Taming Overflows: The City of Columbus Integrated Plan

The Sonesta

June 18, 2025

Welcome

Presenter

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Division of Water Reclamation, Treatment Engineering
City of Columbus

Agenda

- Regulatory Framework (Why Blueprint)
- Blueprint 101 (What is Blueprint)
- Status Update (How are we doing)
- Lessons Learned (How to do better)
- Next Steps
- Q&A

Regulatory Framework

Consent Order History

- 2002 Sanitary Sewer Overflow (**SSO**) Consent Order
  -System Evaluation and Capacity Assurance Plan (**SECAP**)

- 2004 Combined Sewer Overflow (**CSO**) Consent Order
  -CSO Long Term Control Plan (**LTCP**)

- **SECAP** and **LTCP** were combined to form the 2005 Wet Weather Management Plan (WWMP)
  -Submitted July 1, 2005

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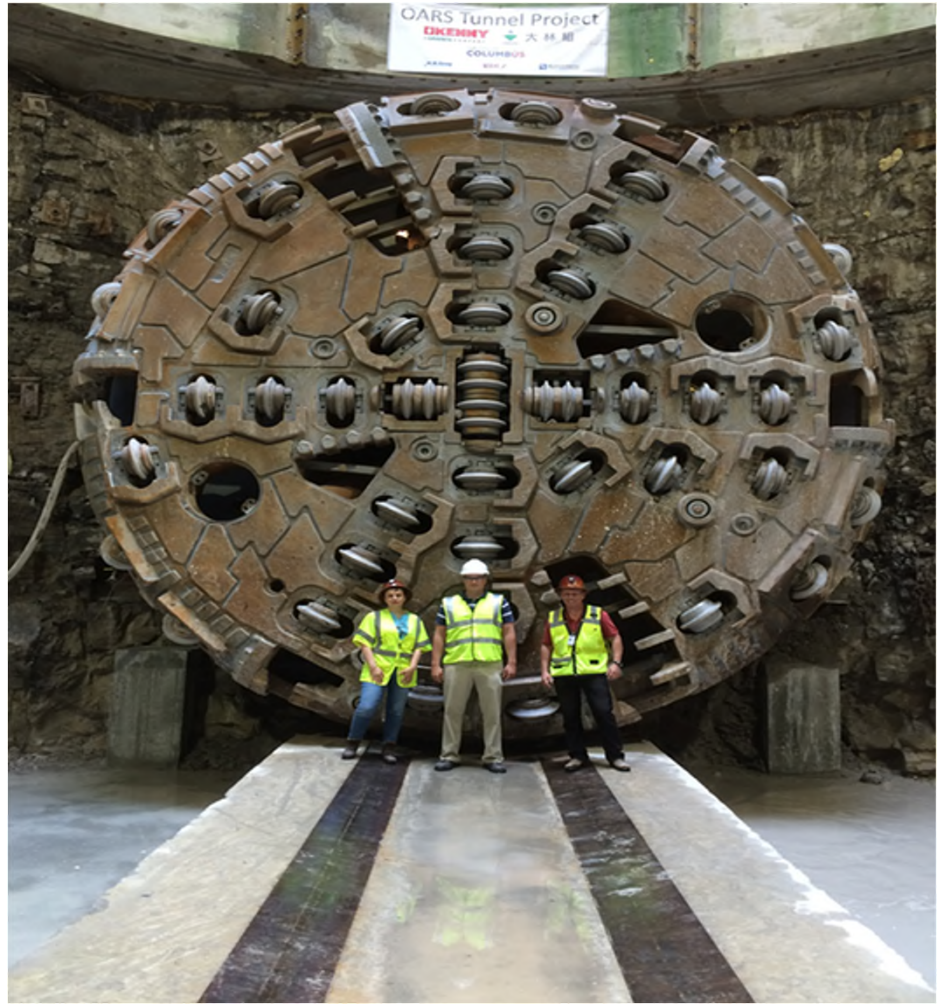
WWMP Capital Program

- Major Capital Projects focused on treatment plant and tunnels to address CSO and SSO
- First of these projects started in 2005 at the WWTPs
- Treatment plant project highlights
  - Treatment Plant work increased each plant capacity 50%
    - Projects completed in 2011
    - Jackson Pike WWTP: ($96 Million)
    - Southerly WWTP: ($550 Million)



Blueprint: An Integrated Plan

- In December 2015, Ohio EPA granted approval for City to revamp WWMP with Blueprint Columbus
  - Treat the root cause of overflows – Inflow/Infiltration

- Ohio EPA in 2018 extended deadline of completion to 2045 to match original WWMP

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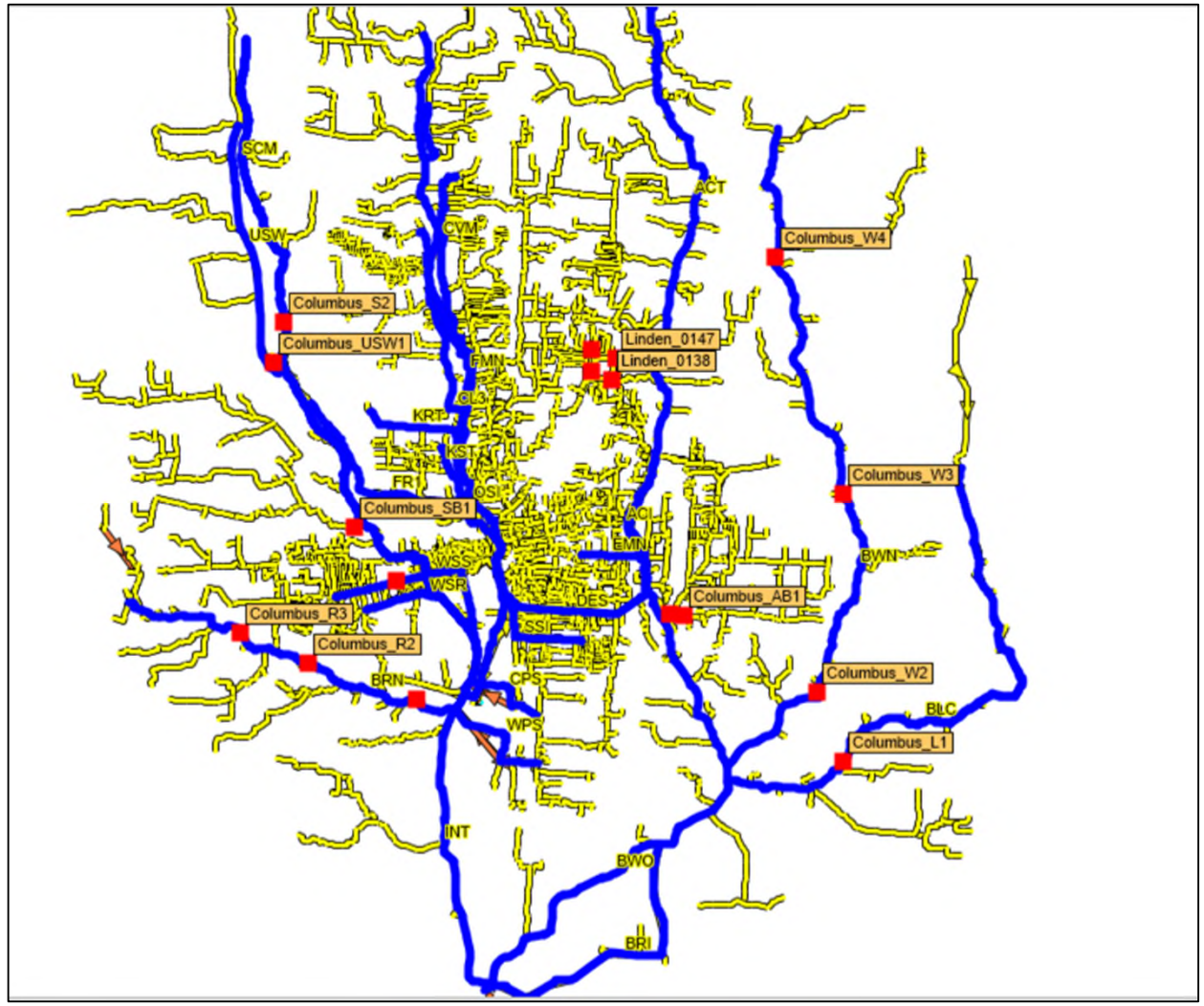
System-wide Sewer Model

- Planning was made possible with a sewer system model
- Developed since the 1990's
- Continuously calibrated with 150+ flow meters and 60+ rain gauges
- Model will be used again to verify whether the consent order targets are met



