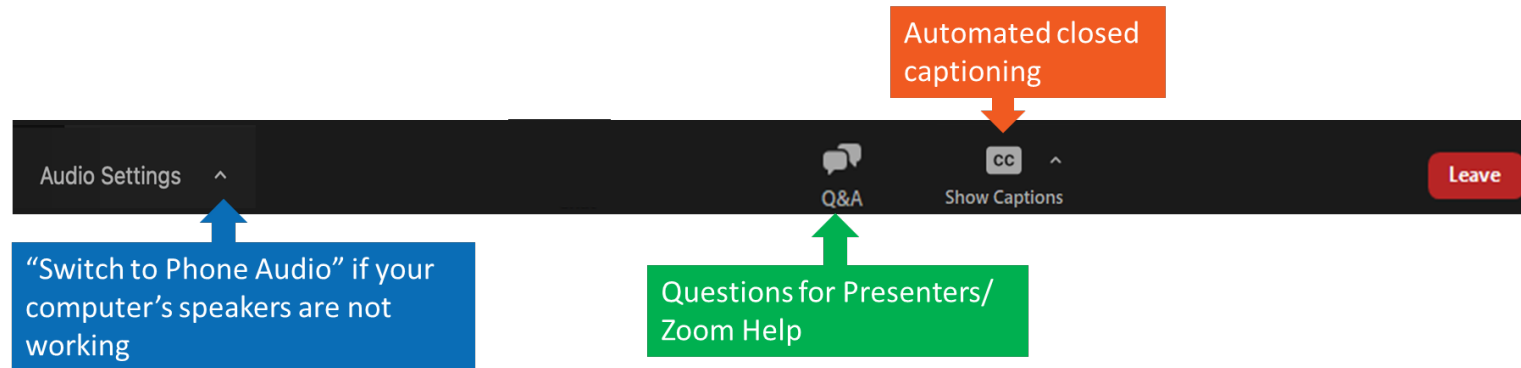




# Communities with Combined Sewers Adapting to a Changing Climate

February 6, 2024

# Webinar Logistics



- This webinar is being recorded.
- To ask a question: Type your question in the Q&A Box for the moderators to see.
- Technical difficulties: If you are having technical difficulties, please send a message through the Q&A Box or email [Kathryn.Harrison@erg.com](mailto:Kathryn.Harrison@erg.com) and the Host will assist you.
- Closed captioning is available by clicking the “CC” button in your control panel.
- **Recording:** Please note that we are recording this webinar and will make it available via EPA’s website: <https://www.epa.gov/npdes/combined-sewer-overflow-training>
- Certificates of attendance will be provided to participants who attend at least 70% of today's webcast.

# Agenda: February 6, 2024

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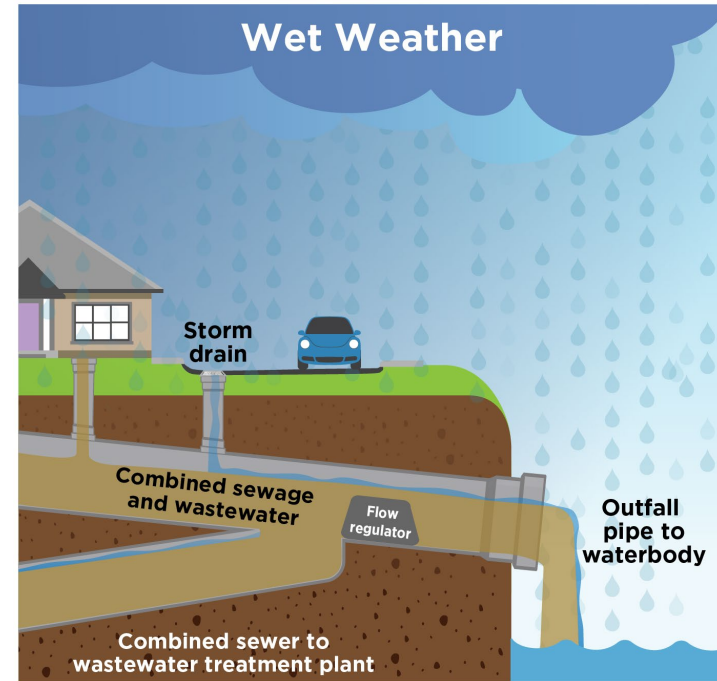
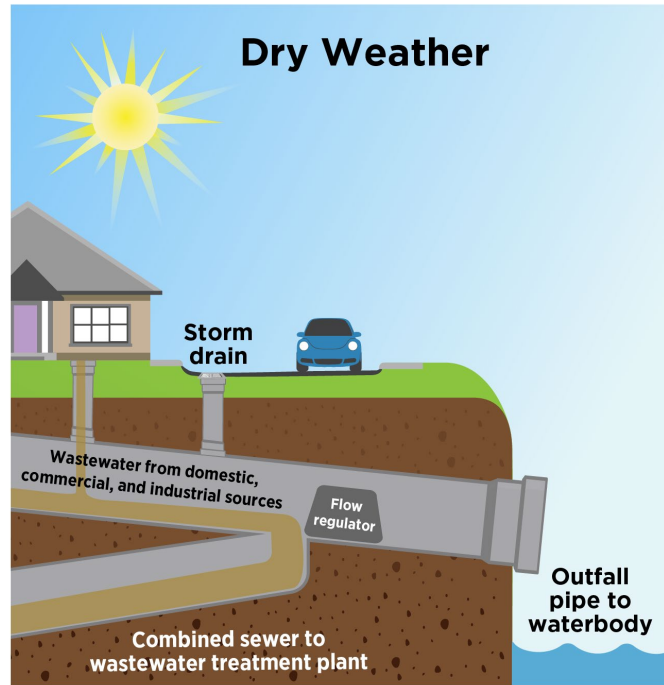
- Opening Remarks – Kathryn Kazior, USEPA
- Detroit, MI
  - Todd King, Great Lakes Water Authority
  - Sam Smalley, Detroit Water and Sewerage Department
- Pittsburgh, PA
  - James Stitt, Pittsburgh Water and Sewer Authority
  - Kyla Prendergast, City of Pittsburgh
- Questions and Discussion

# Disclaimer

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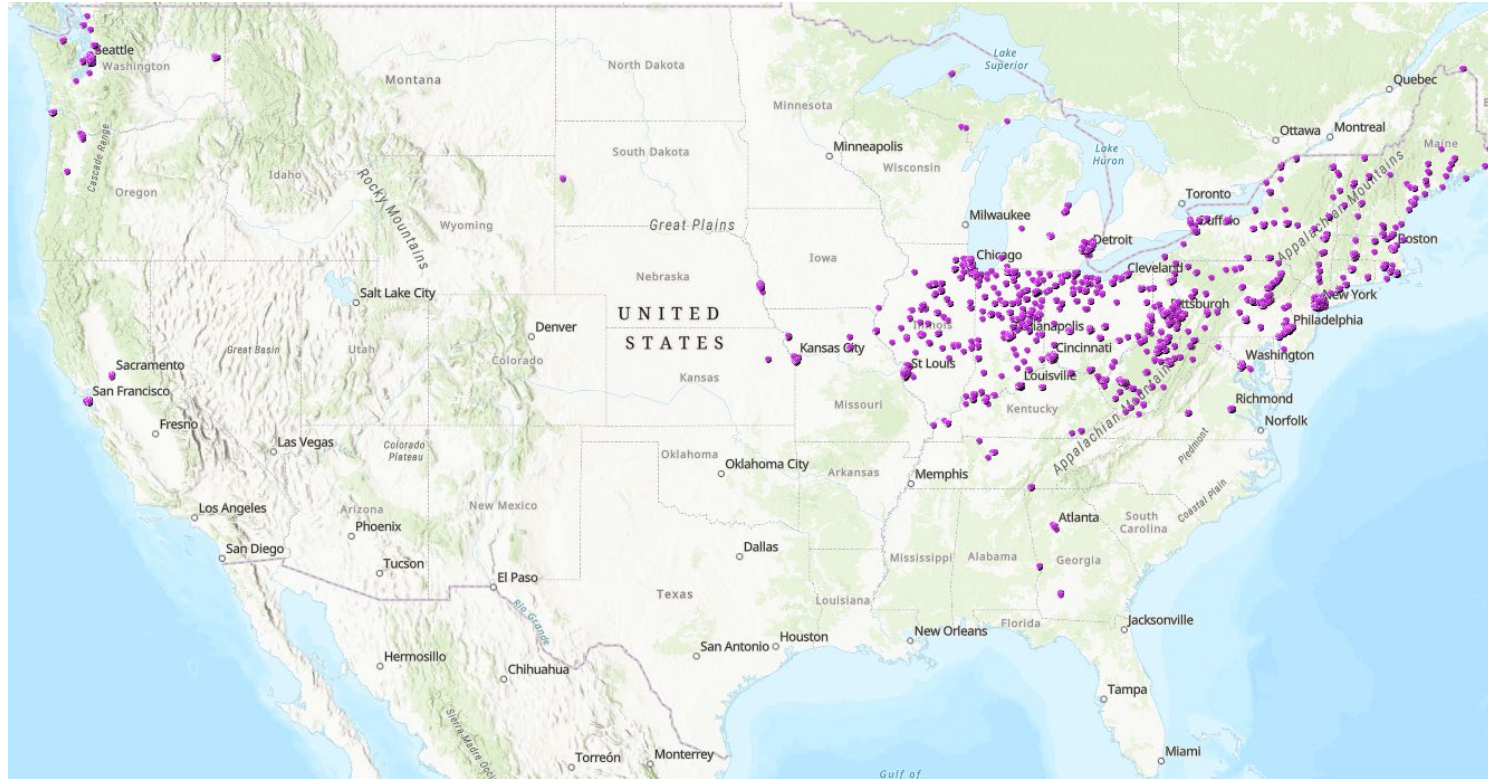
- The views expressed in these presentations are those of the author and do not necessarily represent the views or policies of the U.S. Environmental Protection Agency. Any mention of trade names, products, or services does not imply an endorsement by the U.S. Government or the U.S. Environmental Protection Agency. EPA does not endorse any commercial products, services, or enterprises.

# What are Combined Sewer Overflows (CSOs)?



- More information here: <https://www.epa.gov/npdes/combined-sewer-overflows-csos>

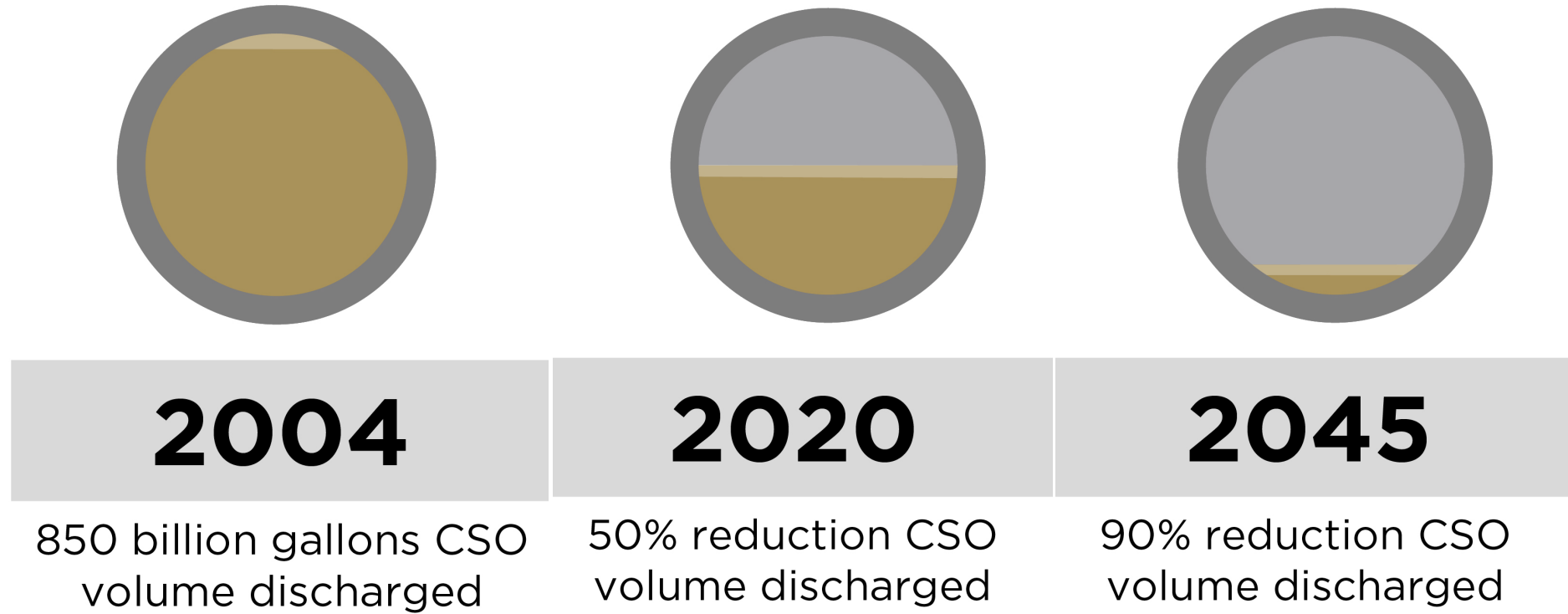
# Where are CSOs located?



<https://www.epa.gov/npdes/where-combined-sewer-overflow-outfalls-are-located>

# Progress

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# Challenges for CSO Communities

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- Complexity
- Water Quality
- Climate Change
- Environmental Justice





# Solutions

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- Gray infrastructure
- Green infrastructure
- Integrated Planning
- Smart Sewers



# Technical Assistance and Funding

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## Funding

- Clean Water State Revolving Funds (SRF)
- Water Infrastructure Finance and Innovation Act (WIFIA)
- Water Infrastructure Improvements for the Nation (WIIN) Act Grants
- Clean Water Indian Set Aside (CWISA)

## Technical Assistance (TA)

- EPA Water TA
  - Environmental Finance Centers
  - Direct Technical Assistance
  - Preliminary Engineering Support
  - Cybersecurity Technical Assistance
  - Creating Resilient Water Utilities

More information here: <http://www.epa.gov/WaterTA>

# Creating Resilient Water Utilities (CRWU)

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- EPA's CRWU initiative provides water sector utilities with the following tools, training, technical assistance, and funding:
  - Resilient Strategies Guide
  - Climate Resilience Evaluation and Awareness Tool
  - Climate Data Maps
  - Adaptation Case Studies
  - Climate Risk and Resilience Trainings
  - Climate Adaptation Funding

Visit <https://www.epa.gov/crwu> for more information.

