Upgrade
- Henderson North CSO Control Facility
- Delridge CSO Retrofits
- Leschi CSO Retrofits
- 14th & Concord Sewer Capacity Improvement
- NW 120th Localized Flooding Improvement
- Licton Springs Localized Flooding Improvement
- Wastewater Pump Station Condition Assessment

Seattle Public Utilities

Venema Creek Natural Drainage System

Delridge Natural Drainage System

Thornton Confluence Improvements

Before and After Photos
(2014-15 construction)

Windermere CSO Control Facility

Henderson North CSO Control Facility

Leschi CSO Retrofits

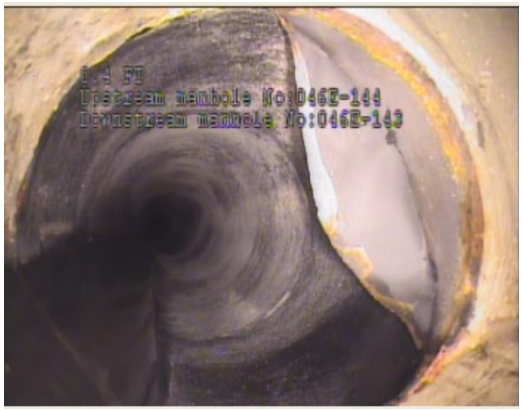


Figure 6 – Partial Blockage Downstream of MH 042-281

Figure 2-1 Infiltration in trunk system

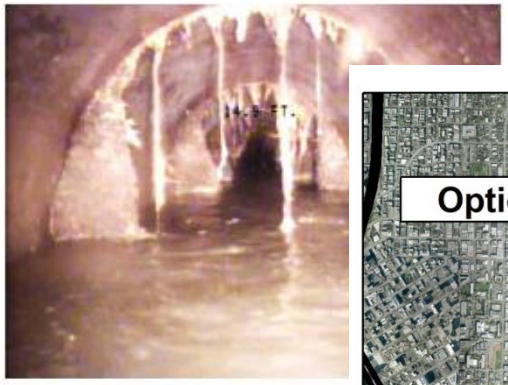


Figure 2-2 Heavy Roots in trunk sys

Figure 2-3 Heavy Roots in trunk system

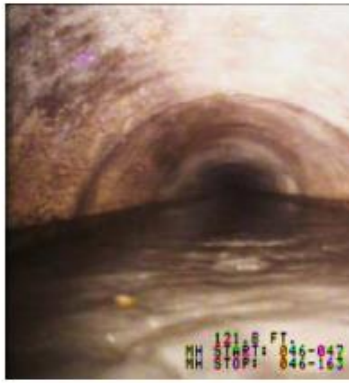
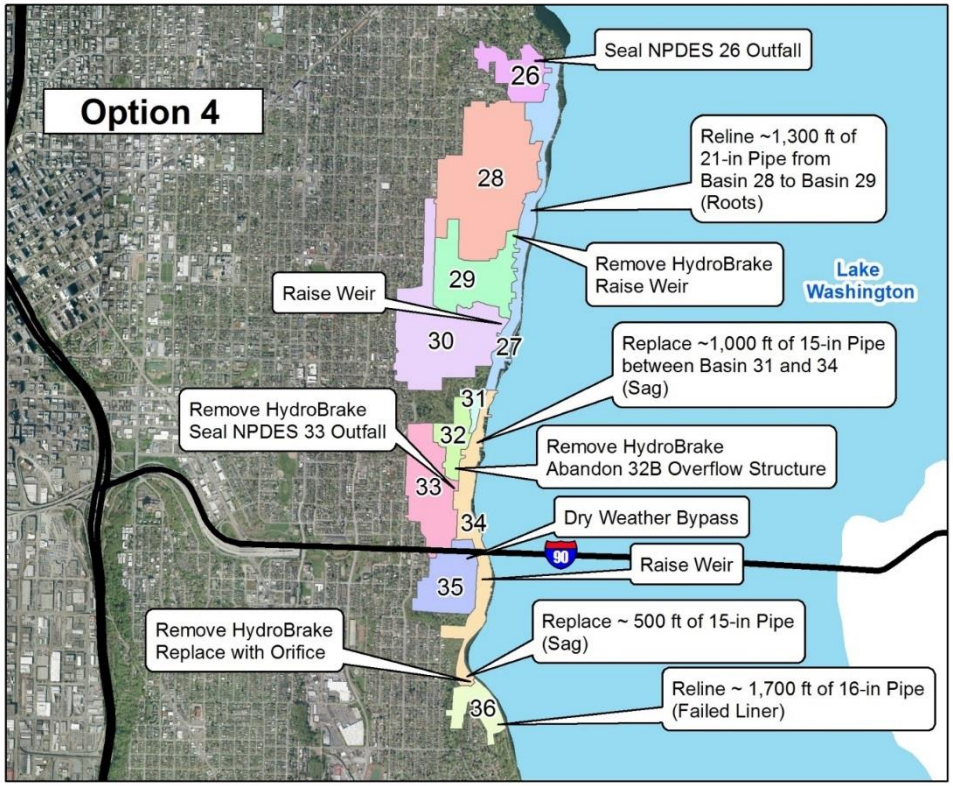
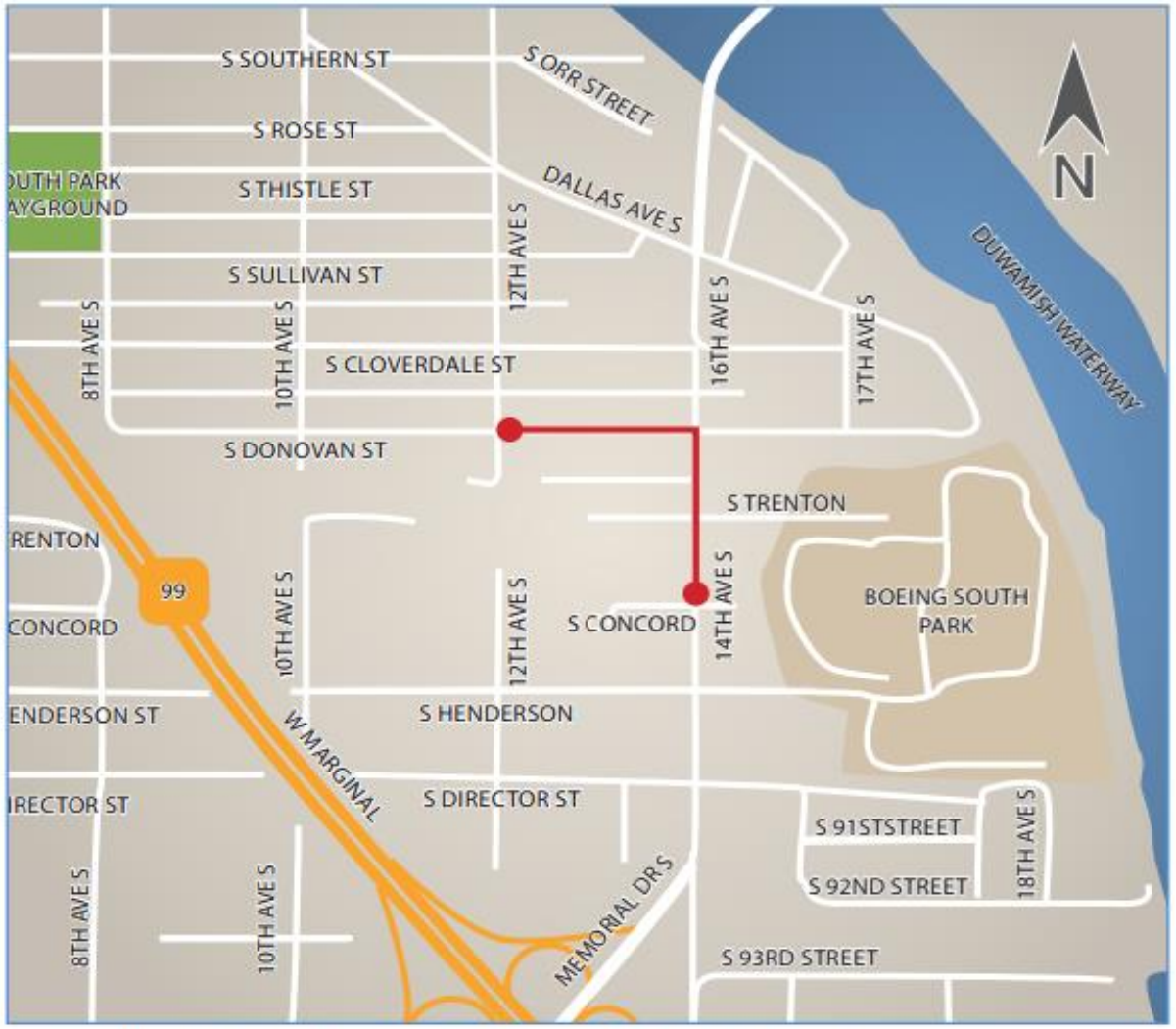