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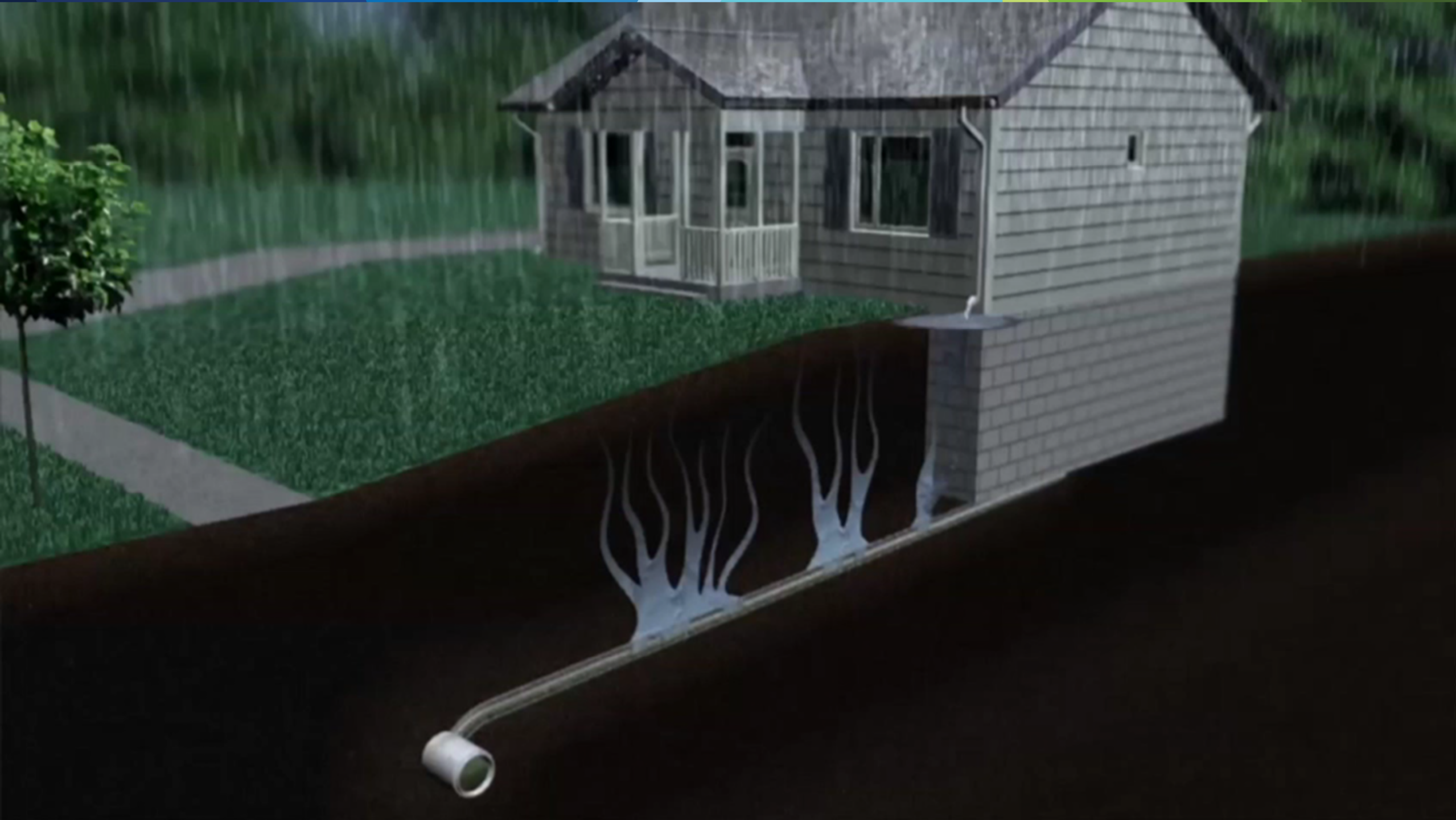
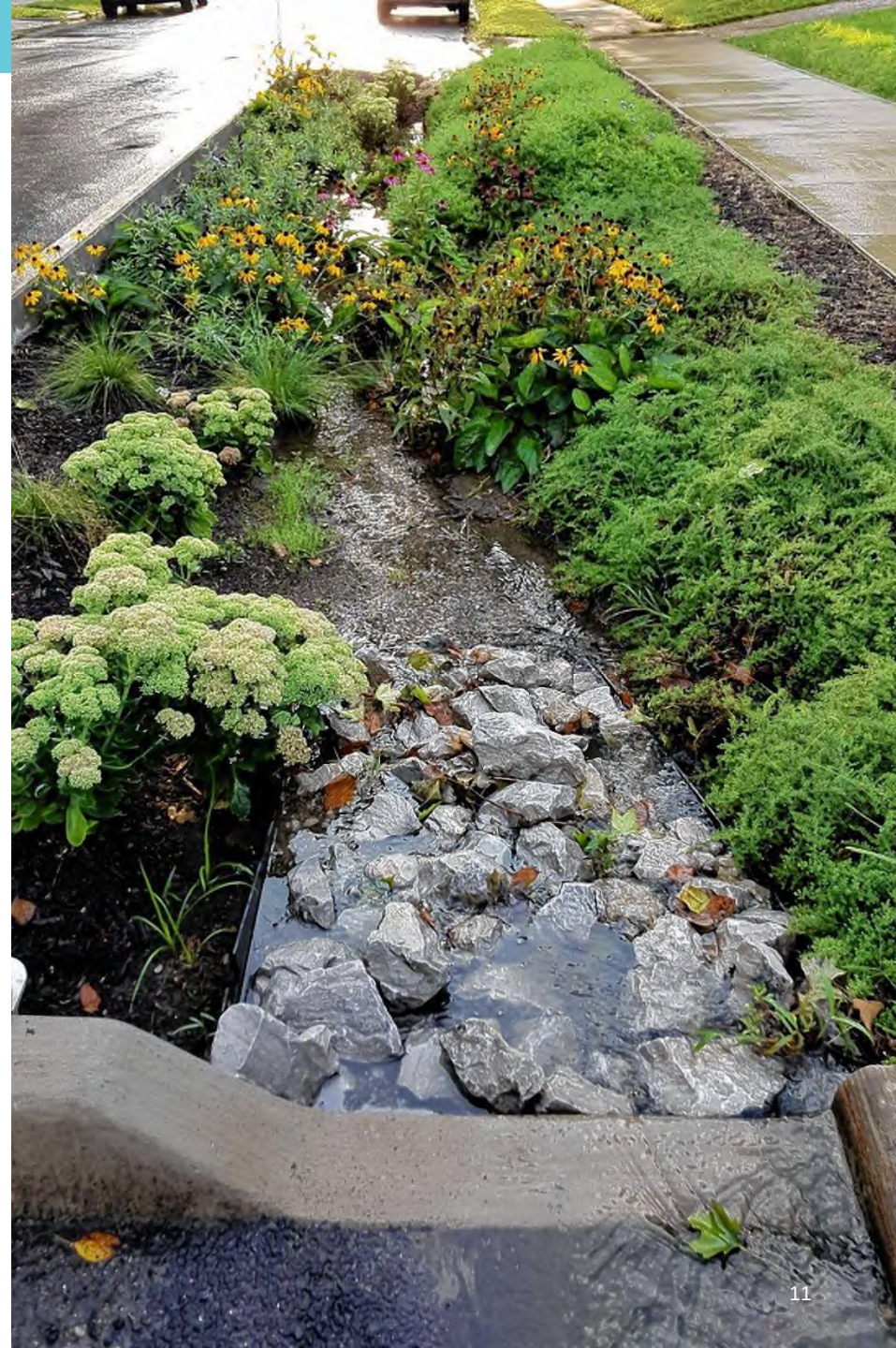
Blueprint 101



Blueprint: An Innovative, Green Solution

- Invests in fixing our existing infrastructure
- Uses local materials, native plants
- Creates opportunities to improve stormwater discharges
- Adds permanent local jobs
- Engages neighborhoods, residents
- Addresses consent order requirements



