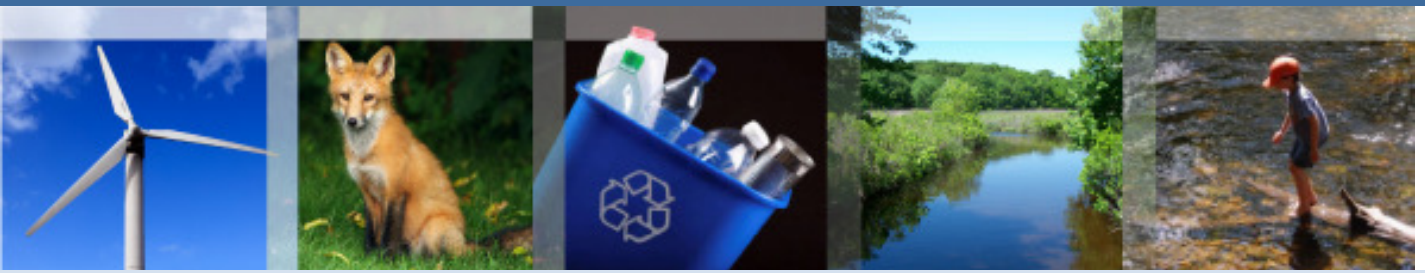
Connecticut Department of Energy and Environmental Protection



Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Agenda

Welcome and Announcements

Chair: Commissioner Katie S. Dykes, CT DEEP

Co –Chair: Dr. Mark Mitchell, George Mason University

<u>Water Subcommittee</u>

Co-chair: Cierra Patrick

Other members: Sharon Lewis; Maisa L. Tisdale

Agenda

Roll Call - Dr. Mark Mitchell

Agenda Item: Combined Sewer Overflows

Graham J. Stevens, Bureau Chief, *Water Protection & Land Reuse*
Nisha Patel, P.E., Director, *Water Planning & Management Division*
Ivonne Hall, P.E., Assistant Director*, Municipal Wastewater*

Combined Sewer Overflows (CSOs)
November 29, 2022

Graham J. Stevens, Bureau Chief, Water Protection & Land Reuse

Nisha Patel, P.E., Director, Water Planning & Management Division

Ivonne Hall, P.E., Assistant Director, Municipal Wastewater

CSO Presentation Agenda

1. Why are CSOs relevant to CEEJAC?
2. Defining Key Terms: What are CSOs?
3. What causes CSOs? Where are CSOs?
4. How do we get rid of CSOs?
5. How do we know when CSOs are active?
6. Discussion on CSOs and Community involvement

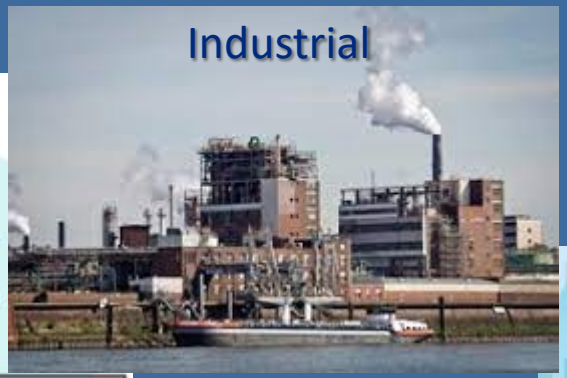
Importance to CEEJEC

- Combined Sewer Overflows (CSOs) are an important environmental challenge that many people are not aware of.
- The general public isn't aware that CSOs are a regular occurrence every time it rains near the areas they live in.

Key Terms

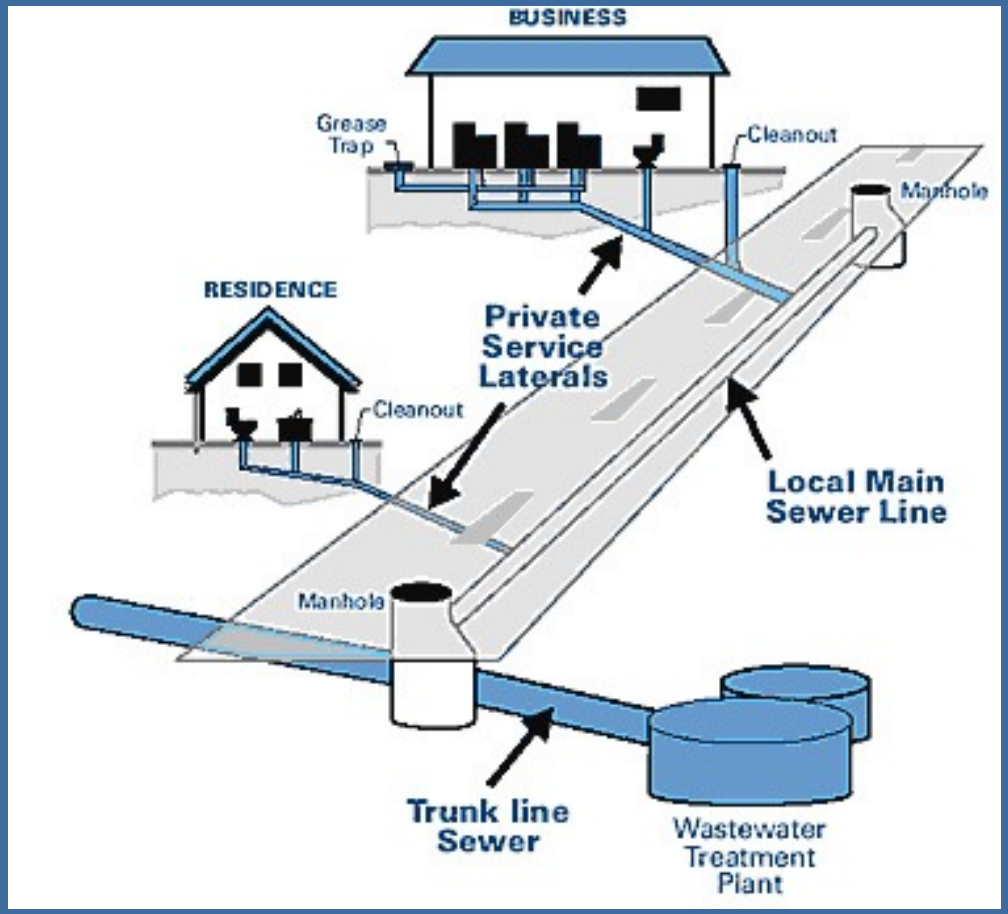
Key Terms

- **<u>Wastewater</u>** (sewage) – comes from toilet, sink, dishwater, laundry, industrial and commercial wastewaters, etc.