Figure 29 Sag in trunk system



14th & Concord Sewer Capacity Improvements

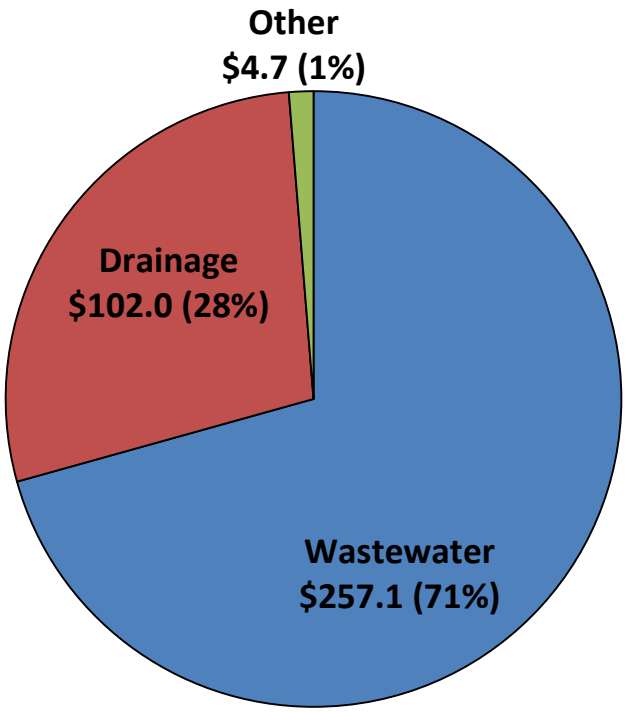


Project location is indicated by the red line on the map

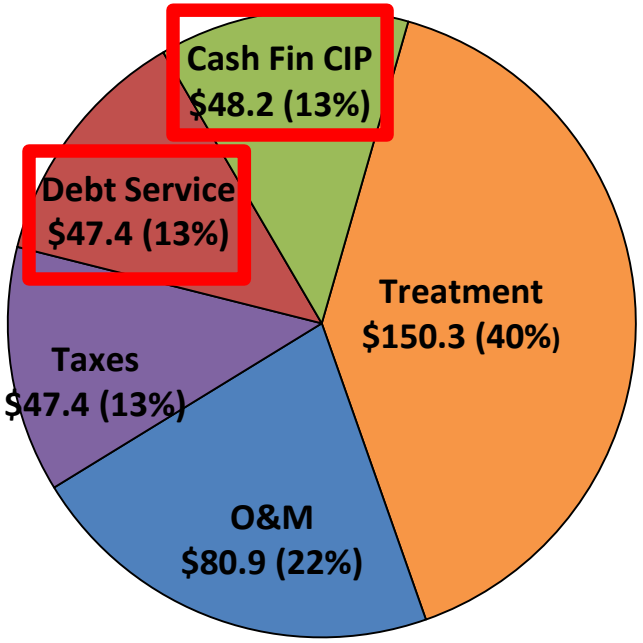
Licton Springs Localized Flooding Improvements

Wastewater Pump Station Condition Assessment

Drainage and Wastewater Fund Revenues and Expenses (2015, $ in millions)