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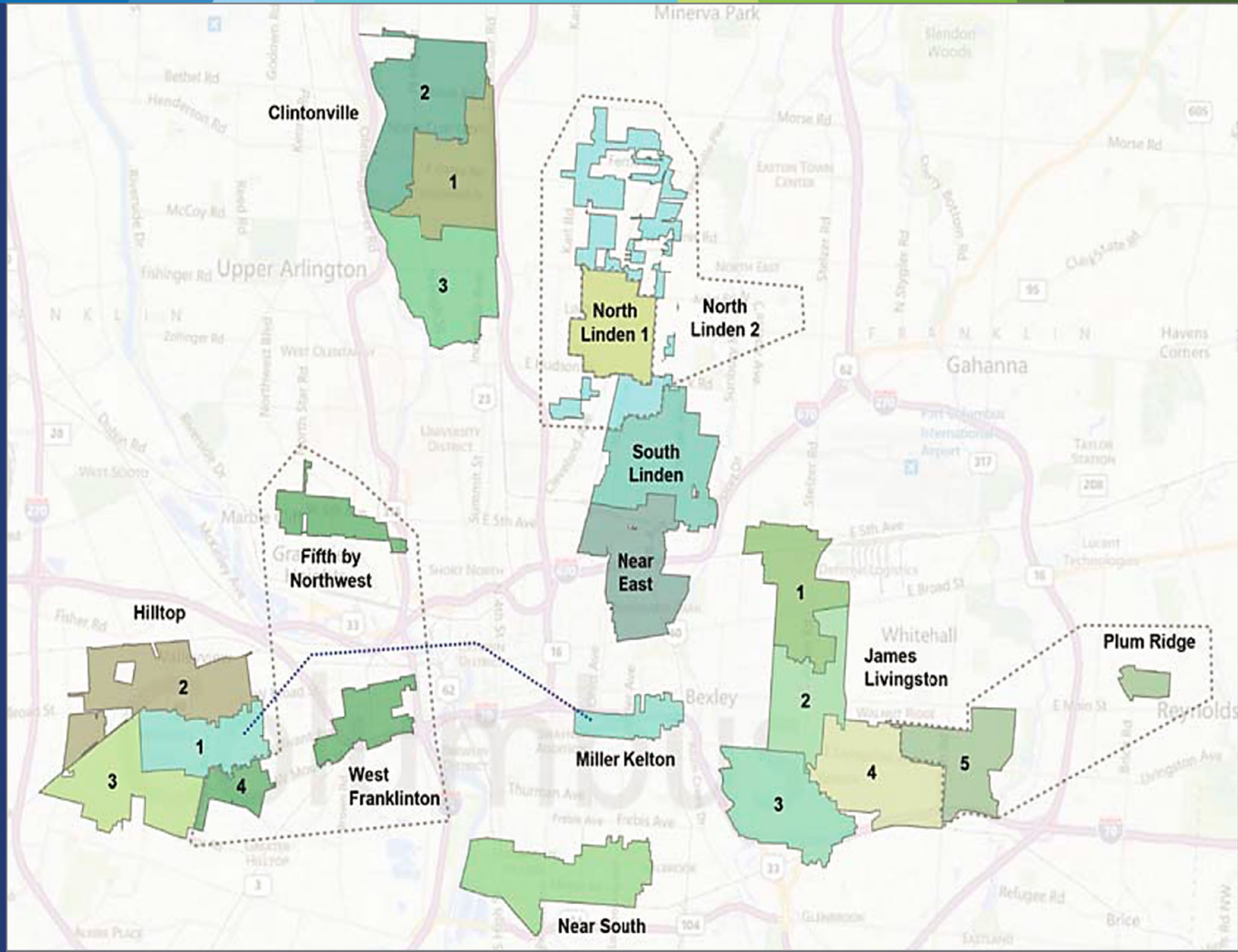
Blueprint Columbus

18,404 acres &
21 project areas throughout Columbus



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Four Pillars

Lateral Lining

- Keeps rainwater out of sanitary sewer
- Seals cracks and small breaks in pipe that carry rain away from your home to sewers

Roof Water Redirection

- Redirects rainwater away from your home and to the street, so that it can't enter the sewer through connection joints around your home

Sump Pumps

- Collects rainwater around your home's foundation
- Discharges rainwater into a pipe that discharges to the street

Green Infrastructure

- Filters rainwater from the street
- Removes pollutants and trash
- Makes rainwater cleaner when it reaches rivers and streams

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Deeper Dive: Lateral Lining

Home sewer lateral is lined with waterproof material, which:

- Seals cracked and loose laterals
- Prevents root intrusion
- Improves property value

Goal: Line 90% of the laterals in each project area

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Deeper Dive:
Roof Water Redirection

Downspout (and rainwater) is redirected to the street, which:

- Keeps roof water from foundation drain
- Reduces water settling around your home
- Prevents seeping into the lateral joint
- Can tie into green infrastructure

Goal: Redirect 50% of the total roof area

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Deeper Dive: Sump Pumps

A sump pump and back-up battery is installed, which:

- Redirects rainwater discharge to the street
- Stops the foundation drain from directly connecting to sewer
- Can tie into green infrastructure

Goal: Install sump pumps in 25% of the homes

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Green Infrastructure Goal

Leaves and debris carried by rainwater rush down the street

Green Infrastructure filters rainwater of debris, leaves, etc.

GOAL: Improve stormwater discharges

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Types of Green Infrastructure

Behind-the-curb rain garden- 2 walls

Behind-the-curb rain garden- no walls

Bump-out rain garden

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Types of Green Infrastructure

Silva Cell

Regional rain garden

Pervious pavement

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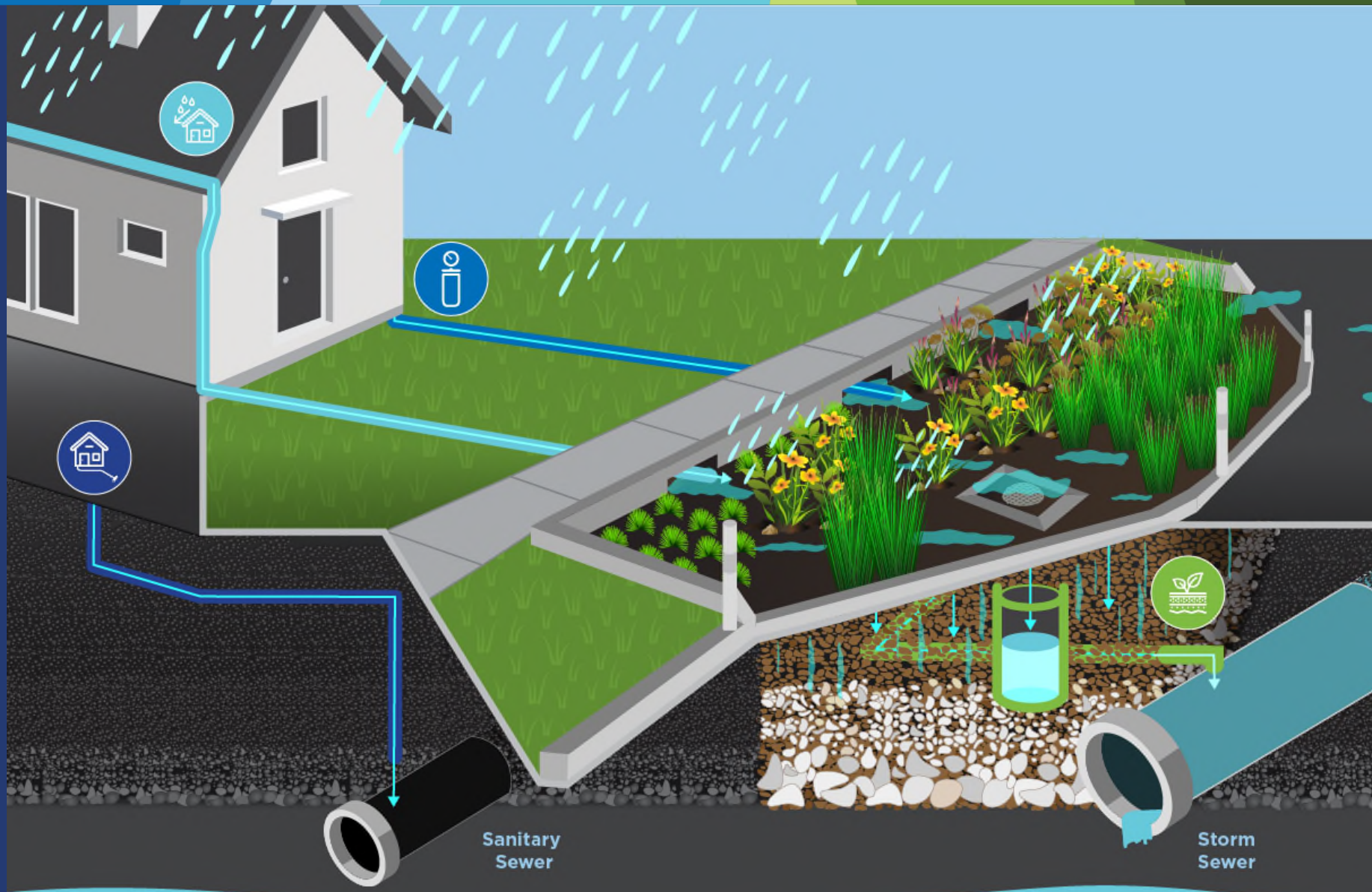
How Green Infrastructure Works