Key Terms

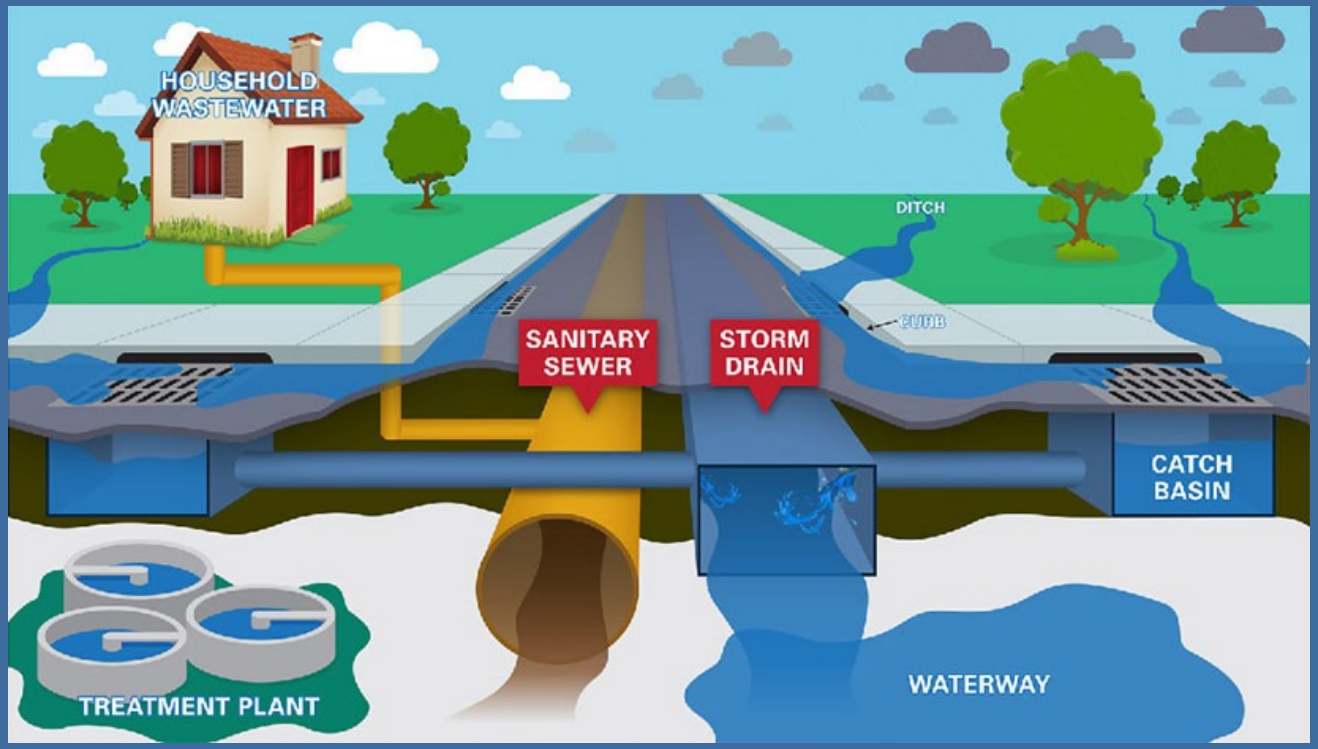
- **Sanitary Sewer** – pipe designed to convey only sewage – also called a **separated sewer**
- **Wastewater Treatment Plant (WWTP) / aka Water Pollution Control Facility (WPCF)** – a facility to remove pollutants from wastewater