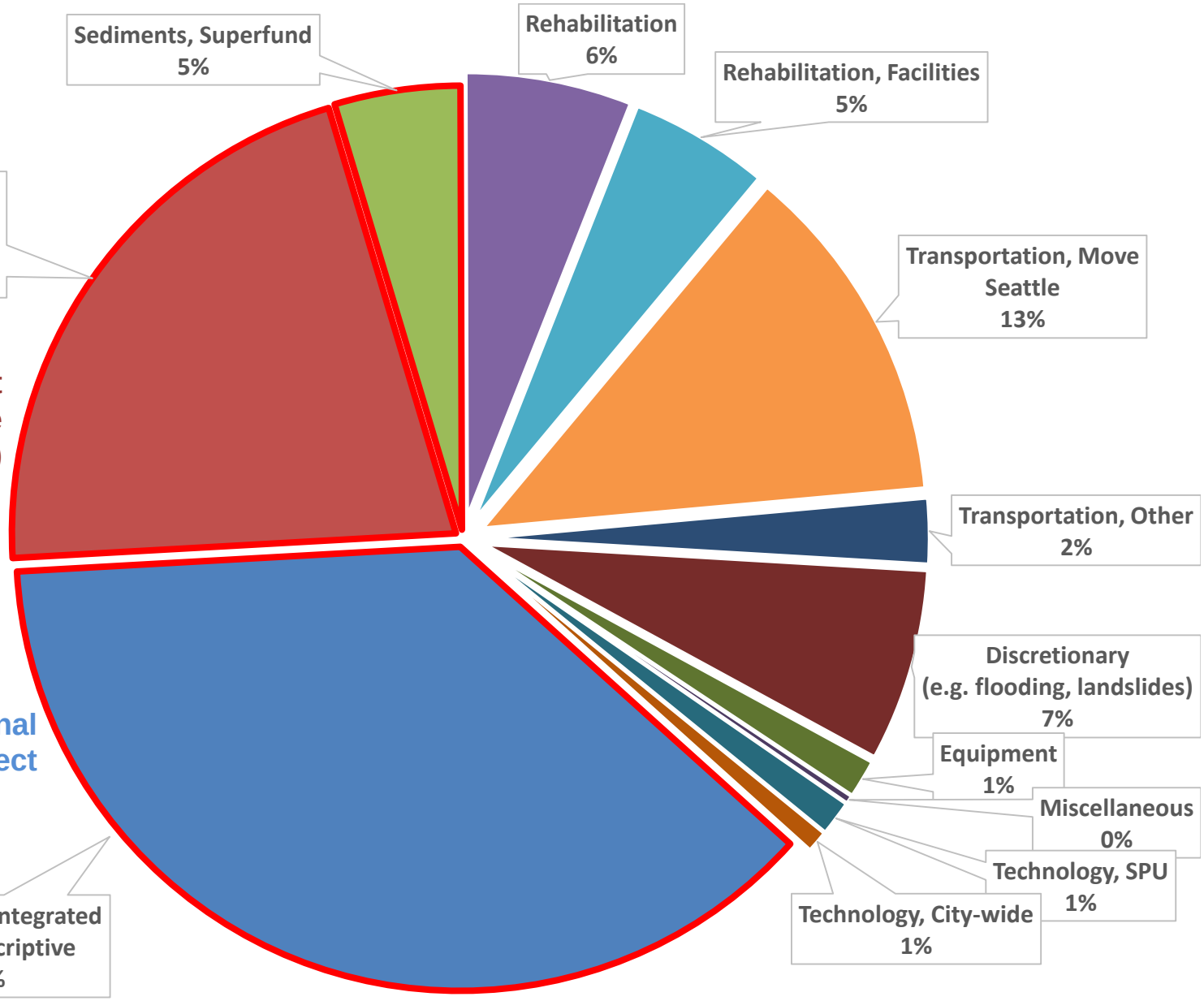


Revenues



Expenses

DWW Capital Improvement Program, 2018-2023



Capacity, Management, Operations and Maintenance (CMOM) Program

Sustainable and Reliable Collection System

Seattle Public Utilities

Seattle Public Utilities

Seattle Public Utilities

Strategy: know your system

Seattle Public Utilities

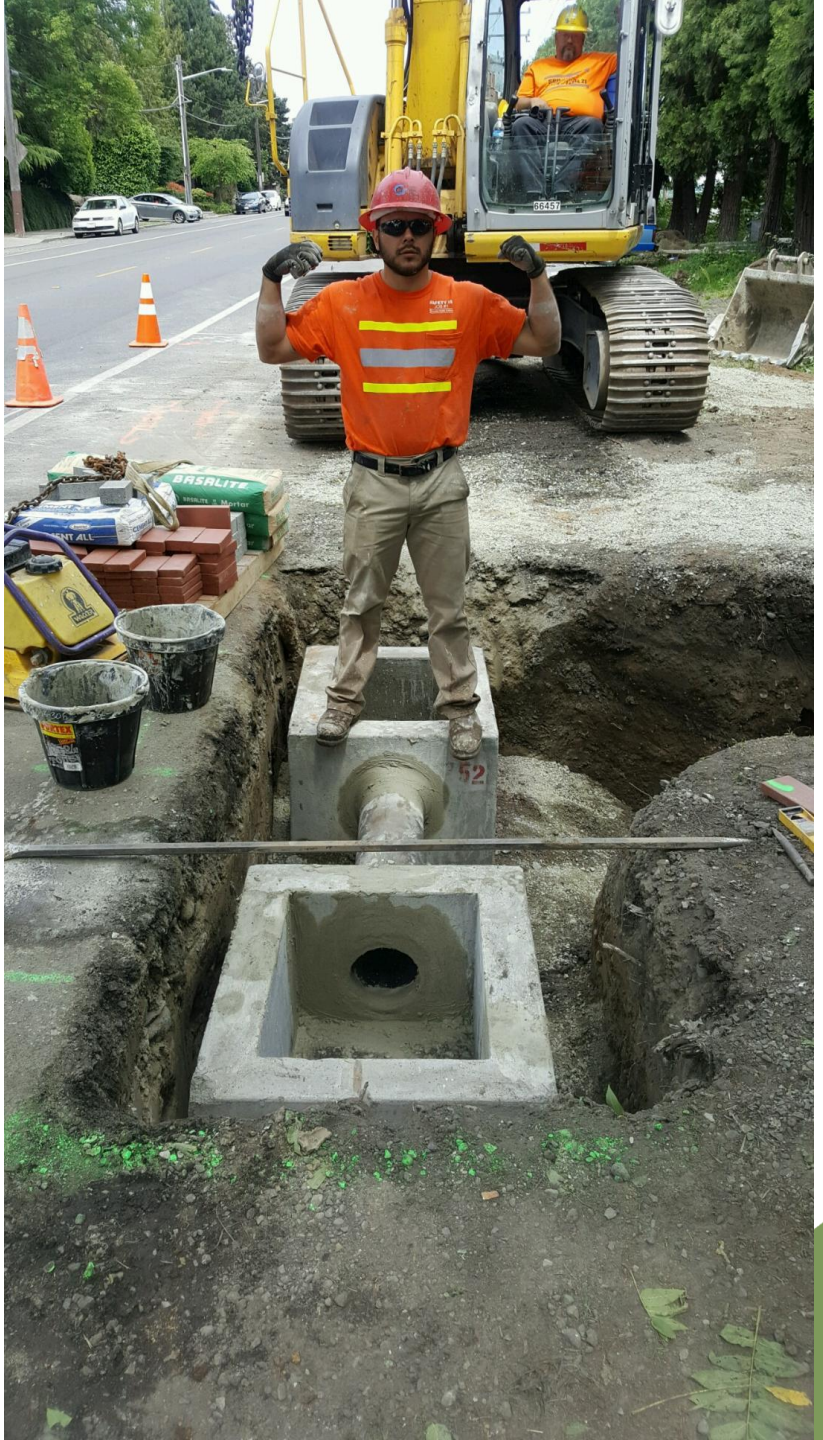
Strategy: Maintenance

Seattle Public Utilities

Strategy: Work with our customers

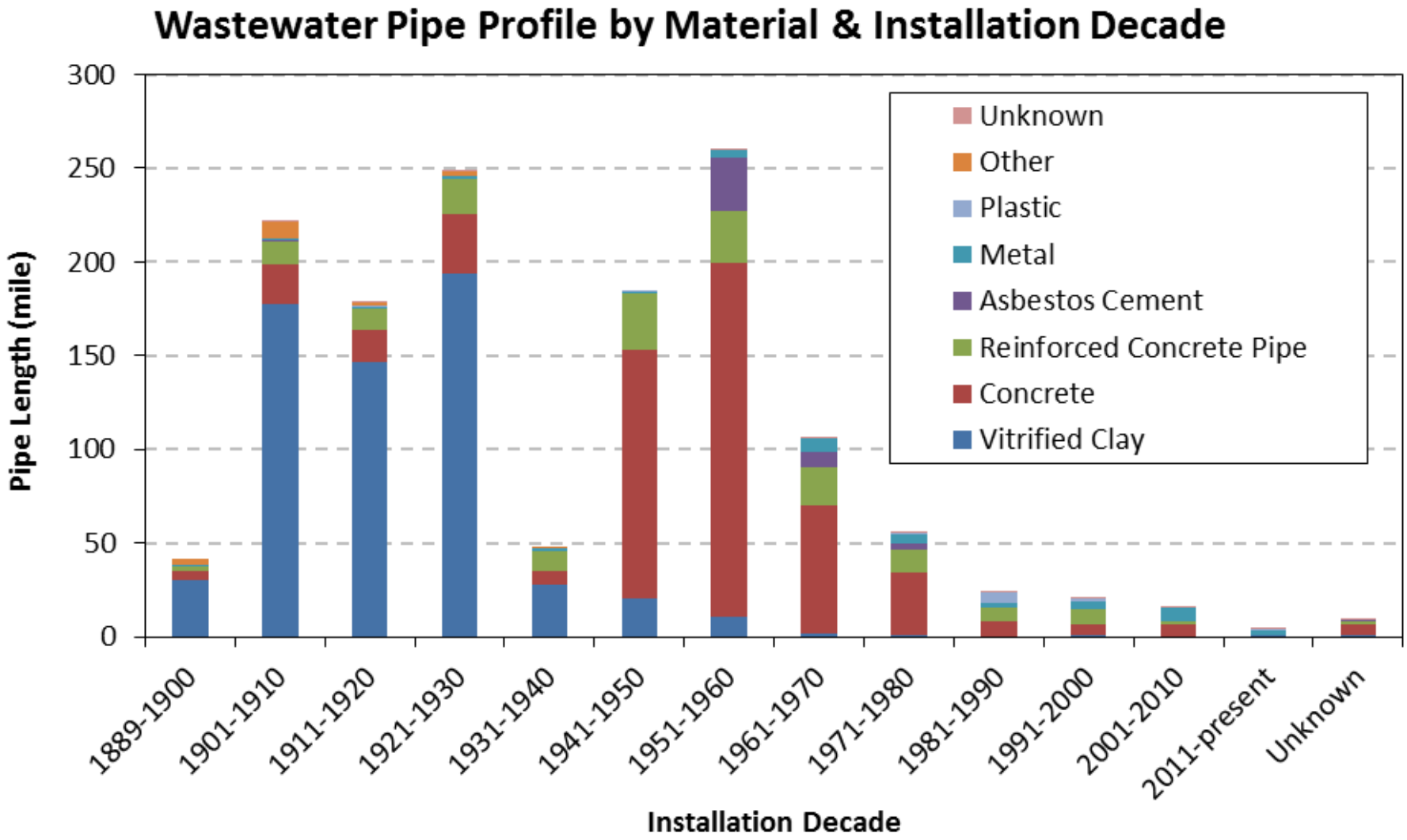
Seattle Public Utilities

Strategy: Rehabilitate

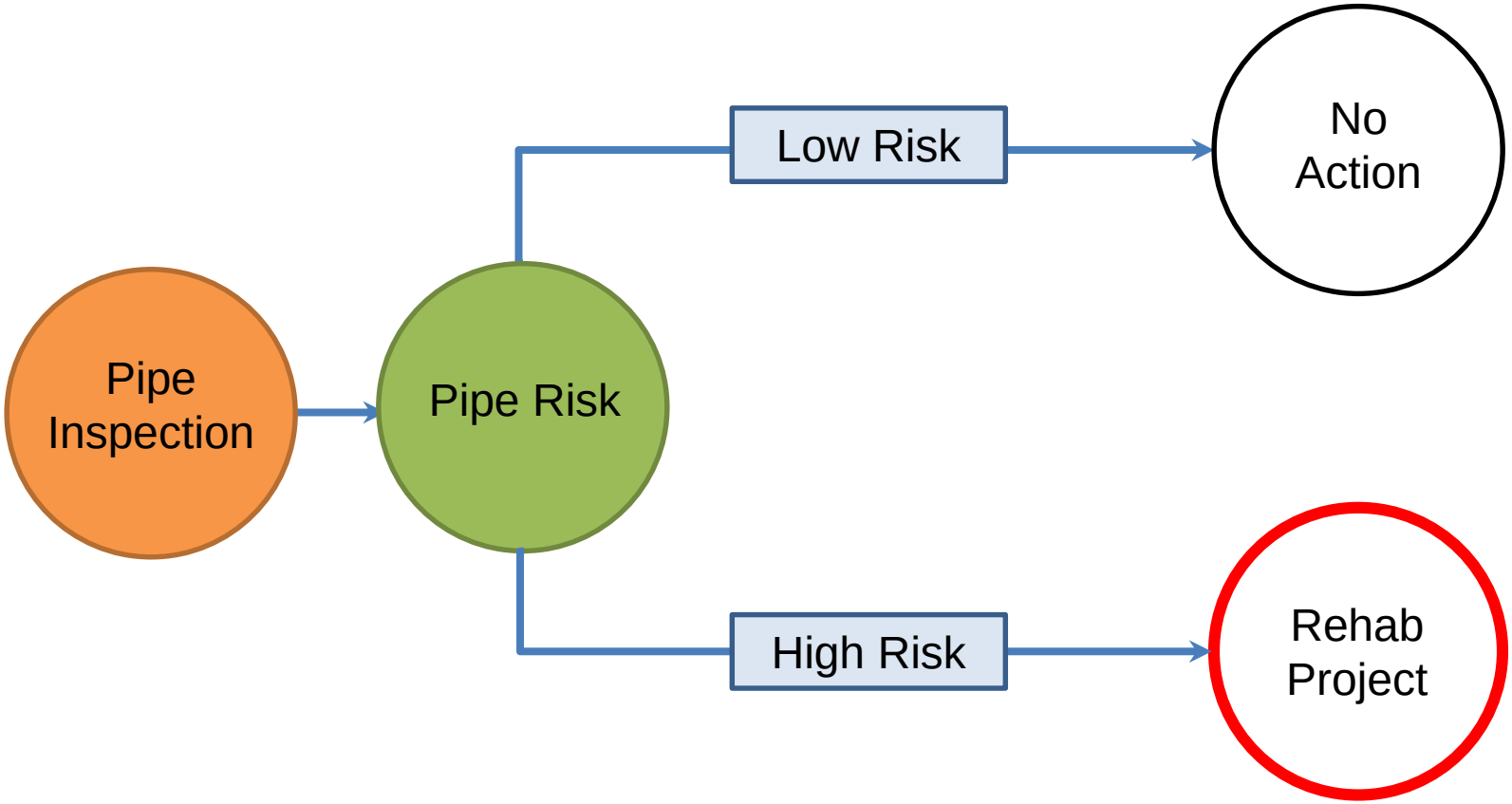


Seattle Public Utilities

Focus: Pipe Rehabilitation



The Rehabilitation Process



Seattle Public Utilities

Let's be inspectors…

Seattle Public Utilities

This is a good pipe:

Seattle Public Utilities

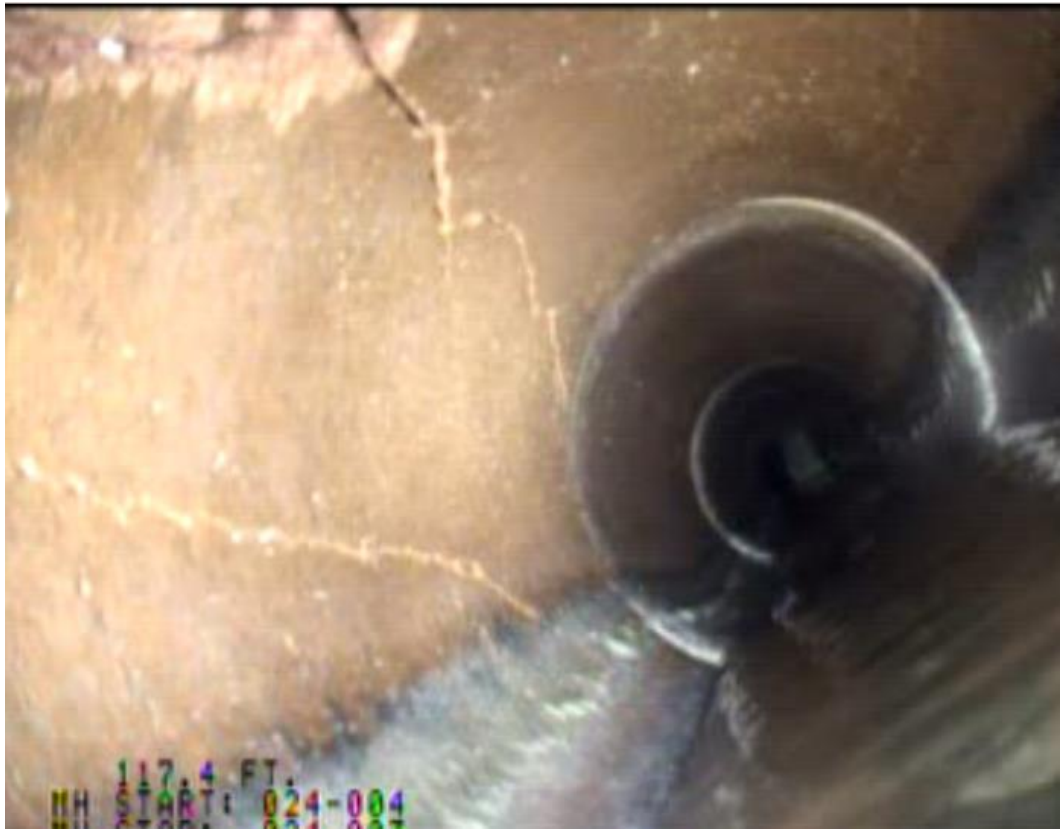
Can you spot the defect?

Seattle Public Utilities

Can you spot the defect?

Seattle Public Utilities

Can you spot the defect?



Seattle Public Utilities

What's the risk?

Seattle Public Utilities

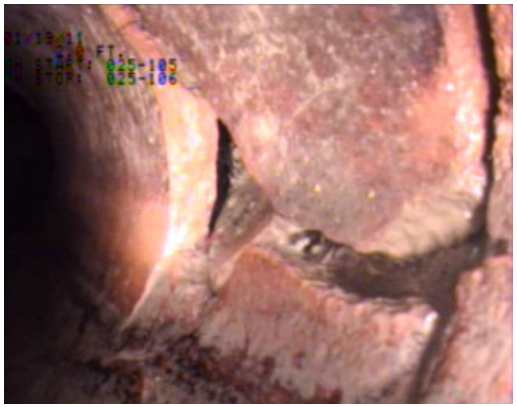
What's the risk?

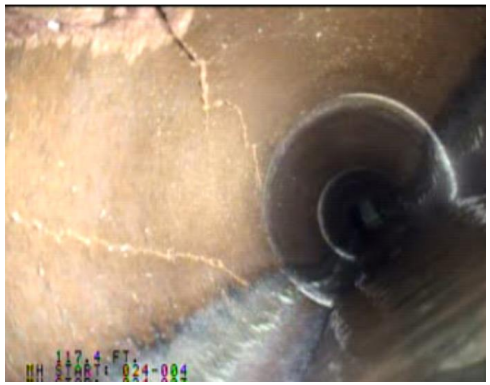
Seattle Public Utilities

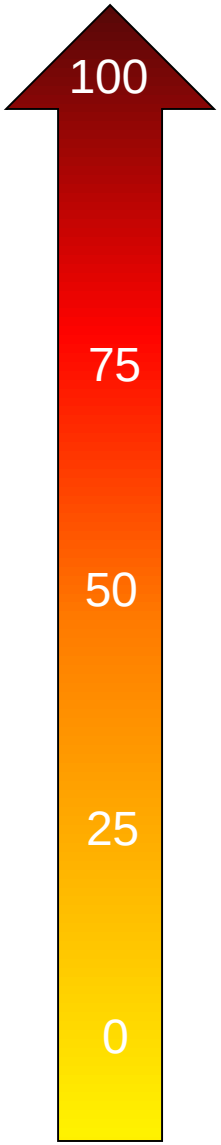
What's the risk?

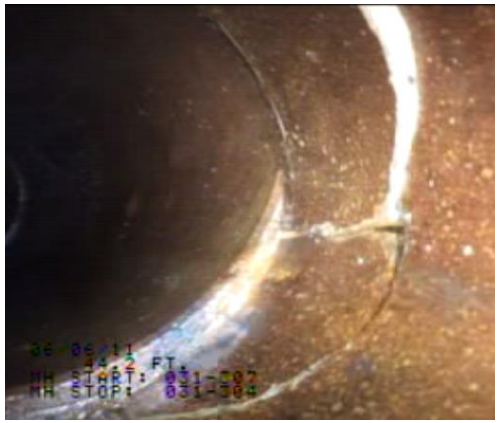
Seattle Public Utilities

Priority (Relative Risk)









Do something quick! (>80)

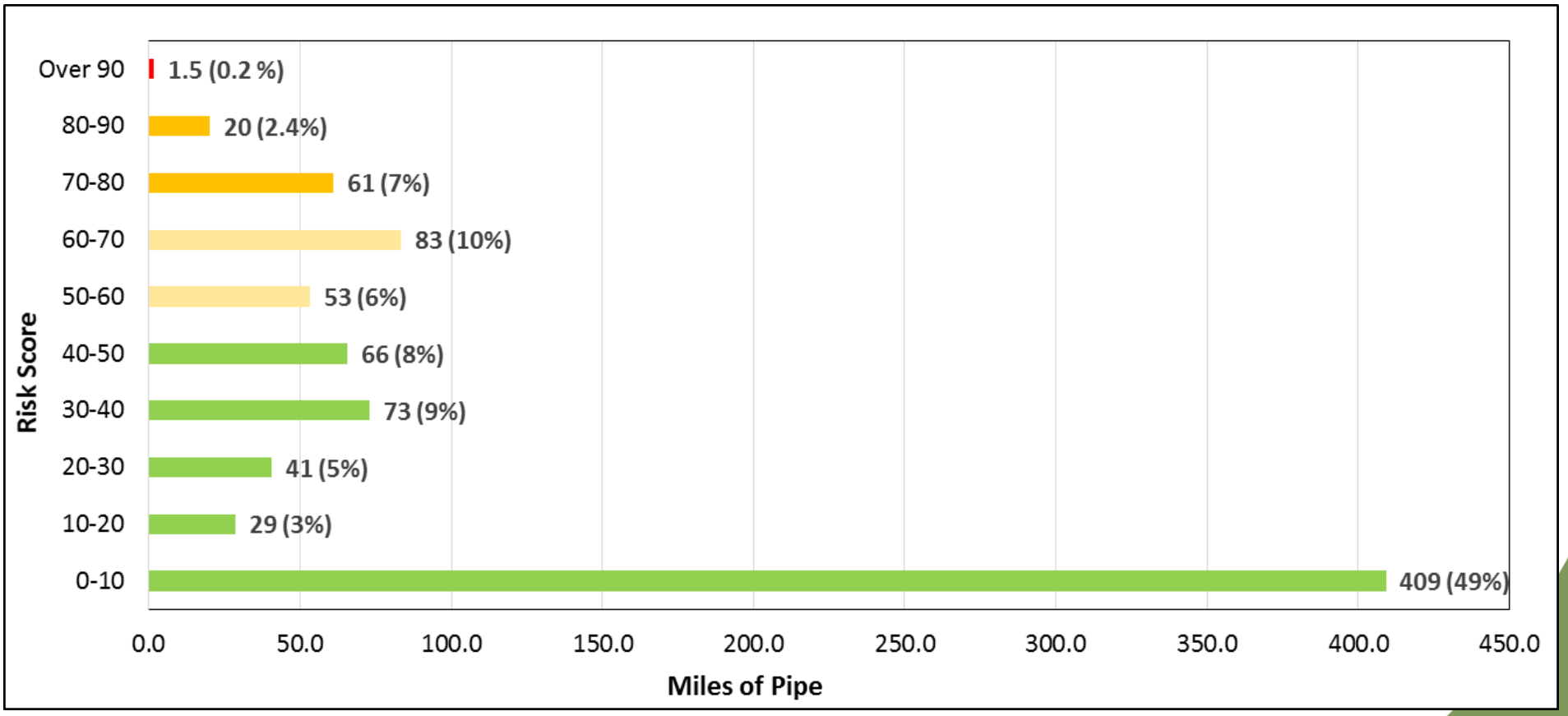
Do something (>60)

Monitor (40-60)

No action (<40)

Seattle Public Utilities

Risk Profile



Approximately 840 miles were inspected, CCTV, between 2005 and August 2016.
Approximately 82 miles (9.5%) fall in high risk category (risk score > 70).

