



City of Portsmouth, Public Works

Wastewater 101 Public Information Meeting

September 13, 2023





PRESENTATION OVERVIEW AND FRAMEWORK

2

- Introduction
- Collection System
 - Terms and Overview
 - Why do we still have CSOs?
 - Why did we have recent flooding?
 - What is happening at the Mechanic Street Pump Station?
- Treatment System
 - Terms and Overview
 - How is the Peirce Island WWTF performing?
 - Do we have capacity to handle all the new construction?
- How do we pay for the work?

Will be recorded and posted on City website YouTube page

We will address the public's questions at the end of presentation



Introduction



PRESENTERS

- Erich Fiedler – City Engineer
- Brian Goetz – Director Water Resources
- Peter Rice – Director of Public Works
- Suzanne Woodland – Deputy City Manager and Regulatory Counsel





WHY ARE WE HERE TONIGHT?

- To introduce and make available the City team
- To communicate our approach towards regulatory compliance
- To help all residents and ratepayers better understand the investments made in the wastewater system
- To provide answers to questions that have been circulating about the City's wastewater system



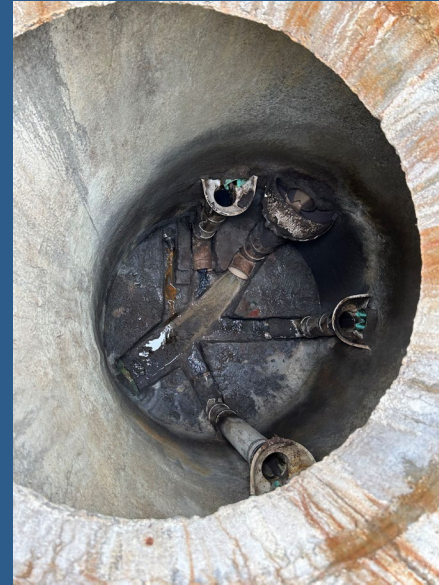
Collection System



COLLECTION SYSTEM TERMS

WASTEWATER

- Industrial, commercial, and domestic liquid wastes. Generated from sinks, showers, toilets, dishwashing, washing machine drains, manufacturing byproducts, etc.
- <https://portsnh.co/wastewater>





COLLECTION SYSTEM TERMS

STORMWATER

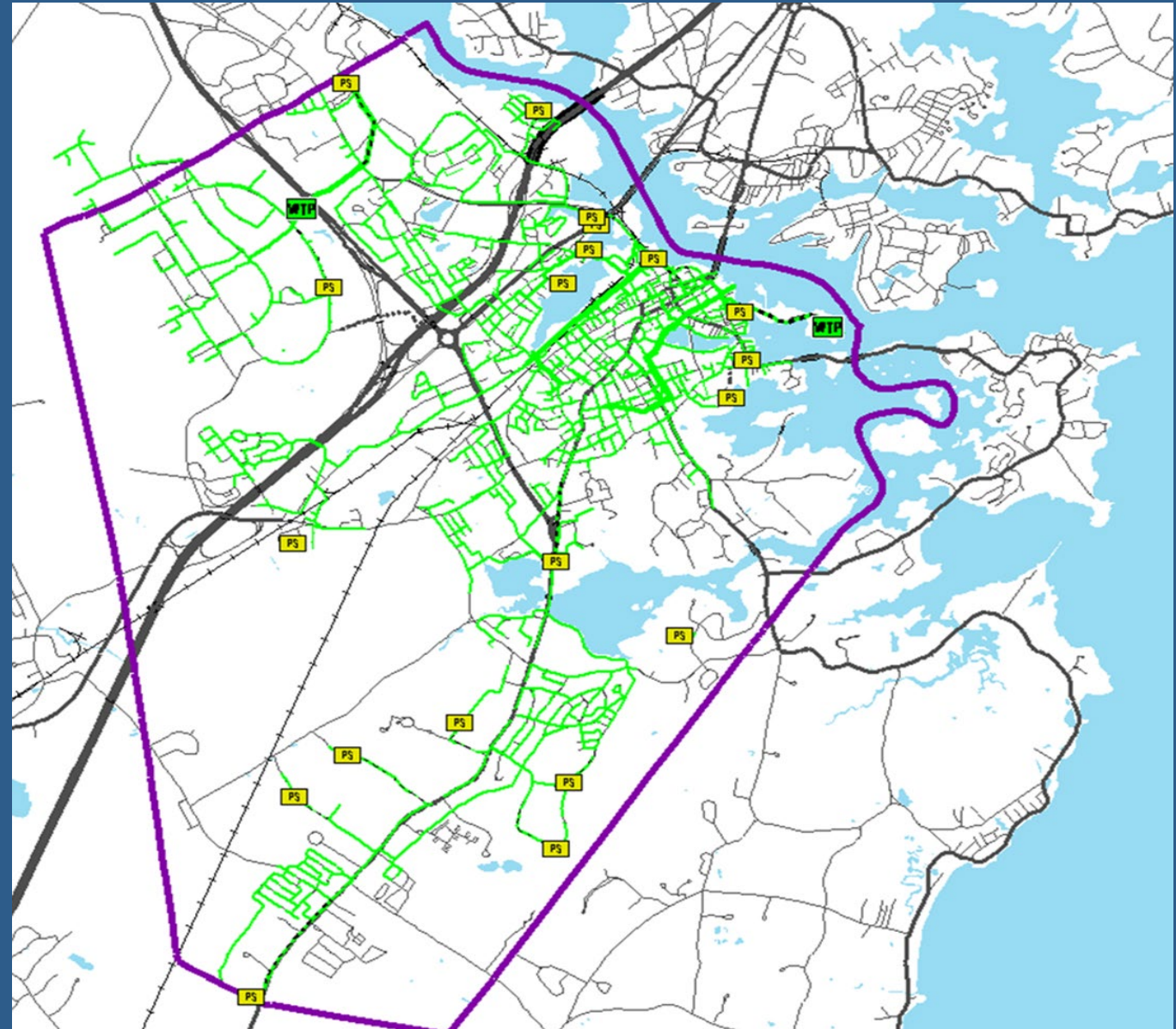
- Runoff from impervious surfaces such as roads, roofs, pastures, construction, etc.
- Can contain agricultural wastes, metals and oils from roads, septic leachate from failed septic tanks, atmospheric depositions, etc.
- <https://portsnh.co/stormwater>





COLLECTION SYSTEM

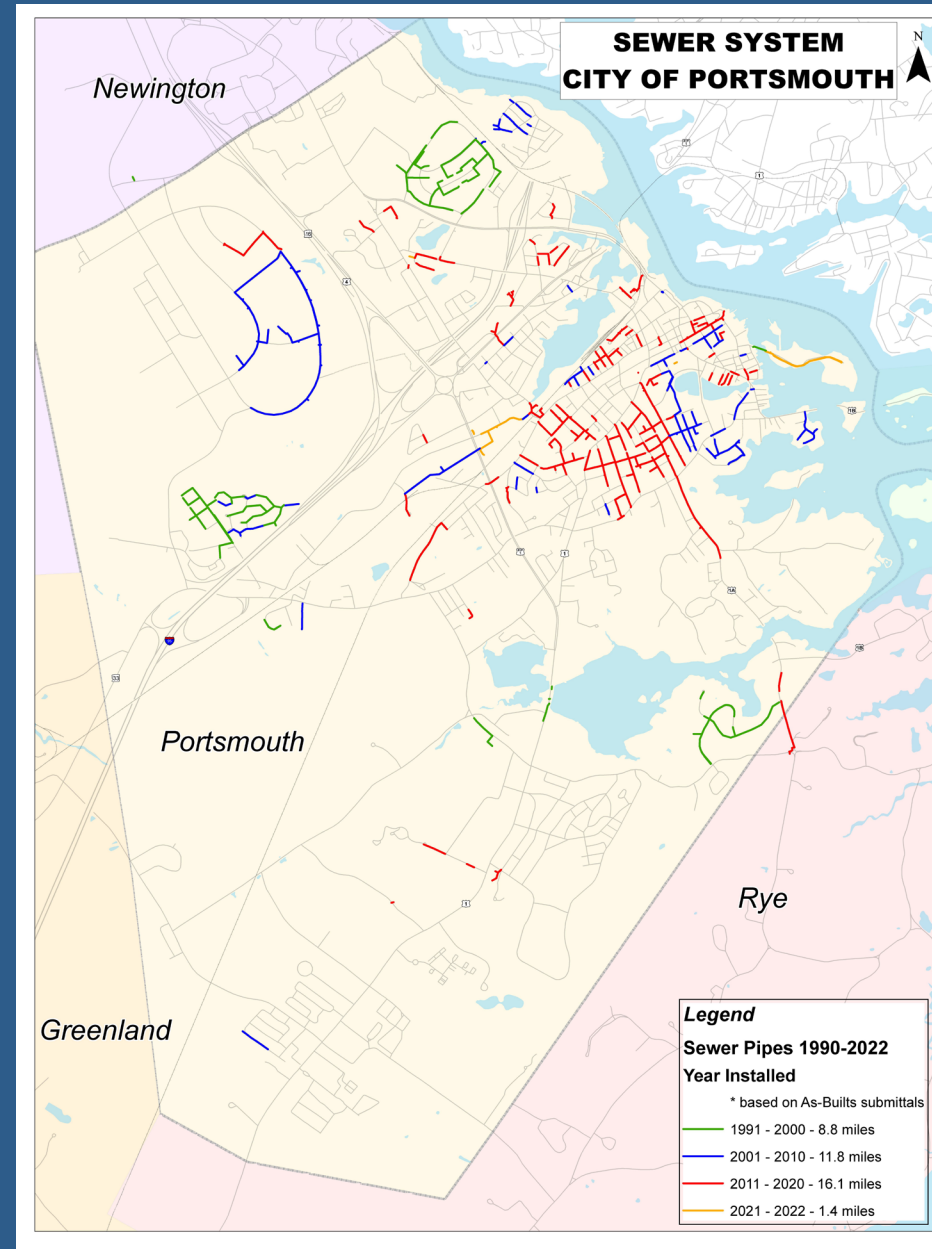
- ≈ 6,700 Service Connections
- 120 Miles Sewer Mains
 - 18% Combined
 - Town of New Castle
 - Customers in Greenland
 - Portions of Rye
- 20 Pump Stations
- 3 Permitted CSO outfalls