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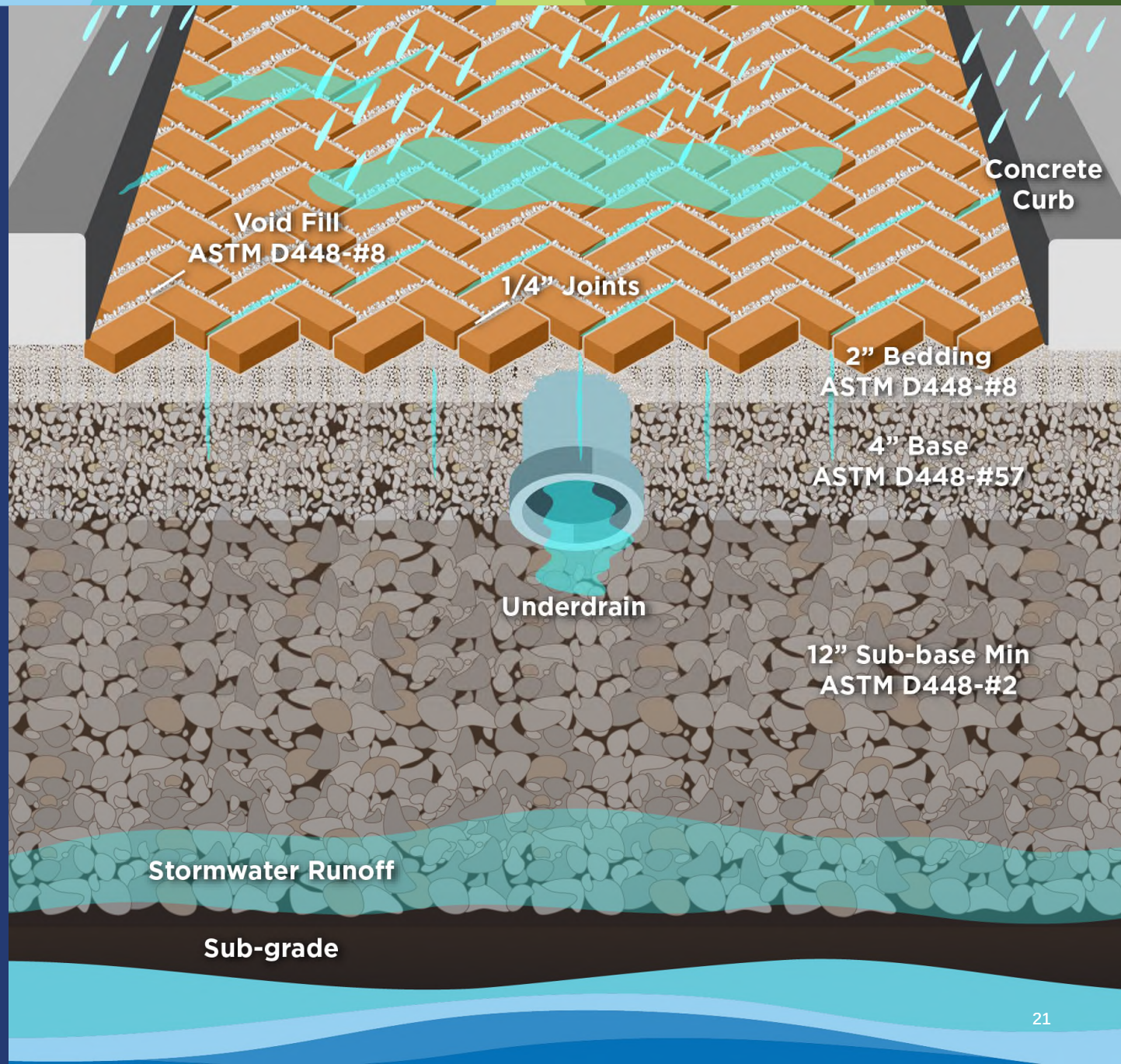
How Pervious Pavement Works

- Filters and cleans rainwater
- Reduces street flooding
- Calms traffic
- Reduces maintenance



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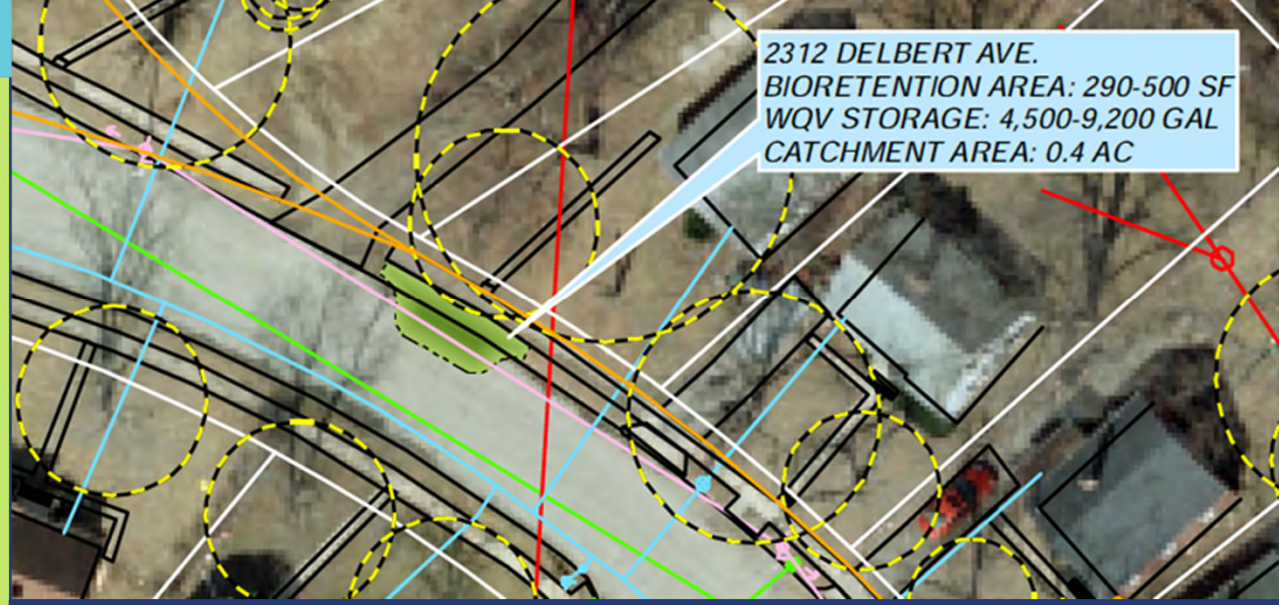
How We Select Improvement Locations

1. Where are biggest problem areas?
2. How much water do we need to control?
3. Where does the water naturally flow?
4. What barriers exist?
5. What would improve the neighborhood?



Land Bank/ Green Space → **Right-of-Way** → **Pavers** → **Bump-Outs**

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The City is Responsible for All Maintenance!

Green infrastructure installed by the City is part of the storm sewer system

Regular maintenance keeps it functioning!

- Weeding, mulching, plant care
- Removing trash
- Checking underdrains
- Removing sediments

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Outreach Efforts

Working WITH the community

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Value of a Public Outreach Team

1. Reduce burden on PM's/design engineers and construction crews
2. Improve efficiency by providing one communication avenue for residents
3. Counter misconceptions & garner community support
4. Cultivate a sense of ownership in the community

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Public Outreach Activities

- Door-to-Door Canvassing
- Resident Site Visits
- Public Meetings
- Media Requests
- Direct Mailings
- Direct Email/Text Message Notifications to Residents
- Social Media
- Neighborhood Events
- Community Presentations
- Community Leader Involvement

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Outreach & Engagement

- Public meetings: virtual & in-person
- Door-to-Door Canvassing & Surveys
- Community Leaders & Community Groups
- Area Commissions & Civic Associations
- Meeting residents where they are at
  - Fairs
  - Festivals
  - Farmers' markets
  - Neighborhood cleanups
  - Schools & Universities

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Outreach & Engagement

- Impact Cards
- Door hangers
- Basin Markings
- Site visits
- Surveys
- Communications
  - Website
  - Social media
  - Translated materials

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Legal Authority

Legal Authority

Two categories of work:
- Work in right-of-way
- Work on private property

Green Infrastructure
- Smaller rain gardens are being installed in right-of-way
- Regional basins are being installed as well
  - On park property maintained by Columbus Rec and Parks
  - On land bank property being transferred to Columbus DPU

Lateral lining, roof redirection, sump pumps
- Require work on private property

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Public Nuisance → Designation Order → Implementation

Public Nuisance

- On December 16, 2015 – Ordinance 2015-2905
  City Council found excessive inflow and infiltration entering the sanitary sewer system was a public health nuisance and created the I/I reduction program.
- Council created the I/I reduction program.
  Columbus City Code Sections 1145.87-89

Public Nuisance → Designation Order → Implementation

Designation Findings & Order

Code Section 1145.87 states in part:
The director may designate areas within the sanitary sewer system where excessive I/I is causing SSOs and/or WIB events. The areas so designated shall be subject to the I/I reduction program on a schedule to be determined by the director. The director may designate more than one area at a time, and if so, the designation may include a prioritization of the areas for implementation of the I/I reduction program. The prioritization may be made on the basis of the number, frequency and duration of the SSOs and WIB events, the likelihood of human exposure and the priority, if any, assigned by Ohio EPA or other relevant factors.

Right to comment on the designation order and right to appeal (if the person lives in or owns property within a designated area) – Code 1145.94 governs appeal process

Public Nuisance → Designation Order → Implementation

Implementation of the I/I Reduction Program

After an area is designated DPU has the authority under Code 1145.88 to enter private property and complete the following tasks:

- Investigate (survey work – dye testing, smoke testing, videography)
- Take Corrective Measures (lateral lining and roof redirection)
- Post-Implementation Inspection

DPU has the authority to enter the property for these purposes and entry is not a trespass under Code 1145.89.

- DPU is required to provide the owner five days written notice of the requested entry.