Seattle Public Utilities

Rehab Methods

- Cured In Place Pipe (Lining): $50K; Half a day
- Spot Repair by Crews: $12k average; Few days
- Spot Repair by Contractor: $80K; Two weeks
- Full Line Replacement: $300K; Two Months

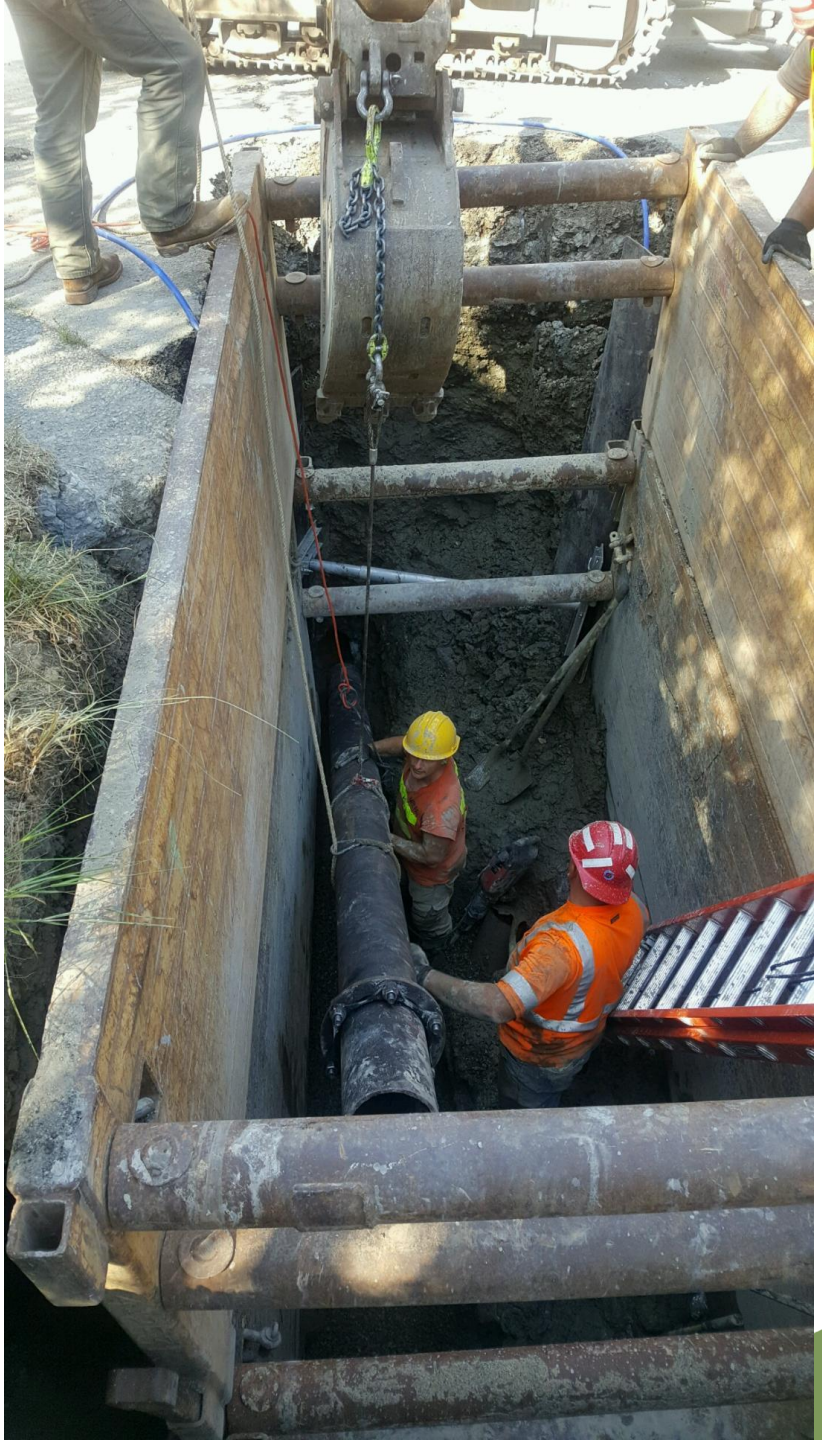
Seattle Public Utilities

Cured In Place Pipe (Lining)

- $50K; Half day
- Chemistry
- Heat or UV Light Activated
- Small Footprint

Spot Repair: Crews

- $12K
- Few days



Seattle Public Utilities

Spot Repair:

Contractor

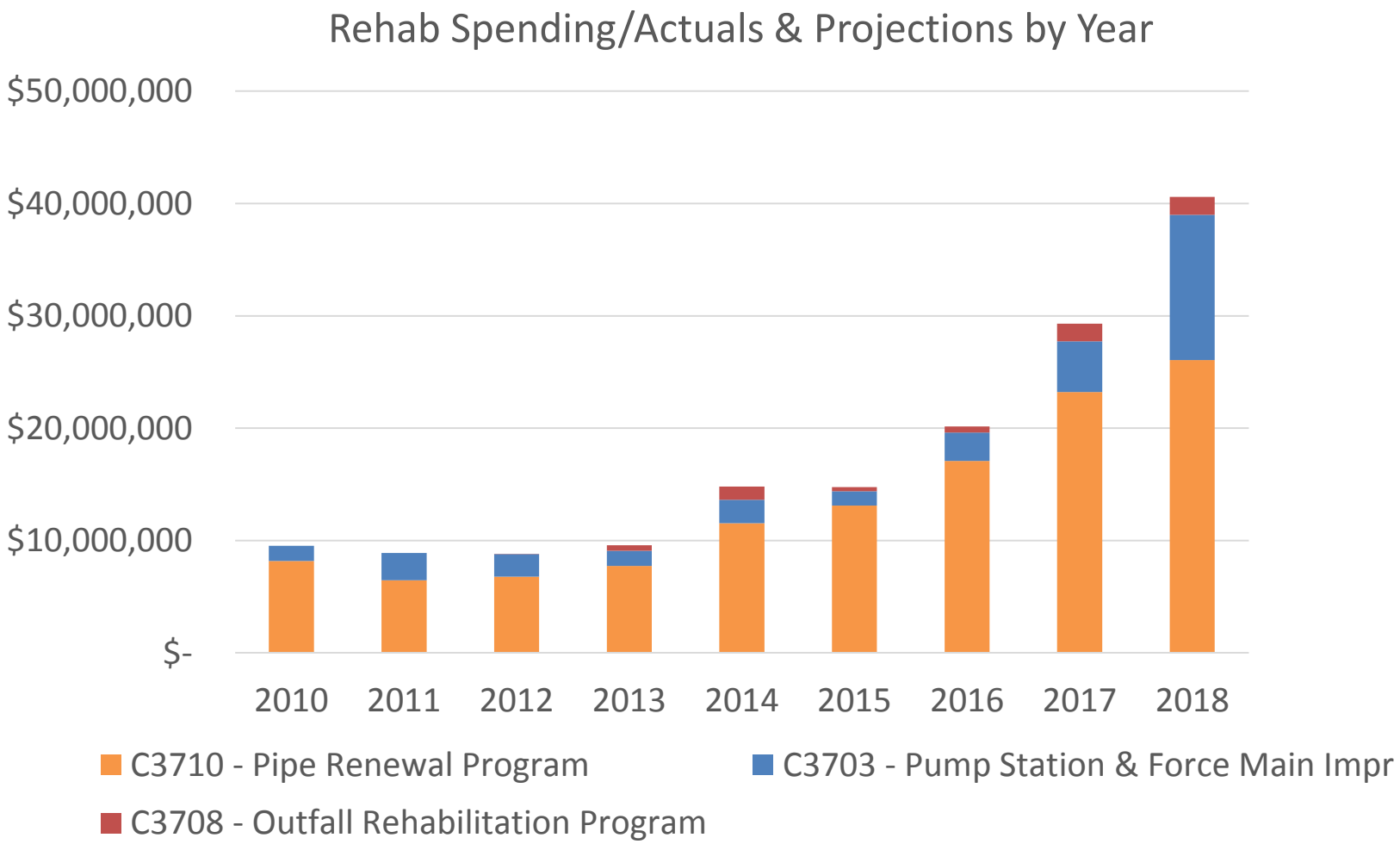
- $80K
- 2 weeks

Seattle Public Utilities

Full Line Replacement

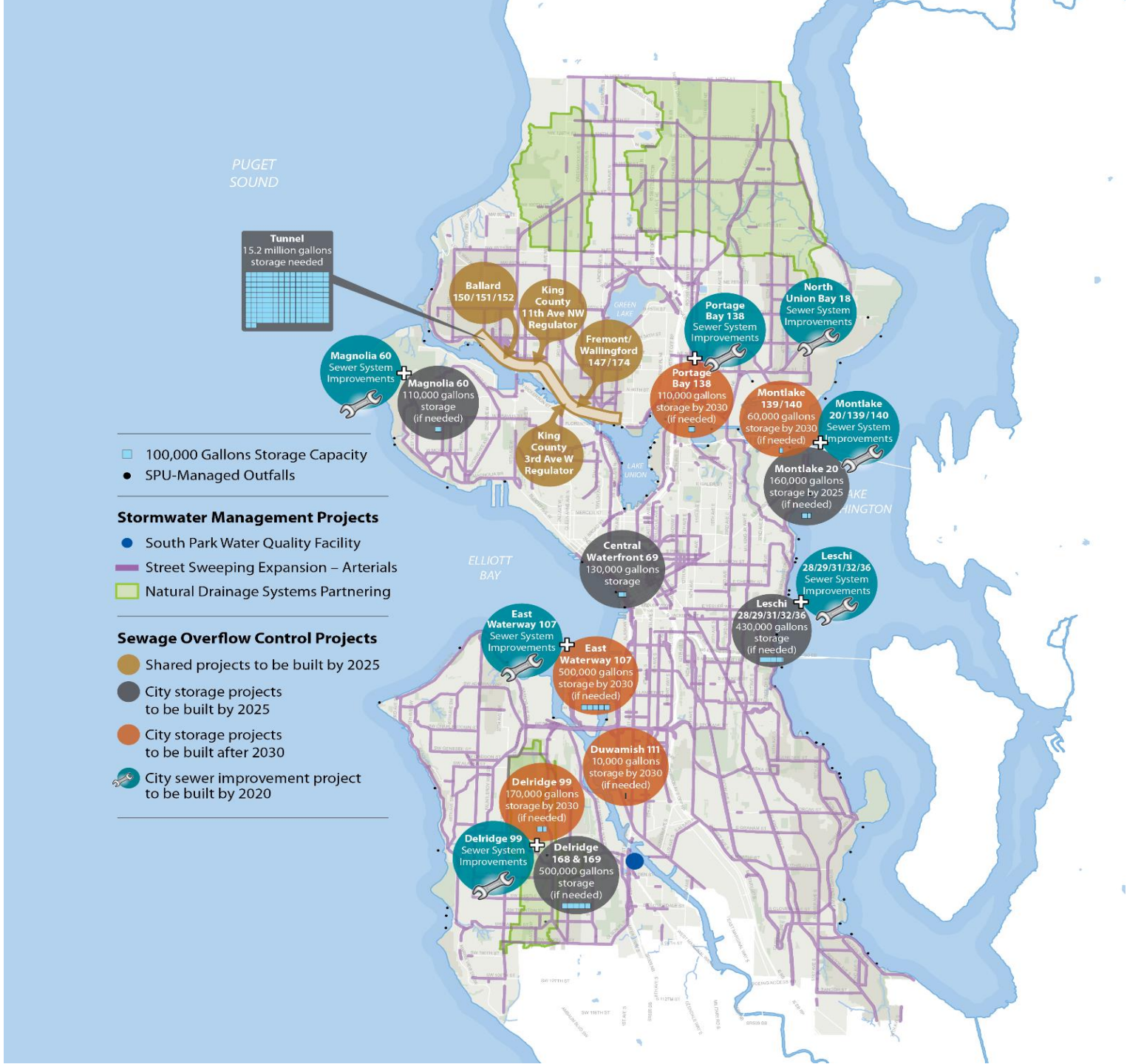
- $300K
- 2 months

Rehabilitation

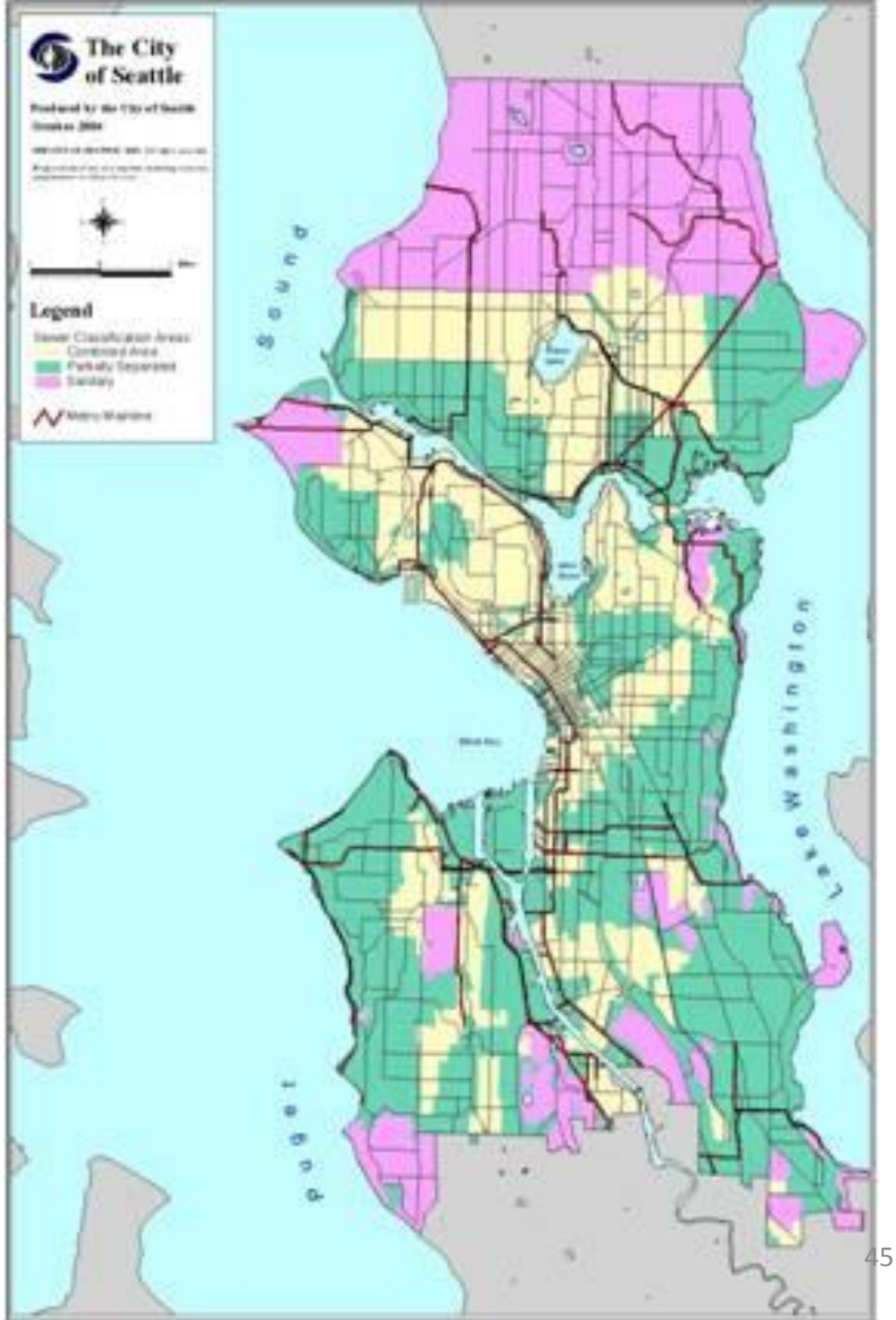


CSO Program & Ship Canal Water Quality Project (SCWQP)

Seattle Public Utilities


PUGET SOUND
Tunnel
15.2 million gallons storage needed
Ballard 150/151/152
King County 11th Ave NW Regulator
Fremont/ Wallingford 147/174
King County 3rd Ave W Regulator
Magnolia 60 Sewer System Improvements
Magnolia 60 110,000 gallons storage (if needed)
Portage Bay 138 Sewer System Improvements
Portage Bay 138 110,000 gallons storage by 2030 (if needed)
North Union Bay 18 Sewer System Improvements
Montlake 139/140 60,000 gallons storage by 2030 (if needed)
Montlake 20/139/140 Sewer System Improvements
Montlake 20 160,000 gallons storage by 2025 (if needed)
Central Waterfront 69 130,000 gallons storage
ELLIOTT BAY
Leschi 28/29/31/32/36 Sewer System Improvements
Leschi 28/29/31/32/36 430,000 gallons storage (if needed)
East Waterway 107 Sewer System Improvements
East Waterway 107 500,000 gallons storage by 2030 (if needed)
Duwamish 111 10,000 gallons storage by 2030 (if needed)
Delridge 99 170,000 gallons storage by 2030 (if needed)
Delridge 99 Sewer System Improvements
Delridge 168 & 169 500,000 gallons storage (if needed)
100,000 Gallons Storage Capacity
SPU-Managed Outfalls
Stormwater Management Projects
South Park Water Quality Facility
Street Sweeping Expansion – Arterials
Natural Drainage Systems Partnering
Sewage Overflow Control Projects
Shared projects to be built by 2025
City storage projects to be built by 2025
City storage projects to be built after 2030
City sewer improvement project to be built by 2020

Drainage & Wastewater Map



Combined System

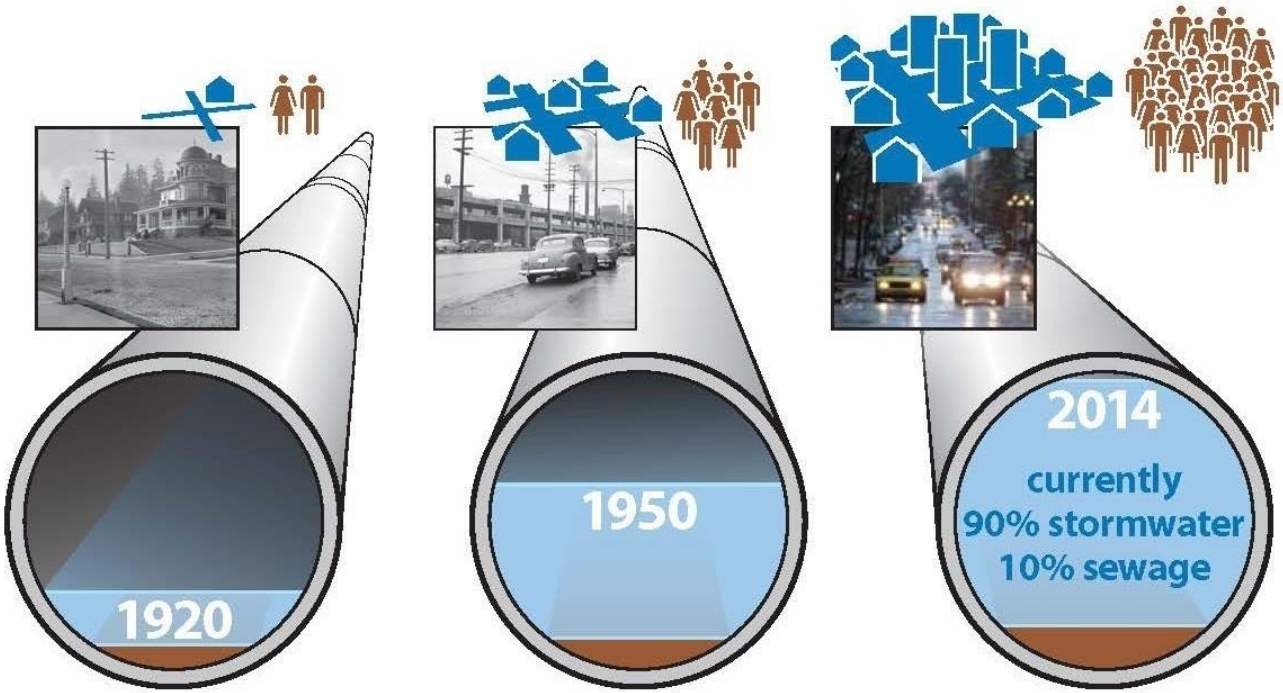
Partially Separated System

Fully Separated System

Seattle Public Utilities

Stormwater Runoff is the Problem

There's plenty of room in the pipe for sewage, but not for stormwater



Stormwater

Sewage

Since 2009, new development has had to manage its own runoff. Nevertheless, we still have to manage the runoff generated from hard surfaces built **before 2009** because the sewer system wasn't built for this much runoff.