COLLECTION SYSTEM REPLACEMENTS

- 38.1 miles of sewer mains replaced since 1991
- ~ 32% of the total piping replaced

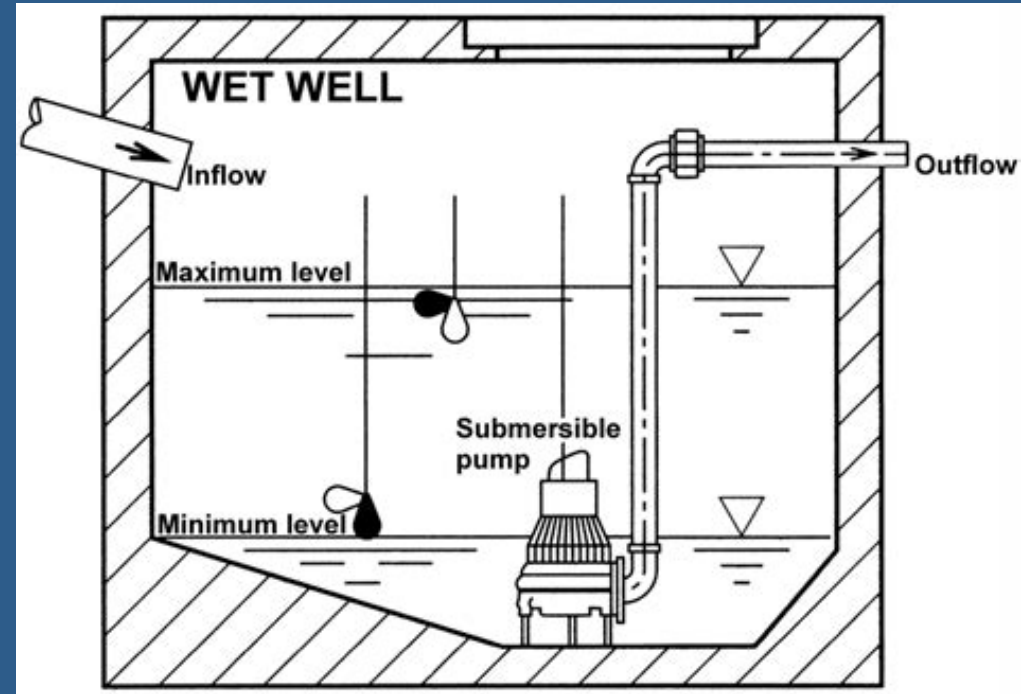




COLLECTION SYSTEM TERMS

PUMP STATIONS

- A pump station is a storage and collection chamber that lifts and distributes wastewater when it cannot naturally be carried by gravity.

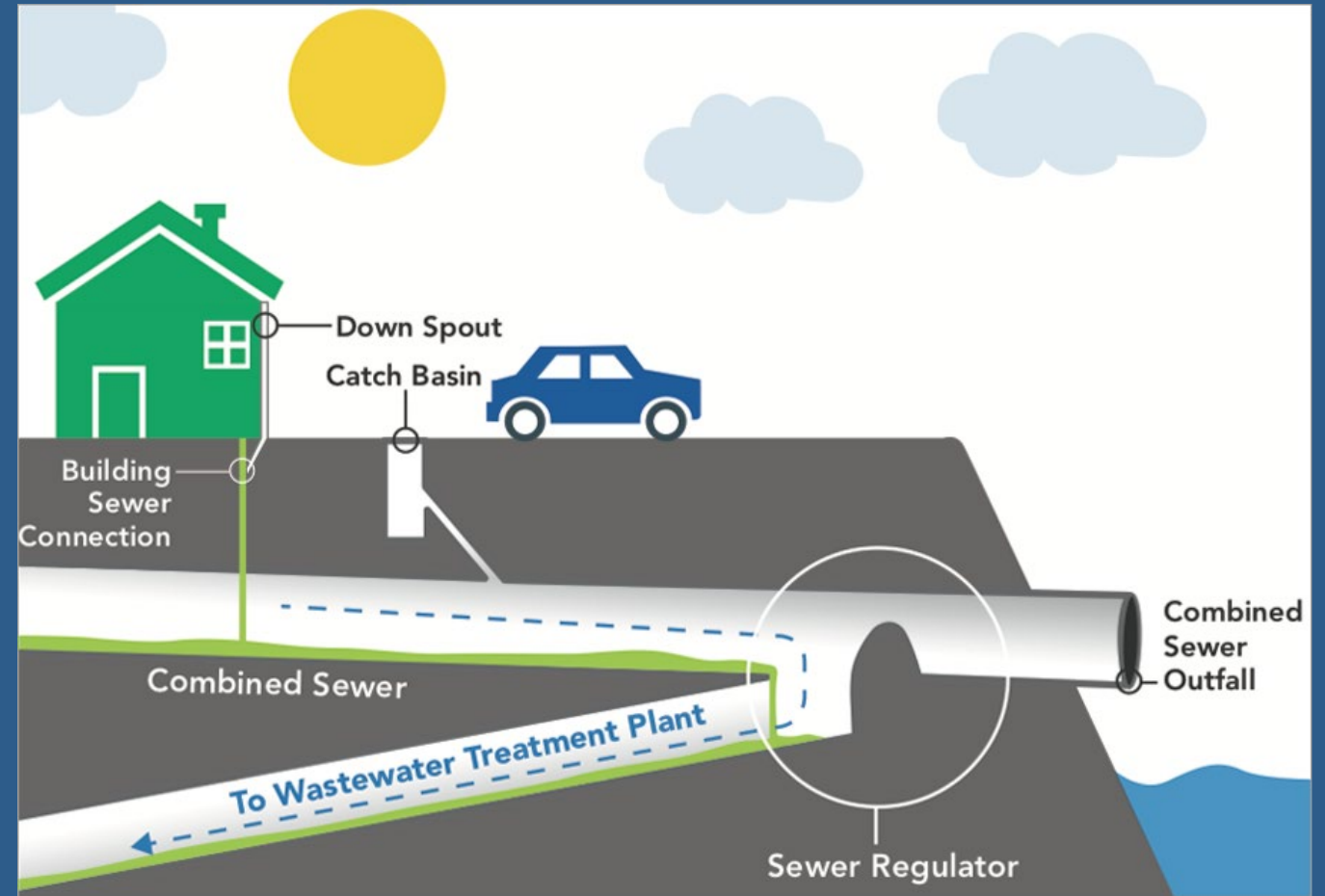




COLLECTION SYSTEM TERMS

COMBINED SEWER

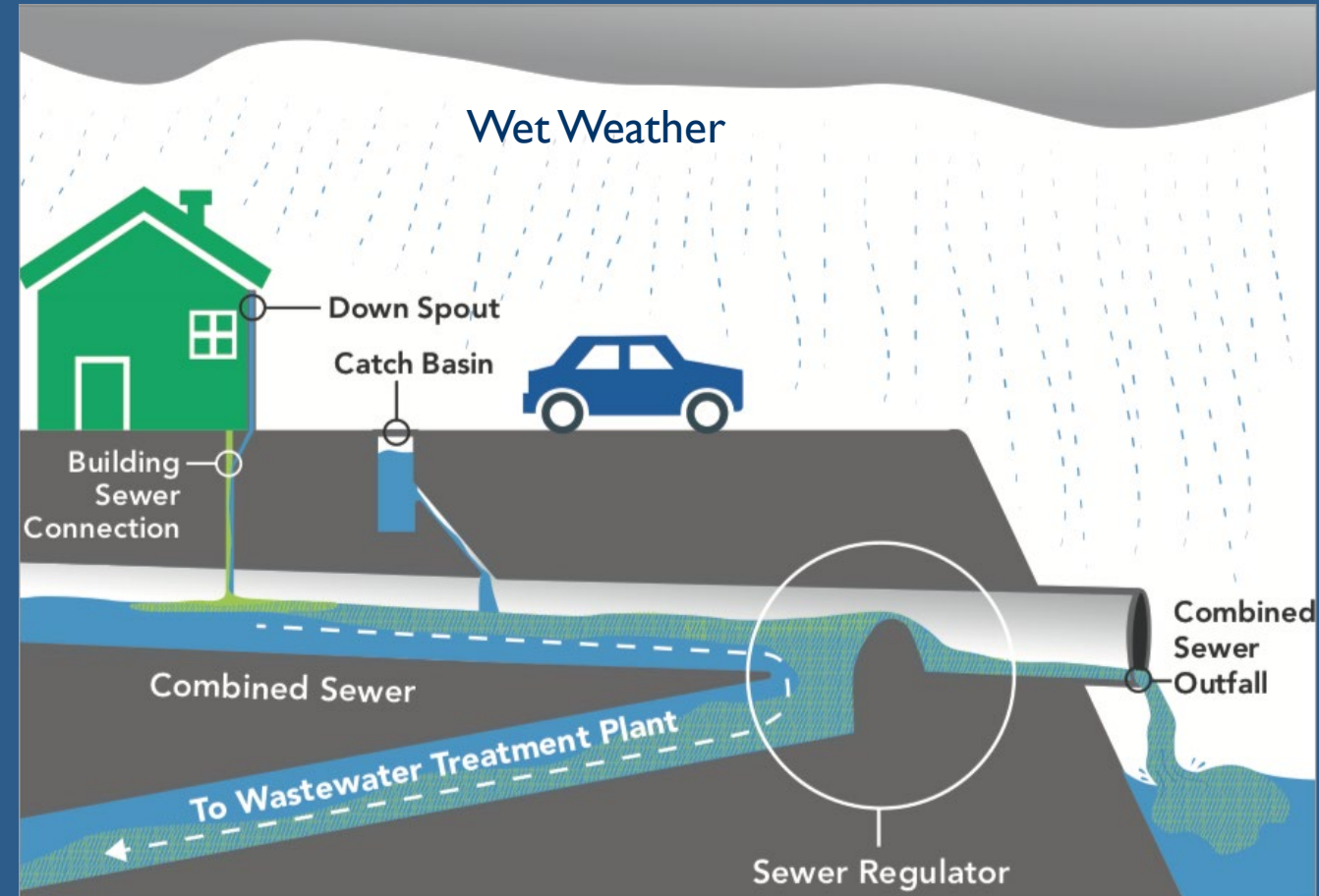
- A system that collects rainwater runoff, domestic sewage, and industrial wastewater into one pipe.