Blueprint Status Update

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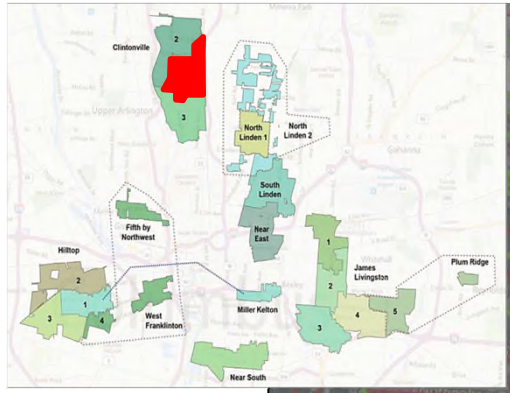
Clintonville 1

- Completed in 2021
- 997 acres, 3000 homes
- Green Infrastructure
  - **All 6** projects completed
  - **415** rain gardens constructed
  - **4** Blocks of Pervious Pavers
- Sump Pump Program
  - Over **614** sump pumps installed (22%)
- Downspout Redirection/lateral lining
  - **2370** laterals lined
  - **1827 Homes** with redirected downspouts
- Total $78 million



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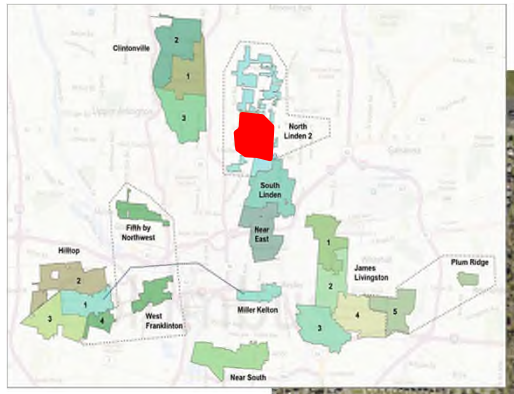
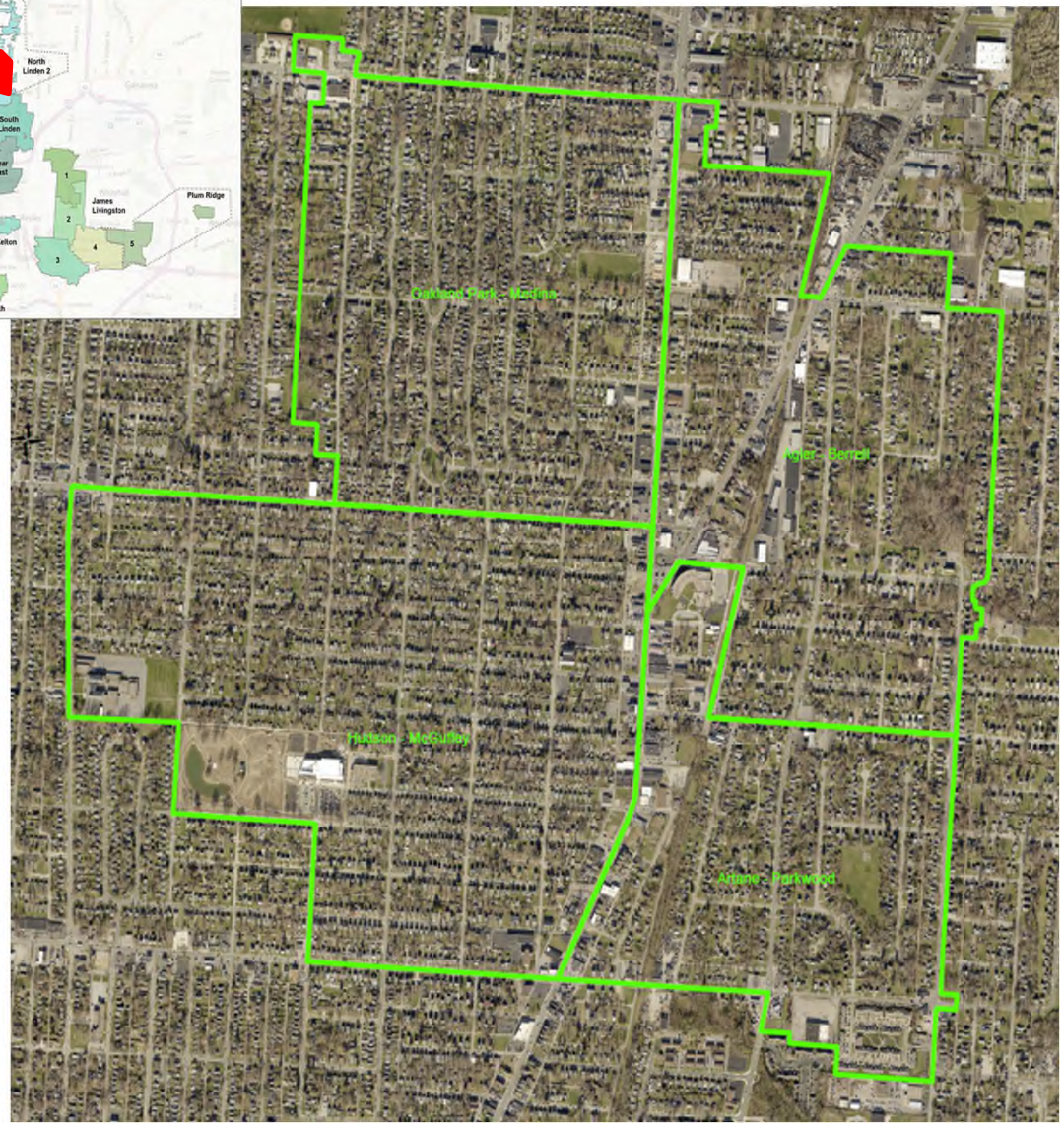
North Linden 1

- Active construction since 2019
- 863 acres, 3500+ homes
- Green Infrastructure
  - **3 of 4 sub areas** projects complete
  - **62** rain gardens constructed
  - **13 regional bioretention basins**
- Sump Pump Program
  - Over **390** sump pumps installed
- Downspout Redirection/lateral lining
  - **More than 400** laterals lined
- To be completed by Dec. 2025





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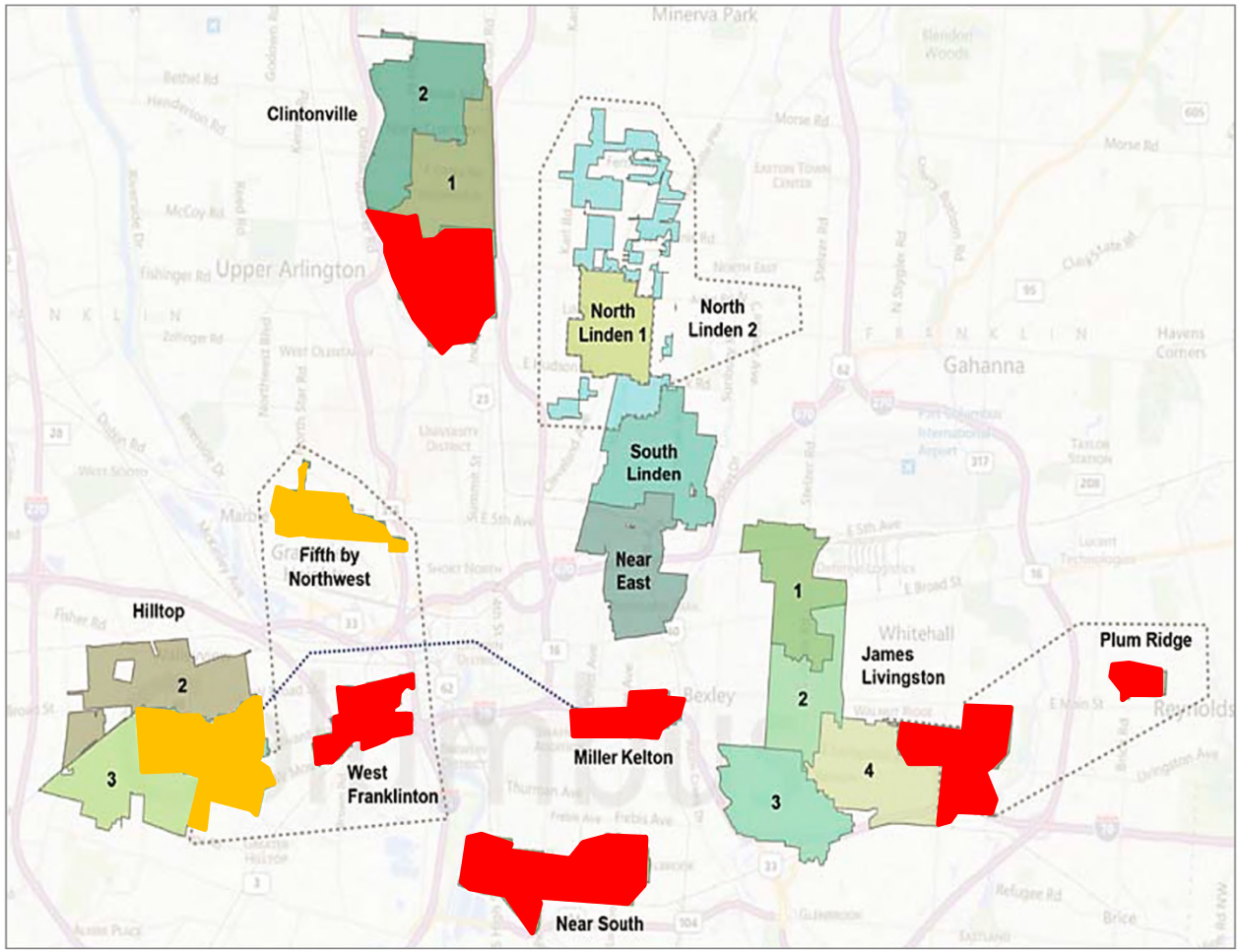
Other Blueprint Areas