# Detroit, MI

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Todd King, P.E., BCEE, LEED AP  
System Resiliency Officer, Great Lakes Water Authority



Samuel Smalley, PE  
Chief Operating Office, Detroit Water and Sewerage  
Department

# Flood Mitigation Efforts

*Sam Smalley, Chief Operating Officer*  
Detroit Water & Sewerage Department

January 2024



**Water & Sewerage  
Department**

# How the Sewer System Functions



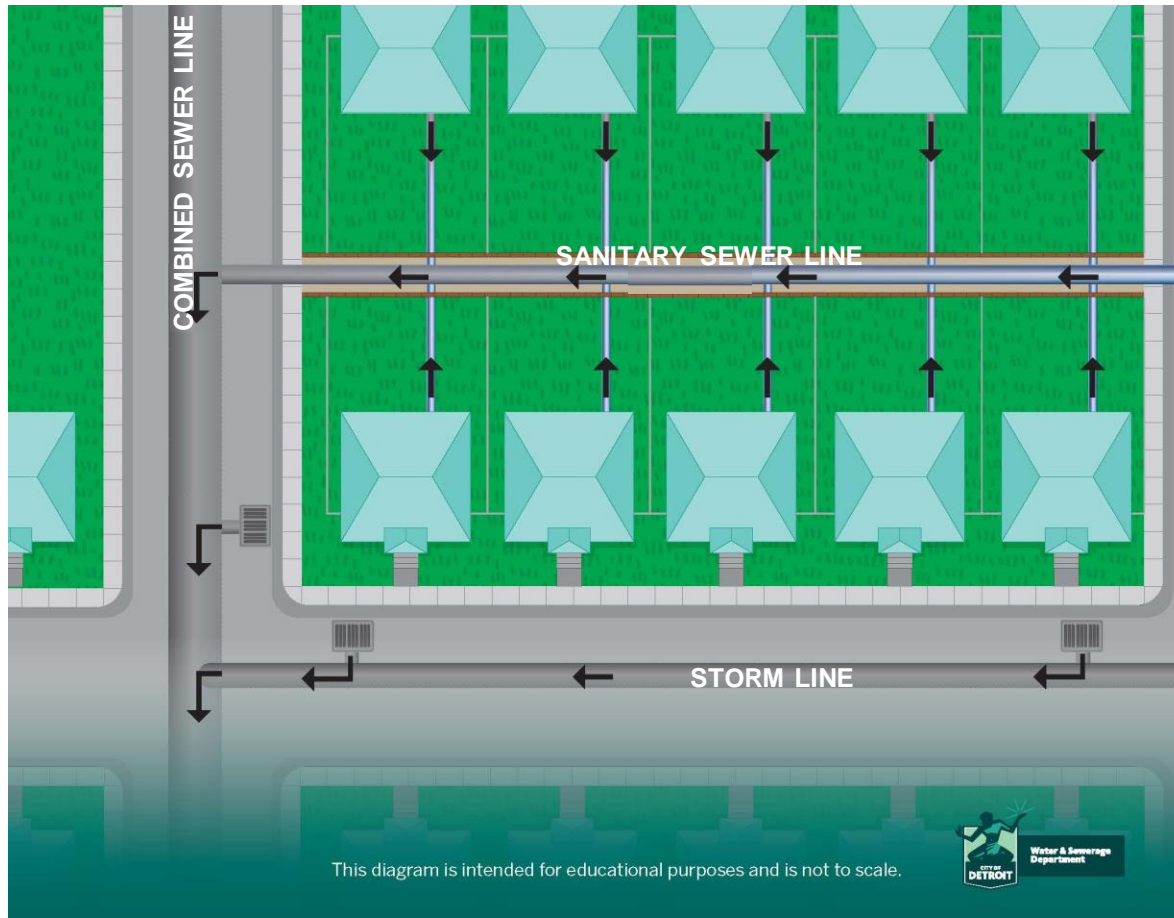
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# Three Parts to the Sewer System



\*GLWA is the Great Lakes Water Authority

# Detroit Sewer System: Local Collection System Operated by DWSD



This diagram is intended for educational purposes and is not to scale.



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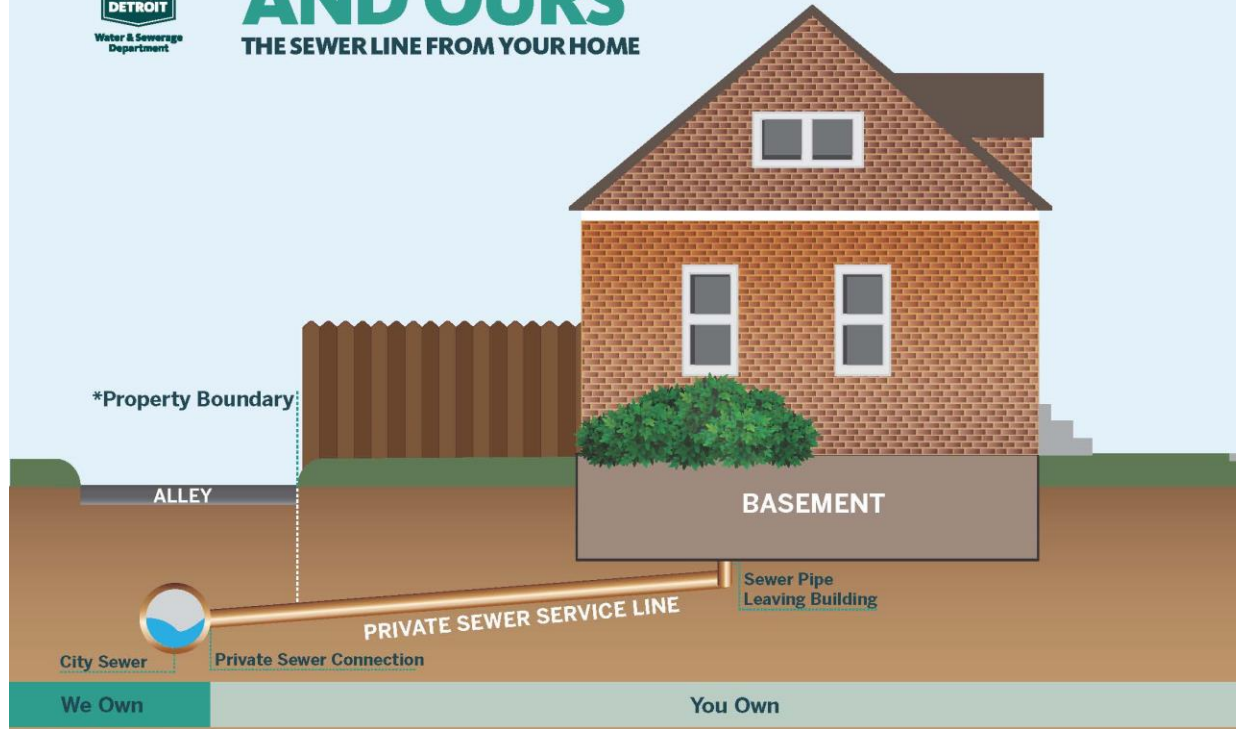
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# Detroit Sewer System: Private Portion



## YOUR RESPONSIBILITY AND OURS THE SEWER LINE FROM YOUR HOME



Less than 20% of homes in Detroit have the sewer service line in front of the house, including some parts of Jefferson Chalmers and in several westside neighborhoods.



# Sewer System Improvements

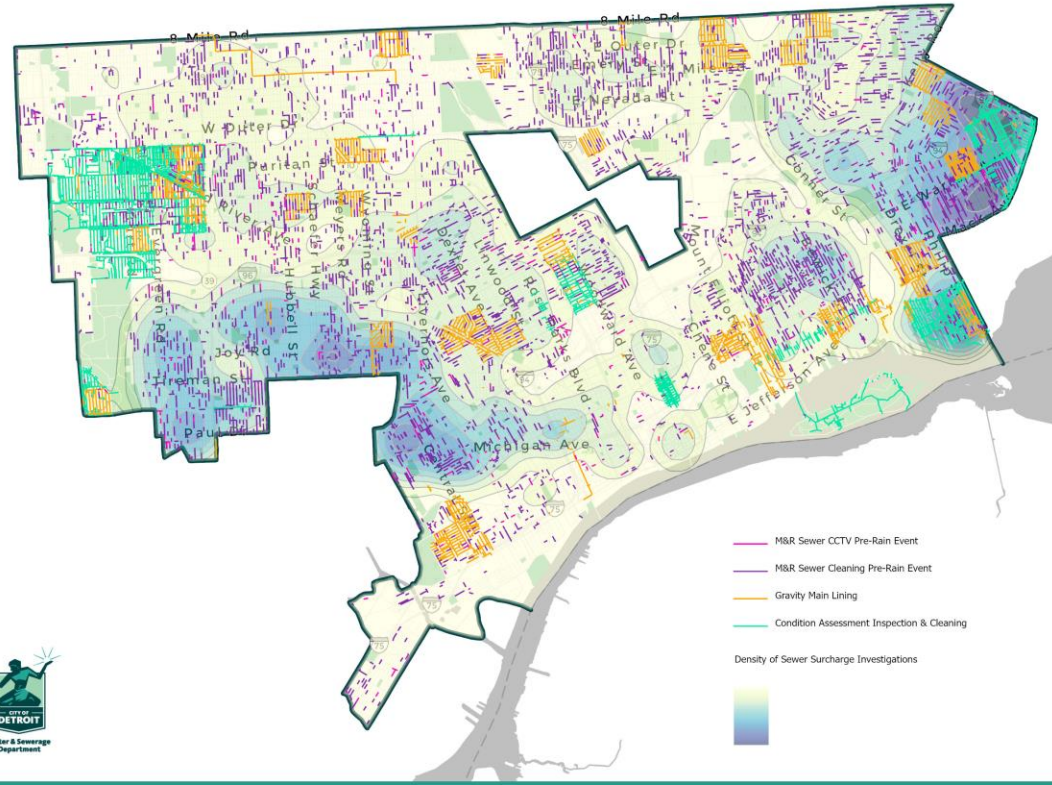


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Department

# What We've Done: Sewer Cleaning and Rehab to Build Capacity

- DWSD has **cleaned 1,183 miles of city sewer pipes** since the rain event in June 2021.
- **300.75 miles of city sewer** have been **condition assessed** since 2018.
- **18.29 miles of sewer** have been **lined or repaired since 2018** to extend the useful life.

## DWSD Wastewater Collection System Maintenance Prior to June 25th, 2021 Rain Event









# DWSD IS ADVANCING MULTIPLE INITIATIVES TO REDUCE IMPACTS FROM STORMWATER ACROSS THE CITY



## **PEAK FLOW CONTROL**

Reducing the intensity of runoff to the DWSD and GLWA system.



## **SOURCE REMOVAL**

Removing unnecessary impervious area from the sewer system.



## **REDEVELOPMENT**

Activating underutilized open space, promoting density and managing runoff via ordinance.



## **COLLABORATION**

Bigger projects result in impactful benefits with higher return on investment.

**Creating Capacity. Reducing Flooding.  
Keeping Basements Dry.**

# Stormwater Ordinance Projects



Water & Sewerage  
Department



# Stormwater Management Ordinance – Enacted Citywide

- **Permit requirement for ordinance was for the Rouge Sewer and Central Sewer districts only.**
- Prior to 2018, no formal stormwater management requirements in the City.
- Excess stormwater caused flooding, backups and sewer overflows in receiving waters (Detroit and Rouge Rivers).
- **Stormwater management ordinance was enacted in November 2018** and is a regulation within City Code.



# Reporting Metrics

## Stormwater Management Ordinance

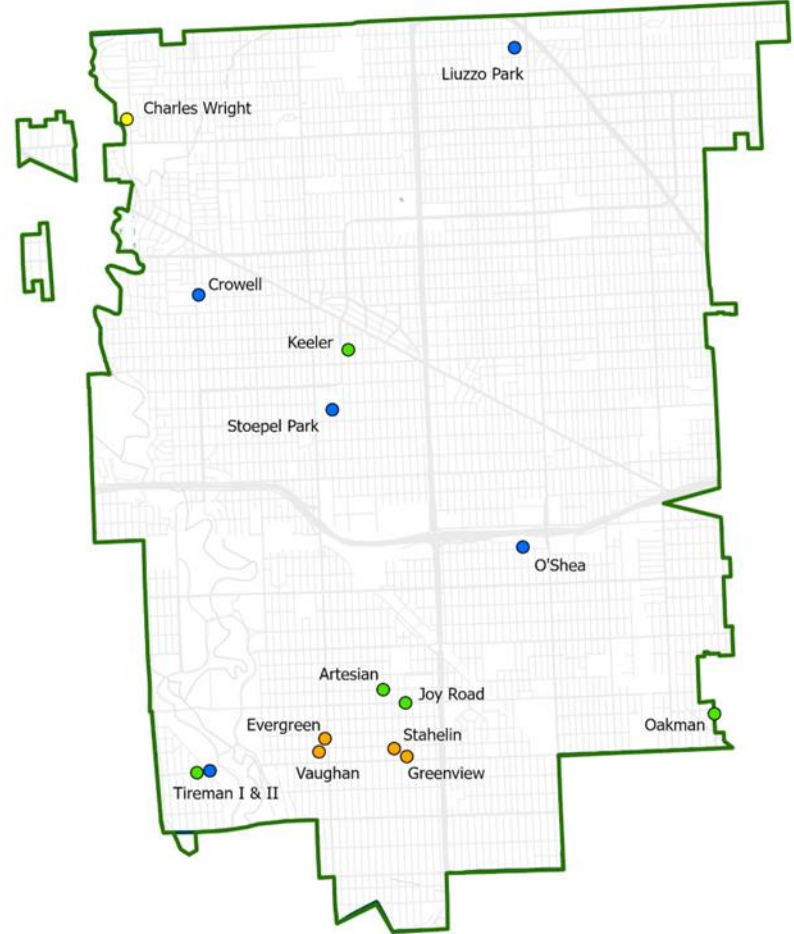
<b>Total Number of Projects</b>	<b>78</b>
<b>Peak Flow Reduction Volume Provided</b> <i>10 and 100 year peak flow detention volume</i>	40 Million Gallons
<b>Volume Reduction Provided</b> <i>Retention Volume</i>	2.5 Million Gallons



# DWSD GSI Program Completed Projects



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Department



Detroit Water and Sewerage Department - CS-1522 Green Infrastructure Program

## Green Stormwater Infrastructure Maintenance Locations



● Park with GSI

● Transportation Corridor with GSI

● Vacant Lot Bioretention

● School with GSI

□ URT Boundary

# Reporting Metrics

## DWSD GSI Program - Completed Projects

**Number of Projects** 19\*

Project Construction  
Cost (estimated) \$13.9M

**Volume provided  
for peak flow  
reduction** 2.2 Million Gallons

*Design Target 2 yr-24 hr  
Event*

**Annual Volume  
Reduction Provided** 53 Million Gallons

*Retention Volume and  
Direct Discharge*

\*Includes Joy Road (GSI funding only)



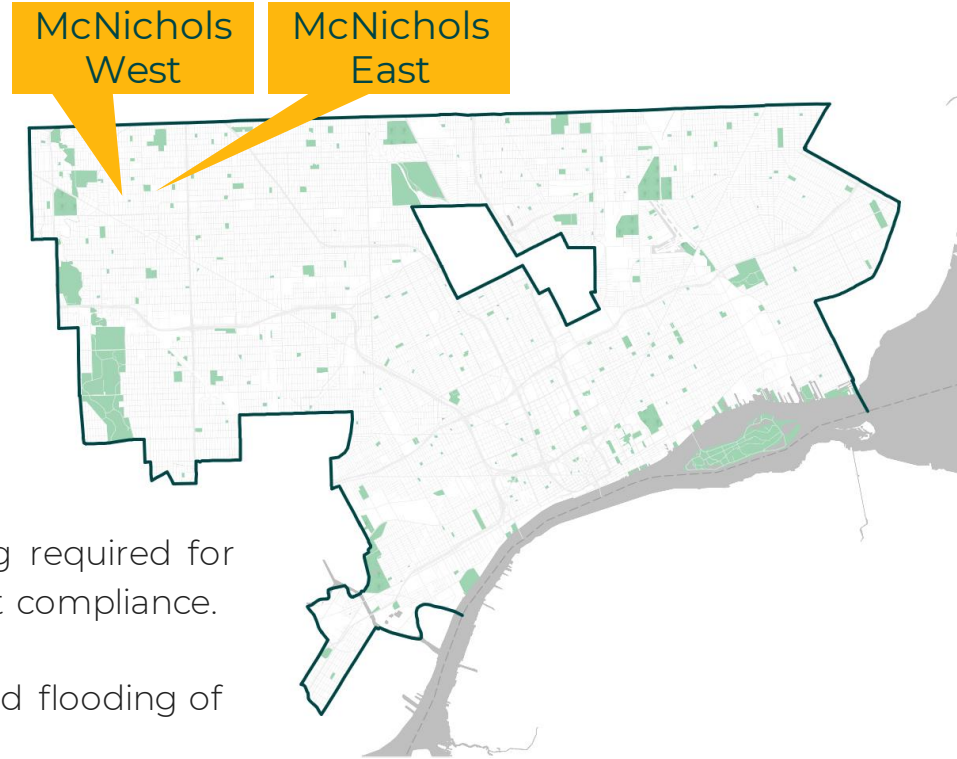
# Flood Mitigation Projects in Planning and Design