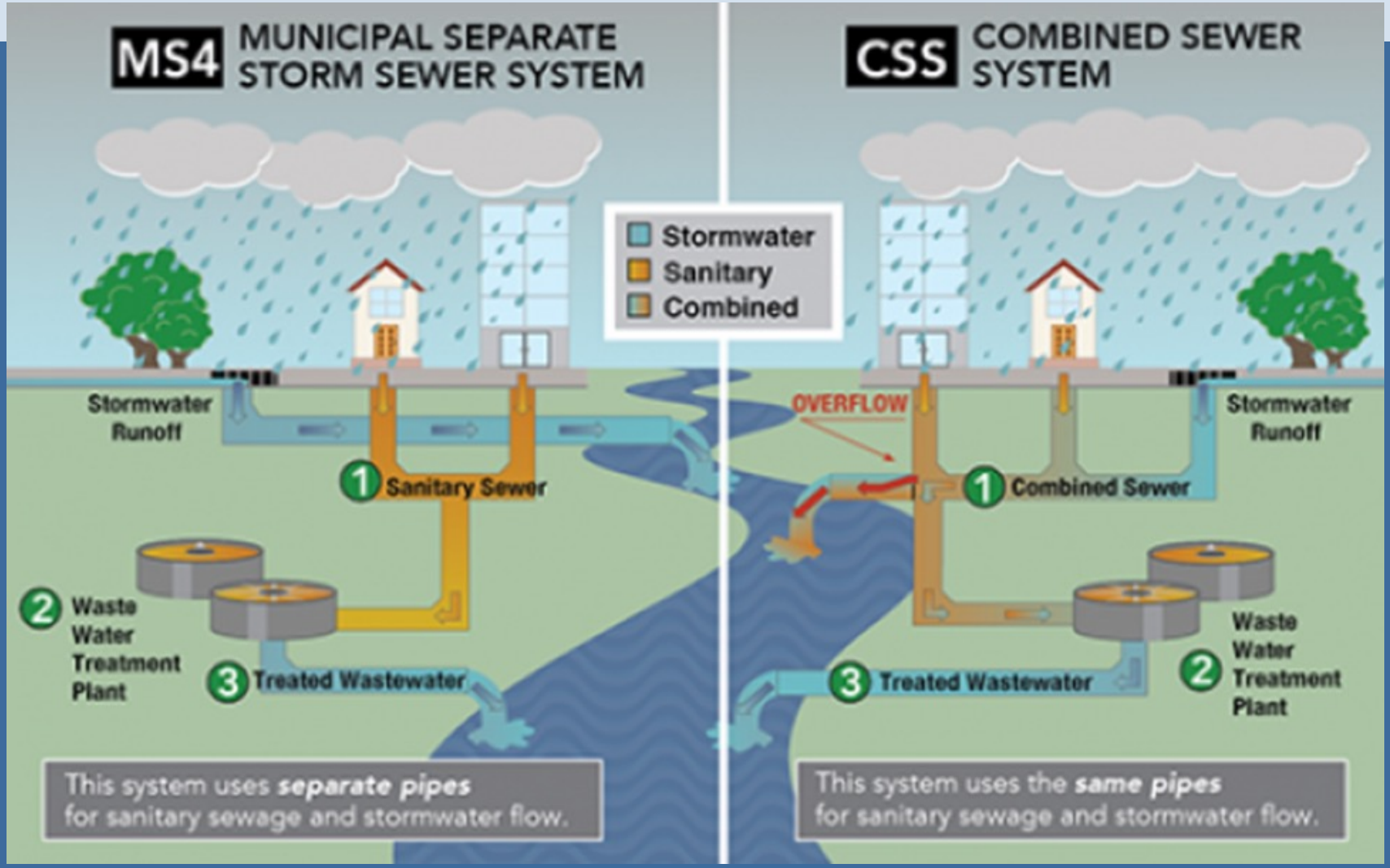
Key Terms

- **Stormwater** – comes from rain and/or snowmelt and handled mostly through separate storm sewer systems

Key Terms



- **Catch Basin** – collects stormwater off ground and sends it to storm drain pipe
- **Storm Drain** – pipe designed to convey only stormwater


MS4
MUNICIPAL SEPARATE STORM SEWER SYSTEM
CSS
COMBINED SEWER SYSTEM
Stormwater
Sanitary
Combined
Stormwater Runoff
1 Sanitary Sewer
2 Waste Water Treatment Plant
3 Treated Wastewater
This system uses separate pipes for sanitary sewage and stormwater flow.
OVERFLOW
Stormwater Runoff
1 Combined Sewer
3 Treated Wastewater
2 Waste Water Treatment Plant
This system uses the same pipes for sanitary sewage and stormwater flow.

Key Terms

- **Combined Sewer** – pipe designed to collect and convey both sewage and stormwater
- **Combined Sewer Overflows (CSOs)** – Discharges into rivers/harbors from combined sewer pipes (untreated sewage and stormwater) that activate during high flow conditions, before it can reach the treatment plant. CSOs contain stormwater, untreated sewage, industrial/commercial wastewaters, debris/trash.

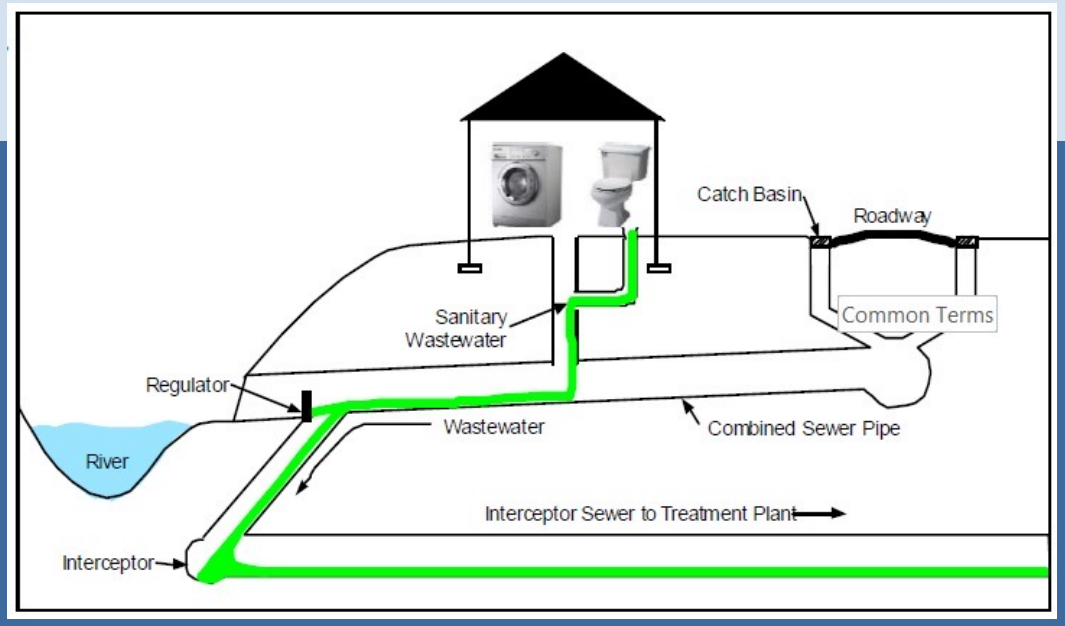
Combined Sewers

- Historical system from early 1900s that were designed to convey sewage and stormwater away from inhabited areas and discharge to water bodies with no treatment
- In modern times, these combined sewers collect and transport sewage directly to the wastewater treatment plant – not to water bodies
- Everything works fine with combined sewers when it's dry…