- Hilltop and Fifth by Northwest
  - GI construction in 2023
- Clintonville 3, M/K, Near South, J/L 5, Plum Ridge
  - Various stages of design



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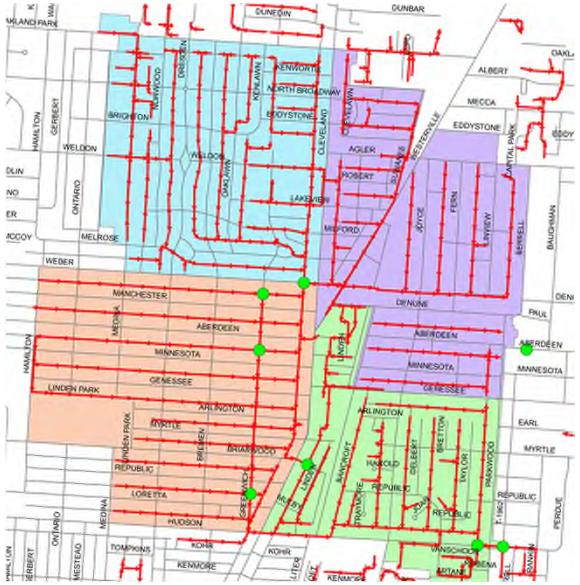
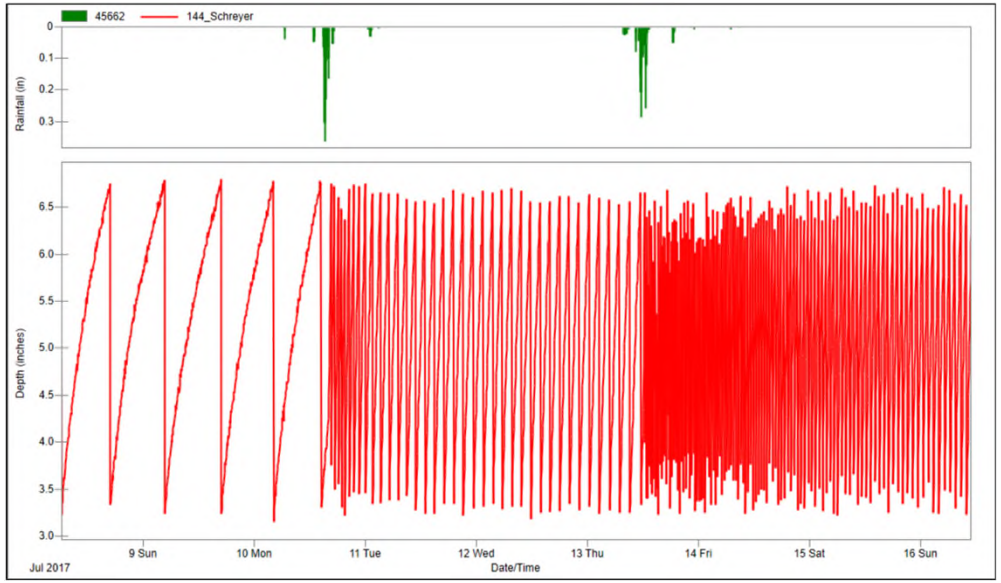
Pre- and Post-Blueprint Monitoring

- Verify the effectiveness of I/I reduction
  - Flow meters in sanitary sewers
  - Level sensors in sump pump pits
- Monitoring Clintonville 1 and North Linden 1
- Monitoring Period (2015-present)





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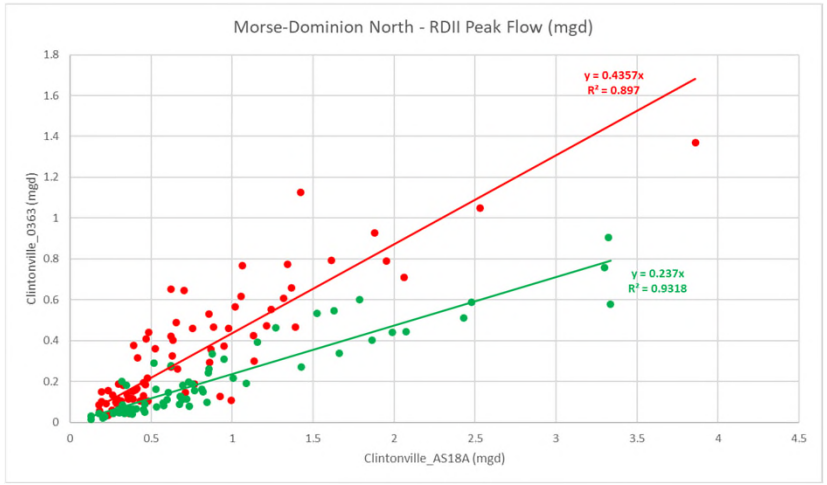
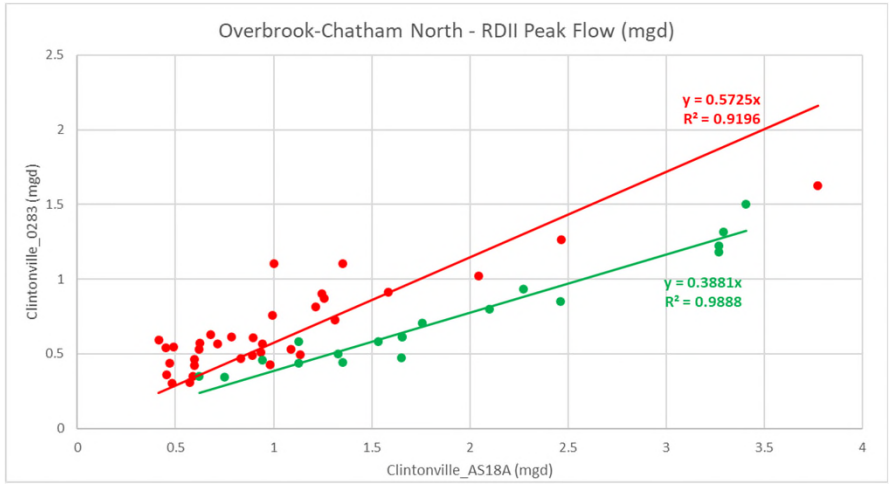
Effectiveness of I/I Reduction – Clintonville 1

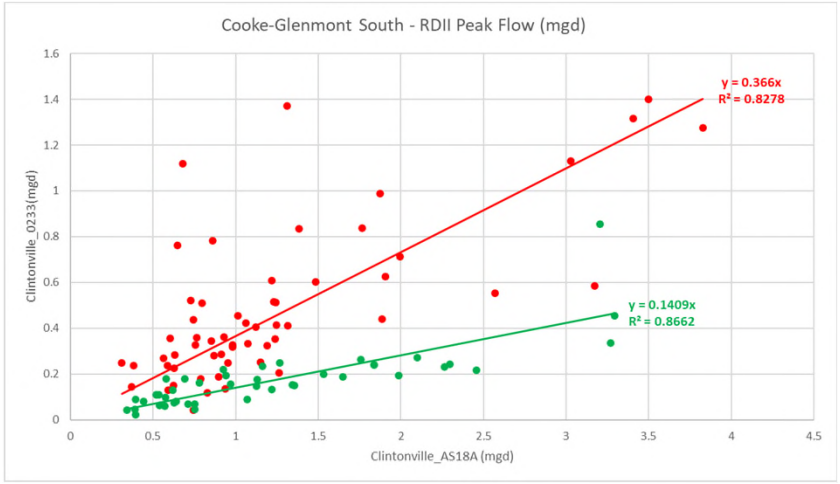
- Achieved median and average of 46% I/I reduction