COMBINED SEWER OVERFLOW (CSOs)

- Sometimes the amount of runoff exceeds the capacity of the system. When that happens, untreated stormwater and wastewater flows into nearby waterbodies.
- Approximately 700 communities in the United States have CSOs.
- <https://portsnh.co/cso>





Why do we still have Combined Sewer Overflow (CSO) Events?



WHY DO WE HAVE CSO OUTFALLS?

- Intense Rain Events (rate of rain, inches per hour) overwhelms portions of collection system
- System is not capable of conveying all wastewater and stormwater during intense rain events
- Need to provide relief points
- If not, combined wastewater will come out basements and on streets





WHAT IS DISCHARGED DURING CSO EVENT

- >99 % Water
- Other parts include
 - Wastewater
 - Road runoff
 - Fertilizer runoff
 - Pet Waste
 - Wildlife (Geese)
 - Metals and hydrocarbons





CURRENT CSO LOCATIONS



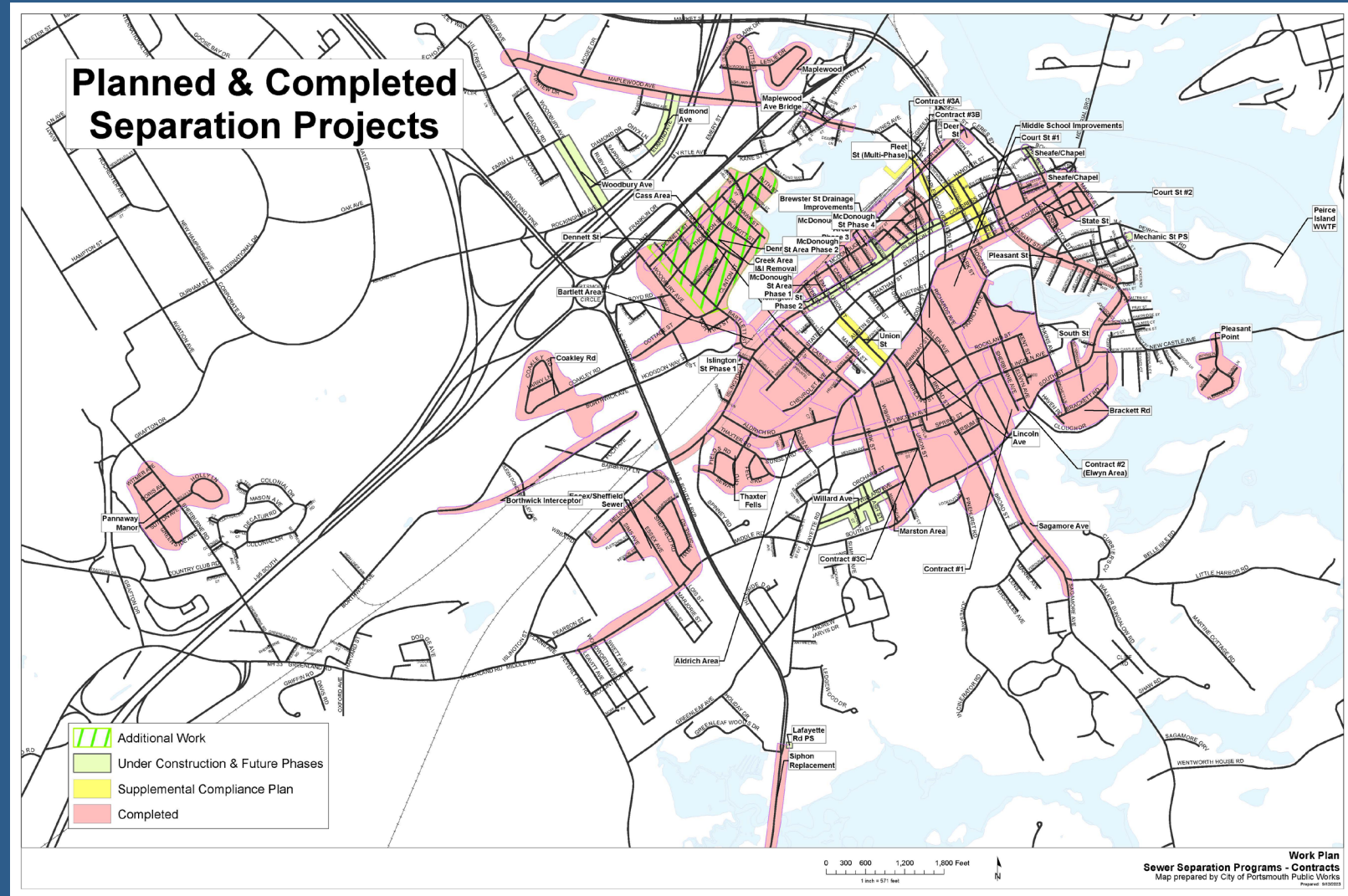


WORK COMPLETED AND NEXT PROJECTS

City has separated the combined sewers in all the areas shown in pink.

Projects currently underway are shown in green and yellow and include:

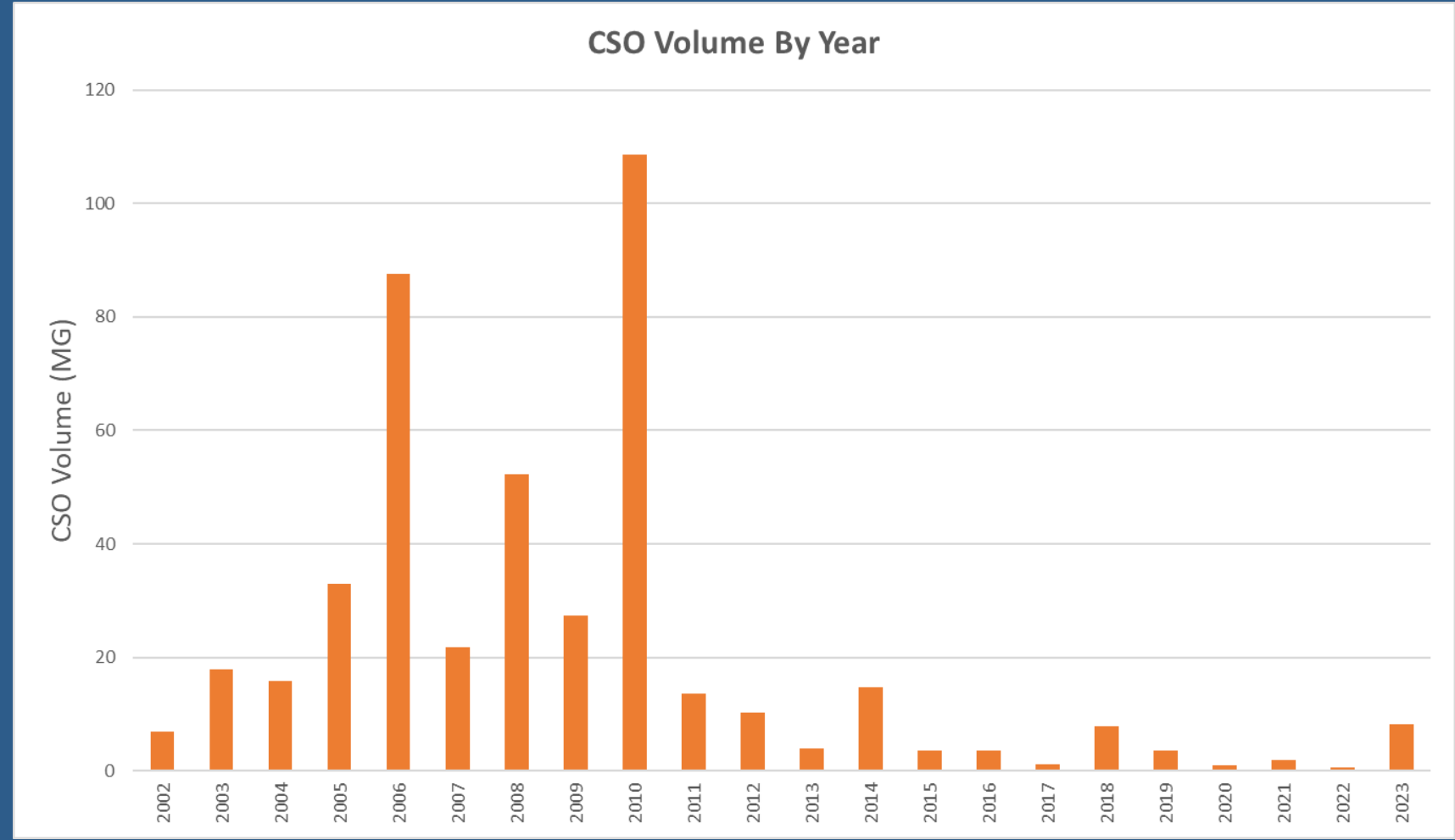
- Fleet Street
- Court Street to Hanover Street
- Union Street
- State Street to Middle Street
- Contract I - Sewer Rehab