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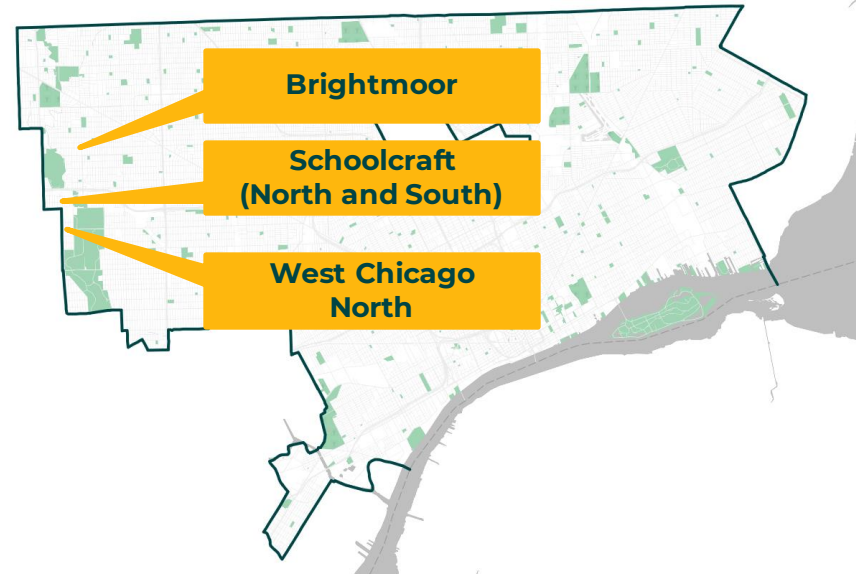
# McNichols West and McNichols East Grant Application

- DWSD seeking **\$975K in grants to study the viability of direct discharge to the Rouge River along McNichols Road between the Rouge River and the Southfield Freeway.**
- The study will complement ongoing work by GLWA to create in-line storage within the combined sewer system and eventually convert the McNichols Relief Sewer to manage stormwater only.
- Study to help advance preliminary engineering required for future construction projects for NPDES permit compliance.
- The projects will also reduce the risk of localized flooding of streets and buildings.



# Westside Stormwater Improvements (Planning)

- **More than \$90M of planned stormwater Improvements** for the West Chicago and Schoolcraft Areas.
- Targeted investment to **remove stormwater from combined sewer systems and improve water quality** of the Rouge River by reducing combined sewer overflows.
- Combination of gray and green infrastructure designed to maximize performance, create native landscapes.
- Funding sought through State of Michigan Clean Water Revolving Fund.

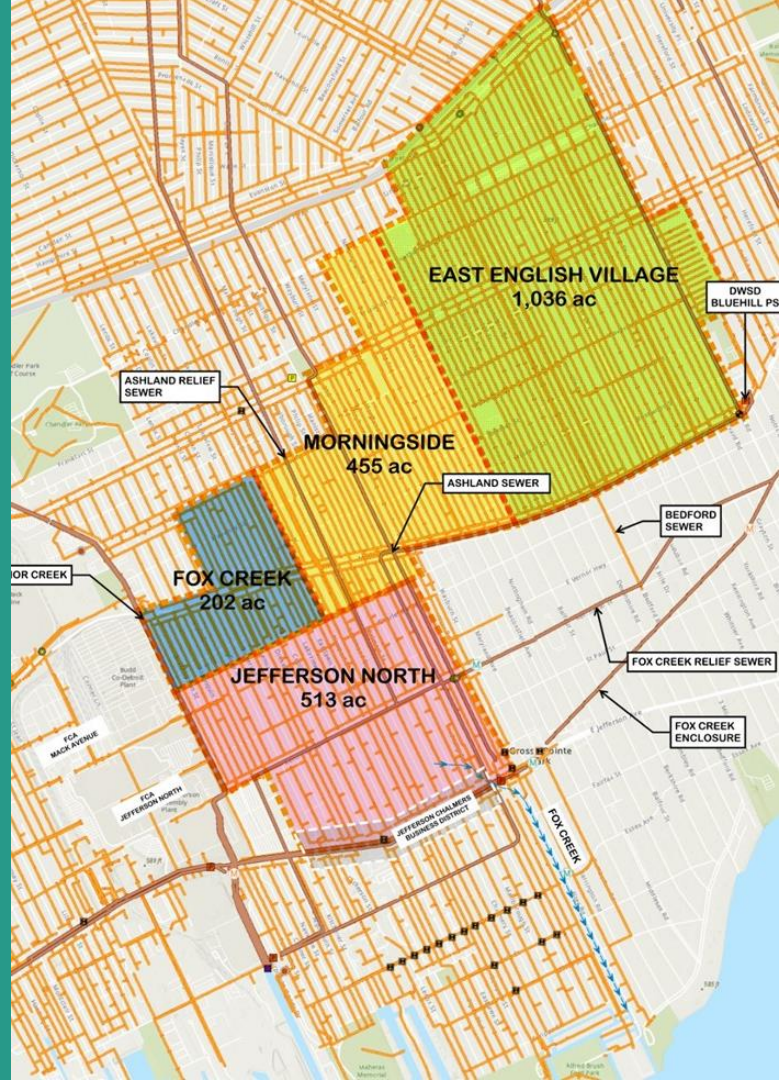


# Eastside Stormwater Relief Project

## Study Phase

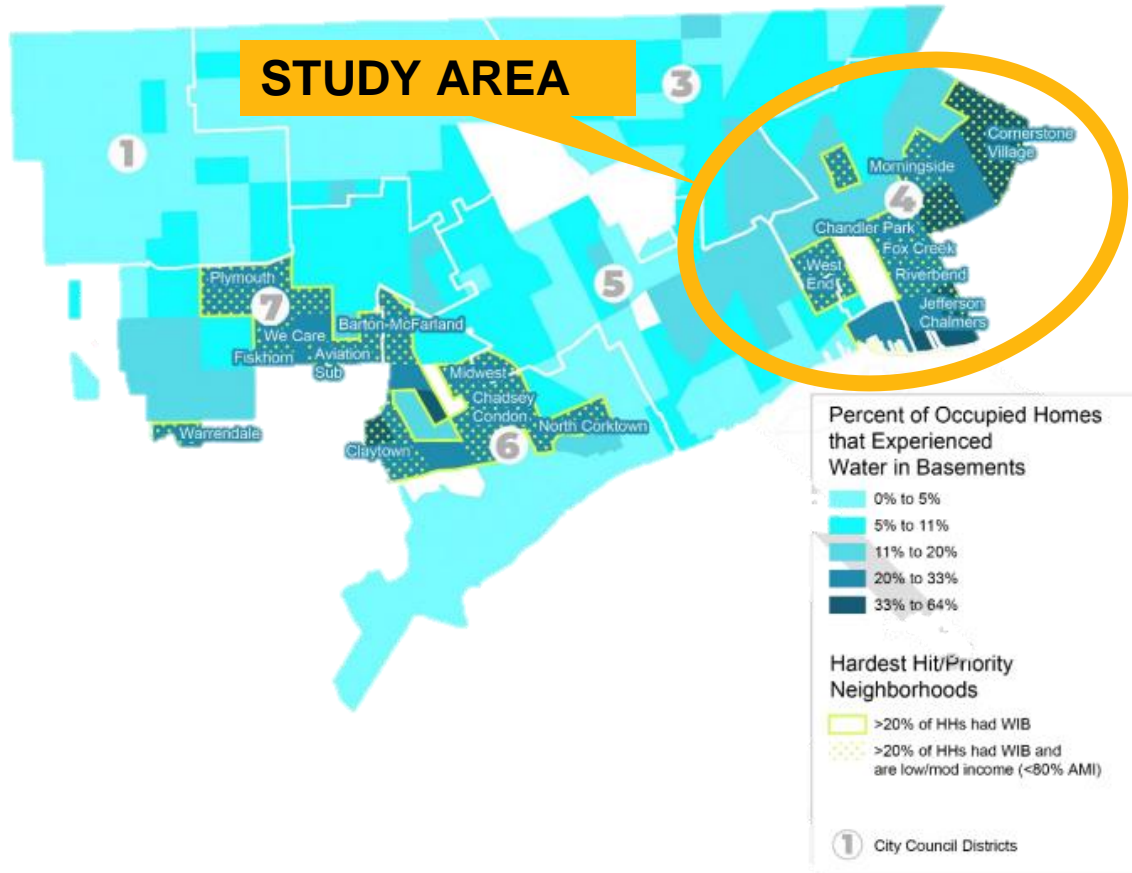
Project will study sewer relief for four eastside neighborhoods:

Drainage Area	Area (Acres)
East English Village	1036
Fox Creek	202
Jefferson North	515
Morningside	455
<b>TOTAL</b>	<b>2,208</b>





# Eastside Stormwater Relief Project – Water in Basement Reports



# Fenkell Stormwater Projects (Final Design)



**Implementation of 22 bioretention practices including one street vacation – planting ~300 of trees**



**\$1.6M grant funds secured (& matched by DWSD) & Economic Redevelopment Opportunities**



**Stormwater runoff managed from roughly 50 acres**



**9 million gallons of peak flow controlled (2-year and 25-year storm)**



**Benefits 100's of occupied homes in close proximity (neighborhood amenities, public space, habitat, etc.) and reduces flooding for the entire neighborhood**

# West Chicago South (Design)



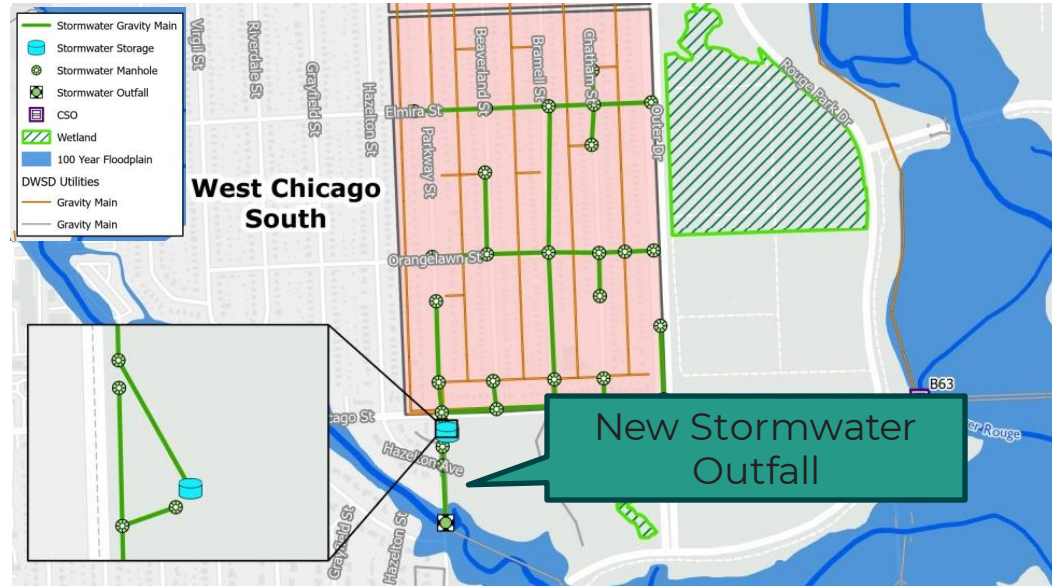
**\$19.1M grant funds secured through the Clean Water State Revolving Fund / American Rescue Plan Act**



