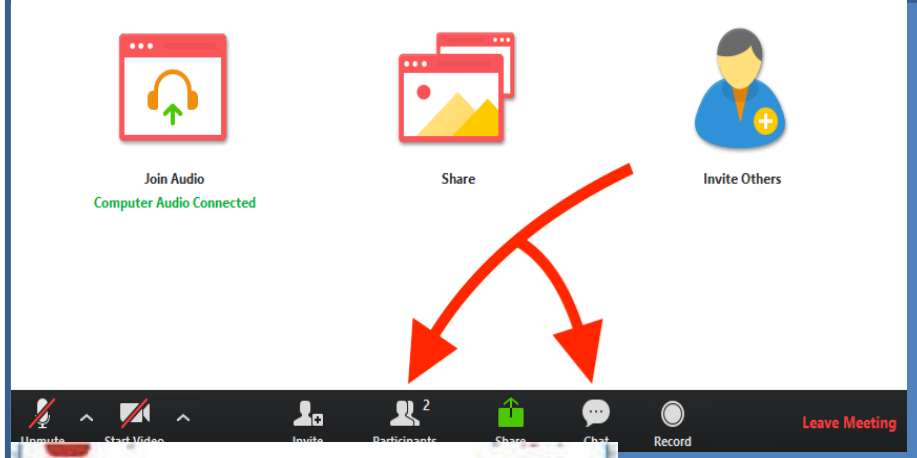
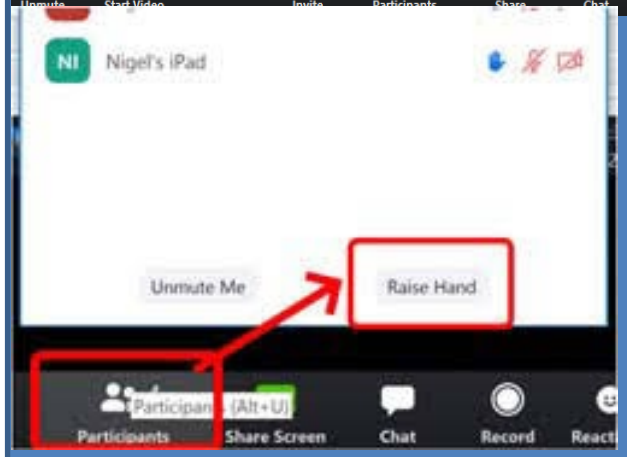
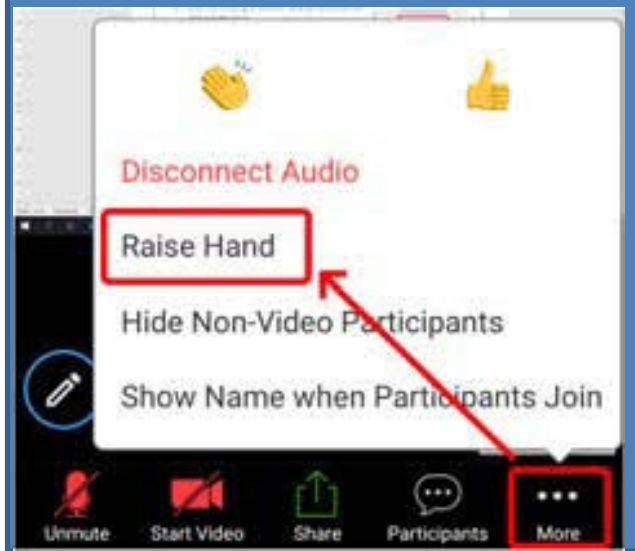
Welcome!

- All participants will be automatically muted upon joining the call.
  - If you are experiencing technical issues, please use the chat function and we will be happy to assist you.
- If you have a question, feel free to submit that via chat or **use the raise your hand feature to be called on.** We will begin calling on participants for general project questions following a brief presentation.
- To access the raise your hand feature, select the participant button at the bottom of your page (or “More” if on a mobile device) and then select the “raise hand” button that will appear at the bottom of the participant box.





Computer View



Mobile View

BLUEPRINT Clintonville III

30% DESIGN MEETING

Today's Agenda

1. Blueprint 101: A brief refresher
2. Clintonville III Neighborhood Plans
3. General Question & Answer
4. Select a Breakout Room By Project Area
5. Property Specific Questions
6. Virtual Question Submission

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Clintonville III Blueprint: Knowing your sub area

Interactive Map

- Overall Presentation followed by general project Q&A
- Self-select your breakout room for property specific questions
- Link to Interactive Map in the Chat
- Enter your address to discover your sub area
- You can put your address in the chat if unsure
- Be prepared to Select your breakout room by your sub-area

You can also send your questions to Outreach at blueprint@columbus.gov or Call Outreach at 614-645-1253

Presenter by Sub-Area

- Jehan Alkhayri — Fredonia Piedmont
- Fang Cheng* — Tulane Findley
- Grace McInerney — Milford Summit
- C. Jim Arthur — Winthrop Milton
- Rob Herr — Dorris Weber