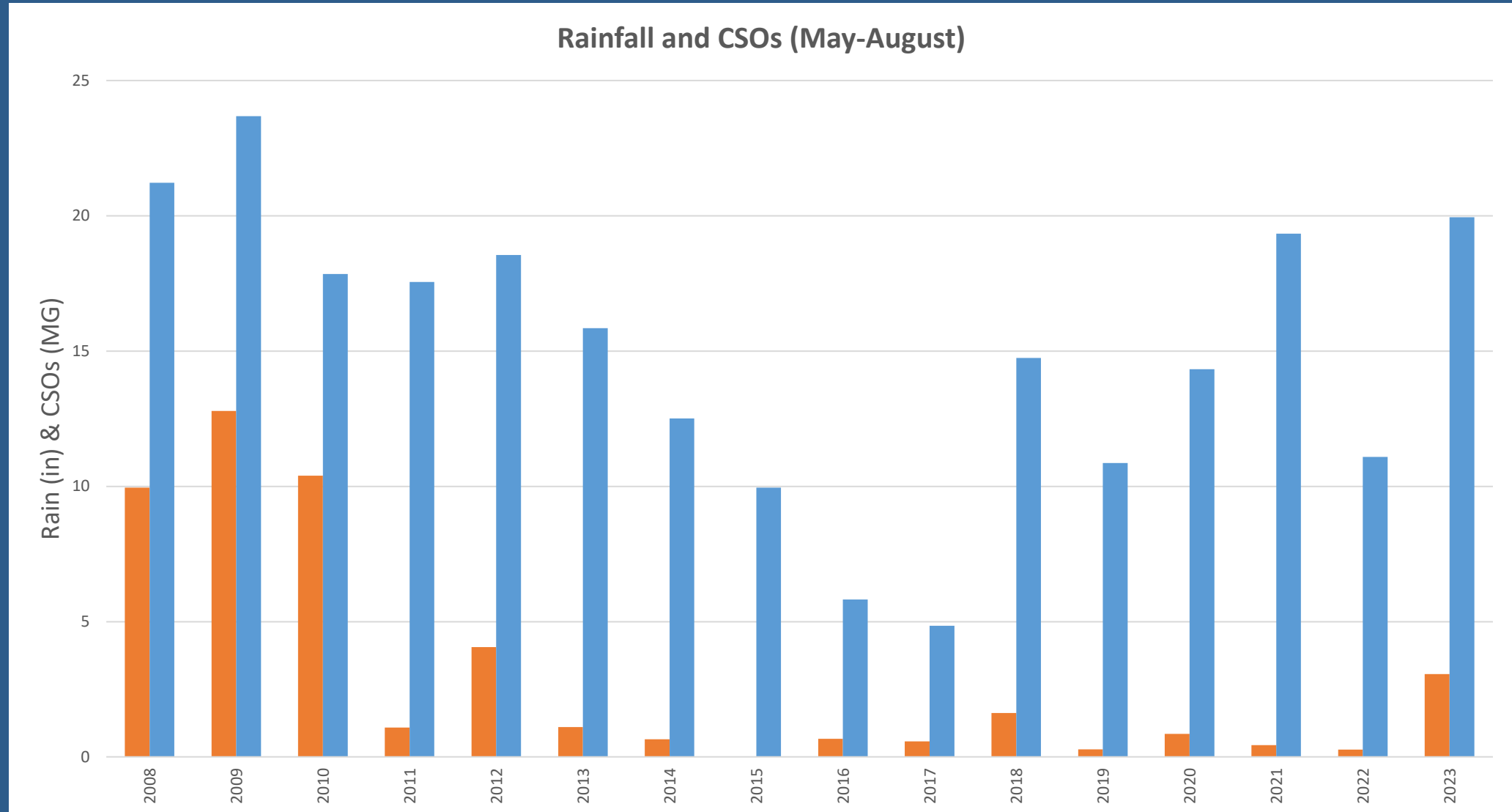
PROJECTS AND FLOW REDUCTIONS

- Since 2002
 - 28 sewer projects
 - \$194 million capital investment
 - \$70 million CSO specific
 - ~90% Reduction in CSO volumes





SUMMER CSO COMPARISONS





CSO TRENDS

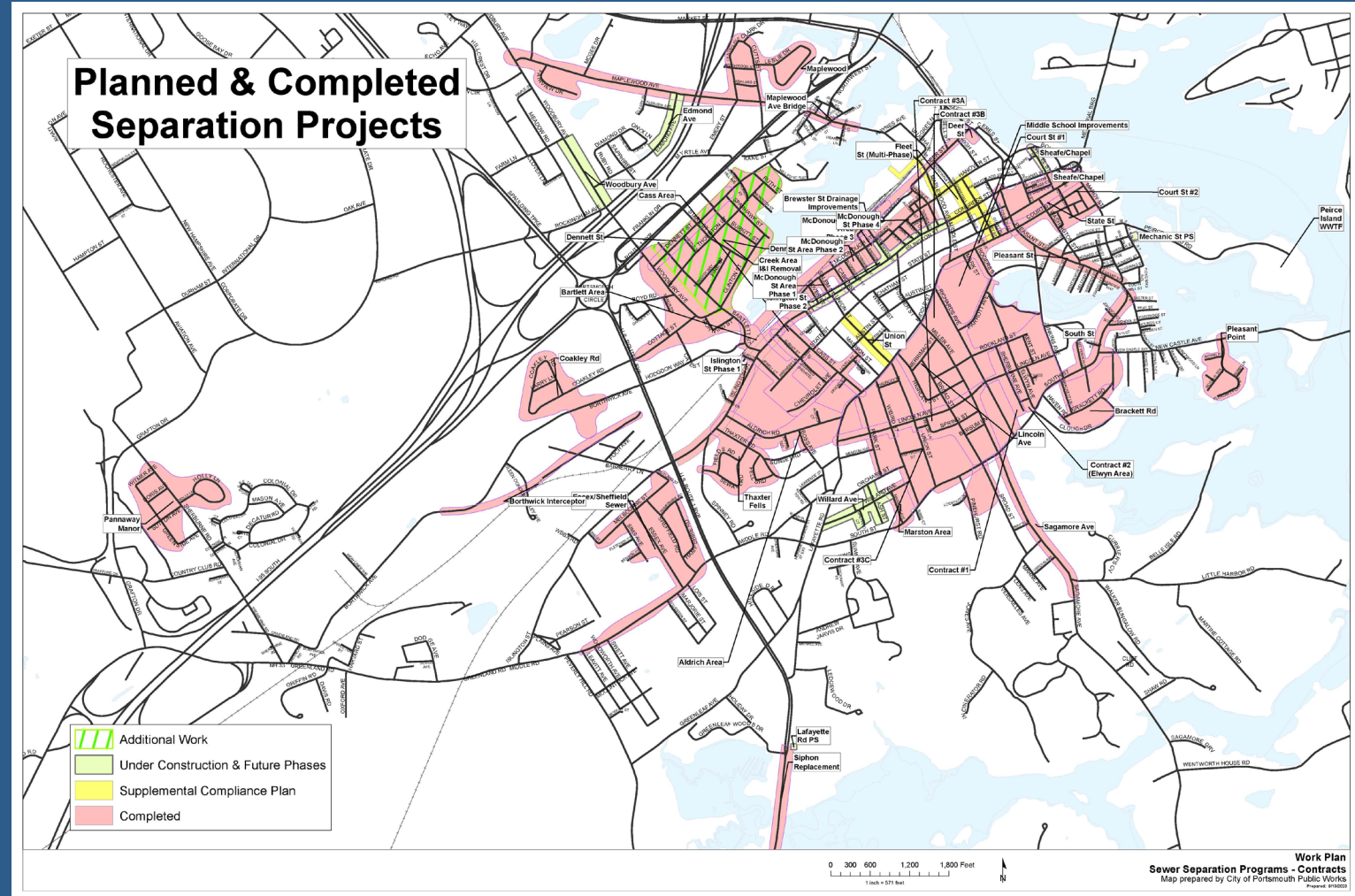
- Significant Reduction in Street Flooding
- Significant Reduction in Basement Flooding





WHEN WILL CSOs BE ELIMINATED?