Combined Sewers

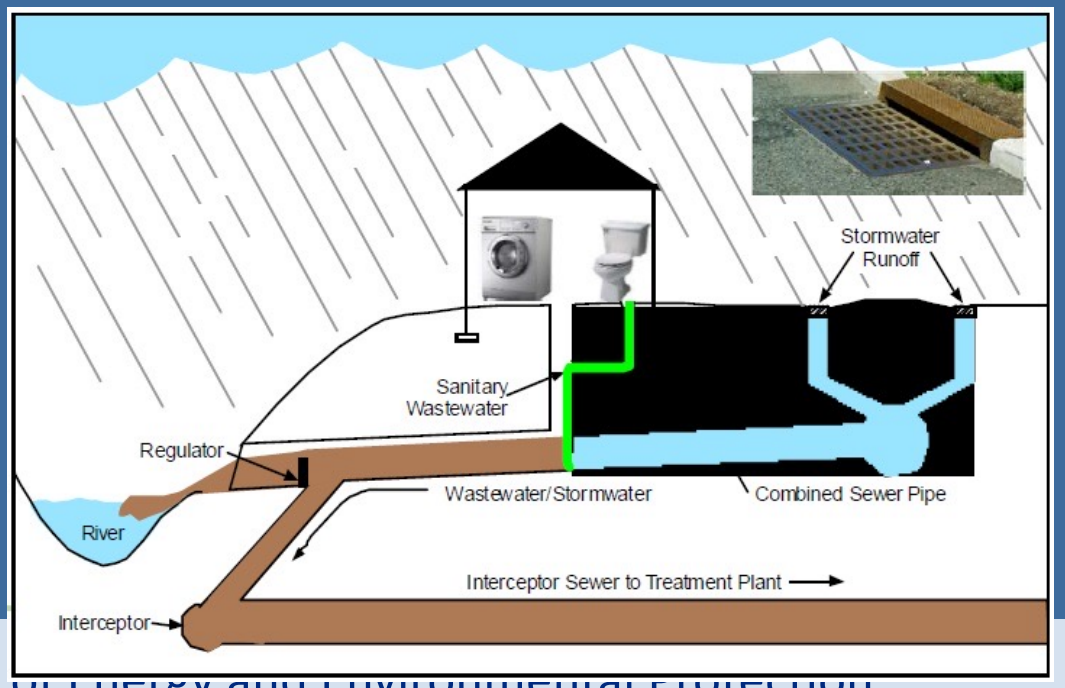
- When it rains, or when there is high snowmelt, combined sewer systems become overwhelmed
- To protect the WWTP, prevent sewer backup into residences/businesses, combined sewers were designed to overflow to water bodies during high flow conditions

Combined Sewers



<u>Dry Day:</u>
No overflows

<u>Wet Day:</u>
During rain events the combined sewer cannot convey all the flow and results in an overflow called a CSO

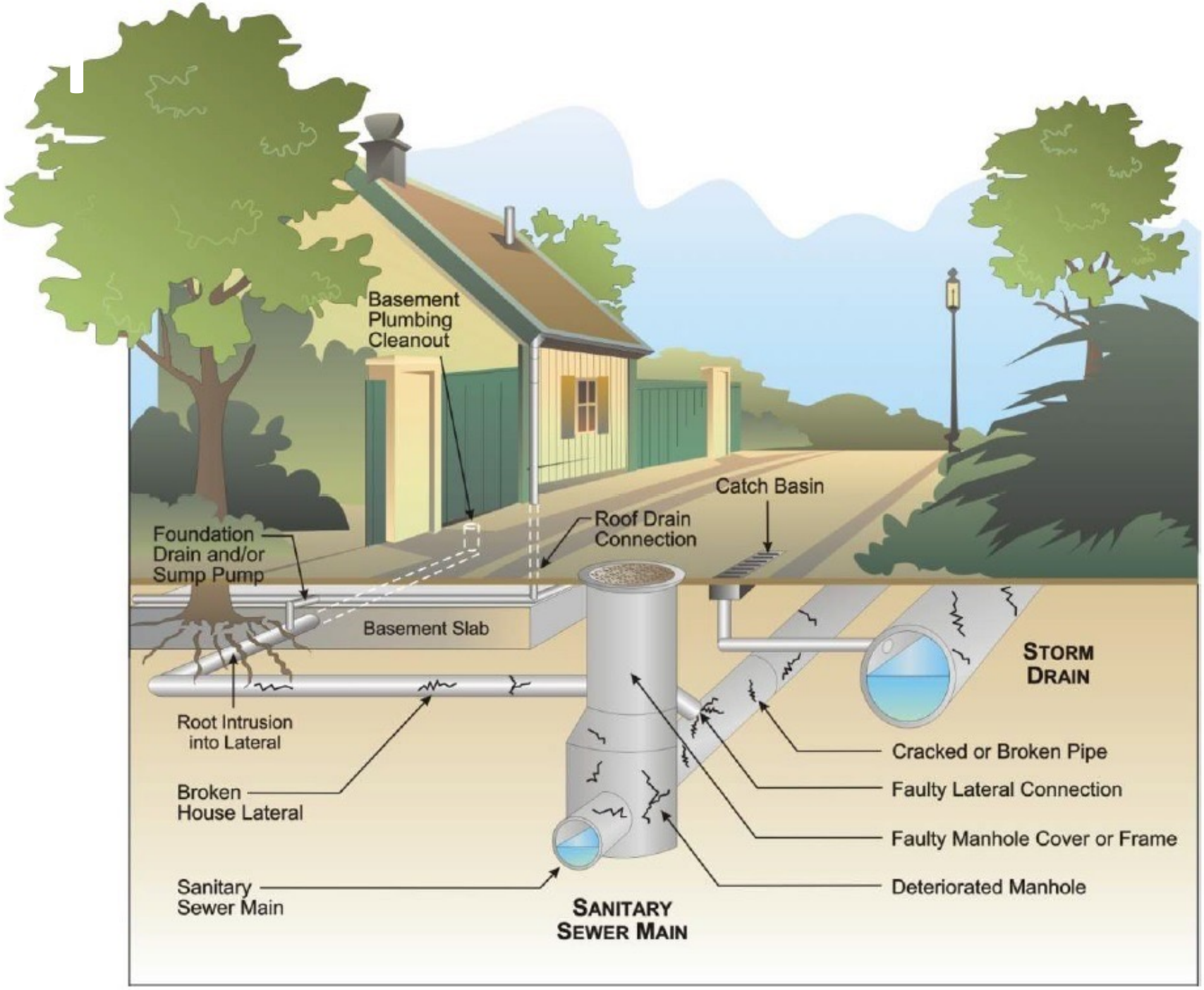


More Key Terms

- **Inflow** – non-wastewater (mostly stormwater, some groundwater) that enters the sewer pipes directly, such as catch basins, manholes, roof leaders, sump pumps, foundation drains, etc.
- **Roof leaders** – aka down spouts, which collect rain off roof
- **Sump pumps** – pumps installed in basements to prevent flooding when it rains
- **Foundation drains** – Drains installed along the perimeter of a building to prevent basement flooding