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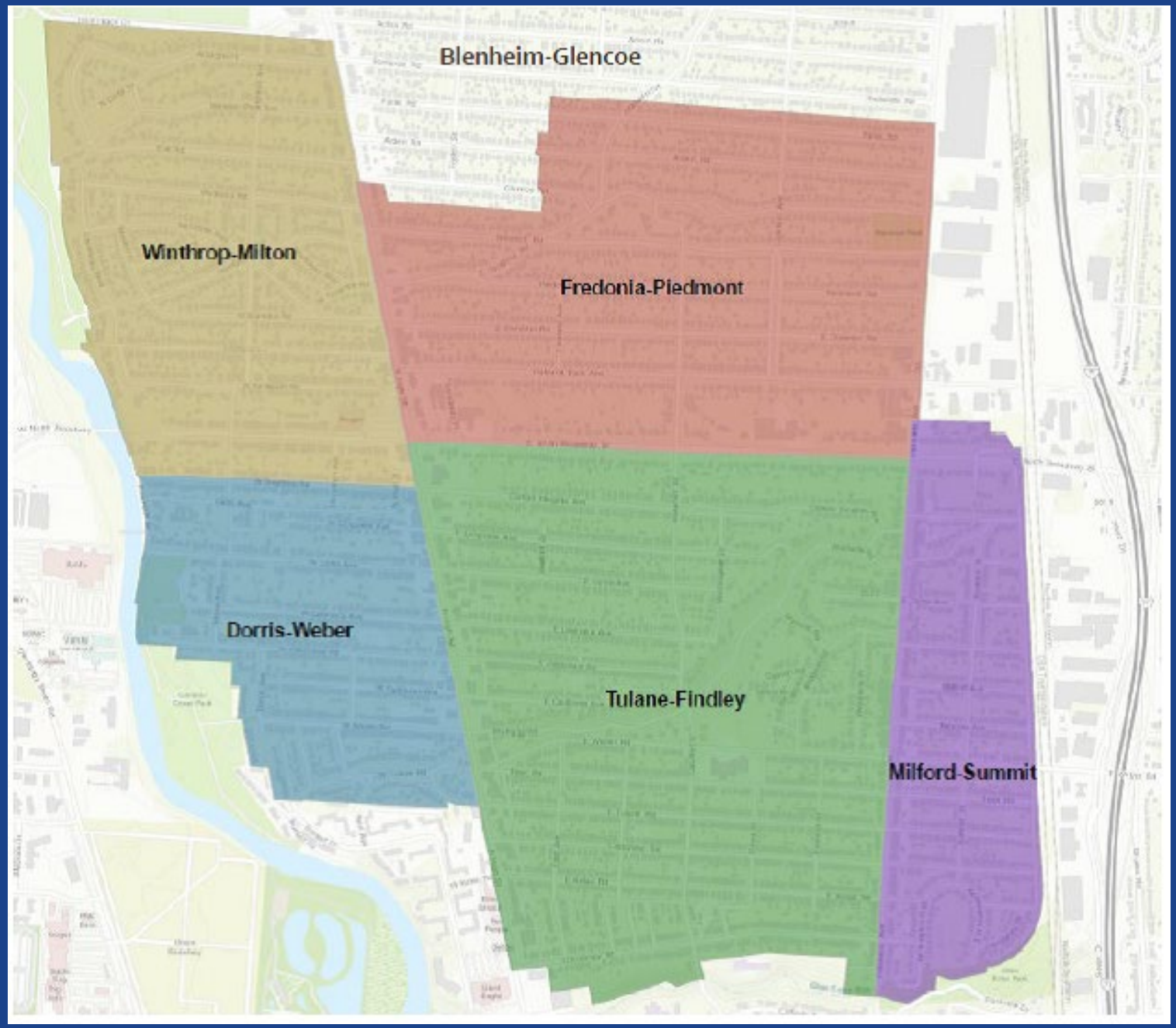

Clintonville III Blueprint Project Area

[Interactive Map]