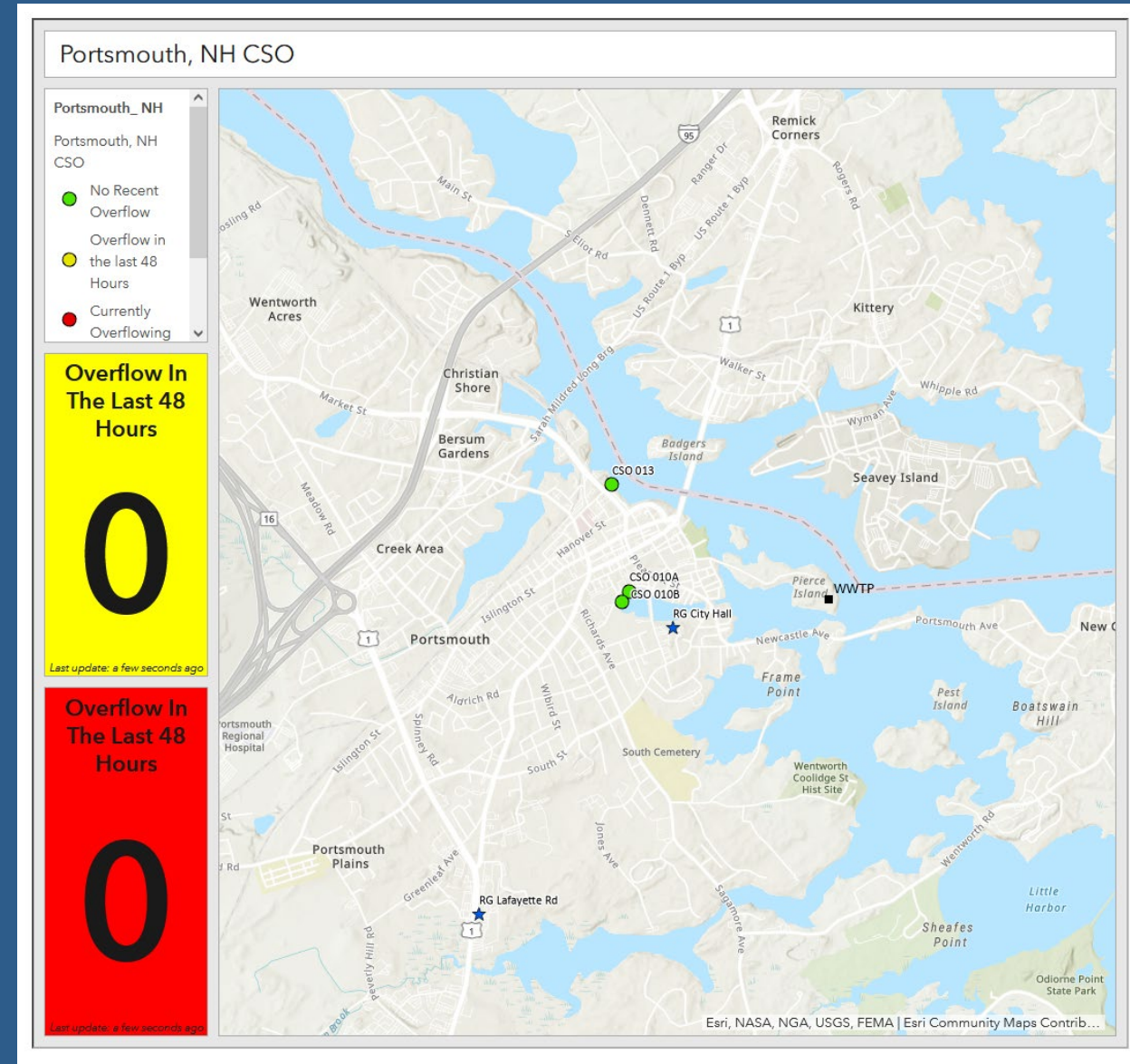
- City is proceeding with the Supplemental Compliance Plan projects
- City intends to evaluate the performance of projects to identify effectiveness and future work
- City prioritizes projects that result in assets used 24/7/365
- CSO removal is a long-term process and must be economical for rate payers





IMPLEMENTING NEW CSO NOTIFICATION SYSTEM

- New “Real Time CSO Information Dashboard”
 - On the City’s website
 - <https://www.cityofportsmouth.com/public-works/wastewater/combined-sewer-overflows-cso>
- New automated CSO notification system
 - Subscribe on the City’s website
 - <https://www.cityofportsmouth.com/public-works/wastewater/combined-sewer-overflows-cso>
 - Notifications going live this week!
 - Old systems and website reporting meet permit requirements





Why did we have recent flooding?



INTENSE RAIN EVENT

- August 18th
 - 1.25" rain in 30-min
 - 1.59" rain in 1-hr
 - 2" rain in 2-hr
- High impervious cover in downtown areas generate large amounts of runoff
- Storm drainage and combined sewer systems both overwhelmed
- Maplewood Avenue and Fleet Street areas in process for sewer separation and storm drainage improvements





What is happening at the Mechanic Street Pump Station?



MOTOR AND SEALS NEED REPLACEMENT

- Originally constructed in 1963
- Motor and seal failures
- Facility is at its end of useful life





MOTOR AND SEALS NEED REPLACEMENT

- Pumps are offsite getting rebuilt
- Parts are custom made overseas
 - Some parts took 4 months to procure
- Rebuild in process
- Electrical winding repairs anticipated an additional 3 months





TEMPORARY SYSTEMS IN PLACE

- Operating with secondary pump and temporary exterior pumps
- Temporary exterior pumps only operate during heavy rain events
- System is passing flows as necessary





NEXT STEPS

- CIP project in process (FY-20)
Interim project is at 90% design
- Recent reliability issues indicate a more comprehensive upgrade/replacement is necessary
- Full upgrade/replacement of Mechanic Street Pump Station likely required
 - Public process





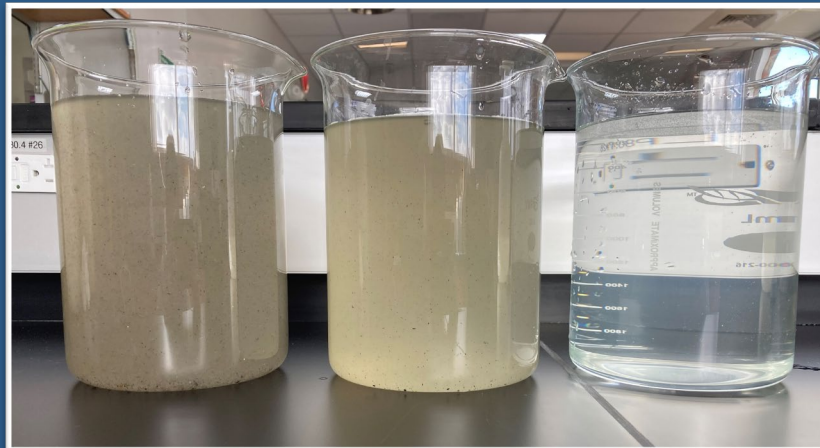
Treatment Systems



TREATMENT SYSTEM TERMS

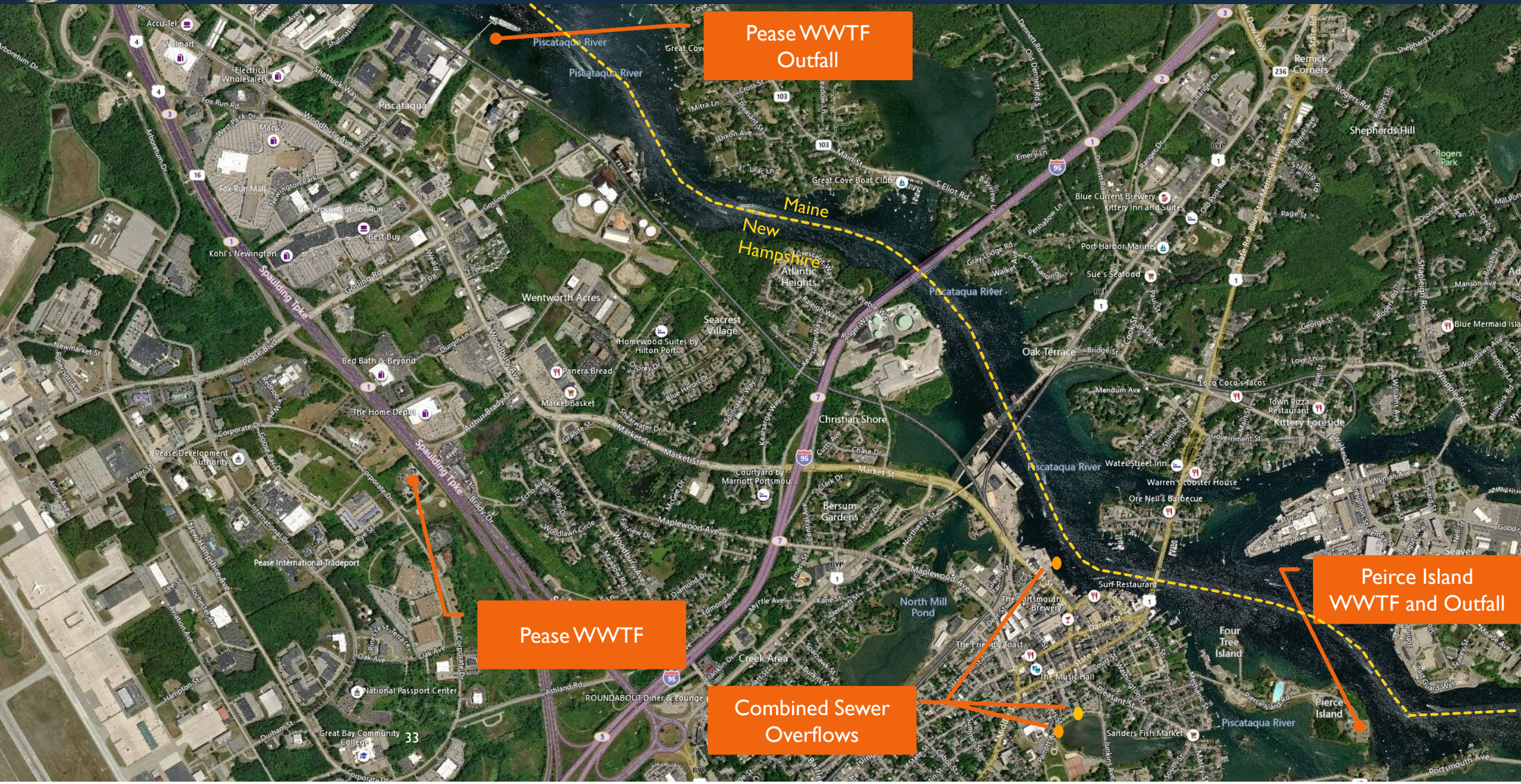
WASTEWATER TREATMENT FACILITY

- Location where physical, chemical and biological processes are used to remove pollutants from wastewater before discharging into a water body.