**Stormwater runoff managed from roughly 79 acres**



**50% reduction in CSO activity within the local combined sewer system**

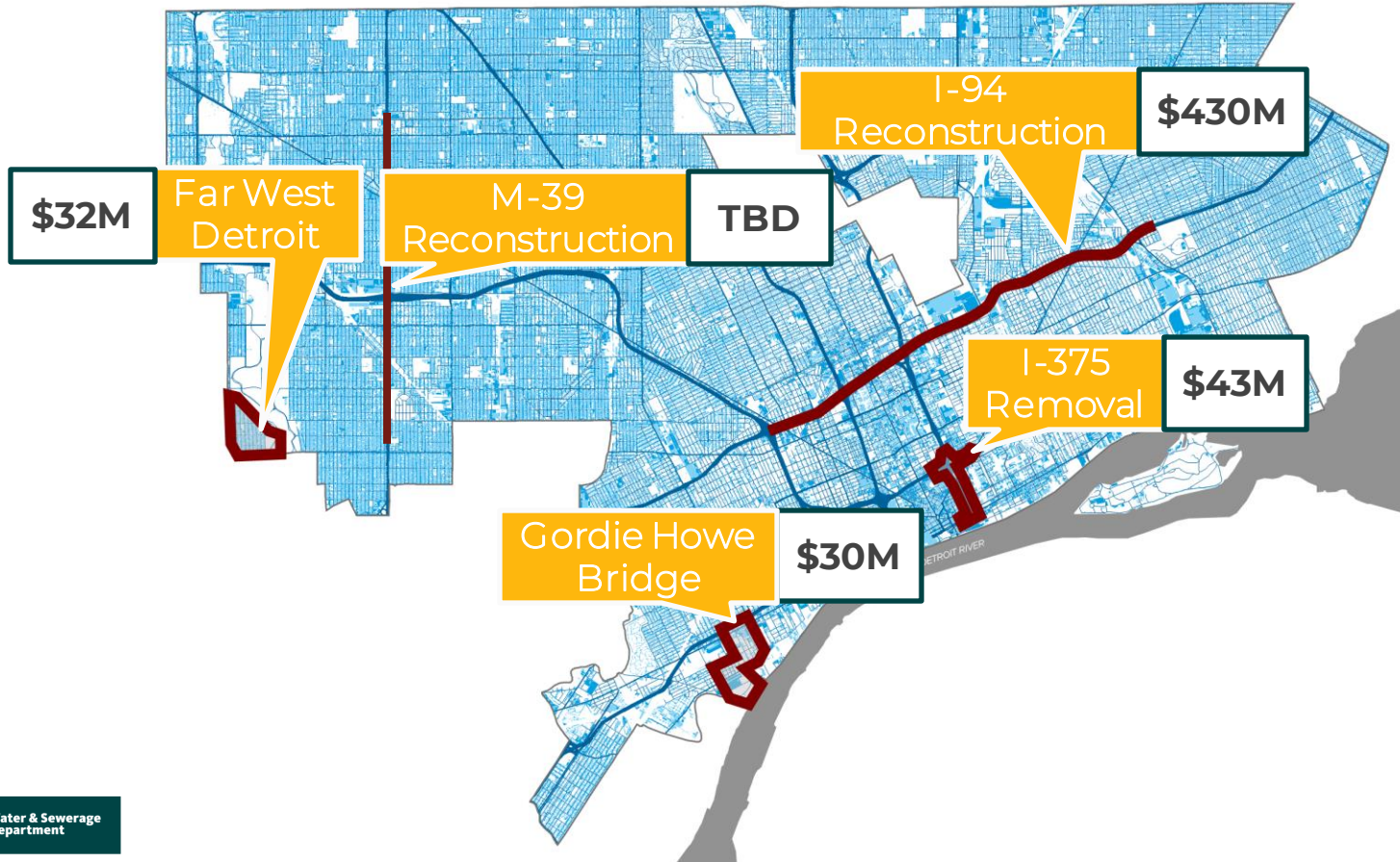


# Stormwater Management Collaboration



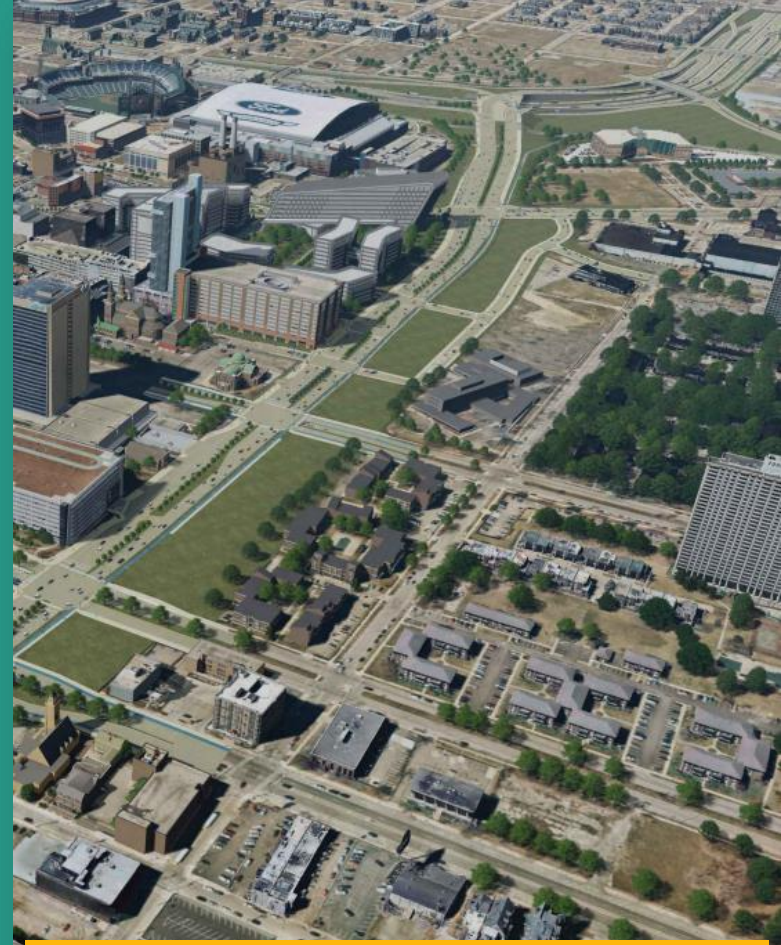
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Department

# Collaboration Projects



## MDOT Collaboration

- DWSD appreciates MDOT recognizing the value of including stormwater management in its plans.
- The freeway projects will utilize existing outfalls to the Detroit River to remove 100s of acres of drainage area from the combined sewer system.
- Projects will manage 100s of millions of gallons annually in accordance with the ordinance.
- Improvements include deep storage tunnels, surface detention and green infrastructure.



**Conceptual rendering of I-375  
Freeway Removal Project**

# MDOT Collaboration



New MDOT drainage tunnel on I-94 to remove 5 miles of freeway and 10 miles of service drive stormwater runoff from the local sewer system.



Elimination of 100s of acres from the DWSD sewer system at the US point of entry through a direct river discharge.



New MDOT trunk sewer with a direct discharge to the Detroit River remove the entire freeway drainage area from the DWSD system.



Study phase to evaluating removing up to 6 miles of urban freeway from the DWSD system with a Rouge River direct discharge.

# Collaboration Projects under Construction



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Department



# Far West Detroit Stormwater Improvement Project



**\$32M stormwater improvements  
funded by Evergreen/Farmington**



**2.5 MG of peak flow reduction**



**100+ MG removed annually**



**Use of city-owned Rouge  
Park creates highly visible  
amenity**



JOY ROAD

NORTH  
BASIN

OUTER DRIVE

NEIGHBORHOOD ACCESS TO  
ROUGE PARK TRAIL SYSTEM, TYP.

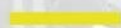

TRAIL CONNECTORS TO EXISTING  
ROUGE PARK TRAILS, TYP.

TIREMAN

SOUTH  
BASIN

WARREN ROAD

### LEGEND

-  PURPLE TRAIL - PRAIRIE PATH
-  YELLOW TRAIL - PARKLAND TRAIL
-  GREY TRAIL - SOUTH BASIN LOOP, TBD
-  DWSD MAINTENANCE ACCESS



# Far West North Basin (Constance) & South Basin Overview

## CONSTANCE BASIN RESTORATION CONCEPT



# Basement Backup Protection Program

The City of Detroit's **Basement Backup Protection Program** provides flood prevention services to 11 flood prone neighborhoods. Home eligibility is based on need and includes assessments by a City inspector and a licensed plumber. The following services are offered to participating homeowners/landlords:

- Camera inspection of sewer lateral service line
- Disconnect downspouts and install extensions
- Install backwater valve (*external installations will be included in phase 2*)
- Install sump pump with overflow
- Sewer lateral repair (*will be included in phase 2*)

**ONLY BACKWATER VALVE PROGRAM IN NORTH AMERICA THAT SECURES THE CONTRACTORS AND PAYS FOR THE ENTIRE COST!**

## 324 Homes Completed: Phase 1

Spring 2022-Summer 2023: 324 homes received a backwater valve and/or sump pump in following neighborhoods:

Aviation Sub

Vitoria Park

Jefferson Chalmers (*internal only*)

East English Village (*internal only*)

Warrendale (*internal only*)



## What's Next: Phase 2

Set to start Fall 2023/Winter 2024 in following (9) neighborhoods:

East English Village

Jefferson Chalmers

Moross-Morang

Morningside

Barton-McFarland

Cornerstone Village

Chadsey Condon

Garden View

Warrendale



# Jefferson Chalmers

- DWSD has developed solutions to expand capacity within existing sewers.
- System will be **sized to accommodate larger storm events – almost 19,000 linear feet of new pipe** (shown in red).
- Project eligible for funding and was submitted to FEMA’s Building Resilient Infrastructure and in Communities (BRIC) grant program.
- **\$11.3M grant** award announced in August 2023.



# GLWA Improvements



Water & Sewerage  
Department

# What We've Done: GLWA Electrical Improvements

- GLWA installed **three new transformers at the Freud Pump Station**.
- It successfully converted the external power supply feeding the transformers to DTE power via **three independent power feeds at Freud and two feeds at Blue Hill Pump Station** increasing power reliability and redundancy.



## Great Lakes Water Authority (GLWA)

- During the next few years, GLWA will invest three-quarters of a billion dollars in Detroit to improve climate resiliency.
- The projects are primarily in the westside and lower eastside.
- These infrastructure upgrades align with construction that DWSD, MDOT and other agencies have planned.

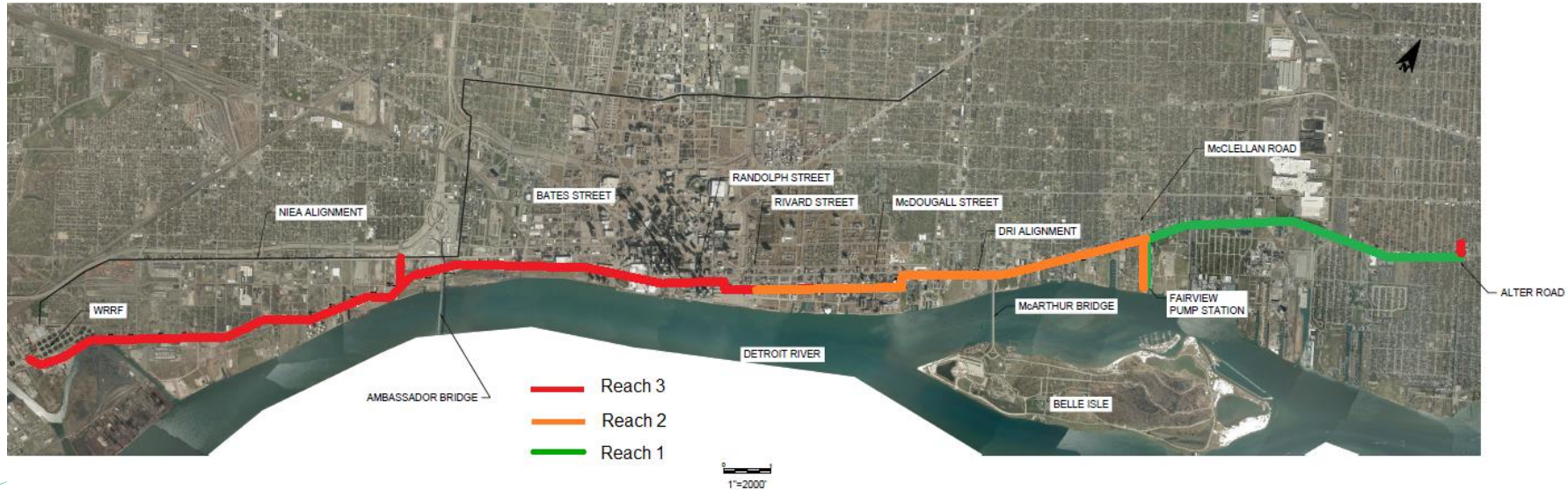


**Conceptual renderings of upgraded Freud Pumping Station**



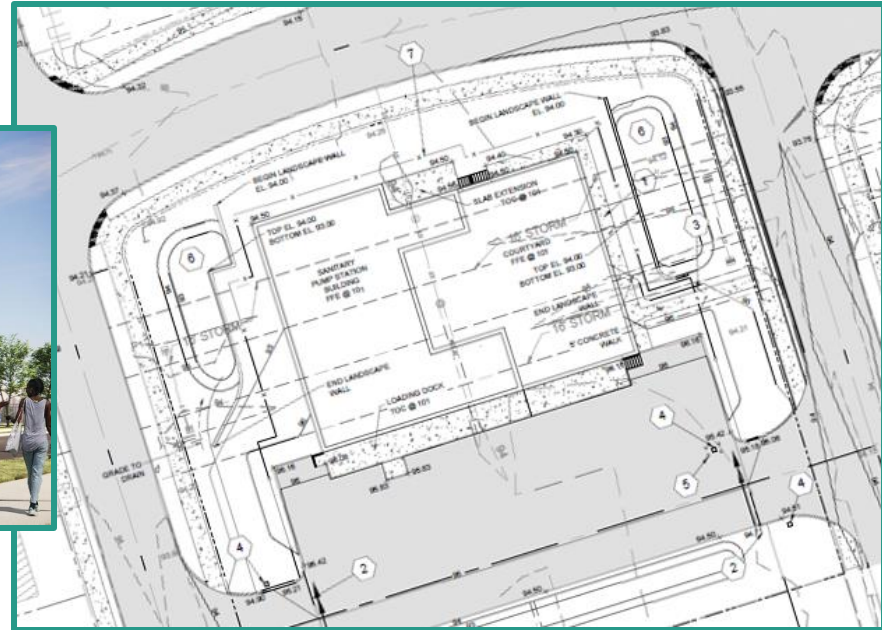
# \$113M Upgrade to Detroit River Interceptor

- The **most comprehensive upgrade to the Detroit River Interceptor (DRI)** since it was constructed – will optimize capacity and extend the service life.
- The DRI conveys one-third of all wastewater flow from the GLWA service area.



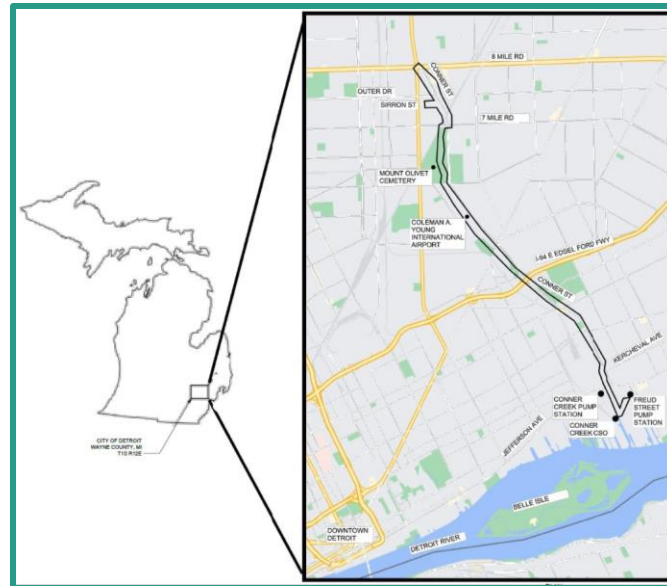
# \$594M Upgrade to Freud and Conner Pumping Stations

- Freud Pumping Station expansion is to improve the overall reliability of the collection system and minimize system surcharging to **substantially reduce the risk of future combined sewage flooding/backups** in Jefferson Chalmers and the lower eastside.
- The Conner Creek Pump Station rehabilitation will be to improve reliability of sanitary and storm pumping.



# \$55M Woodward and Conner Sewer System Rehabilitation

- The Woodward Sewer System project is to **improve capacity and life cycle** by addressing structure defects.
- The Conner Sewer System rehabilitation is intended to **extend the life and already removed 45,000 tons of grit from usage/flooding** and addresses defects to improve capacity.



# Grant Funding Secured

## Secured

- **\$1.6M in state and federal grants** for the Fenkell Stormwater Project to install 24 bioretention gardens – community engagement underway, construction begins 2024
- **EGLE ARPA Grants \$32.99M** for water main and lead service line replacement on various streets
- **GLWA Capital Contribution Agreement \$31.6M** for complete neighborhood drainage improvements and Green Stormwater Infrastructure (GSI) features in Rouge Park
- **EGLE \$480,000 grant** to support East Side Resiliency Planning Project to study and determine a stormwater management project(s) – waiting on second grant approval (see next slide)
- **FEMA BRIC \$11.3M grant** for upsizing sewers in Jefferson Chalmers
- **EGLE CWSRF (ARPA) \$19.1M grant** for constructing stormwater sewers within the West Chicago – South Area



# Grant Funding Applied

## Allocated, Waiting Approval

- **HUD Disaster Recovery \$40M** for flood and sewage backup mitigation following June 25-26, 2021 flooding – may increase to \$80M

## Applied

- **EGLE Clean Water State Revolving Fund \$91M in grants** for four westside stormwater projects – expect approval by September (Brightmoor, West Chicago North and Schoolcraft North/South areas)
- **FEMA HMGP \$3.2M grant** for Basement Backup Protection Program – expect response by Fall 2023
- **National Fish & Wildlife Foundation \$540,000 grant** to support East Side Resiliency Planning Project to study and determine a stormwater management project(s) – expect response by January 2024
- **MI State Police ORG3785 Safeguarding Tomorrow Through Ongoing Risk Mitigation Revolving Loan Fund Program \$10M** to upsize certain sewer segments to reduce combined sewer system surcharging near the Conner sewer
- **U.S. Department of Homeland Security HMGP \$1.9M** to support Basement Backup Protection Program in Jefferson Chalmers neighborhood
- **U.S. Department of Homeland Security HMGP \$21M** to conduct engineering, environmental, feasibility and/or benefit cost analyses for the Fischer Sewer improvements project
- **U.S. Department of Homeland Security HMGP \$13.4M** to support the Design and Planning of the Near Eastside Sewer improvements
- **U.S. Department of Homeland Security HMGP \$9.4M** to conduct engineering, environmental, feasibility and/or benefit cost analyses for East English Village Sewer improvements project
- **MSP Storm Grant \$10M** for the Annsbury and Norcross Village Stormwater Improvements Project
- **FEMA - Building Resilience in Communities (BRIC) \$900K** for stormwater planning study on McNichols West and McNichols East