SP+LL+RR: 46% Peak Flow Reduction



SP+LL+RR: 32% Peak Flow Reduction



SP+LL+RR: 62% Peak Flow Reduction

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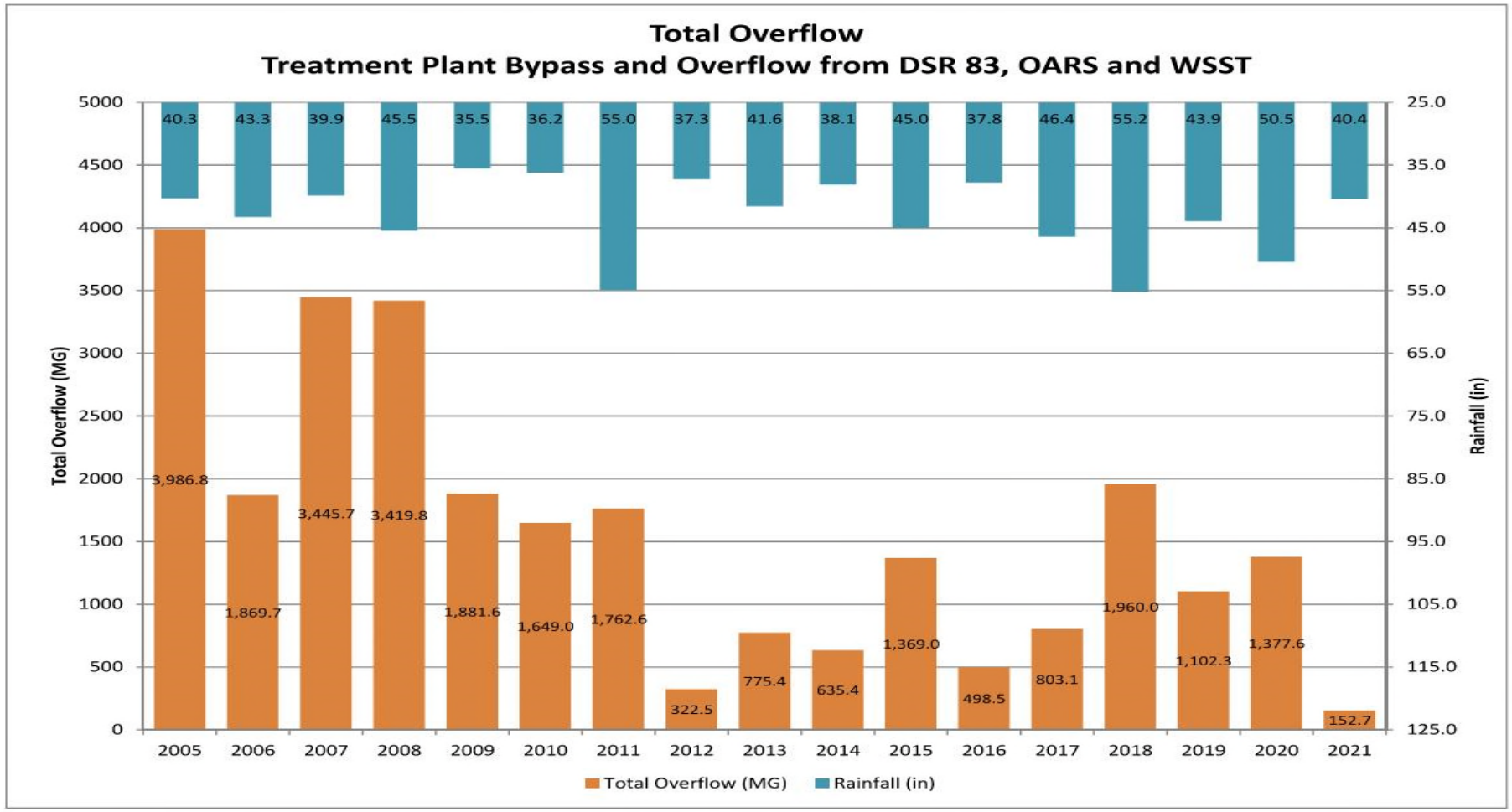
Effectiveness of I/I Reduction – System Wide



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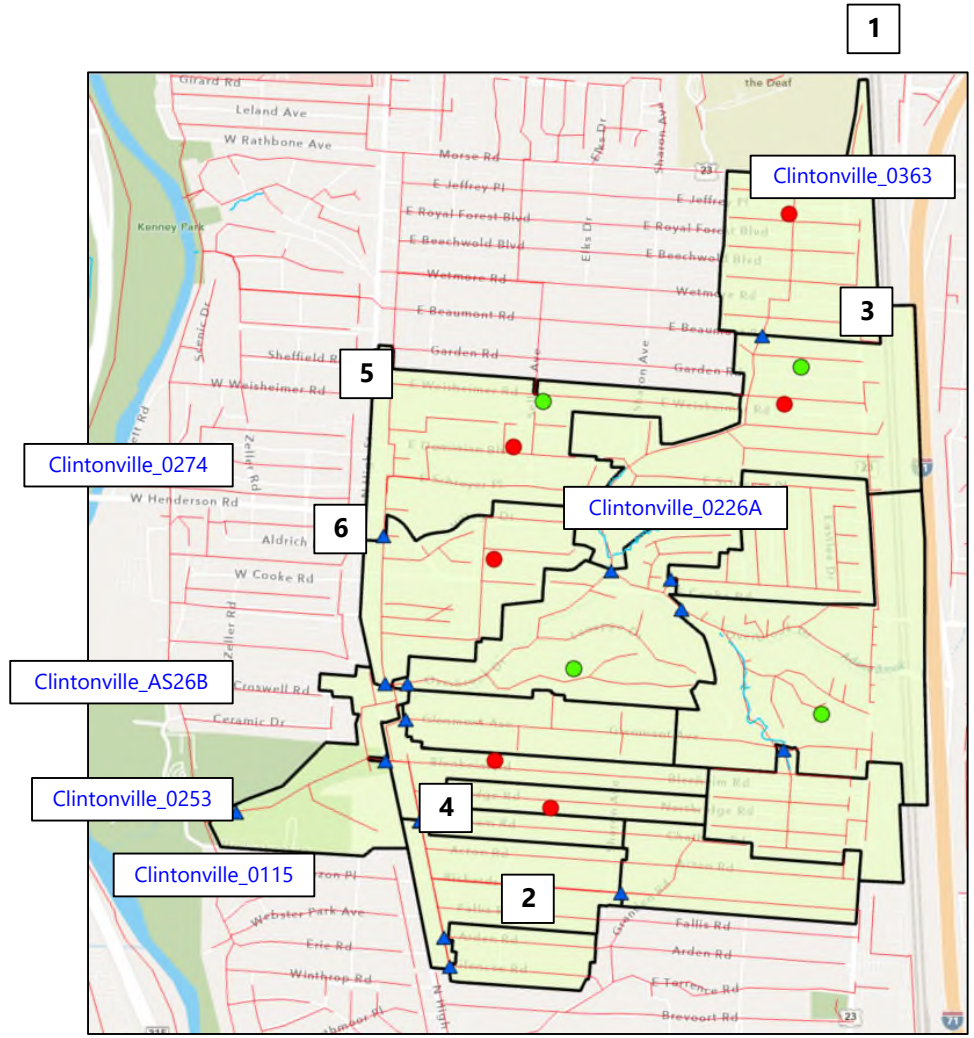
Clintonville 1 2022 DSRs and WIBs

- 2 DSR activations – False Positive
- 10 WIB Complaints in 2022
  - 4 in dry weather
  - 6 in wet weather, but 5 of them are not caused by capacity constraint

#	StreetAddr	Request Date	Rainfall LOS
1	601 E JEFFREY PL	7/7/2022	10 – 25 Year
2	211 NORTHRIDGE RD	9/5/2022	1 Year
3	608 E WEISHEIMER RD	9/12/2022	< 2 Month
4	142 BLENHEIM RD	9/12/2022	< 2 Month
5	204 E DOMINION BLVD	4/21/2022	< 2 Month
6	183 FAIRLAWN DR	2/8/2022	< 2 Month



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Lessons Learned

GI Lessons Learned

- Reduced dimensions of green infrastructure
  - Maintain 20’ of continuous lot frontage for houses without driveways
  - Use no more than 60% of the lot frontage occupied by rain gardens
  - Max. length of 40 feet

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GI Lessons Learned

- Adjusted walled basin approach
  - 1- or 2-walled basins are preferred
  - If no step out or adjacent to roadways and sidewalks, use stamped (artistic) concrete walls
- Improved inlet design with effective capture

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GI Lessons Learned

- Permeable Paver Location
  - On streets with rear alley access
  - Not on streets with sanitary sewers
- Developed GI Standard Drawings and Design Guidelines
- Developed GI Maintenance Manual
  - Bio-retention basins – monthly
  - Permeable Pavers - quarterly

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Lateral Lining Lessons Learned

- Require inspector to be CIPP trained and certified
- Perform wet weather post-lining televising
- Inspector to Monitor
  - Inhibitor volume and temperature
  - Resin saturation at liner seams
- Scaled back on testing
  - One plate sample per crew per day
  - Air test from 20% to 10%