WWTF LOCATIONS





PEIRCE ISLAND TREATMENT FACILITY

- Constructed 1977
- Updated 2019
- 6.13 MGD
 - Secondary Treatment
- 21 MGD
 - Primary Treatment
- Permit Status - Draft 2023
- Detailed video tour of the WWTF on the City's website:
 - <https://portsnh.co/wwtf-tour>





PEASE TREATMENT FACILITY

- Constructed 1952
- Updated 1997, 2002, 2015, 2021
- 1.2 MGD (Design)
- 1.77 (Permitted)
- Permit Status – Active 2023



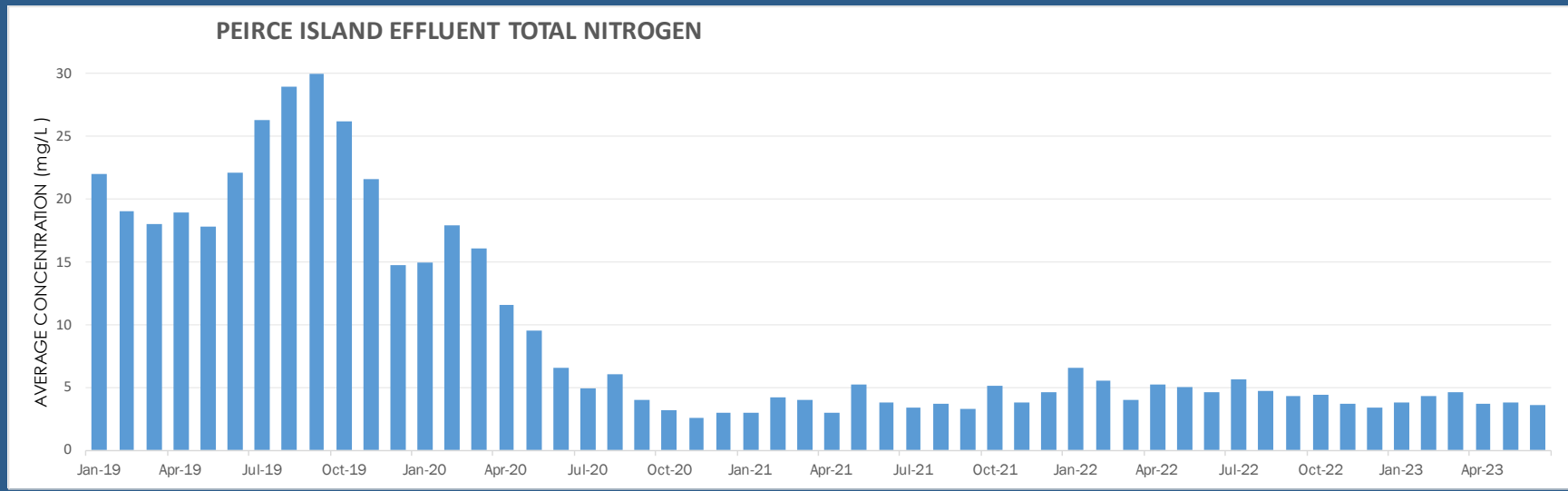
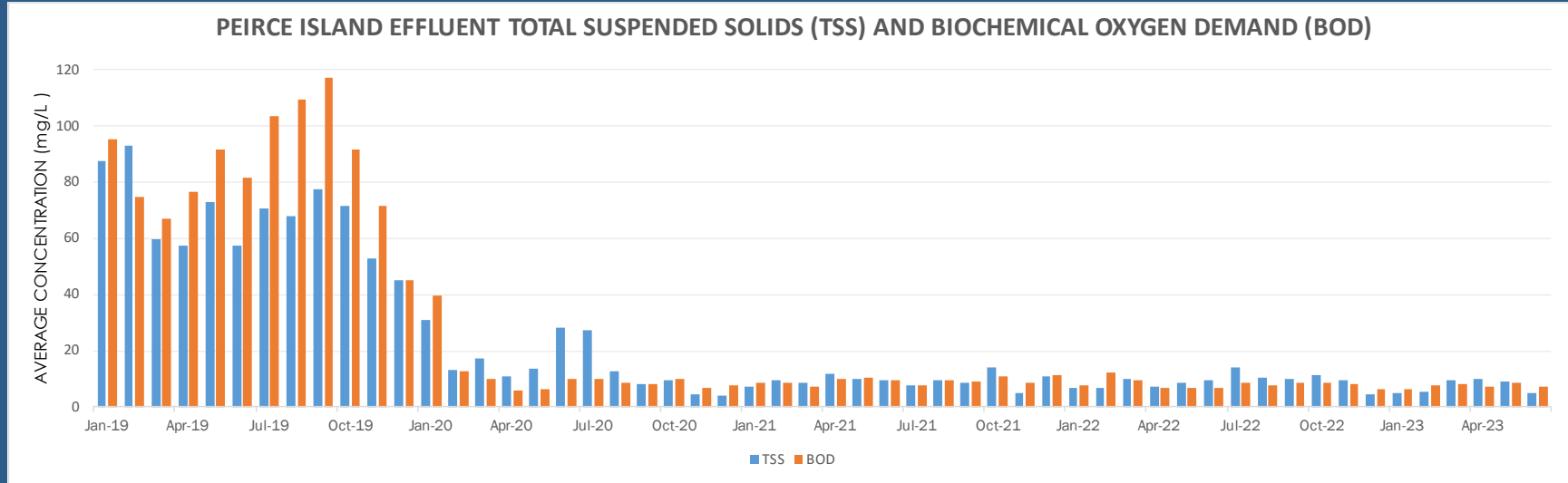


How is the Peirce Island WWTF performing?



REGULATORS CONFIRM FACILITY IS FUNCTIONING VERY WELL

- Following the upgrade and the start up of the biological aerated filter (BAF) technology, the effluent discharge shows substantial reduction in pollutants.
 - TSS and BOD - 10 fold reduction
 - Total nitrogen 75% Reduction