# Thank You!

## Detroit Water & Sewerage Department

**Email:** [DWSD-publicaffairs@detroitmi.gov](mailto:DWSD-publicaffairs@detroitmi.gov)

**Phone:** 313-267-8000



Water & Sewerage  
Department



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[YouTube.com/DWSDwater](https://YouTube.com/DWSDwater)

# Pittsburgh, PA

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James Stitt  
Sustainability Manager, Pittsburgh Water and Sewer Authority



Kyla Prendergast, AICP  
Senior Environmental Planner, City of Pittsburgh

**PGH<sub>2</sub>O**



*6 February 2024*

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# **Increasing Stormwater Resiliency Through Innovative Codes and Ordinances**

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*US EPA Webcast Series*

*Communities with Combined Sewers  
Adapting to a Changing Climate*





- James J. Stitt, Sustainability Manager, Pittsburgh Water & Sewer Authority [jstitt@pgh2o.com](mailto:jstitt@pgh2o.com)
- Kyla Prendergast, Senior Environmental Planner, Dept. of City Planning [kyla.prendergast@pittsburghpa.gov](mailto:kyla.prendergast@pittsburghpa.gov)



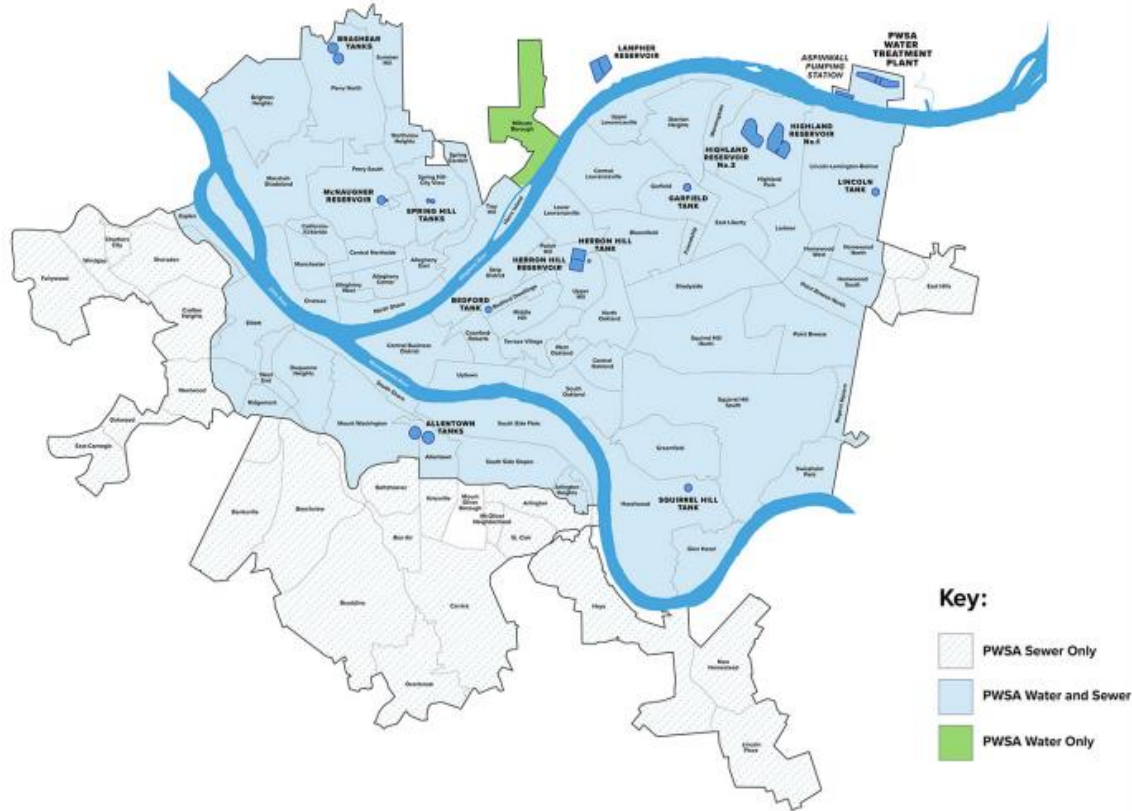
# Stormwater in Pittsburgh



At the turn of the 20<sup>th</sup> century, Pittsburgh embarked on its biggest infrastructure improvement campaign, building sewers, water lines, roads, and power lines that created the city we know today.

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# PWSA Service Area



## Service Area Facts

PWSA is the largest combined water, wastewater, and stormwater authority in Pennsylvania.

We serve approximately 500,000 consumers throughout the city of Pittsburgh and surrounding areas.

### PWSA Customer Accounts

- Total Customers: 116,365
- Water, Sewer, Stormwater: 80,524
- Sewer and Stormwater: 30,197
- Stormwater Only: 5,644

- PWSA provides water to approximately 84% of the City's population
- System includes water treatment plant, microfiltration plants, approx. 964 miles of water mains, 4 in-ground reservoirs, 10 storage tanks, 1,220 miles of sanitary, storm, and combined sewers, and 25,00 catch basins
- Wastewater treatment is provided by Allegheny County Sanitary Authority, "ALCOSAN"

# Where Does Stormwater Go in Pittsburgh?

## Legend

Separate Sewersheds	Combined Sewersheds
 Allegheny	 Allegheny
 Ohio	 Ohio
 Mon	 Mon

- Sewershed: an area of land where stormwater and/or sewage flows into and through sewers to a single endpoint
- Separated sewersheds make up 25% of our sewer system

# Stormwater Challenges in Pittsburgh

- Aging infrastructure
- Combined sewer overflows
- Impaired streams
- Flash flooding
- Basement backups
- Landslides



# Historic Flooding in Pittsburgh



WPXI 2018

Destroyed By Landslide



Bob Bauder Tribune-Review 2019



NY Post 2011

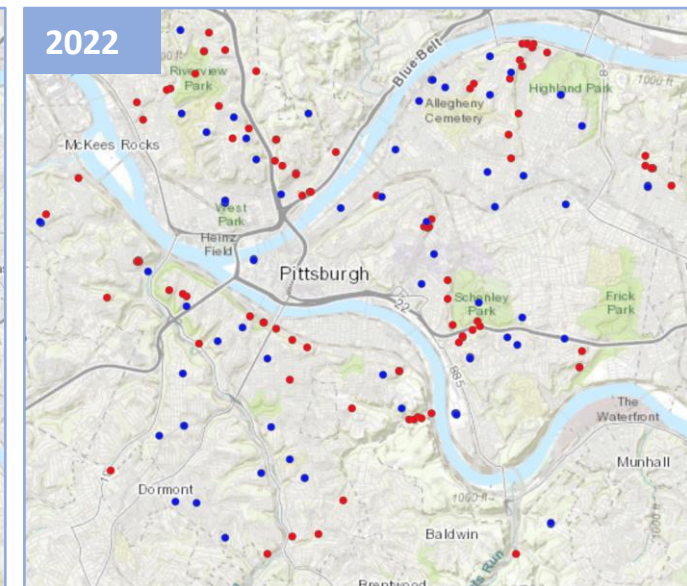
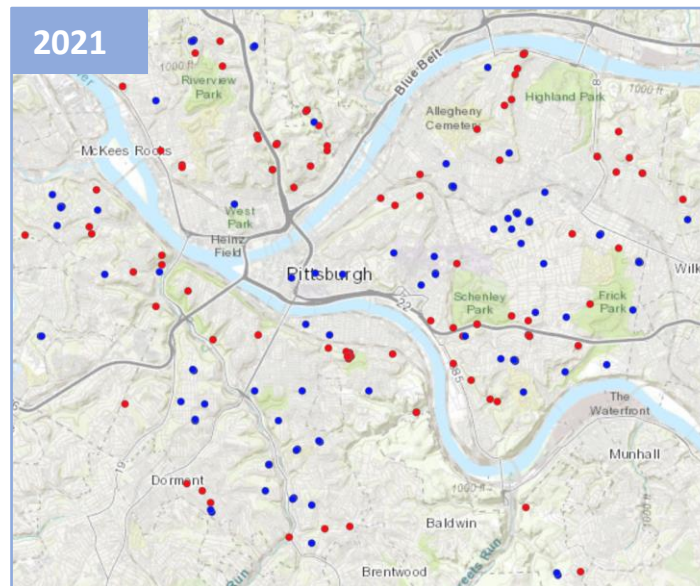
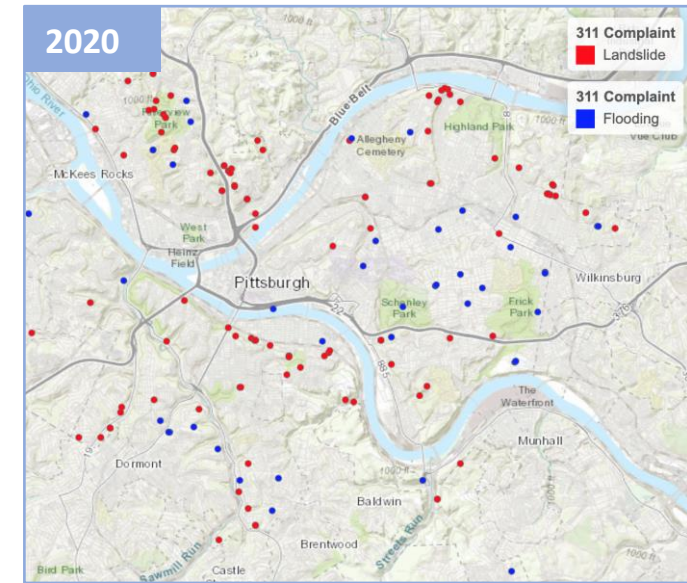
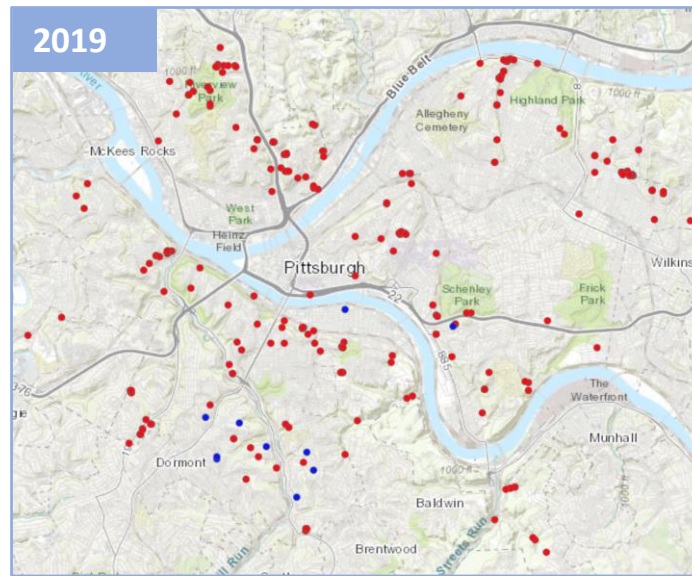


ALLEGHENY CONFERENCE ON COMMUNITY DEVELOPMENT PHOTOGRAPHS, 1892-1981. MSP 285, DETRE LIBRARY & ARCHIVES AT THE HISTORY CENTER.

# Current Flooding in Pittsburgh

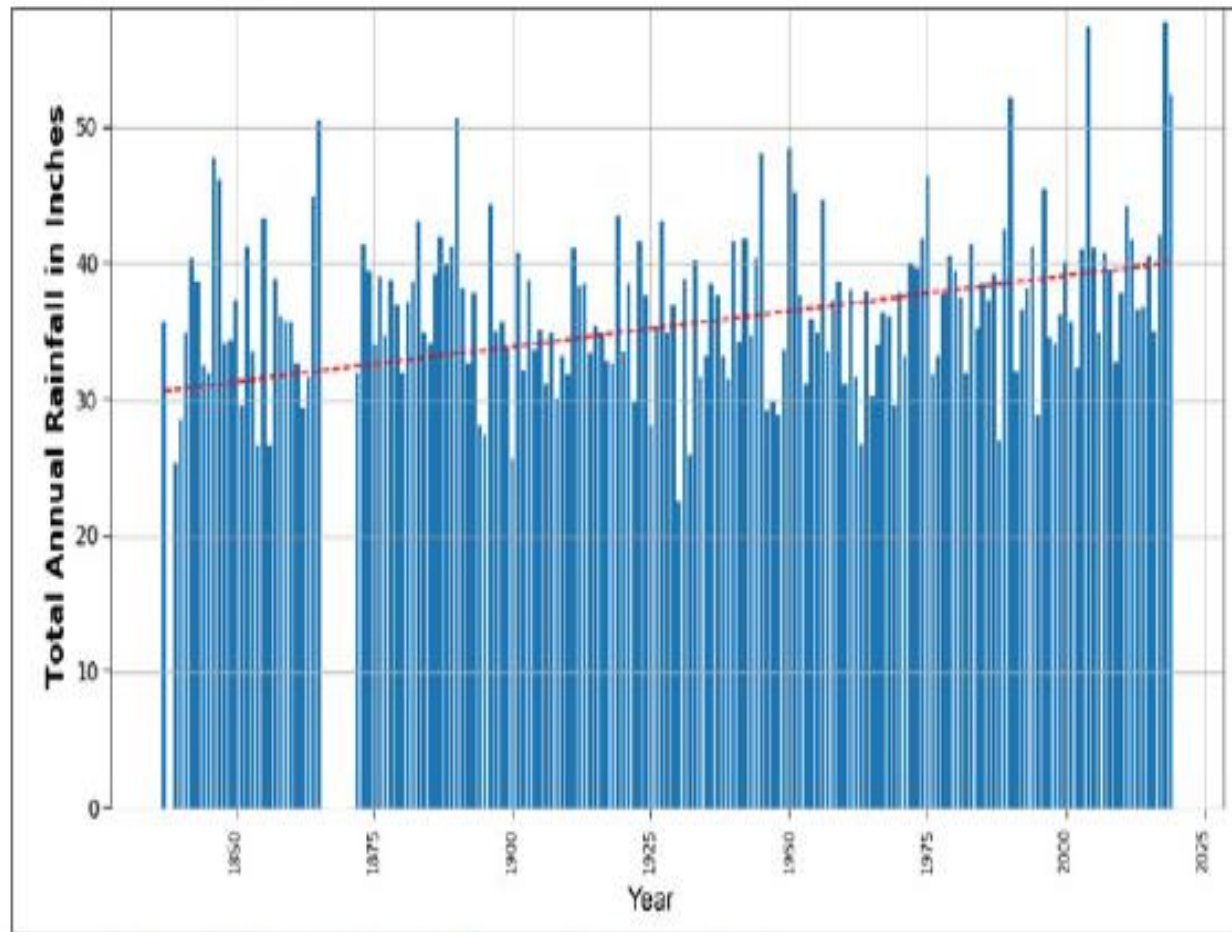
Year	Rainfall (in.)	311 Flooding Calls	311 Landslide Calls
2019	52.46	10	270
2020	39.33	44	111
2021	40.53	94	92
2022	42.58	73	106