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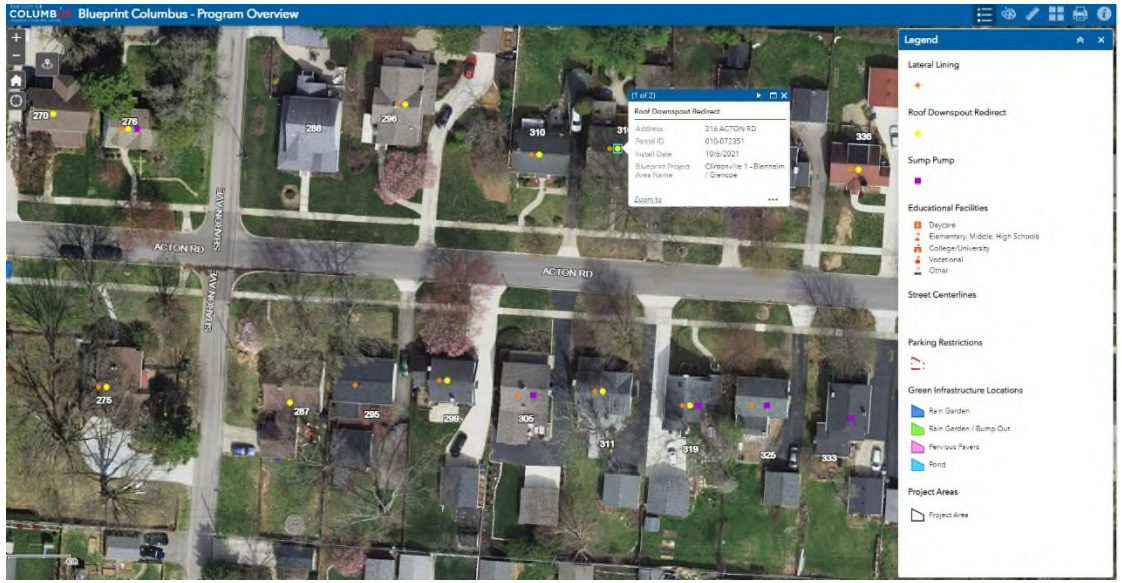
Downspout Redirection Lessons Learned

- Limit the roof area < 500 sqft per drain pipe (3” diameter)
- Discharge upstream of rain gardens, not into them
- Educate home owners how to maintain
- Migrate data management into digital form
  - Exhibits for contractors
  - As-built
  - ESRI Fields Map App



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Next Steps

Next Steps

- Continue monitoring and evaluating the effectiveness
- Update the system-wide model to reflect the actual I/I reduction
- Verify meeting the consent order targets
- Affordability check
- Submit Updated Blueprint Report by Dec. 2025

Q&A

Thank you!

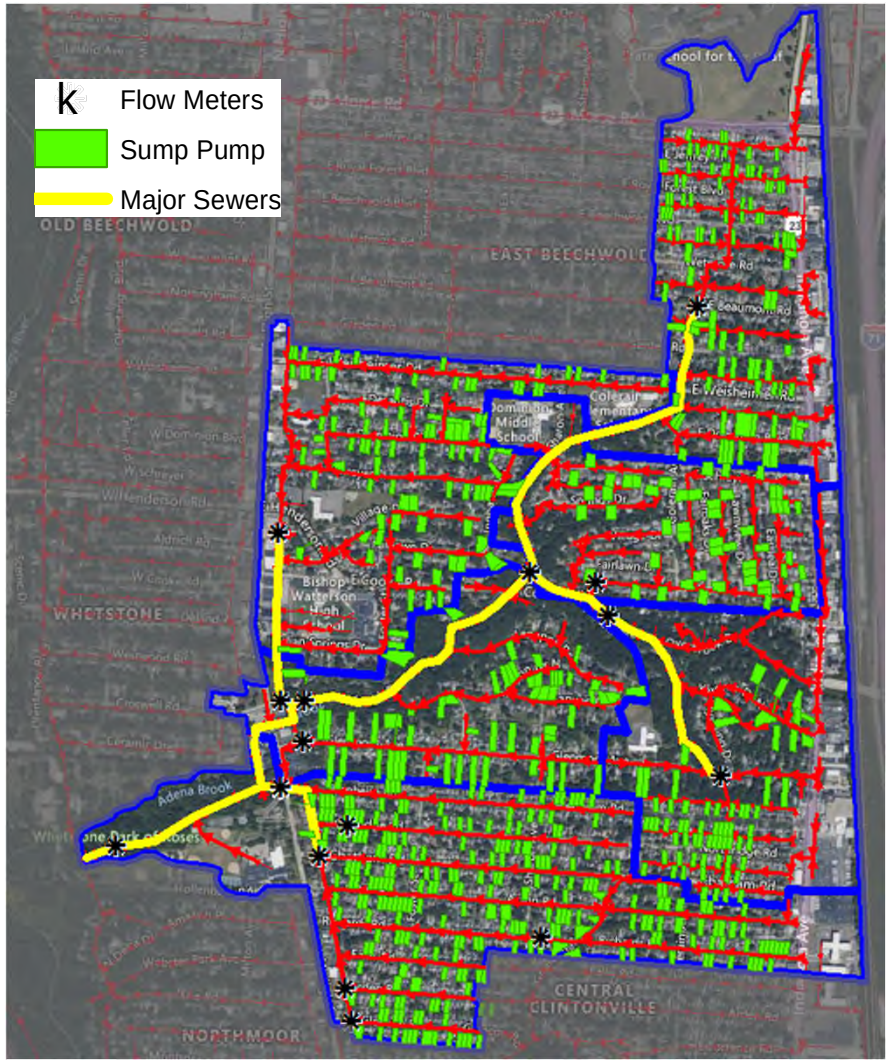
blueprintneighborhoods.com

blueprint@Columbus.gov

Follow us! **@blueprintcbus**

Sump Pump Installation - Clintonville 1

- Installation Duration: 2016 – 2021
- 614 Sump Pumps: (22%)



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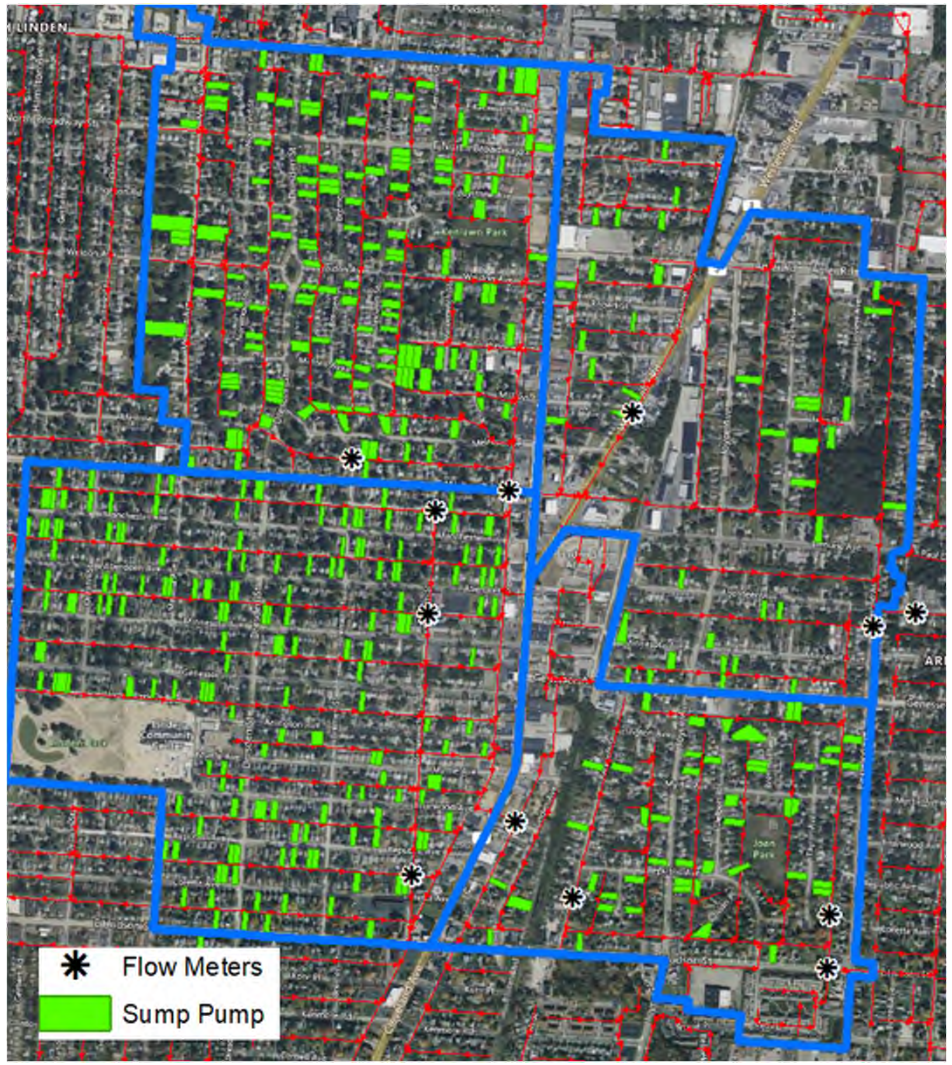
Sump Pump Installation – North Linden 1

- Installation Duration: 3/2019 – To Date
- 390 Sump Pumps: (~11%)



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