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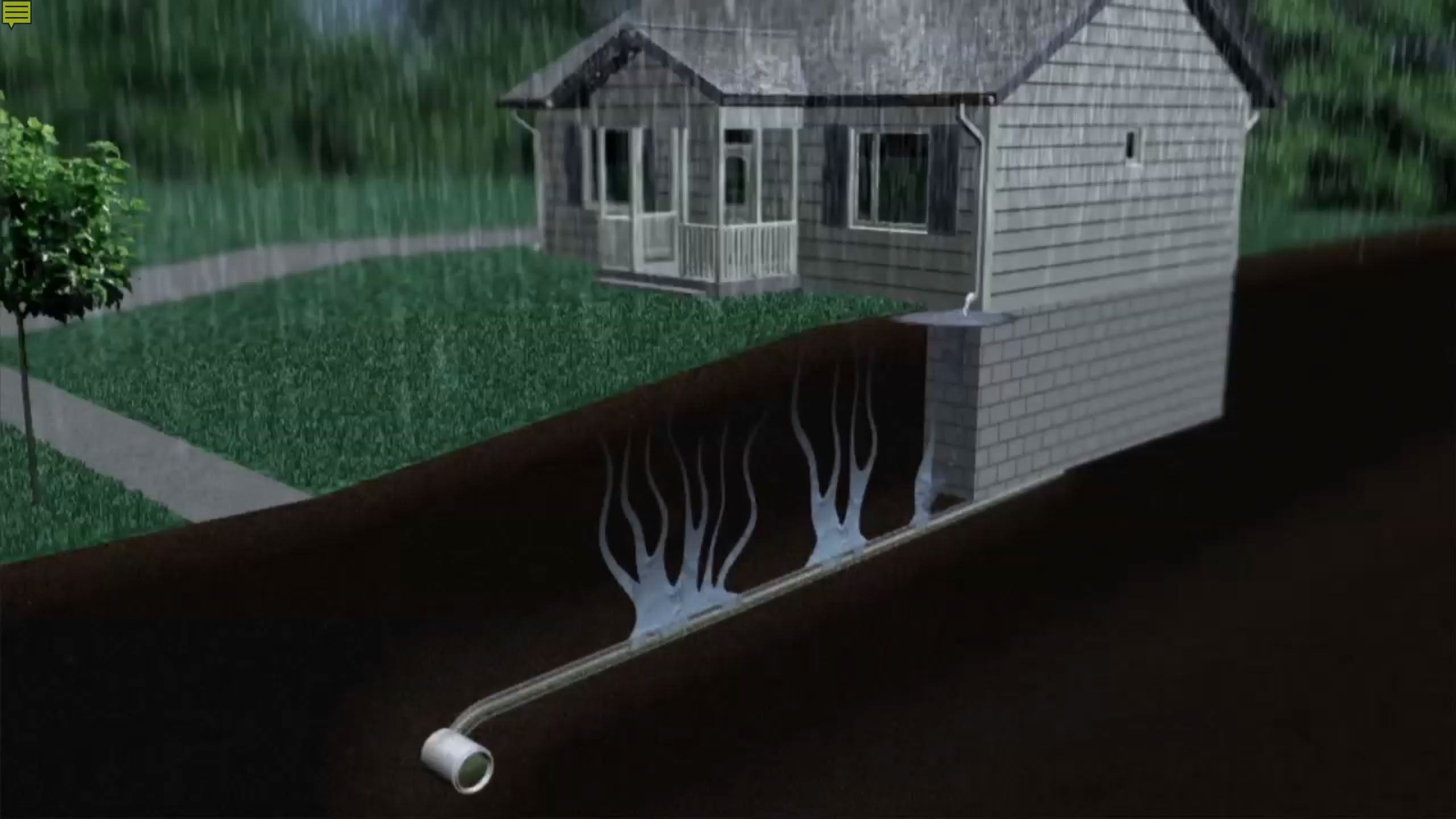
Blueprint 101: An introduction



RAIN WATER IN THE SANITARY SEWER SYSTEM CAUSES:

- Sewer Overflows into our rivers and streams
- Basement Backups (sewage coming up from floor drain)

ALSO:

- Pollutants found on the street (dirt, oil, trash, etc.) get carried to our rivers and streams by the storm sewers

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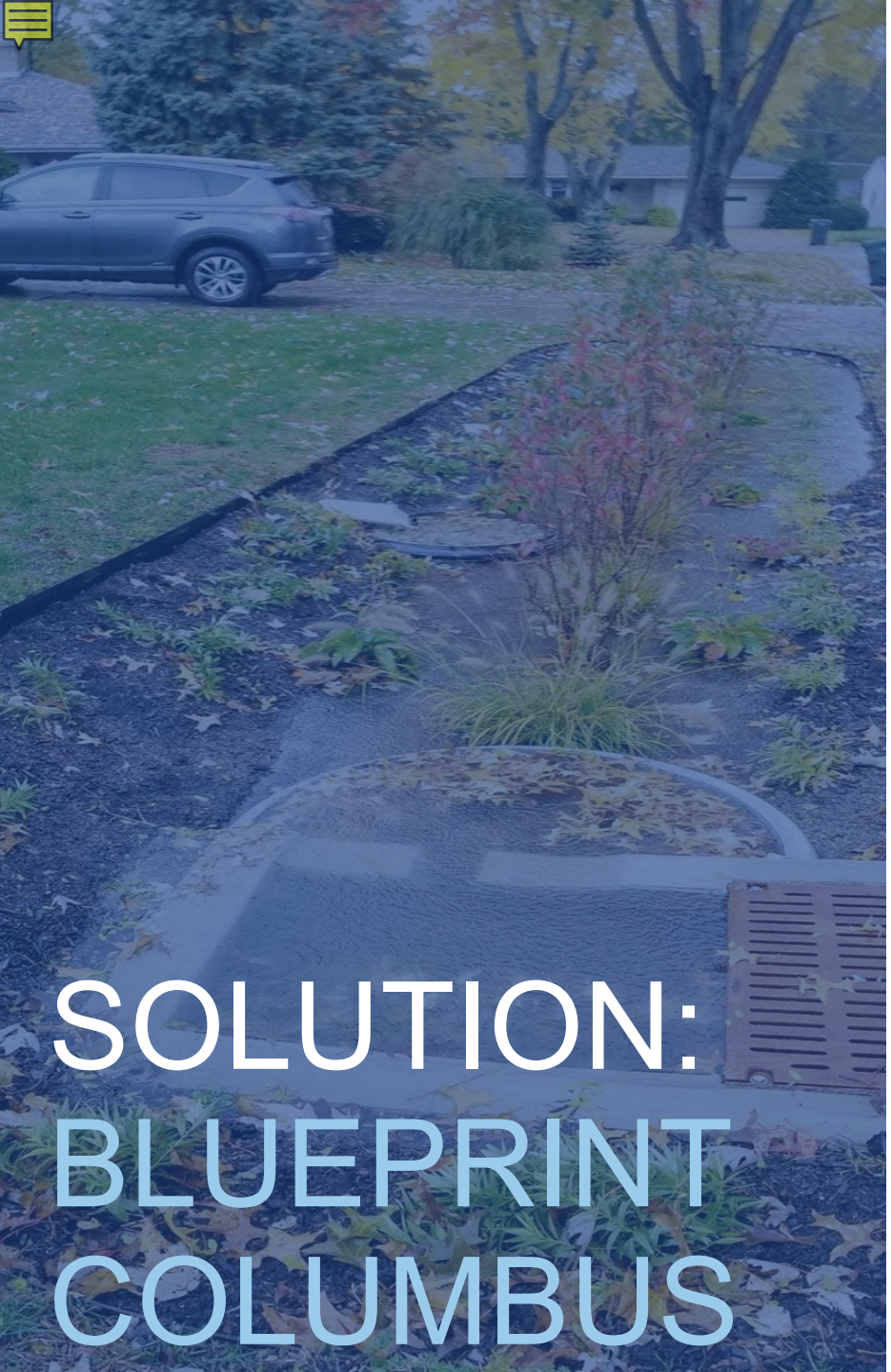
WHAT'S THE PROBLEM?