More Key Terms

- **Infiltration** – non-wastewater (typically groundwater) that seeps into the sewer from cracked pipes, leaky manhole walls, lateral leaks, etc.
- **Lateral** – pipe connecting sewer pipes in buildings to sewer lines in street
- **"I/I"** – common acronym meaning infiltration and inflow


Basement Plumbing Cleanout
Catch Basin
Roof Drain Connection
Foundation Drain and/or Sump Pump
Basement Slab
STORM DRAIN
Root Intrusion into Lateral
Broken House Lateral
Cracked or Broken Pipe
Faulty Lateral Connection
Faulty Manhole Cover or Frame
Deteriorated Manhole
Sanitary Sewer Main
SANITARY SEWER MAIN

Infiltration & Inflow (I/I)

- I/I is additional, “cleaner” water in sewers and storm drains
- Any extra I/I is bad for the combined sewer system and results in more overflows
- Inflow can be controlled by disconnecting roof leaders and sump pumps
- Infiltration can be controlled with regular maintenance and pipe lining (to make older pipes water-tight again)

thecityoftoronto, YouTube

Combined Sewers Overflows (CSOs)

Combined Sewer Overflows (CSOs)

Causes are:

Snowmelt or rain: can be as little as 0.25 inch of rain

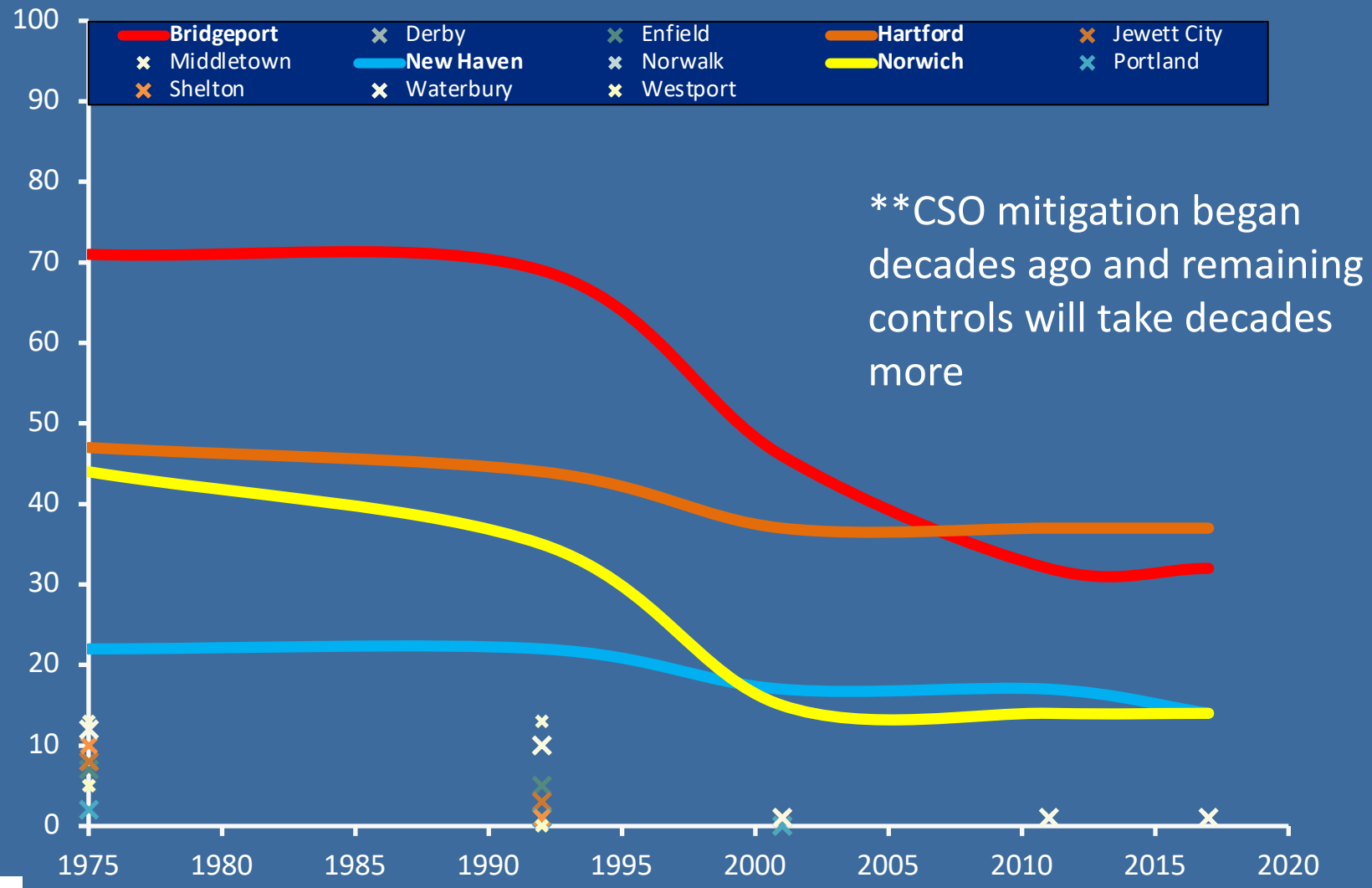
Where are CSOs?