Integrated Plan Benefits

Cleaner water faster

- Treats an additional 100 million gallons of polluted runoff each year

More “bang for the buck”

- Stormwater projects are 100 times more cost effective than deferred CSO projects

Deferring CSO projects provides time to implement sewer system improvements

- Could eliminate need to construct storage projects
- Could save up to $60M

Seattle Public Utilities

Integrated Plan Projects

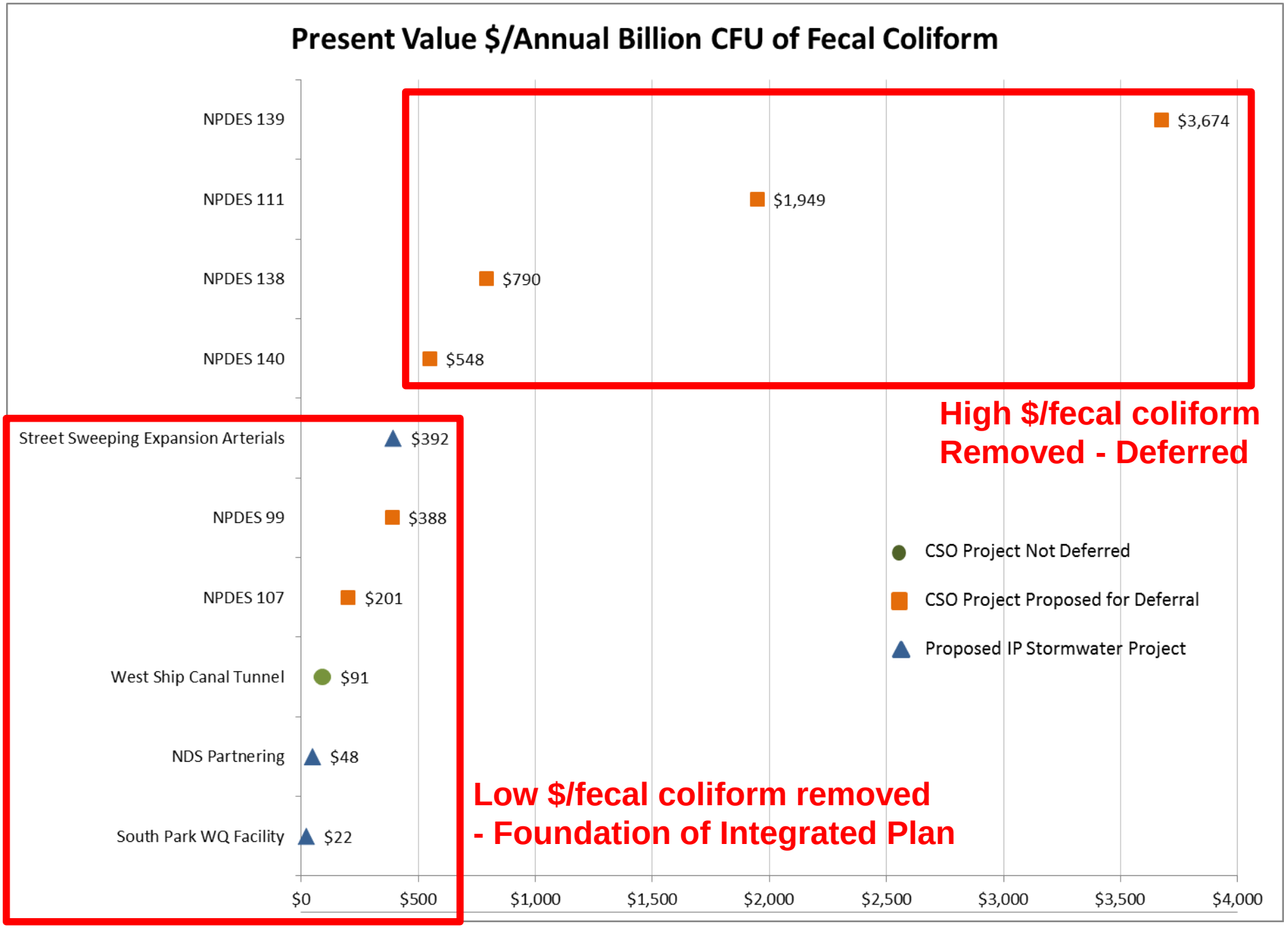
Enhanced Street Sweeping

South Park Water Quality Facility

Natural Drainage Systems Partnering

Piper's, Thornton and Longfellow Watersheds

Integrated Plan Provides Greater Water Quality Benefits


Present Value $/Annual Billion CFU of Fecal Coliform
NPDES 139
NPDES 111
NPDES 138
NPDES 140
$3,674
$1,949
$790
$548
High $/fecal coliform
Removed - Deferred
Street Sweeping Expansion Arterials
NPDES 99
NPDES 107
West Ship Canal Tunnel
NDS Partnering
South Park WQ Facility
$392
$388
$201
$91
$48
$22
CSO Project Not Deferred
CSO Project Proposed for Deferral
Proposed IP Stormwater Project
Low $/fecal coliform removed
- Foundation of Integrated Plan
$0
$500
$1,000
$1,500
$2,000
$2,500
$3,000
$3,500
$4,000

Progress

- ✓ Early action projects ($200M)
  - ✓ Windermere, Genesee and Henderson
  - ✓ Delridge Retrofit
- ✓ Launch Integrated Plan Projects
  - ✓ NDS Partnering
  - ✓ South Park Water Quality Facility
  - ✓ Street Sweeping
- ✓ Launch Sewer System Improvements
- ✓ Launch SCWQP

Seattle Public Utilities

Figure ES-7. Recommended Alternative Schedule

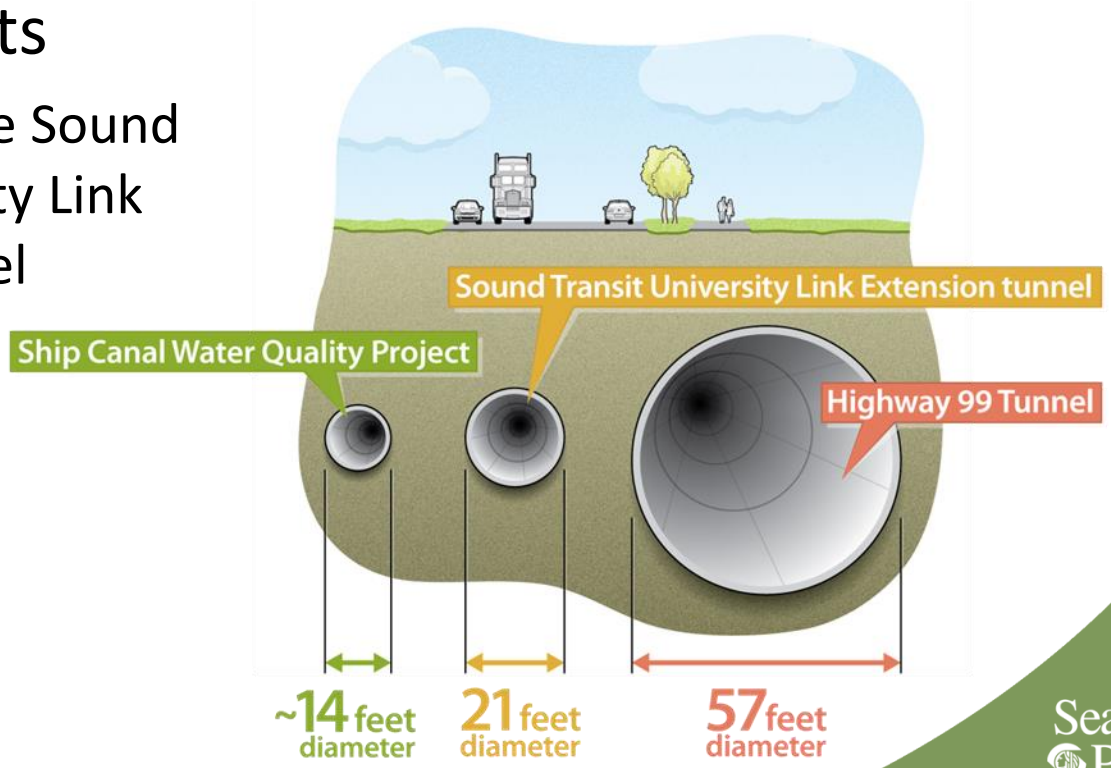
Does not include all of the currently ongoing projects. See Table ES-2 for complete list of projects.