Rain water can enter the sanitary sewers through leaky joints, cracks, roof gutters, old sewers, and foundation drains.

Gray (Tunnels)	Green (Blueprint)
Addresses the symptom	Addresses the problem
Temporary local jobs	Permanent local jobs
Machines from overseas	Local materials
Does not address stormwater	Improves stormwater
Addresses consent order requirements	Addresses consent order requirements
Out of sight, out of mind	Improves neighborhood infrastructure



SOLUTION: BLUEPRINT COLUMBUS

BLUEPRINT IS AN INNOVATIVE, GREEN SOLUTION:

- Instead of building more infrastructure, invest in fixing our existing infrastructure

- Create opportunities to improve stormwater discharges
  - Route water away from houses to streets
  - Treat with green infrastructure before discharging

- Improve rivers, neighborhoods, local economy

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THE FOUR PILLARS OF BLUEPRINT

Lateral Lining

Lateral Lining keeps rain water out of the sanitary sewer by sealing the cracks and small breaks in the pipe that carries wastewater away from your home to the city's sanitary sewer system.

Roof Water Redirection

Roof Water Redirection ensures that rain water is carried away from your house and out to the street, so that it can't enter the sanitary sewer through connection joints around your home.

Sump Pumps

Sump Pumps help keep rain water out of the sanitary sewer by collecting it from around your home's foundation and into a pipe that discharges to the street.

Green Infrastructure

Green Infrastructure, such as rain gardens or pervious pavement, filters rain water from the street to remove pollutants and trash so that the water is cleaner when it reaches our rivers and streams.

The Blueprint Approach

Goal: Keep rain water OUT of sanitary sewers

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Lateral Lining

- Line home sewer lateral with waterproof material
- Seals cracked and loose laterals
- Improves property value
- Prevents root intrusion

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Roof Water Redirection

- Rainwater can settle around the foundation of your home, seeping into the lateral joint
- The City can redirect the downspout to road
- Keeps roof water from foundation drain
- Can tie into green infrastructure

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Sump Pumps

- Stops foundation drain from directly connecting to sanitary sewer
- The City can redirect the discharge to road
- Can tie into green infrastructure
- City provides installation, sump pump, and back-up battery

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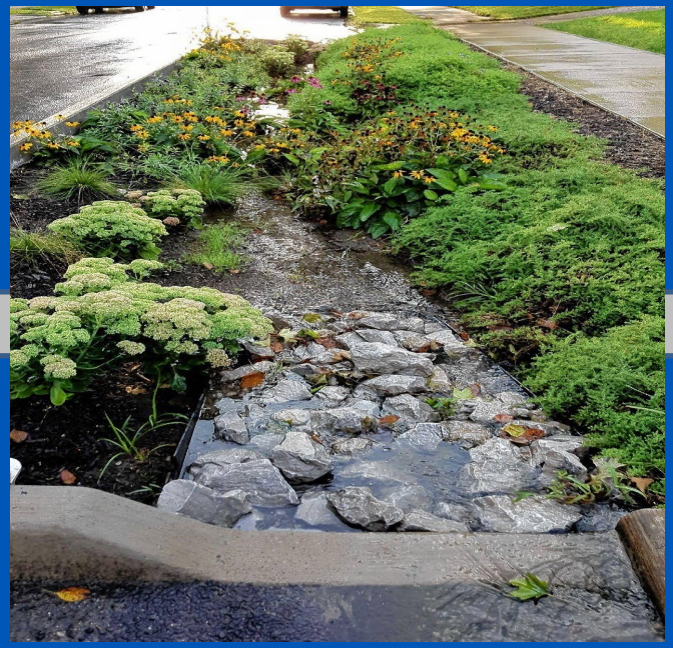
Today’s Focus: Potential Green Infrastructure

Green Infrastructure

Leaves and debris carried by rain water rush down the street



Green Infrastructure filters rain water of debris, leaves, etc.