Bridgeport, Hartford, New Haven, and Norwich

History of CSOs

- CSOs are not unique to CT
- In the US, many CSOs still exist in bigger, urban areas like NYC, Boston, Chicago, Philadelphia
- Majority of CSOs in US are concentrated in Northeast because we have older cities & drainage systems
- CT has been working on addressing CSOs for decades
  - In 1975, there were **263** CSOs in 13 municipalities
  - By 2020, there were **109** CSOs in 4 municipalities:
    - Bridgeport
    - Hartford
    - New Haven
    - Norwich

CT CSOs by Municipality



Methods to Remove CSOs

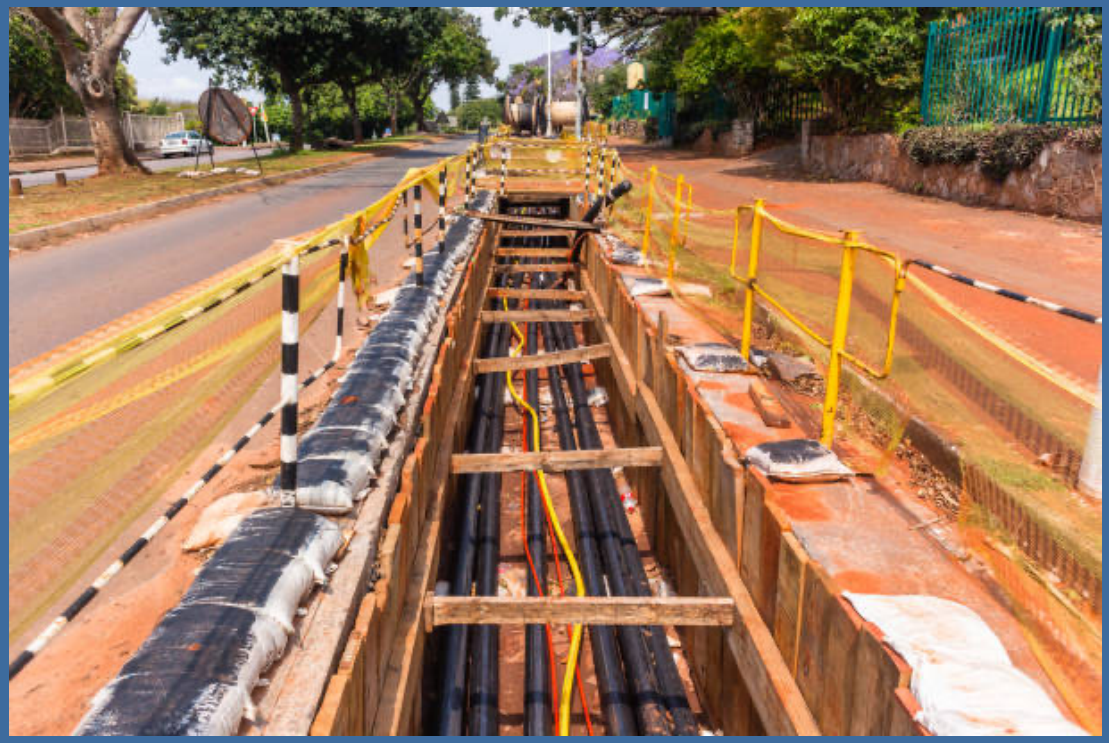
1. Sewer separation: install extra pipe so there are 2 dedicated pipes for sanitary sewage and stormwater
2. Extra storage: build tanks or tunnels to hold extra water when it rains
3. Increase capacity of WPCF when it rains so it can treat more wastewater
4. Reduce and remove sources of I/I: disconnect roof leaders and sump pumps, fix leaky pipes

Challenges: Sewer Separation

- Building another piping system is challenging and expensive, especially in densely populated urban areas
- The construction for a sewer separation project will impact community for extended period of time (road closures, impacts to business entrances/parking, traffic impacts)

Challenges: Sewer Separation

- Multiple utilities exist in roadways, and some utilities may need to be relocated or modified for the new stormwater piping



Challenges: Sewer Separation

- Debate – new pipe for sanitary sewer or storm water?
  - If a new sanitary sewer pipe is installed –
    - Sewer connections must be reconnected for every property, but work is mostly in the street.
    - Old pipe likely won't meet today's stormwater needs, such as adequate volume/capacity to manage larger storm events due to climate change
  - If a new storm pipe is installed –
    - All storm drain catch basins must also be reconnected.
    - Municipality doesn't usually want to remove private inflow sources (more on this in the next slide)

Challenge: Private Inflow

- Sewer separation often doesn't include removal of private inflow b/c it's even more challenging
- Roof leaders and sump pumps are harder to disconnect because access for work on private properties must be granted by owners
- Municipality is required to complete restoration work on private property: driveways, landscaping (additional costs for overall projects)
- Work on private property is NOT eligible for state funding
- Many later illicitly reconnect to sewer after it's been disconnected by municipality

Challenges: Extra Storage

- **Underground tanks and larger pipes (like tunnels) can be used to store combined wastewater**
  - **However – they have to be large enough to hold several million gallons of combined wastewater**
  - **Finding enough space to fit a tank or pipe of this size can be more difficult than installing another pipe in the roadway**
  - **Need permission of all property owners above the proposed tunnel(s)**
  - **Soil conditions also determine tunnel path**

How much is 1 million gallons?

Connecticut Department of Energy and Environmental Protection

Challenges: Treatment

- Most WWTPs don't have capacity to treat more wastewater when it rains
- Not all WWTPs have the space needed to expand and increase capacity

Norwich Water Pollution Control Facility

Challenges: $$$$

- Solutions to address CSOs are area-specific and differ based on technical and cost considerations

- CT is ahead of the national curve for CSO control due to state investments in the Clean Water Fund (CWF)
  - CT CWF provides 50% grant / 50% loan for projects that work toward the removal or reduction of CSOs, but only for work on public property
  - CSO work which is not funded by CWF is 100% paid by residents/utility users

Challenges: $$$$

- CSO projects are still very expensive and will take several decades to complete
  - Financial capability is a considered factor with CSO mitigation and thus far, **2% of median annual household income** is used to determine affordability of user rates, based on existing EPA guidance.
  - **Even with 2% limit and 50% grant, sewer fee increases to complete CSO work can still be $100s/yr**

Investment in CSOs in CT

$2+ BILLION DOLLARS – spent so far. Cost of work to come?