CLARIFIER EQUIPMENT NEEDS REPLACEMENT

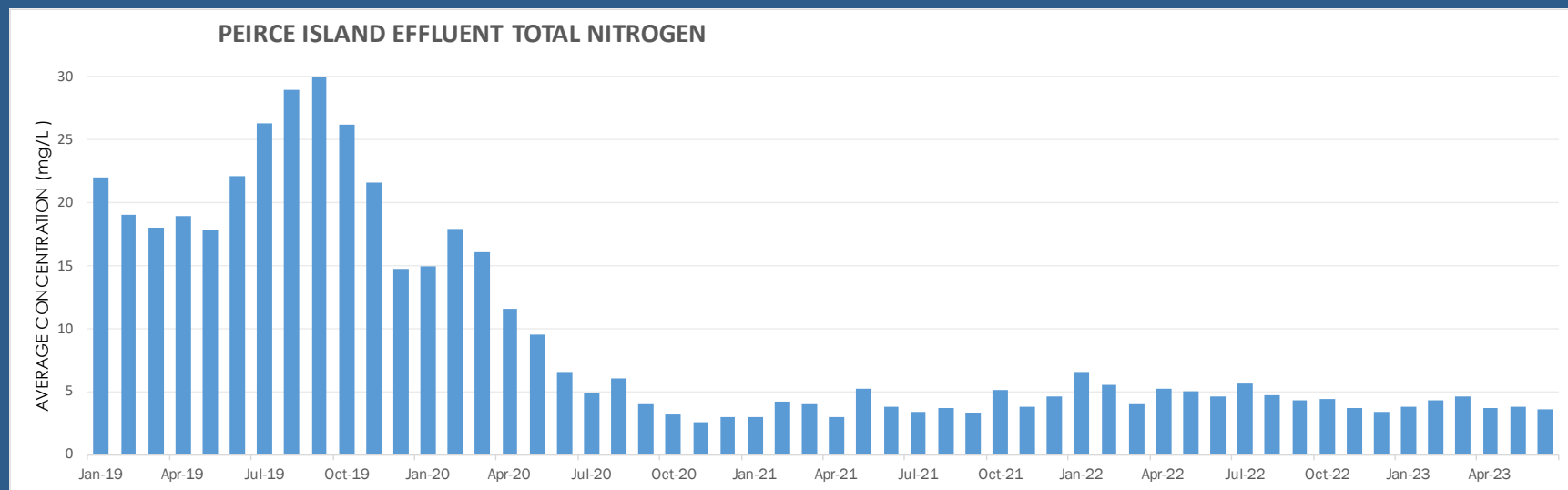
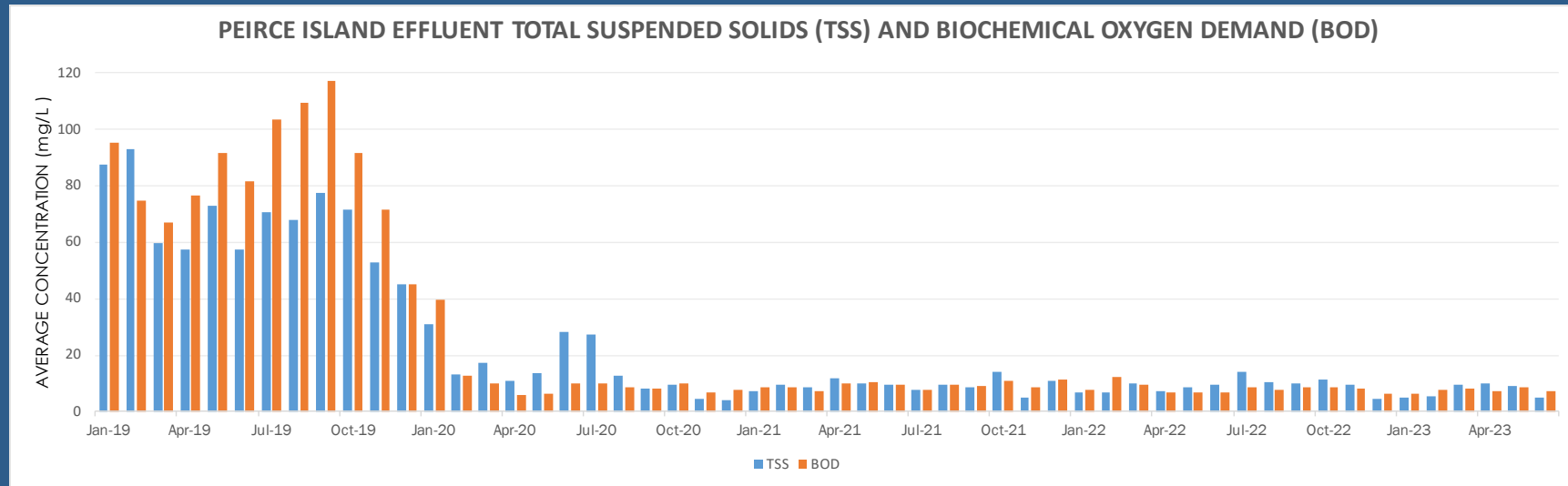
- Peirce Island WWTF clarifier # 2 scraper mechanism experienced equipment failure
- This equipment has been rebuilt several times and is part of the original WWTF treatment train (see 1995 picture)
- Bearing and bearing housing metal failure
- Equipment shipped on 9/13/23





NO IMPACT ON PERFORMANCE

- Equipment off-site for rebuild
- Vendor delay due to work backlog but shipped 9/12/23
- Equipment replacement was included in FY-26 CIP
- No change in effluent performance since January



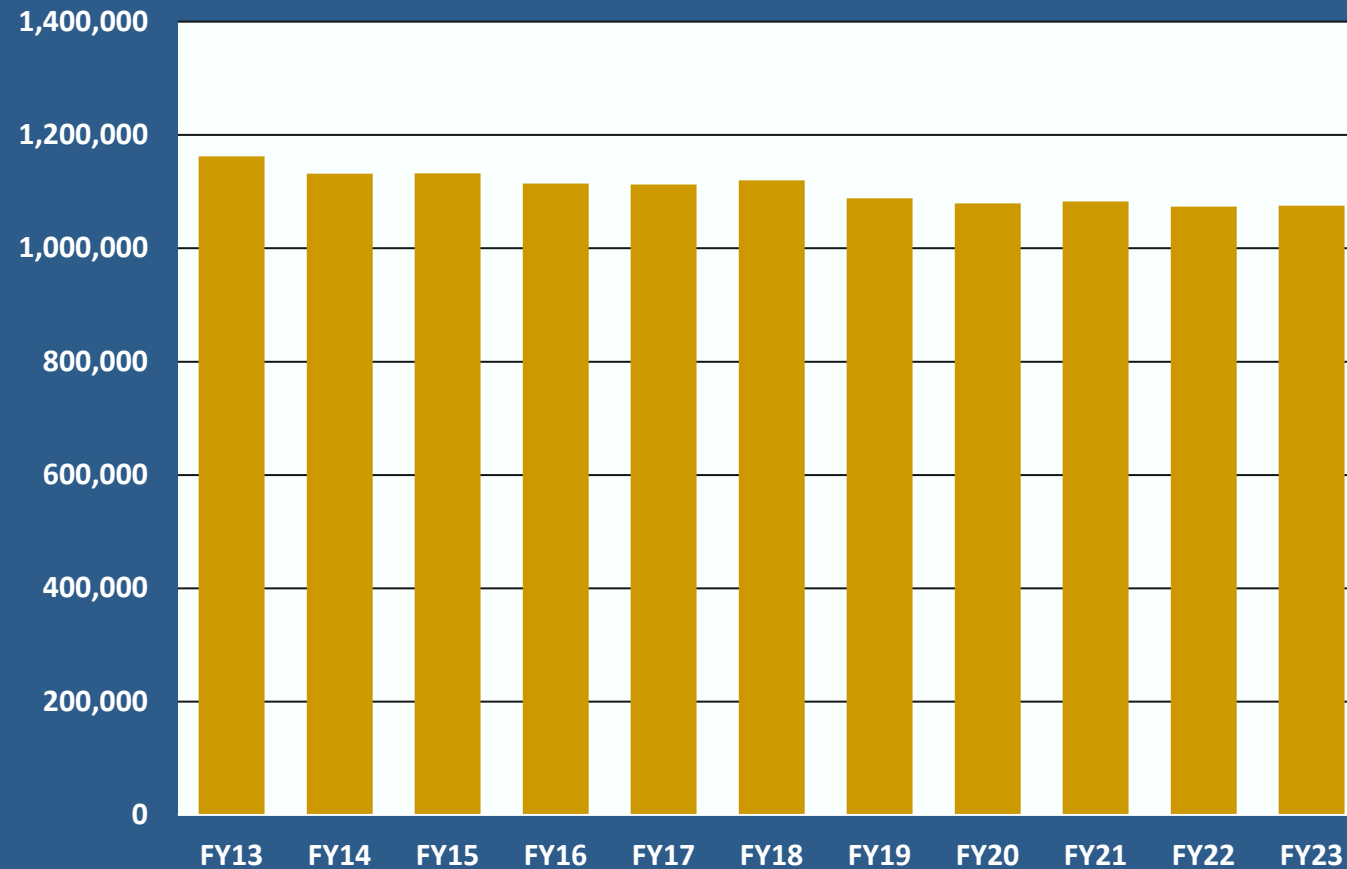


Do we have the capacity to handle new development?



YES WE HAVE CAPACITY

- Peirce Island was designed for growth in mind and Pease WWTF has additional permitted capacity
- Sewer use trend (Total Units)