GOAL: Improve Stormwater discharges

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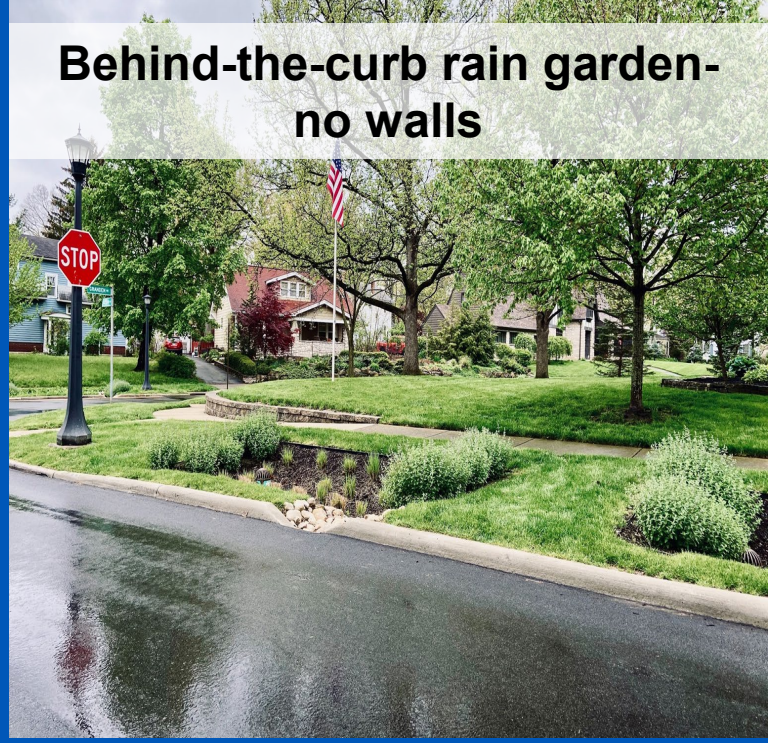
Types of Green Infrastructure

Regional rain garden

Behind-the-curb rain garden- 2 walls

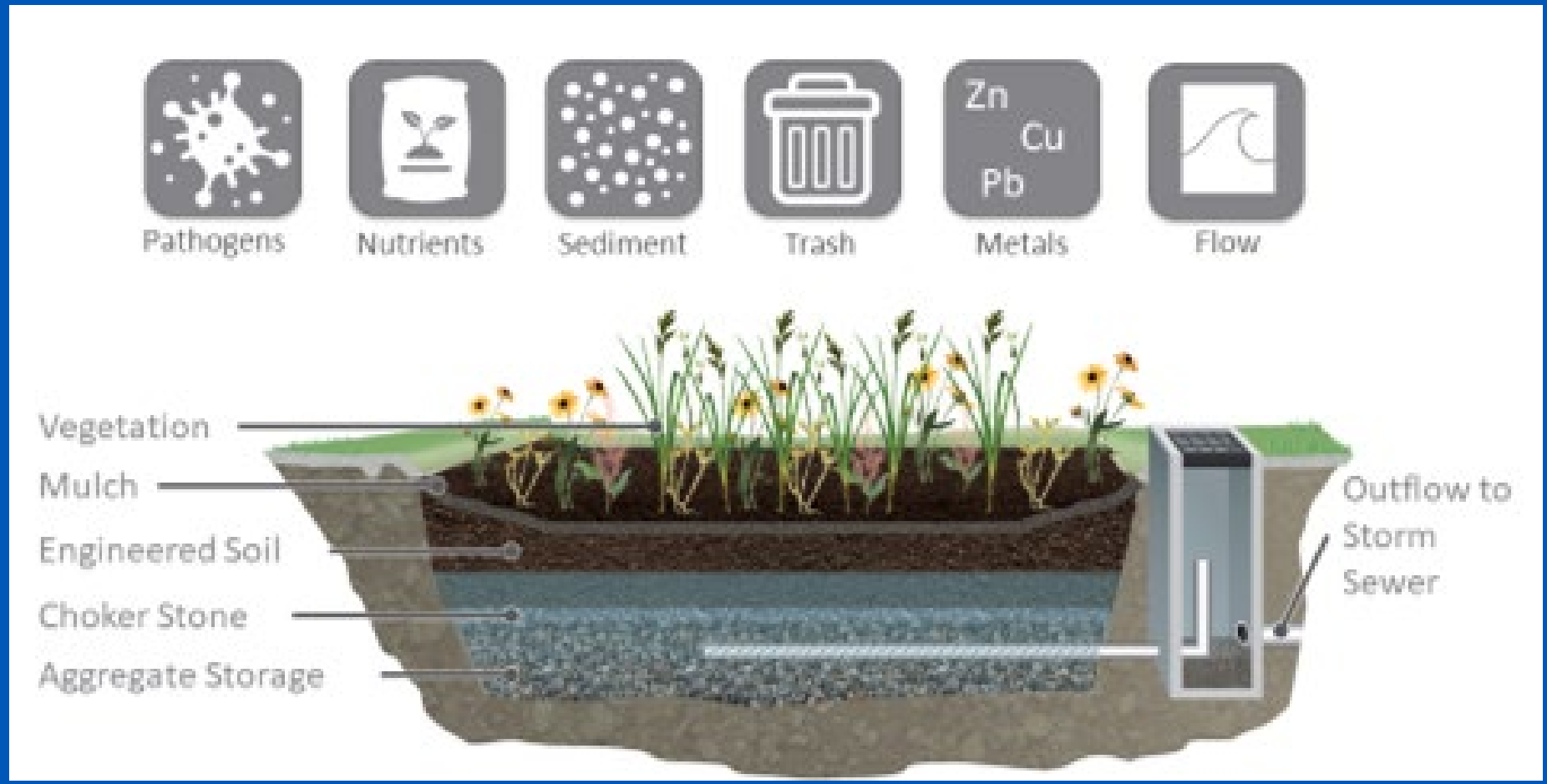
Behind-the-curb rain garden- no walls



Pervious pavement

Bump-out rain garden

What does green infrastructure do?