311 Complaint	
<span style="color: red;">●</span>	Landslide
<span style="color: blue;">●</span>	Flooding

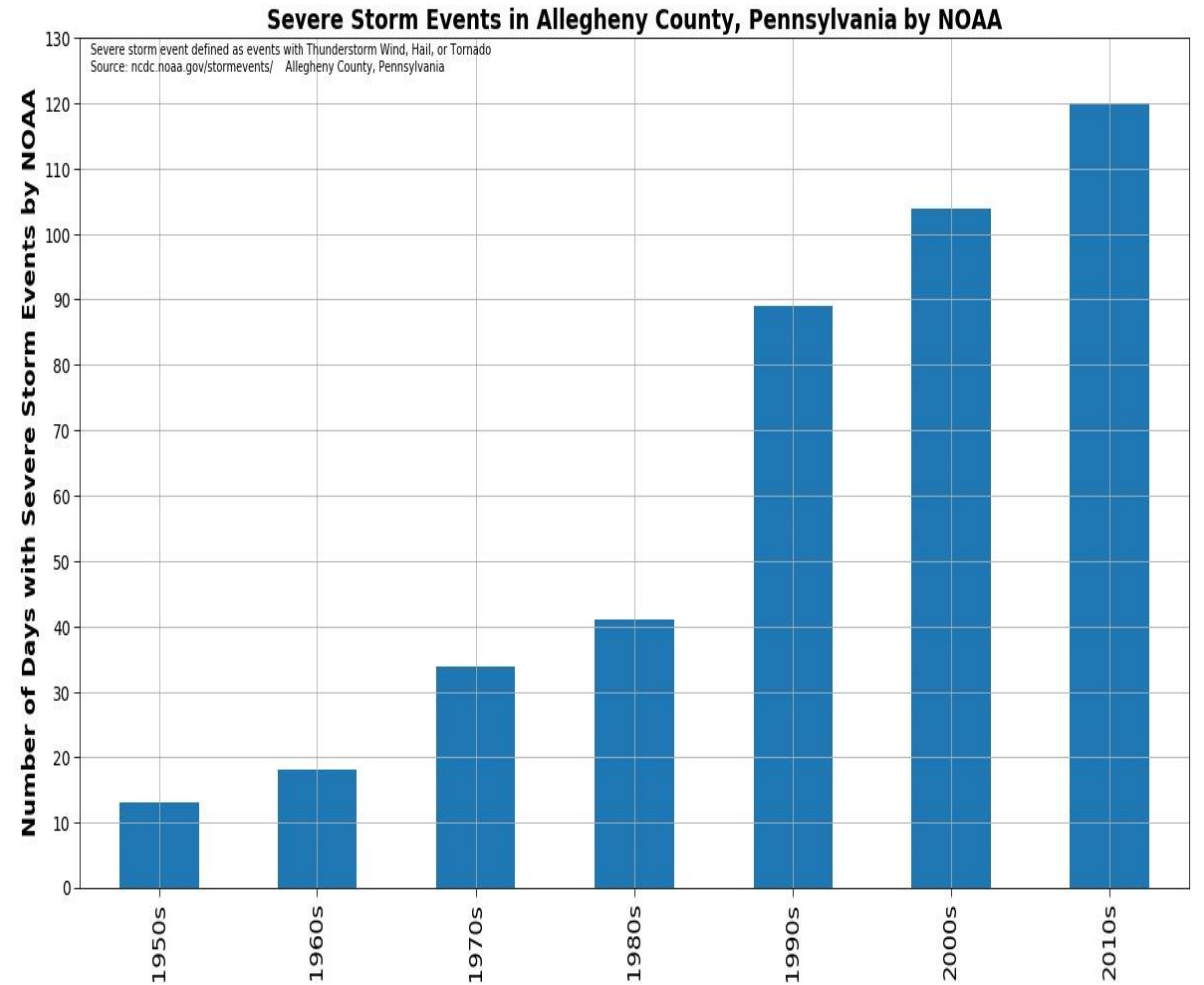




# Historic Data: Total Annual Rainfall & Severe Storm Events



**Figure 1.1.** Annual Recorded Rainfall 1837 to 2019 in Pittsburgh



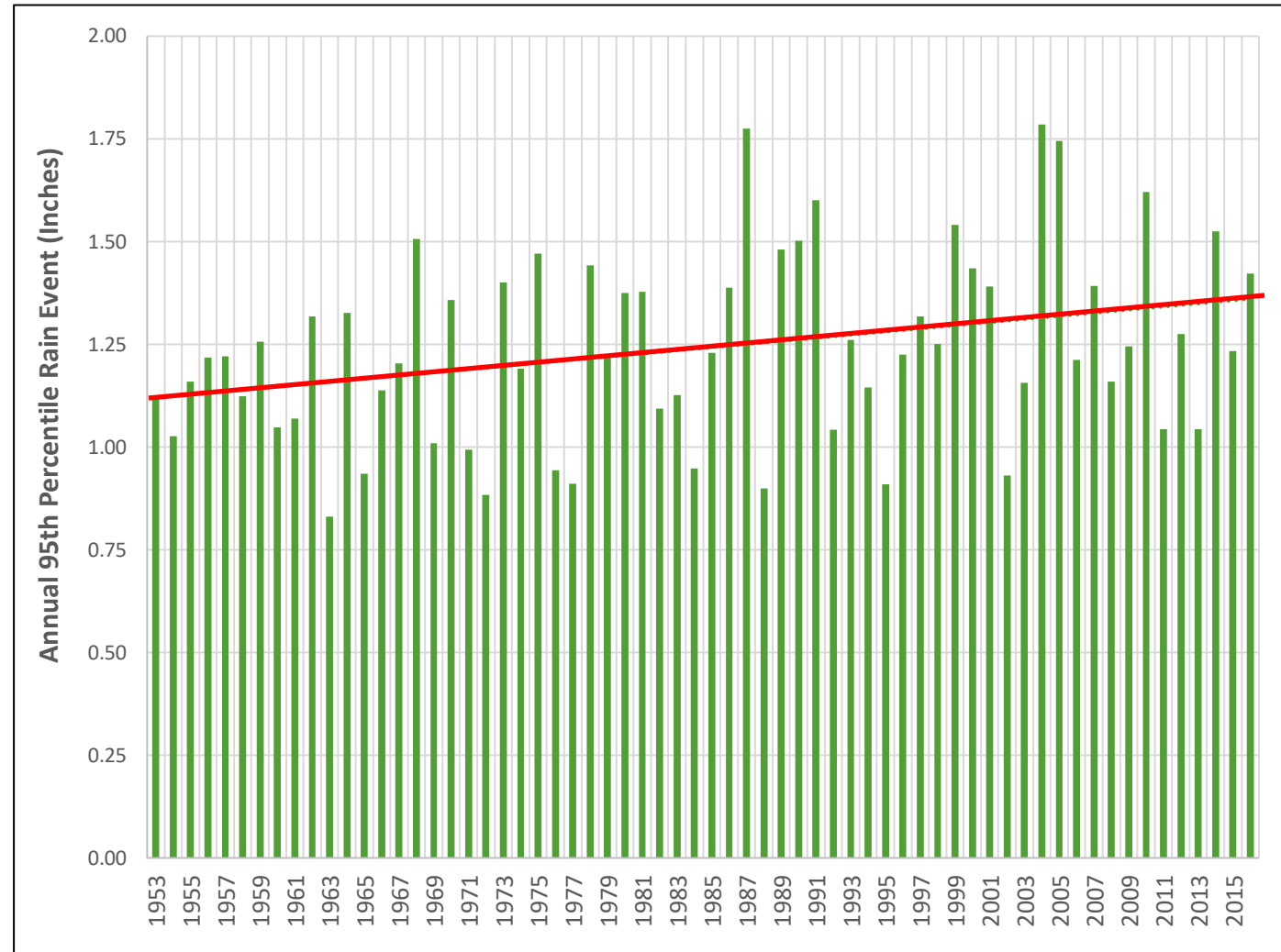
# Historic Data: Annual Percentile Event

Stormwater Management is a **long-term investment** and designs must consider potential future conditions

Investigated over **60 years of historical rainfall data** from 1953 for potential changes and trends

Of primary concern to Pittsburgh for green infrastructure design and stormwater control measures:

- **Annual Percentile Rain Event (Sizing of Systems)**



95<sup>th</sup> Percentile Storm Size

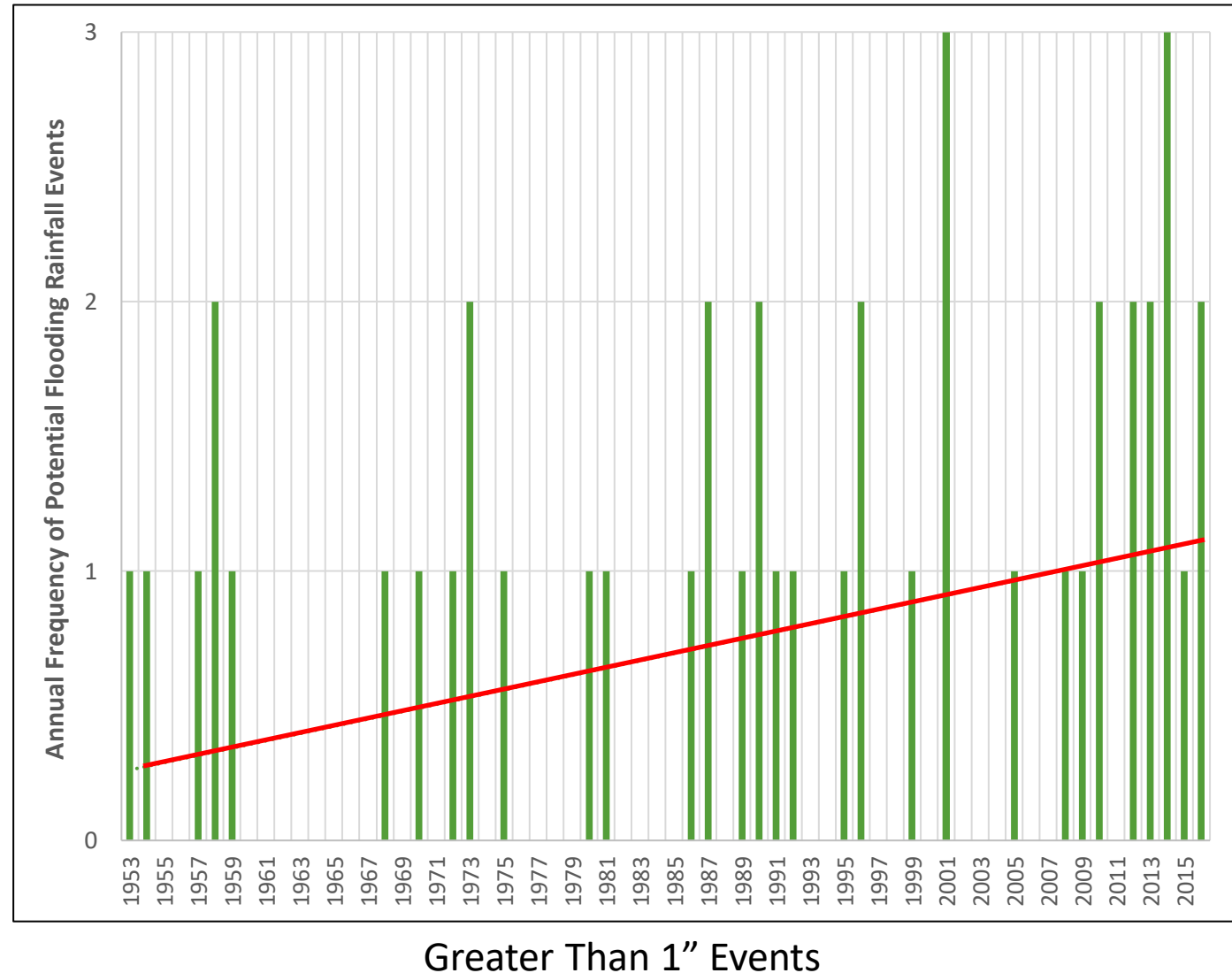
# Historic Data: Frequency of Large Events

Stormwater Management is a **long-term investment** and designs must consider potential future conditions

Investigated over **60 years of historical rainfall data** from 1953 for potential changes and trends.

Of primary concern to Pittsburgh for green infrastructure design and stormwater control measures:

- **Annual Percentile Rain Event (Sizing of Systems)**
- **Frequency of Potential Flooding Events (For Flood Prevention)**



# Climate Change Projection

- RAND & CMU Projection Models Specific for Pittsburgh

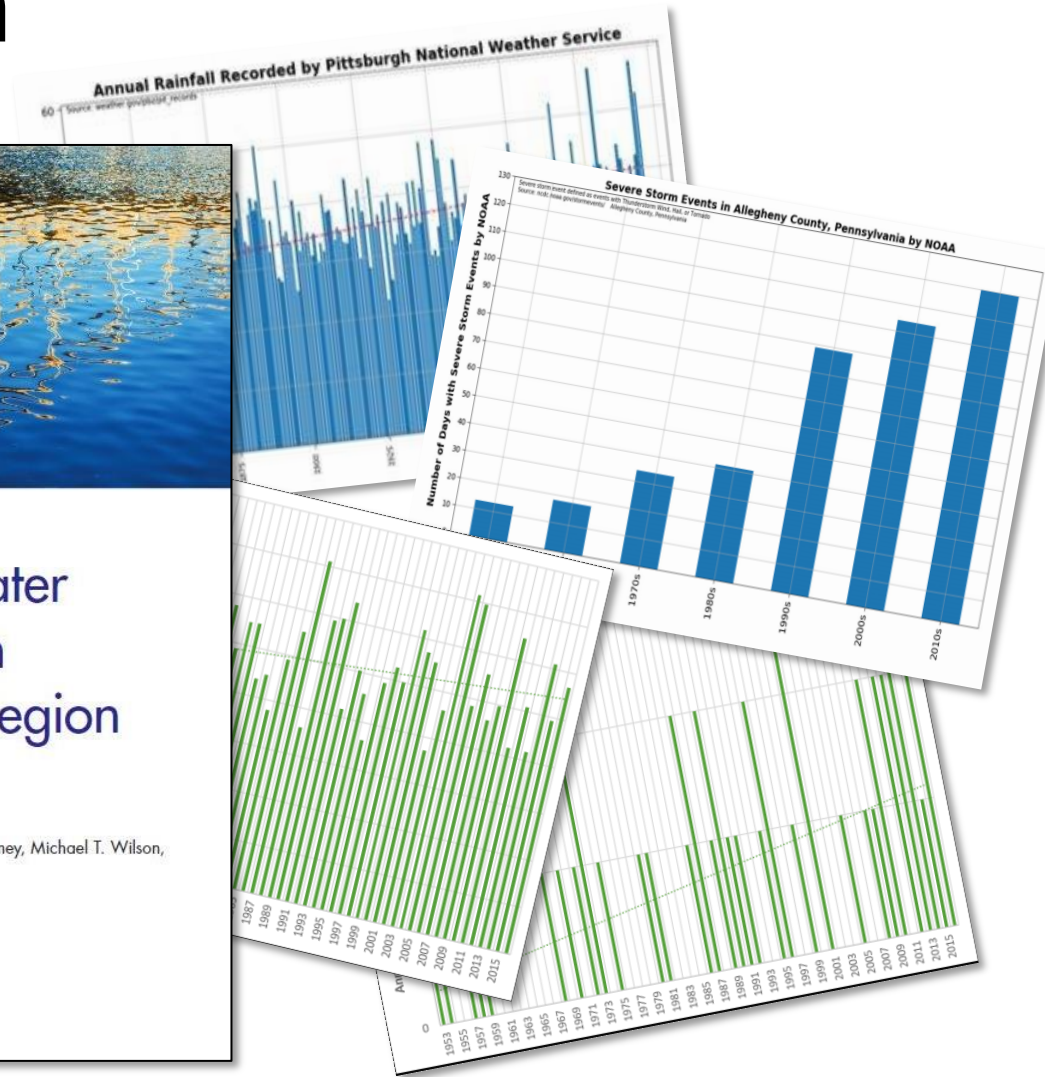
- 8% to 23% increase in rainfall depth, depending on storm frequency
- 13% increase of 95th percentile rainfall
  - Following same trajectory, 2050=1.56" and 2100=1.66"



## Robust Stormwater Management in the Pittsburgh Region

A Pilot Study

Jordan R. Fischbach, Kyle Siler-Evans, Devin Tierney, Michael T. Wilson, Lauren M. Cook, Linnea Warren May