$3+ BILLION DOLLARS

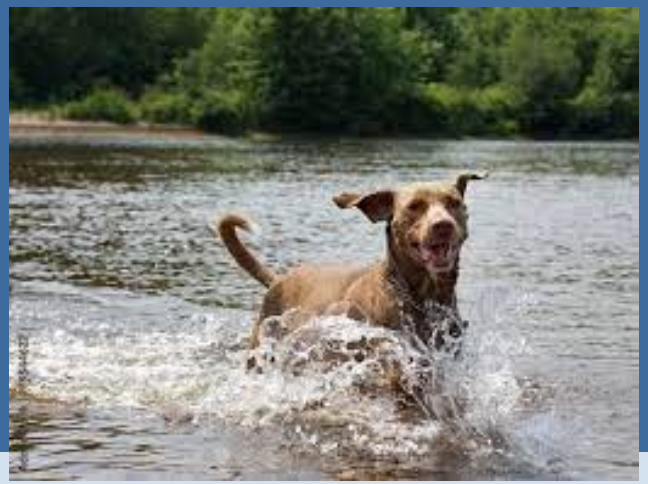
Municipality	Cost Estimate ($2018)	Completion Year
Bridgeport	$385,000,000	2039
MDC Hartford	$2,000,000,000	2058
New Haven	$550,000,000	2036
Norwich	$400,000,000	2037

Even when all this money is spent, CSOs will still not be completely removed – CSOs will only be reduced to occur less often

How do I know when and where CSOs are active?

CSO Signs

- The four CSO municipalities in Connecticut are responsible for posting permanent signs near all CSO outfalls indicating their presence.
- These signs warn people to avoid swimming or fishing in water that may be impacted near sewer pipe overflows.
- Bacteria and chemicals from CSOs can increase the risk of getting sick from swallowing water or eating fish in the area.



CSO Signs

- Required by DEEP permits for CSO community wastewater treatment facility discharges
- DEEP's recent permit renewals recommend posting signs in predominant language(s) of residents

Current CSO Signage

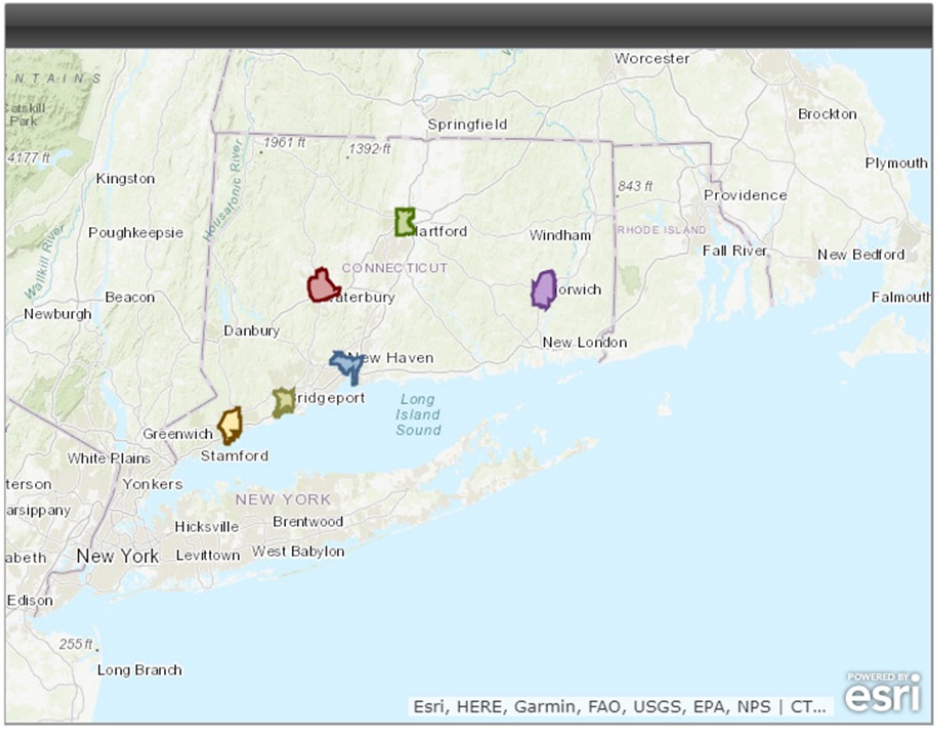
(PERMITTEE NAME)
WET WEATHER SEWAGE
DISCHARGE OUTFALL (discharge serial number)

Anyone observing a discharge from this outfall during dry weather conditions should call and report it to the Permittee at **[_____]**, and to the Department of Energy and Environmental Protection at (860) 424-3704 or 424-3338.

Sewage Right-to-Know

- In 2012, CT passed the first Sewage Right-to-Know law (CGS 22a-424a) requiring notifications by operators of CSOs/spills and CT DEEP to post these locations

Combined Sewer Overflows (CSOs)