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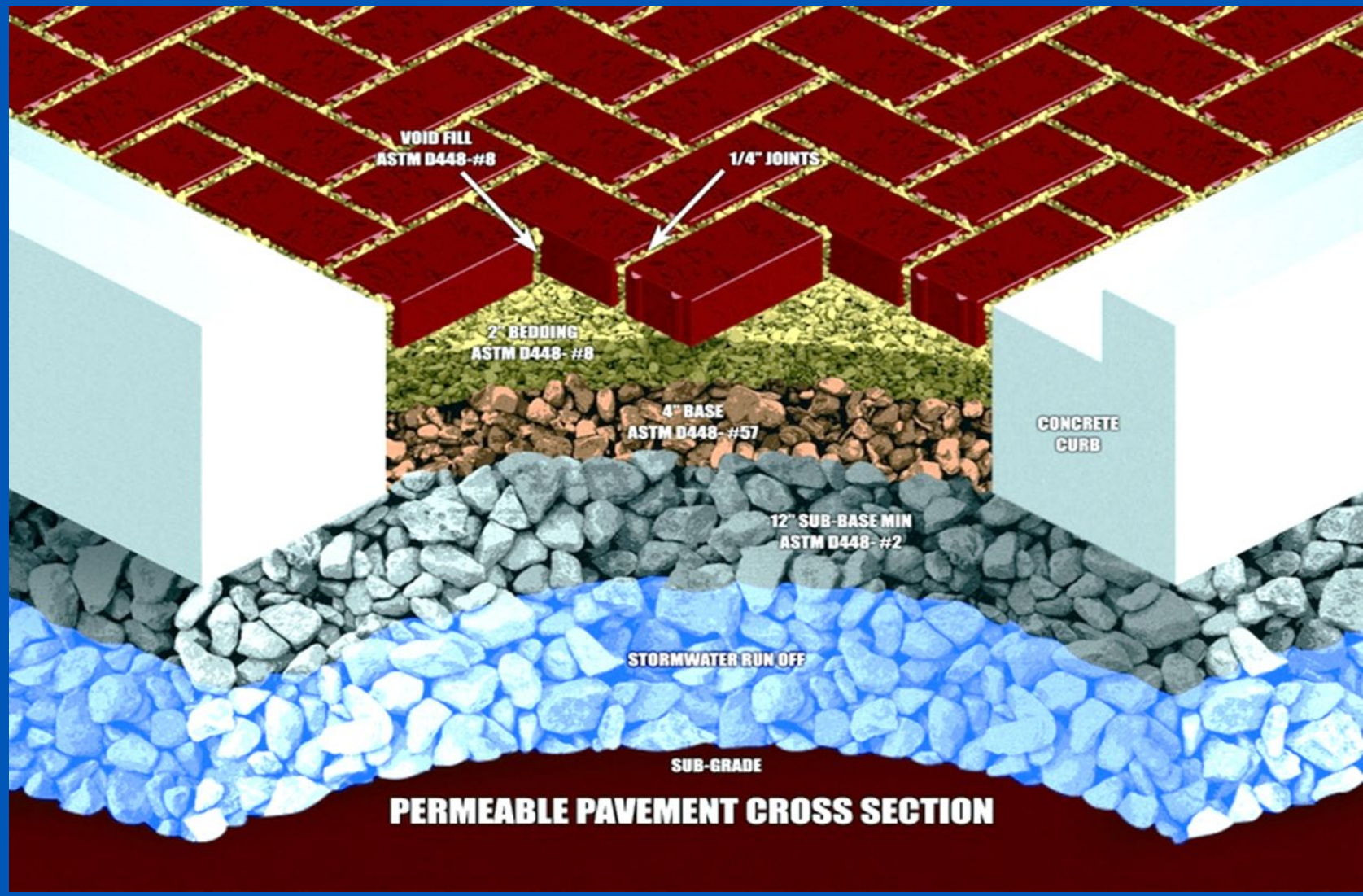
Pervious Pavement

Try it out for yourself! Take a ride on E Dominion in Clintonville!

General Paver Benefits

- ✓ Traffic Calming
- ✓ Filter and Clean Stormwater
- ✓ Reduced Street Flooding
- ✓ Less Maintenance Required



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How do we select locations?