SCWQP Project Overview Map

Tunnel Sizing

Size of Shared West Ship Canal Tunnel compared to other projects

- Smaller than the Sound Transit University Link Extension Tunnel



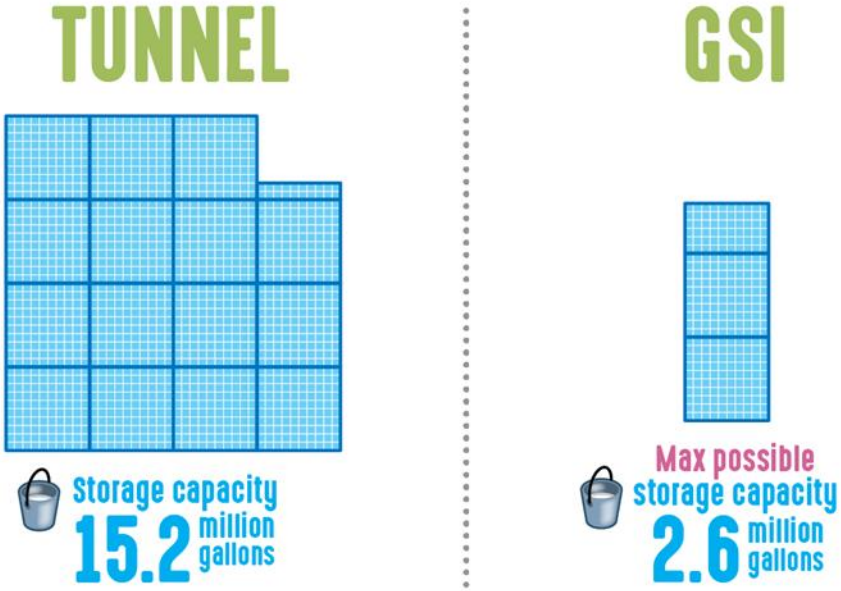
Seattle Public Utilities

Tunnel Sizing – More GSI?

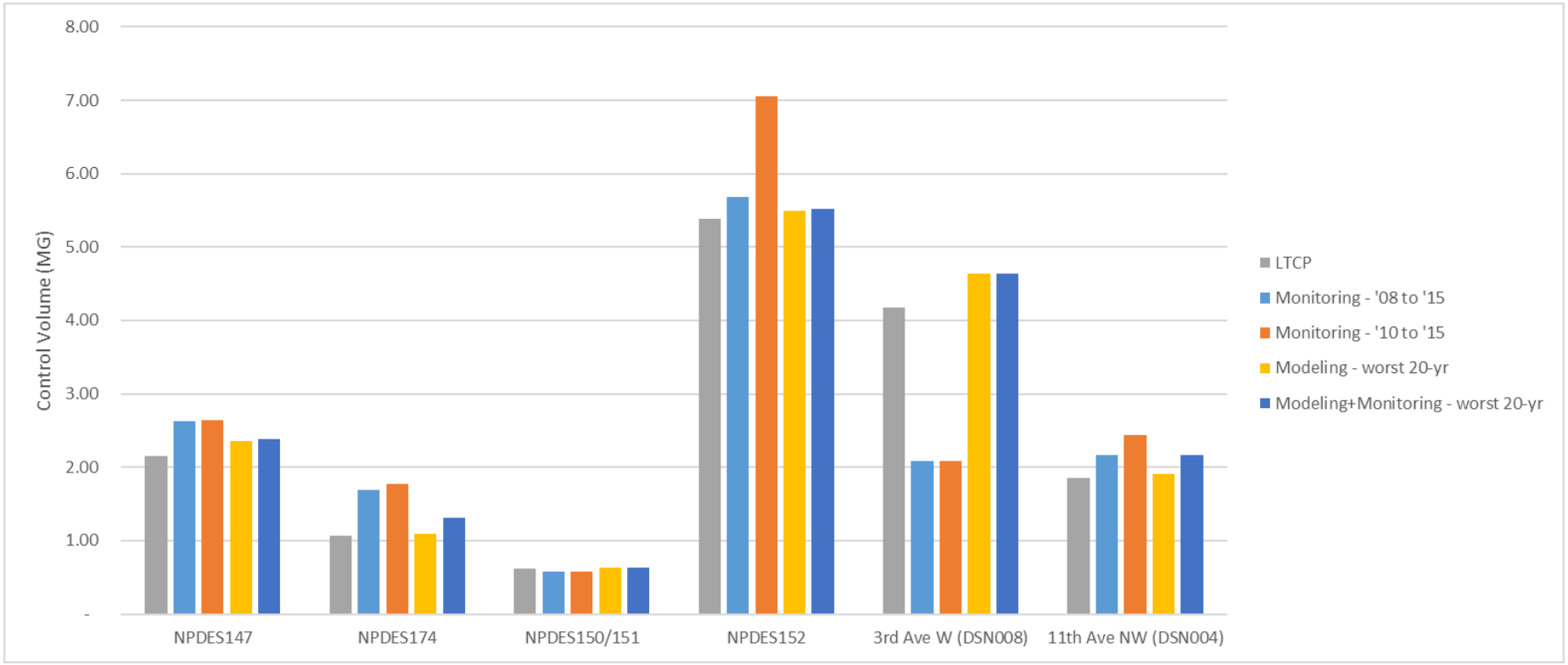
Q Why do we need to build a tunnel?
Can't we manage the CSO volume using only GSI?

A GSI alone can't provide enough stormwater overflow storage

- Not enough land for required storage
- It would require an area larger than all 3 neighborhoods combined.

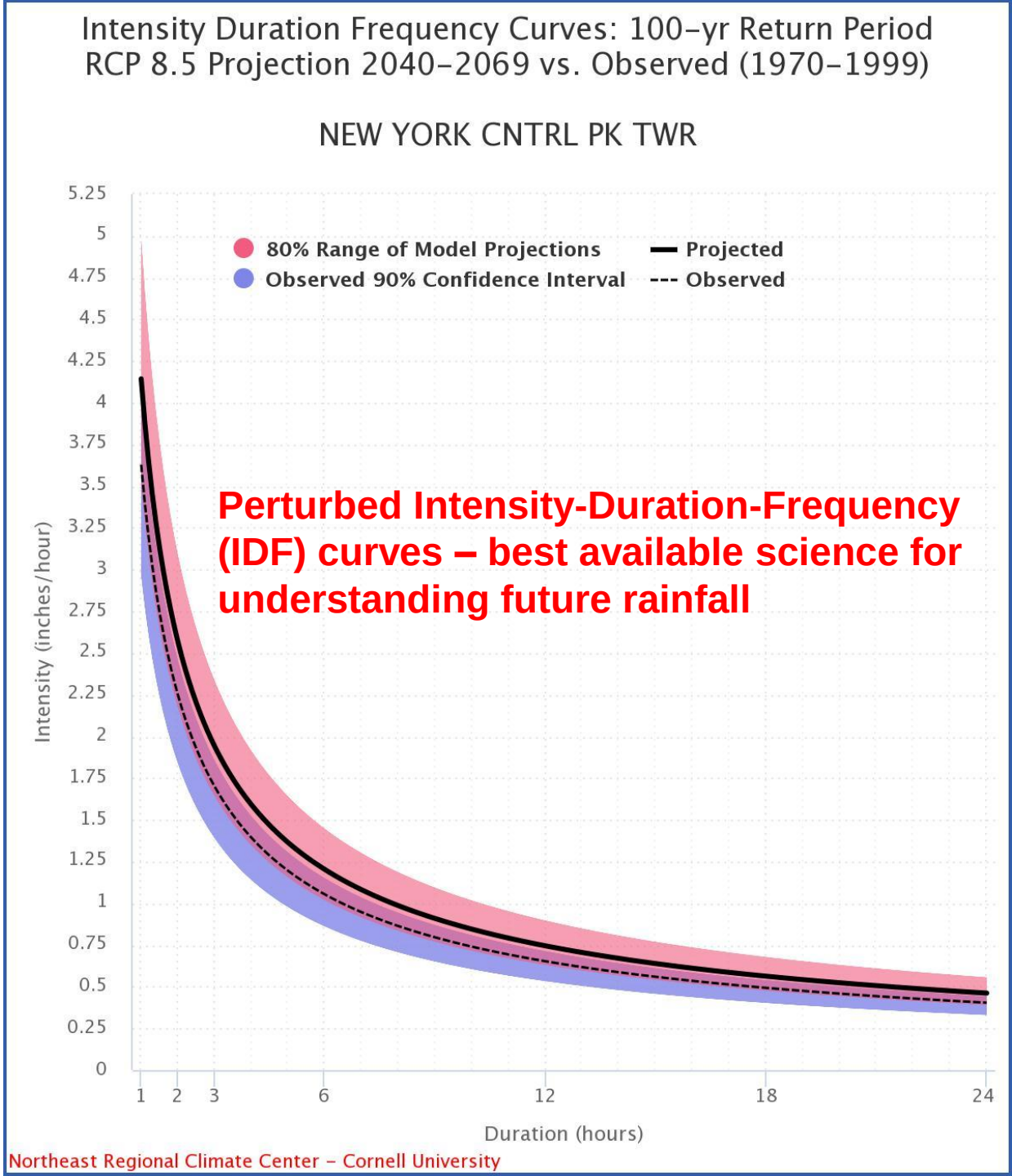


Tunnel Sizing – Past Rainfall



Looking at historical rainfall data 5 different ways at each outfall using past rainfall

Tunnel Sizing, Future Rainfall



Discussion

Seattle Public Utilities