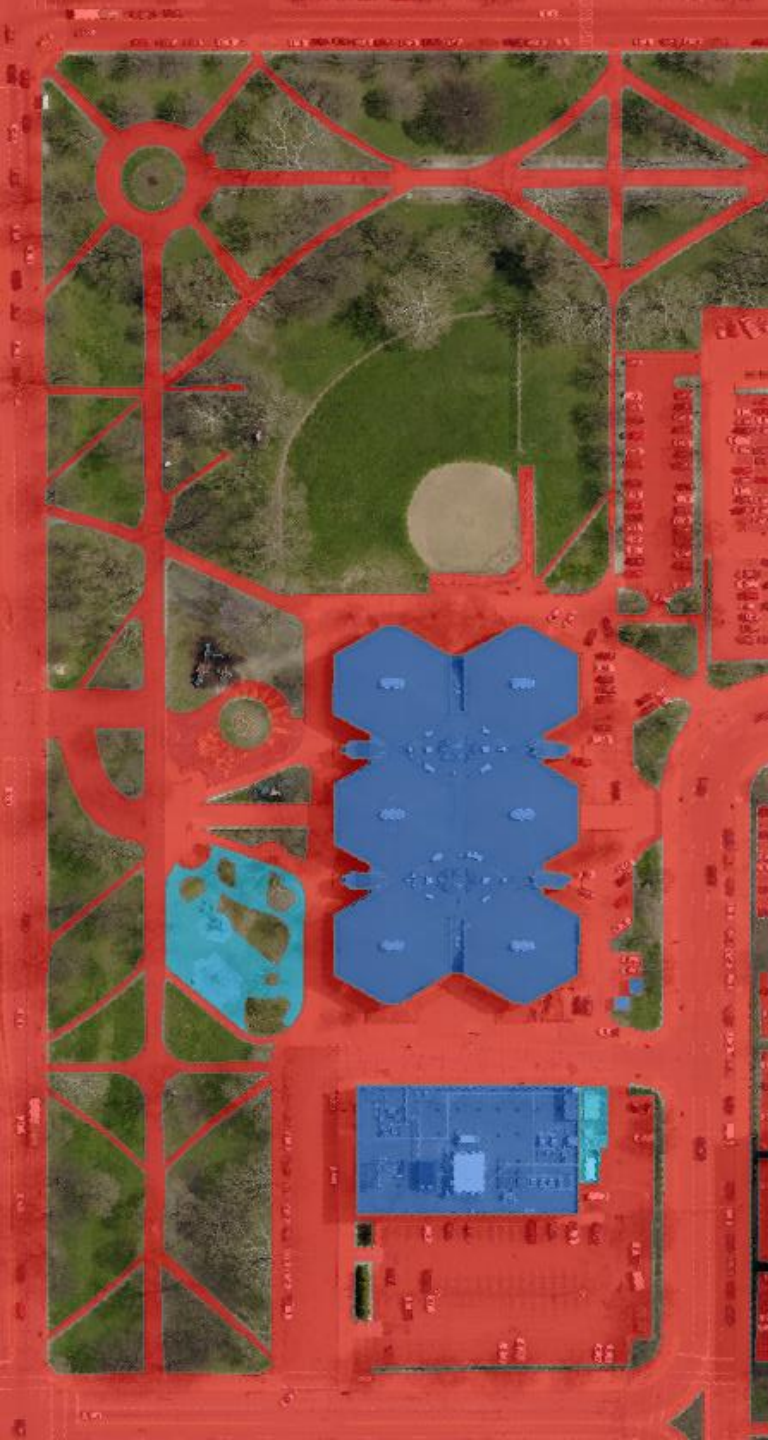


# Design Storm Rainfall Depths

Return Period (Yr)	Current Code Requirements	CMU Climate Change Study	Percent Difference between Existing and Future Climate Return Period Values			
	NOAA Atlas 14* (inches of rainfall)	Average Future* (2020-2099) (inches of rainfall)	Pittsburgh	VA Beach	Auckland, NZ	Vancouver, BC**
2	2.3	2.5	8%	20%	9%	21%
5	2.9	3.3	12%	20%	11%	19%
10	3.3	3.9	15%	20%	13%	22%
25	3.9	4.8	19%	20%	15%	21%
50	4.4	5.6	21%	20%	17%	21%
100	4.9	6.4	23%	20%	17%	20%

\*Values taken from Table C.4 *Managing Heavy Rainfall with Green Infrastructure* (RAND 2020)

\*\*Estimated from visual comparison of Vancouver, BC 2014 and 2100 IDF Curves in City of Vancouver Rainwater Management Bulletin July 11, 2018



# Impervious Area Based Stormwater Fee

- Impervious area mapping of Geographic Information System (GIS) data was generated to determine unique impervious area for each customer parcel
- PWSA has a Credit Program & process for property owners to appeal or correct impervious surface area calculations

## Stormwater fee funds

- **Capital Costs:** design and construction of stormwater projects identified in PWSA's Capital Program
- **Direct Costs:** Day-to-day maintenance
  - Cleaning catch basins
  - Weeding and maintenance of PWSA raingardens and stormwater infrastructure
  - Meeting state water quality requirements
- **Indirect Costs:** Shared functions that support stormwater, water, and wastewater services



New Code  
vs.  
Old Code

# Highlight of Major Code Changes

- All stormwater-related regulations relocated to Title Thirteen
- Use of climate change projection rainfall model for BMP design and sizing
- Public Health and Safety Release Rate Watersheds
- Two-step approval process (conceptual and site plan review)
- Introduction of Design Manual
- Stormwater Permit and Inspection program



# Climate Change Projected Rainfall

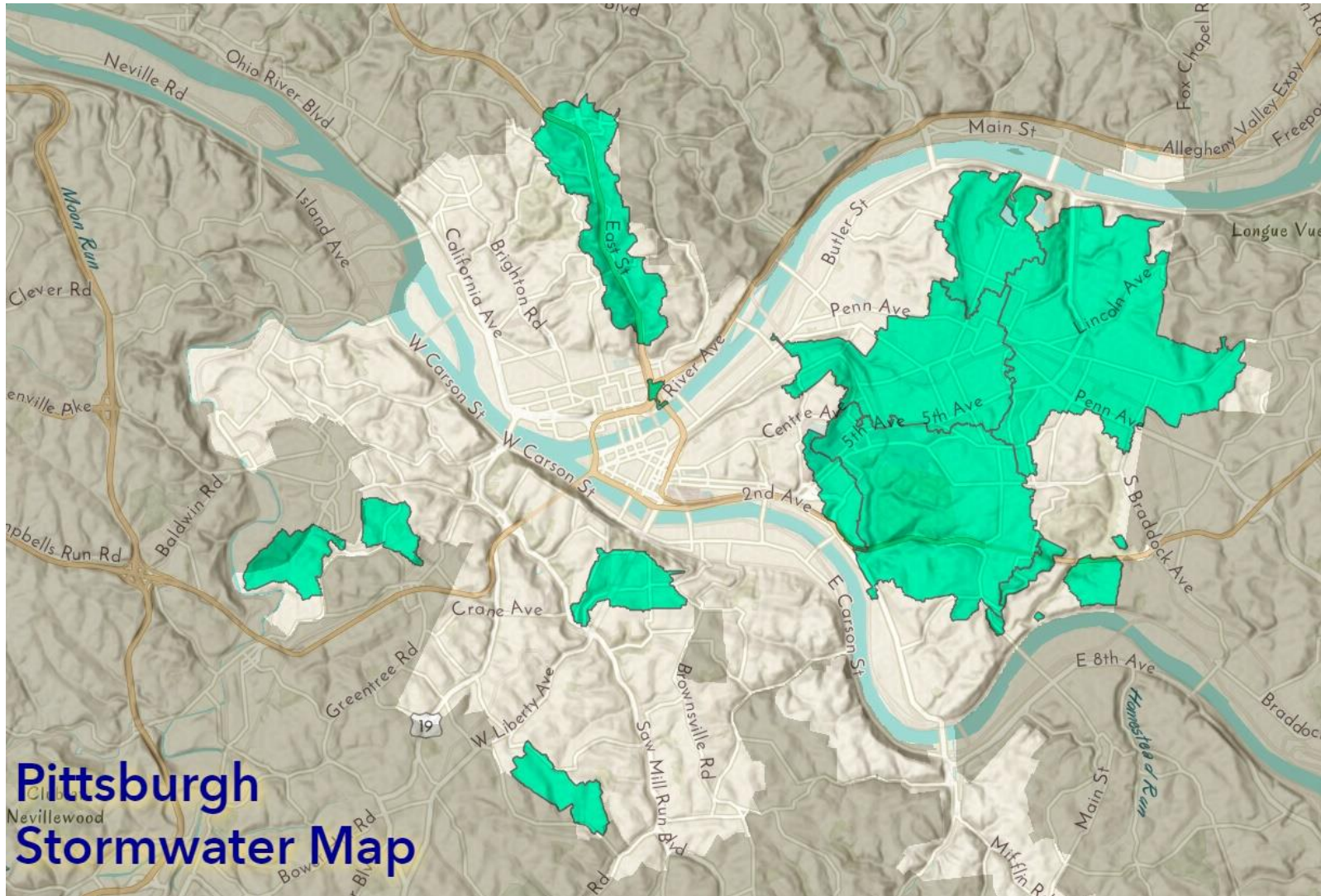
**TABLE 2.3. 24-HOUR DURATION FUTURE CLIMATE CHANGE RAINFALL VALUES FOR THE CITY OF PITTSBURGH**

*(Table adapted from RAND (2020) – results from Carnegie Mellon University)*

<b>Return Period (years)</b>	<b>Average Future Rainfall Depth (inches)</b>
1	2.1
2	2.3
5	3.3
10	3.9
25	4.8
50	5.6
100	6.4

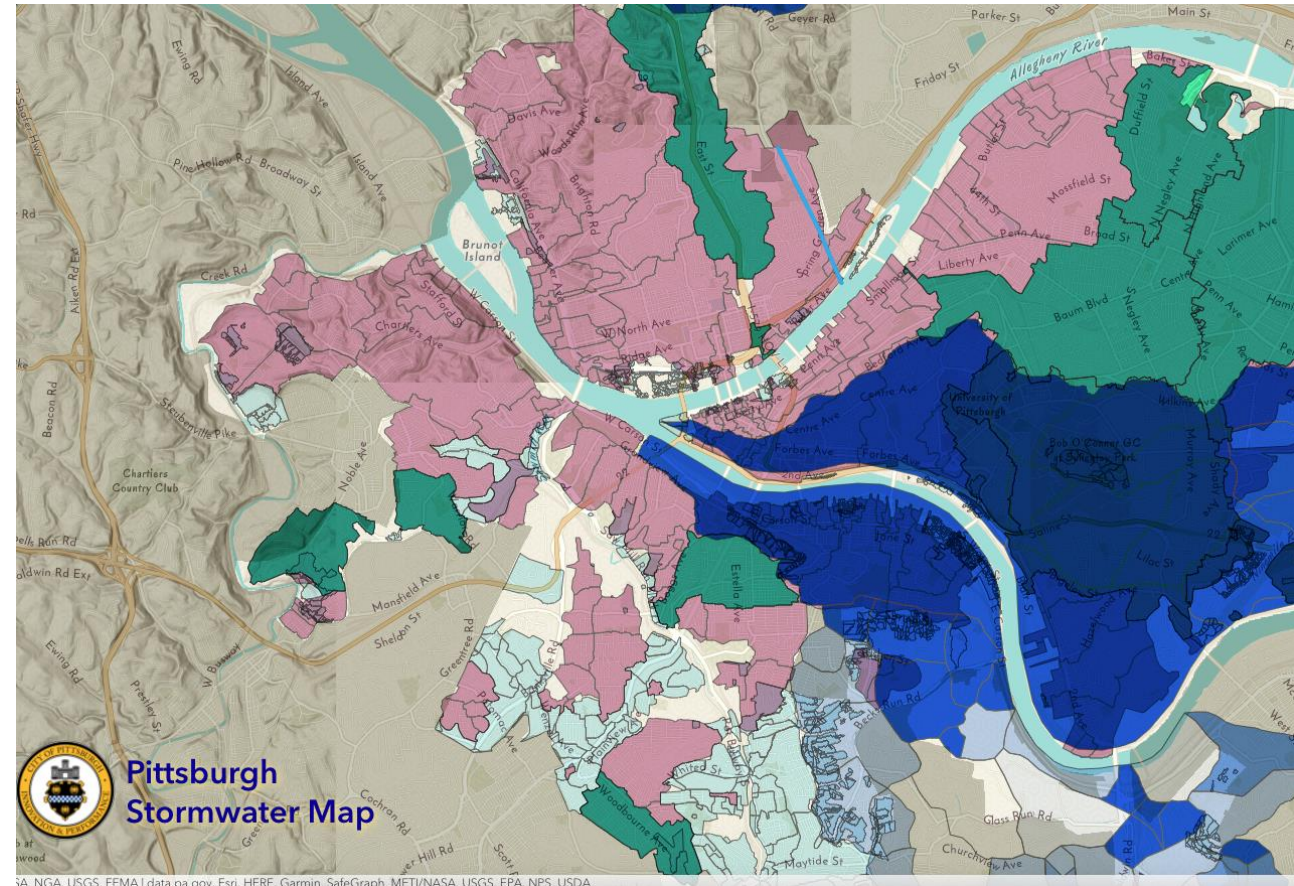
If the present-day NOAA Atlas 14 rainfall depth value is higher than the future climate projection rainfall value, the NOAA Atlas 14 value shall apply for modeling analysis purposes.

# Public Health and Safety Watersheds



# Stormwater Map

- Includes previously accessible environmental data (e.g., landslide prone soils, steep slopes, etc.)
- New data:
  - PADEP impaired waters
  - Act 167 watersheds
  - Public health and safety watersheds
  - Watersheds and sewersheds
  - RIV
- Data will be kept up-to-date in the online GIS interface hosted by the City and will be available for download [here](https://gis.pittsburghpa.gov/v/pghstormwater/).