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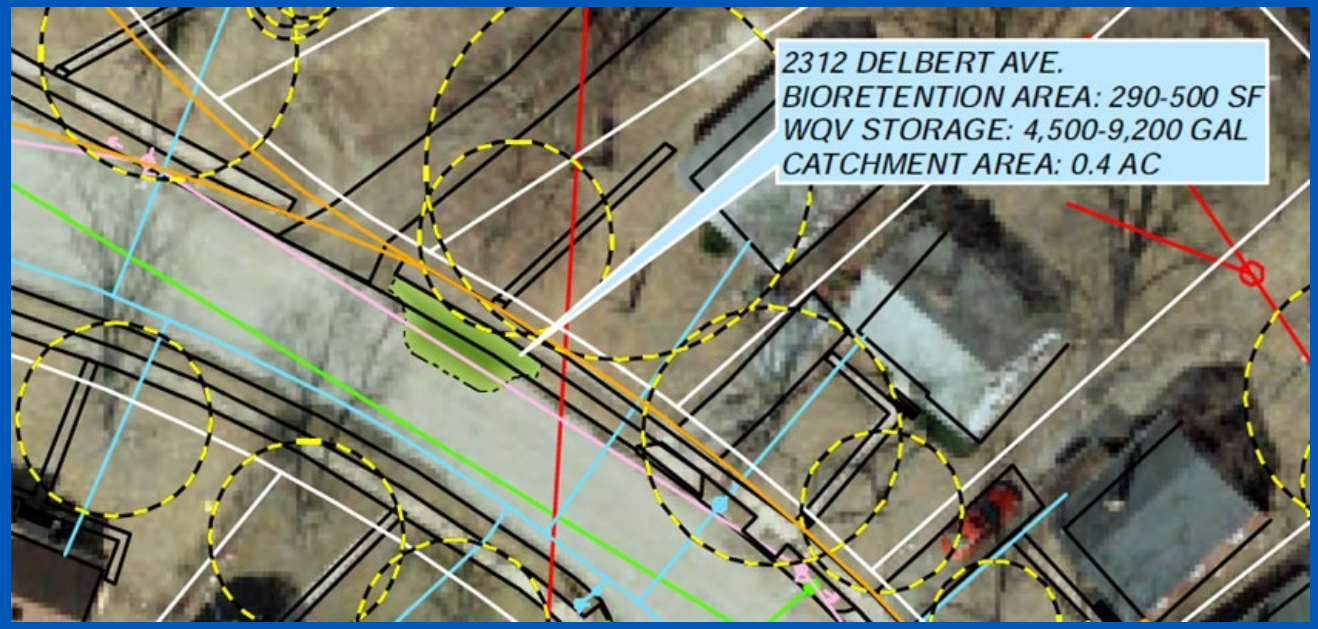
1. How much water do we need to control?
2. Where does the water naturally flow?
3. What barriers exist?
4. What would improve the neighborhood?



Land Bank/Green Space → Right-of-Way → Pavers → Bumpouts

The City is Responsible for All Maintenance!

All Green Infrastructure installed by the City is a component of the storm sewer system. Regular maintenance keeps it functioning!

- Regular weeding, mulching, plant care
- Removing trash
- Checking underdrains
- Sediment removal