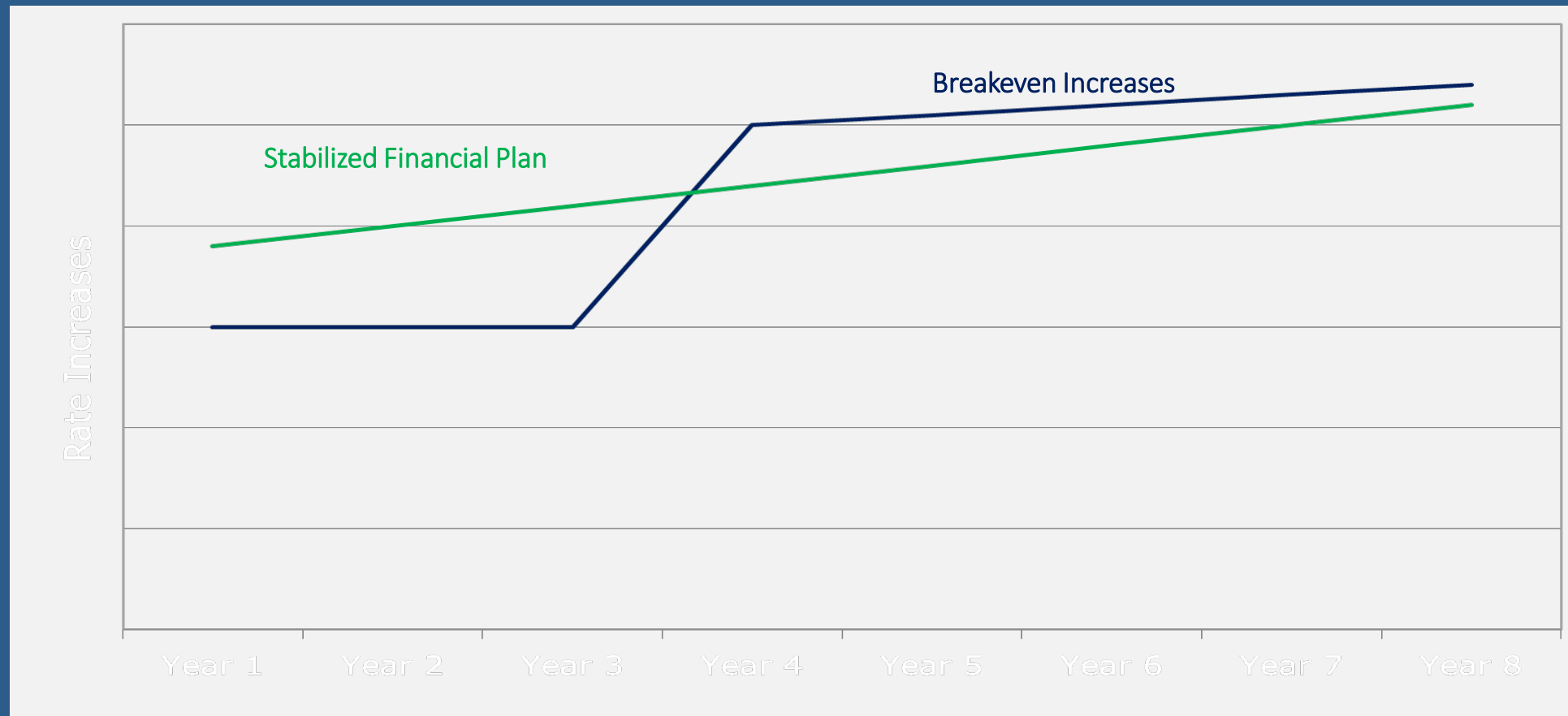


How do we pay for the work?



FINANCIAL PLANNING AND RATE SETTING

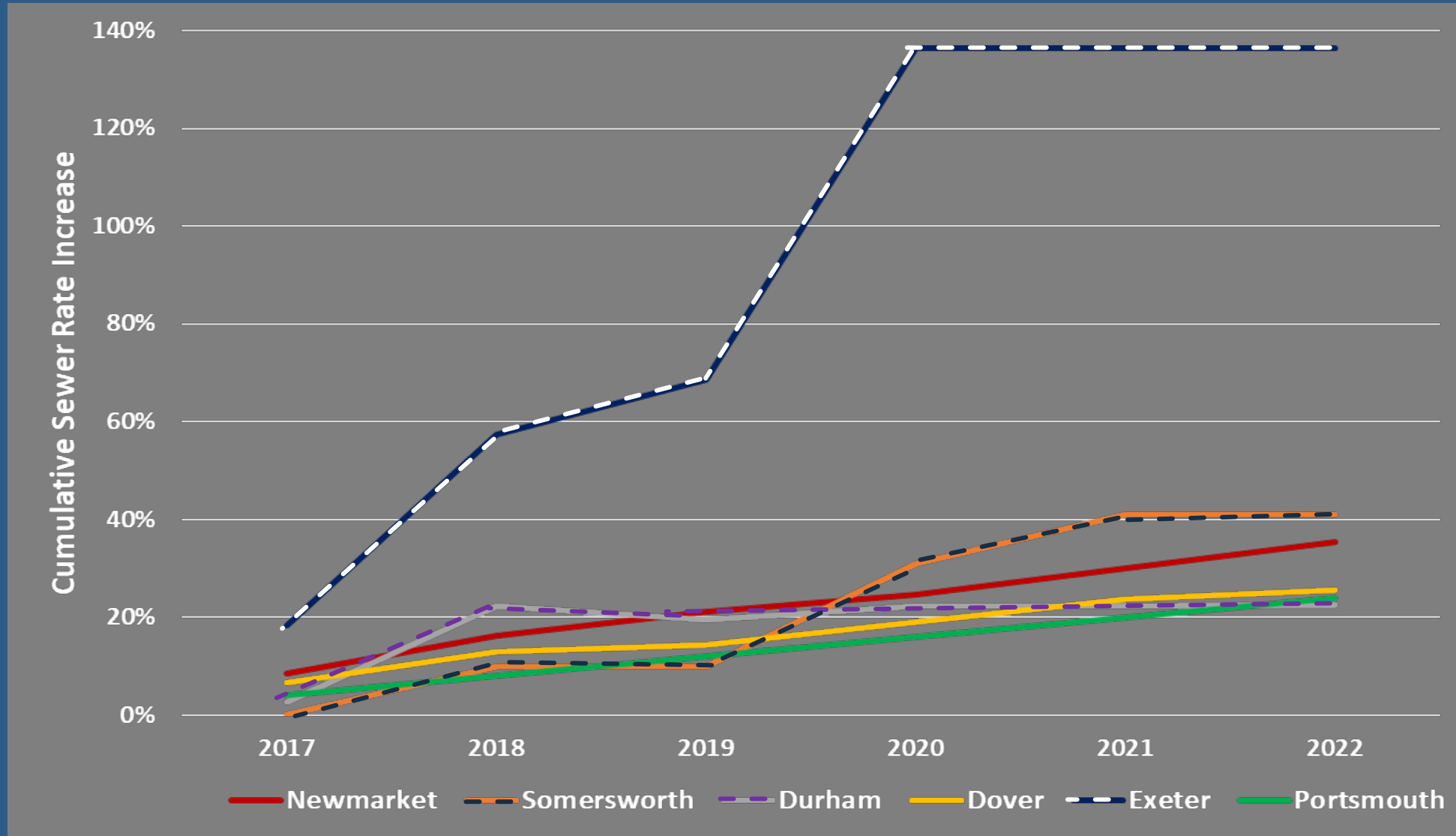
- Financial Policy to Fund Major Capital Improvements
- Rate Setting Policy Established for FY15
- Use of “Glidepath” Approach to Raising Rates in Anticipation of Major Capital Projects





FINANCIAL PLANNING AND RATE SETTING

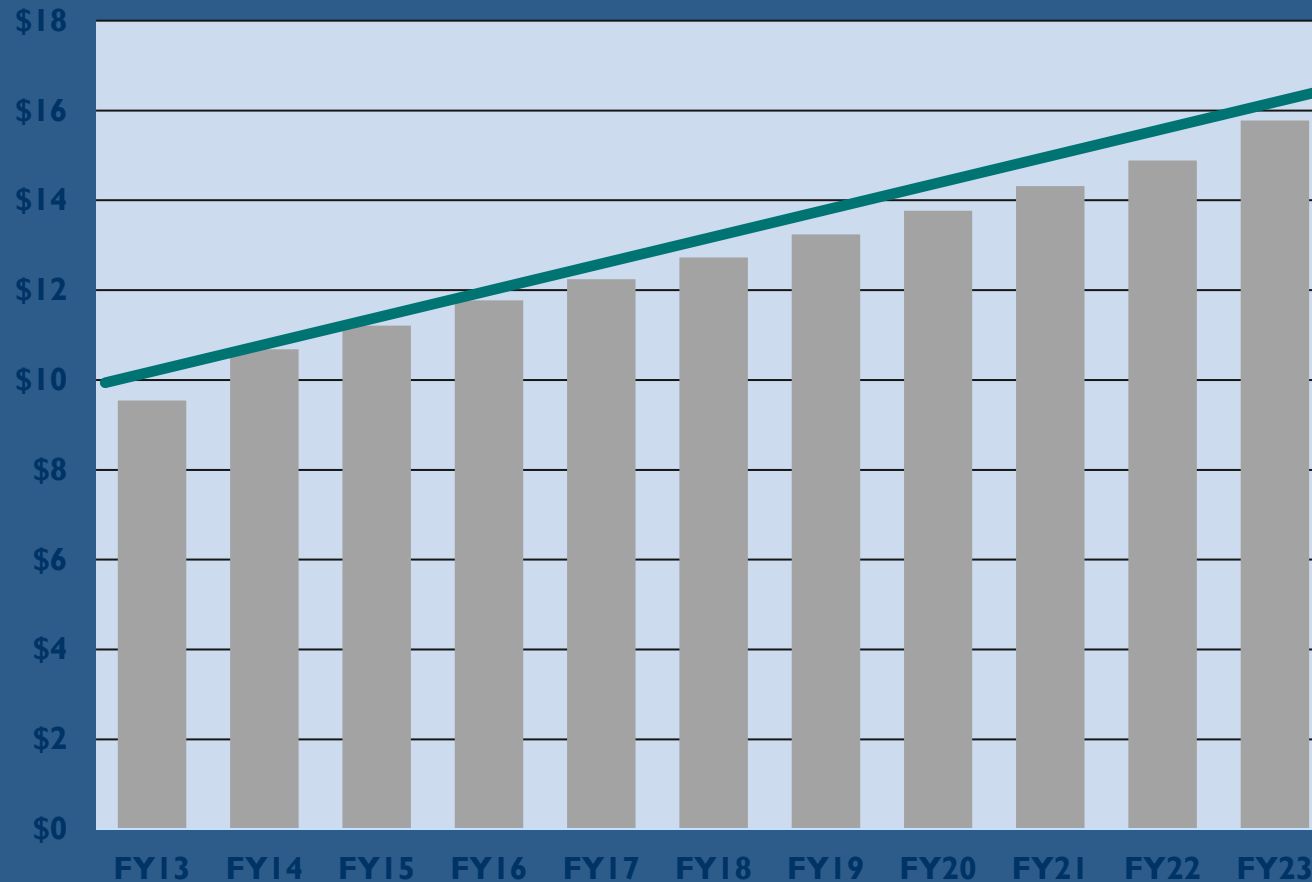
- Comparison to other Seacoast Community Sewer Rate Trends





FINANCIAL PLANNING AND RATE SETTING

- Sewer rates have followed the glide path





Wrap up and Questions