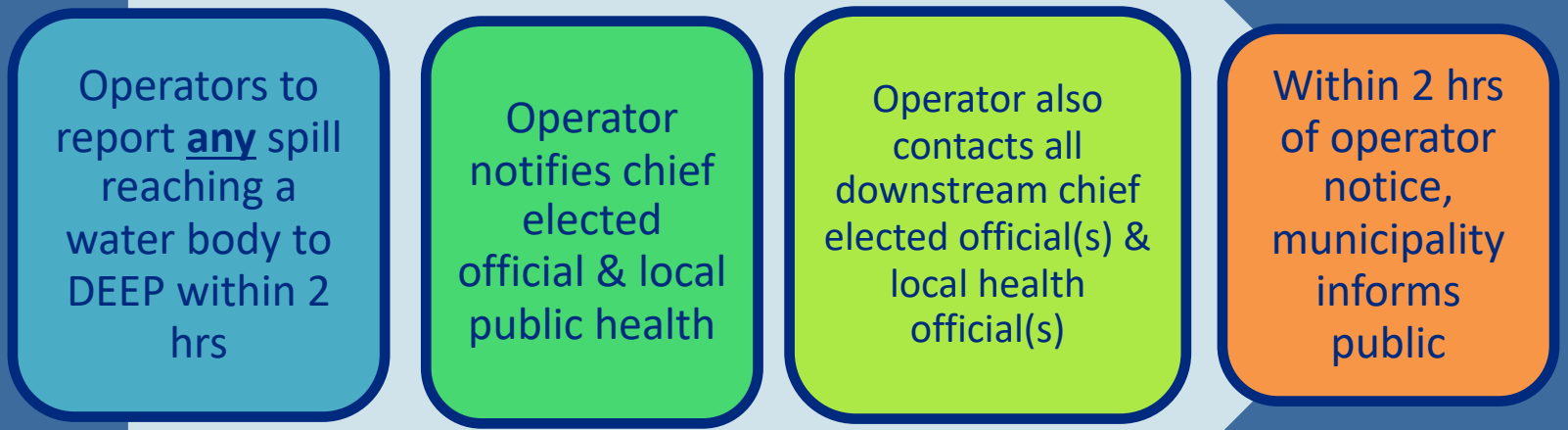


How to use the Combined Sewer Overflow (CSO) locations map:

- Select one of the highlighted municipalities to display a pop-up window.
- Selecting "zoom to" will center the map on that municipality and display the location of the individual CSO locations.
- For additional information about a specific location, select the location to display a pop-up window. (Additional information is available in the fact sheets.)
- The map may also be zoomed in by selecting the + button or zoomed out by selecting the - button.
- To pan the map hold in the left mouse button and move the cursor.
- Selecting the legend button will display the map legend.

Sewage Right-to-Know – Municipal Requirements

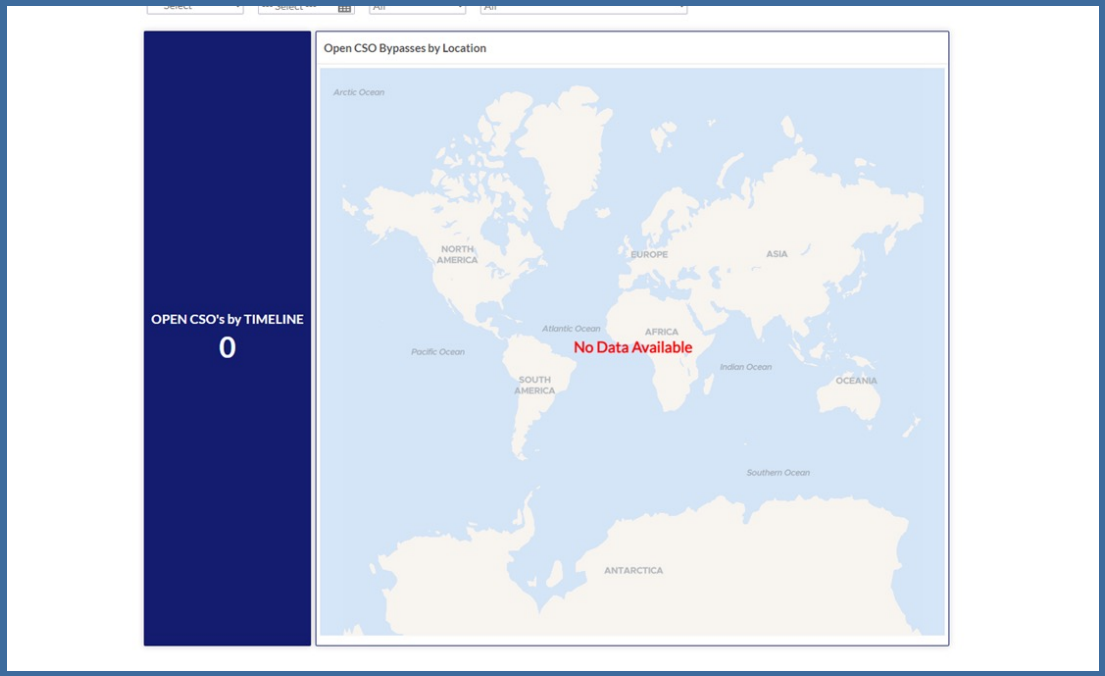
The Sewage Right-to-Know law was updated in 2021 and now requires:



Public notification may be via municipality's social media but must be in each predominant language spoken by residents.

Sewage Right-to-Know: DEEP Requirements

Post a map showing active sewage spills, bypasses, and CSOs: CT DEEP Performance Dashboard (mygovcenter.com)



Sewage Right-to-Know: DEEP Requirements

CT DEEP's updated electronic reporting system went live on December 1, 2021, with a new live map in real time.

DEEP Public Information

Current information from December 1, 2021 forward may be viewed at the CT DEEP Performance Dashboard

Historic information from July 1, 2016 to December 1, 2021 may be viewed at the Bypass and CSO Events Public Viewer

Public notifications may be viewed on the DEEP Twitter page CTSewerOverflows (@CTSewageSpills)

Real-time information: Performance Dashboard

Historic information: Pre 12/1/21 data

Sewage Right to Know: DEEP Requirements

- CT DEEP using a Twitter feed called CTSewerOverflows (@CTSewageSpills)

More CSO info at:

https://portal.ct.gov/DEEP/Municipal-Wastewater/Combined-Sewer-Overflows-Right-to-Know

CSOs & Community Involvement

- Does anyone live in a CSO community?
- Have you seen a CSO or CSO sign?
- Have you heard from your municiaplity about CSOs?
- What do you believe is the best way for municpalities to engage with the community on the planning for and implementation of CSO mitigation/elimination projects?

Water Planning & Management Division

Points of Contact –

1) Ivonne Hall, Assistant Director
ivonne.hall@ct.gov or (860) 424-3754

2) Nisha Patel, Director
Nisha.patel@ct.gov or (860) 424-3840

Questions & Answers
CEEJAC subcommittee comment period

Questions & Answers
Public comment period

Agenda

Next Steps

Schedule Next Water Subcommittee Meeting

Adjourn

Reminder - next CEEJAC meeting –
December 5, 2022, 5:30pm: Waste Committee
December 14, 2022: Quarterly Meeting