<https://gis.pittsburghpa.gov/v/pghstormwater/>

THE CITY OF PITTSBURGH

# STORMWATER DESIGN MANUAL



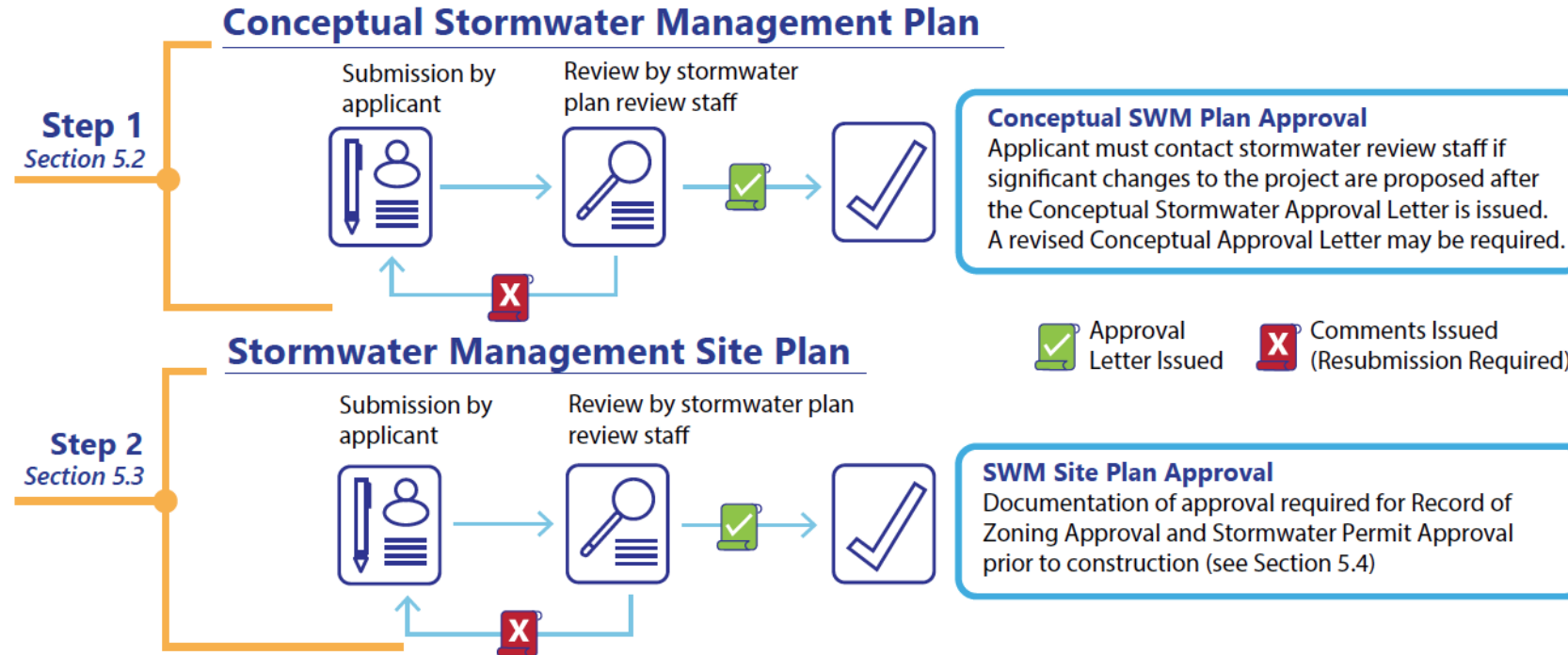
DECEMBER 2021

# Stormwater Design Manual & Guidance

# Design Manual Contents

- 1.0 Introduction and Purpose
- 2.0 Stormwater Management Requirements
- 3.0 Integrating Stormwater Management with Site Design
- 4.0 Stormwater Best Management Practice Design Standards
- 5.0 Stormwater Plan Review Requirements
- 6.0 Construction Guidance
- 7.0 Operations and Maintenance

# Stormwater Permit Application Process



# Volume Control Requirements

## 1303.03

Do not increase the post-development total runoff volume for all storms equal to or less than the two-year, twenty-four-hour duration rainfall event.

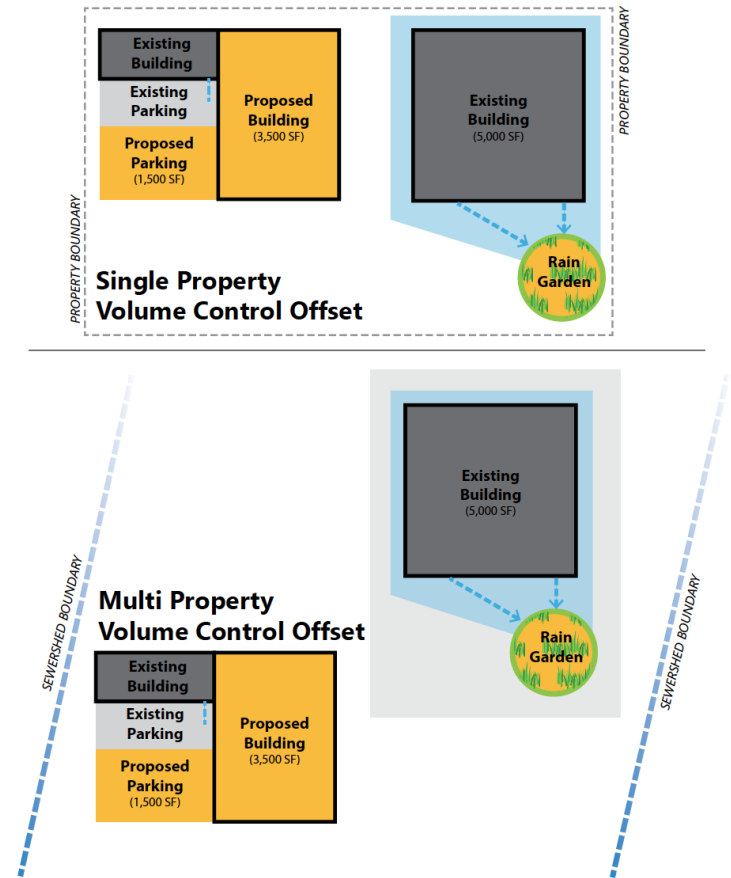
Runoff from at least the annual 95th percentile rainfall event using future climate change rainfall projections shall be permanently removed from the runoff flow, i.e., it shall not be released into the sewer system or surface waters of this Commonwealth.

Removal options include reuse, evaporation, transpiration, and infiltration.

For modeling purposes, existing (pre-development) non-forested pervious areas shall be calculated using permeability coefficients for meadow in good condition, in an effort to be as conservative as possible in existing conditions modeling.

# Volume Control Offset

- Provides applicants with more flexibility in complying with the volume control requirement.
- Useful for projects where the regulated activity is occurring within a more constrained portion of a property.
- Must be on a property with the same owner.
- Must be in the same sewershed.



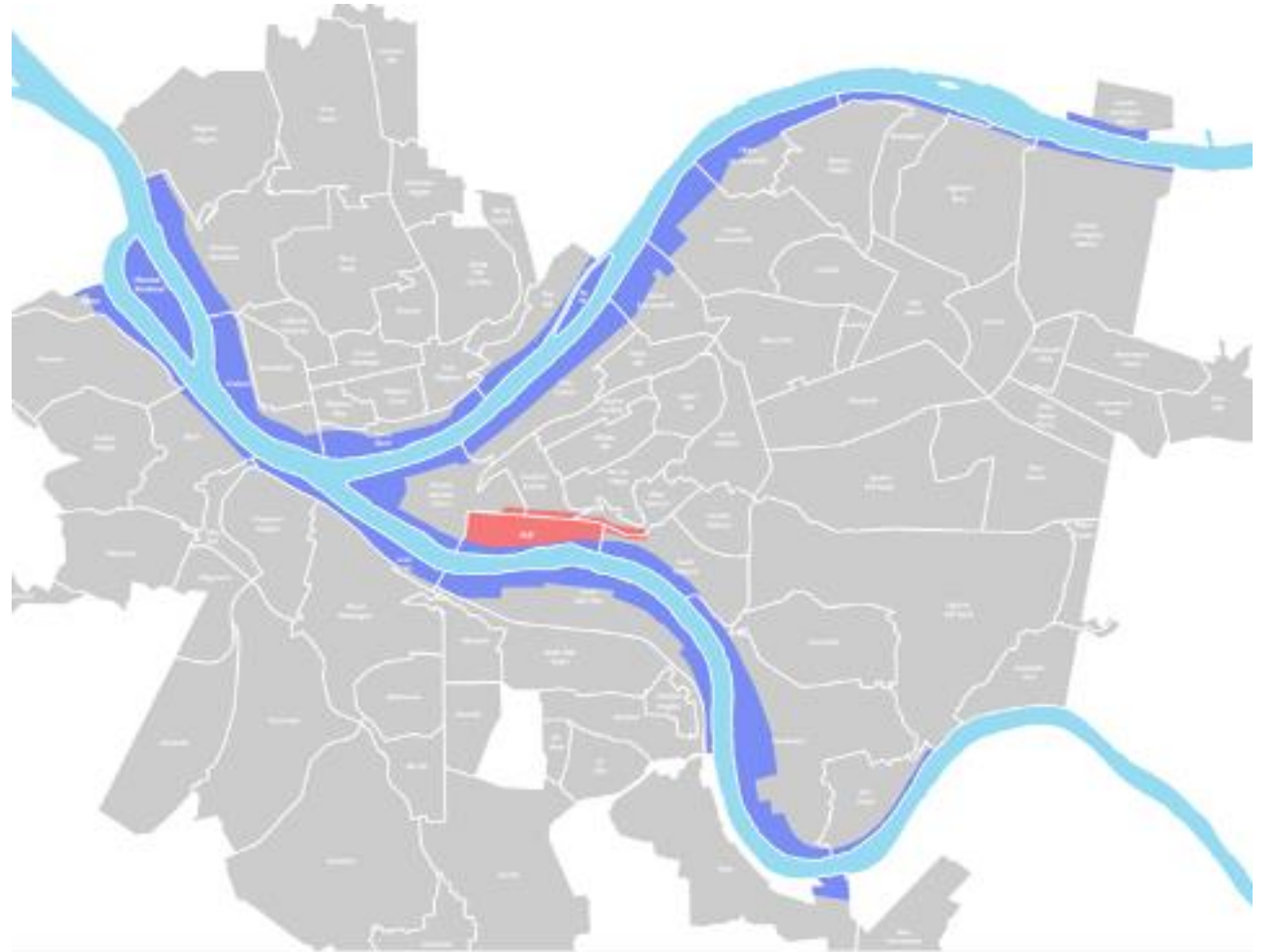


# Rate Control Requirements

Watershed Type	Rate Control Requirements
Allegheny County Act 167 Stormwater Management Plan Watershed	For the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, twenty-four-hour rainfall events, the post-development peak discharge rates will follow the applicable approved release rate maps and procedures incorporating the use of future climate rainfall projections.
Public Health and Safety Release Rate Watershed	Post-development discharge rates shall not exceed the pre-development discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour rainfall events using the rainfall estimates and procedures incorporating the use of future climate change rainfall projections.
Not in Public Health and Safety or Act 167 Watersheds	Post-development discharge rates shall not exceed the pre-development discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour rainfall events using the rainfall estimates and procedures incorporating the use of future climate change rainfall projections.
For Modeling purposes	Existing (pre-development) non-forested pervious areas shall be calculated using permeability coefficients for meadow in good condition and 20% of existing impervious area, when present, shall be calculated using permeability coefficients for meadow in good condition in the model for existing conditions.

# Rainwater Performance Points

- Exclusively for Riverfront (RIV), Uptown Public Realm District (UPR), and Urban Center Mixed Use UC-MU Zoning Districts
- Allows for a height bonus of 10 feet up to the area's height maximum OR allows for placement 10 feet closer to the river from the distance specified by the Riparian Buffer Zone.



# Rainwater Performance Points 915.07

## Rainwater

	Points
All vegetated Green Infrastructure must use at least 50% Native Plants.	
5.a At least 50% of the first two (2) inches of runoff from impervious surfaces is captured and managed using Preferred Stormwater Management Technology installations; or	<b>1</b>
At least 15% of the first two (2) inches of runoff from impervious surfaces is captured and reused on-site.	
5.b At least 75% of the first two (2) inches of runoff from impervious surfaces is captured and managed using Preferred Stormwater Management Technology installations; or	<b>2</b>
At least 30% of the first two (2) inches of runoff from impervious surfaces is captured and reused on-site.	
5.c 100% or more of the first two (2) inches of runoff from impervious surfaces is captured and managed using Preferred Stormwater Management Technology installations; or	<b>3</b>
45% of the first two (2) inches of runoff from impervious surfaces is captured and reused on-site.	

# Permit Review & Enforcement of New Stormwater Code

- We've issued 14 stormwater permits so far since April 2022
  - 3 out of 14 of these have completed the pre-, underground, and post-construction inspections
- We currently have 49 permits in review
- Staff capacity:
  - 3 stormwater inspectors
  - 2 DCP staff trained to complete the Conceptual Review
  - 4 PLI staff trained to complete the Site Plan Review
- New permitting process also improved our coordination with the County

# Public Engagement

- Two levels of public engagement
  - Informing the general public
  - Consulting and involving stakeholders such as engineers, developers, and other agencies
- Sent public notices by mail to all residents in the Act 167 watersheds
  - Received ~100 responses
- Held events for stakeholders to provide input throughout the code update and following the implementation
- Hold pre-application meetings by request for permit applicants
- Design Manual has been a great tool to assist stakeholders

# Citations & Links

## [Design Manual](#)

## [Appendices](#)

## [SW Map](#)

## [City of Pittsburgh Open Data](#)

## <https://pittsburghpa.gov/dcp/stormwater>

### Slide 8 images

- Bauder, B. (2019). Trib Live. Couple sues Pittsburgh over landslide that destroyed their home. Retrieved November 28, 2023, from <https://triblive.com/local/pittsburgh-alleggheny/couple-sues-pittsburgh-over-landslide-that-destroyed-their-home/>.
- Cook, R. (2022). This Week in Pittsburgh History: The St. Patrick's Day Flood. Pittsburgh Magazine. Retrieved November 28, 2023, from <https://www.pittsburghmagazine.com/this-week-in-pittsburgh-history-the-st-patricks-day-flood/pic/149889/> <https://triblive.com/local/pittsburgh-alleggheny/couple-sues-pittsburgh-over-landslide-that-destroyed-their-home/> [https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.wpxi.com%2Fnews%2Ftop-stories%2Fwest-end-landslide-that-destroyed-home-disrupting-traffic-businesses%2F706981320%2F&psig=AOvVaw2Jv9rq\\_ZTU6IDr0\\_vbN6js&ust=1701267803343000&source=images&cd=vfe&opi=89978449&ved=0CBQQjhqFwoTCJCaqcry5oIDFQAAAAAdAAAAABBZ](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.wpxi.com%2Fnews%2Ftop-stories%2Fwest-end-landslide-that-destroyed-home-disrupting-traffic-businesses%2F706981320%2F&psig=AOvVaw2Jv9rq_ZTU6IDr0_vbN6js&ust=1701267803343000&source=images&cd=vfe&opi=89978449&ved=0CBQQjhqFwoTCJCaqcry5oIDFQAAAAAdAAAAABBZ).
- NY Post. (2011). Two women, kids killed in Pittsburgh flash floods. Retrieved November 28, 2023, from <https://nypost.com/2011/08/20/two-women-kids-killed-in-pittsburgh-flash-floods/>.
- WPXI. (2018). West End landslide that destroyed home disrupting traffic, businesses. Retrieved November 28, 2023, from <https://www.wpxi.com/news/top-stories/west-end-landslide-that-destroyed-home-disrupting-traffic-businesses/706981320/>.

- PWSA <https://www.pgh2o.com/your-water/stormwater>
- [Stormwater Strategic Plan - https://www.pgh2o.com/your-water/stormwater/stormwater-plans/stormwater-strategic-plan](#)
- [One Water: Pittsburgh's Guide to Action - Living Waters of Pittsburgh \(livingwaterspgh.org\)](#)
- WPC <https://waterlandlife.org/gardens-greenspace/stormwater-solutions/>
- ALCOSAN <https://www.alcosan.org/our-plan/plan-documents>
- <https://stormworkspgh.com/>
- <https://wospgh.org/>
- SPC <https://spcwater.org/>
- City DCP <https://pittsburghpa.gov/dcp/stormwater-code-update>
- Rand <https://www.rand.org/well-being/community-health-and-environmental-policy/centers/climate-resilience/projects/resilient-stormwater-management-in-alleggheny-county.html>
- ACCD <https://www.conservationolutioncenter.org/>

# Contact Information

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Kathryn Kazior, US EPA  
[Kazior.Kathryn@epa.gov](mailto:Kazior.Kathryn@epa.gov)

Todd King, Great Lakes Water Authority  
[ToddKing@glwater.org](mailto:ToddKing@glwater.org)

Samuel Smalley, Detroit Water and Sewerage Department  
[Samuel.Smalley@detroitmi.gov](mailto:Samuel.Smalley@detroitmi.gov)

James Stitt, Pittsburgh Water and Sewer Authority  
[JStitt@pgh2o.com](mailto:JStitt@pgh2o.com)

Kyla Prendergast, City of Pittsburgh  
[Kyla.Prendergast@pittsburghpa.gov](mailto:Kyla.Prendergast@pittsburghpa.gov)

# Questions?

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