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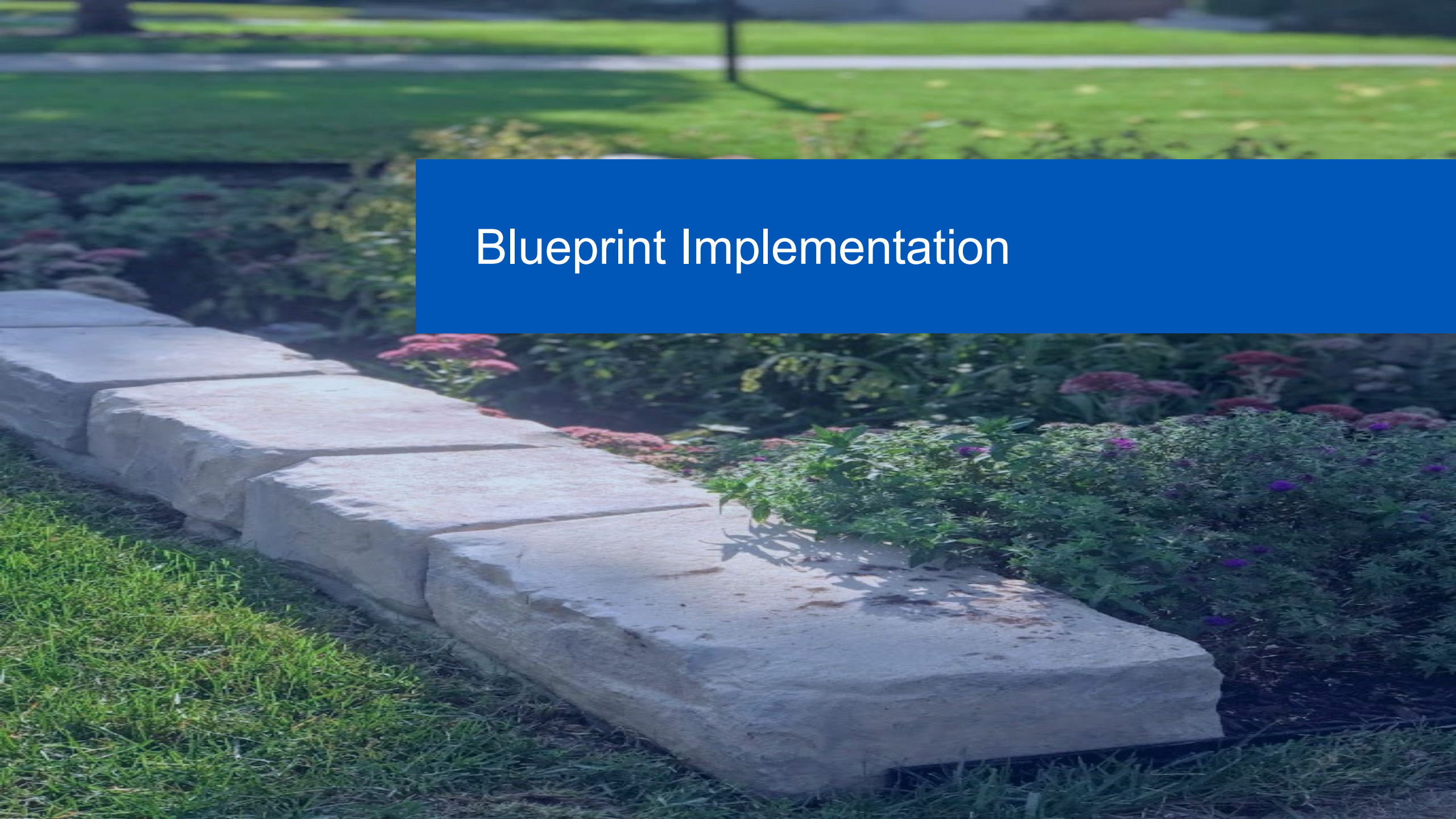
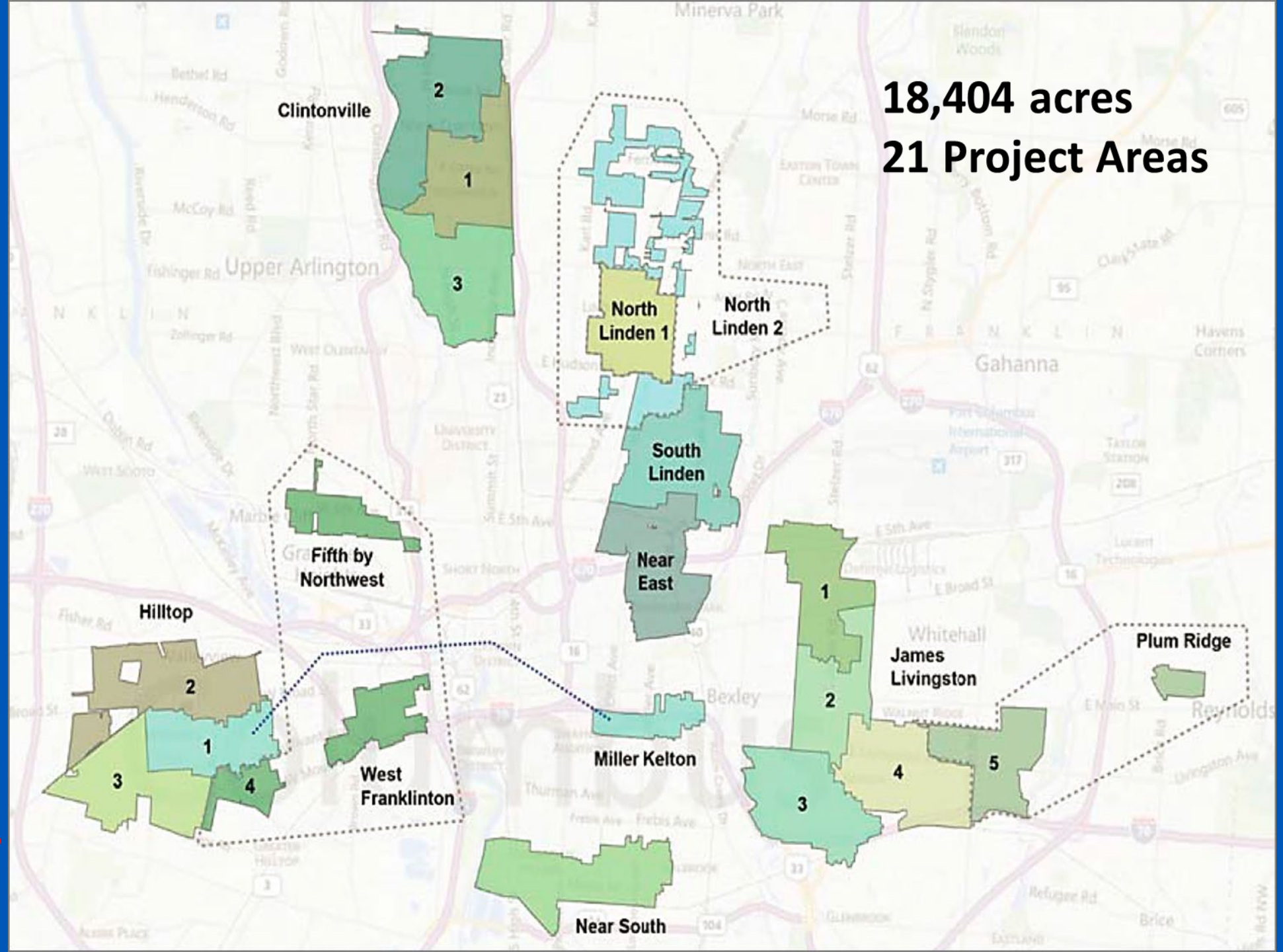


Blueprint Implementation



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Current Phase: 30% Design

- Survey data is analyzed by design engineers who propose various Blueprint solutions.
- Parking study completed.

Resident feedback

City & stakeholder input

WHAT'S NEXT?

Resident feedback will be collected and considered, plans will be updated and submitted.

60% Design Meeting (TBD)

Sump Pump Sign Ups: Residents in these five areas who have a basement with no sump pump are eligible for an inspection for a free sump pump through Blueprint Columbus.

https://blueprintneighborhoods.com/contact/

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Q & A

General Project Questions?

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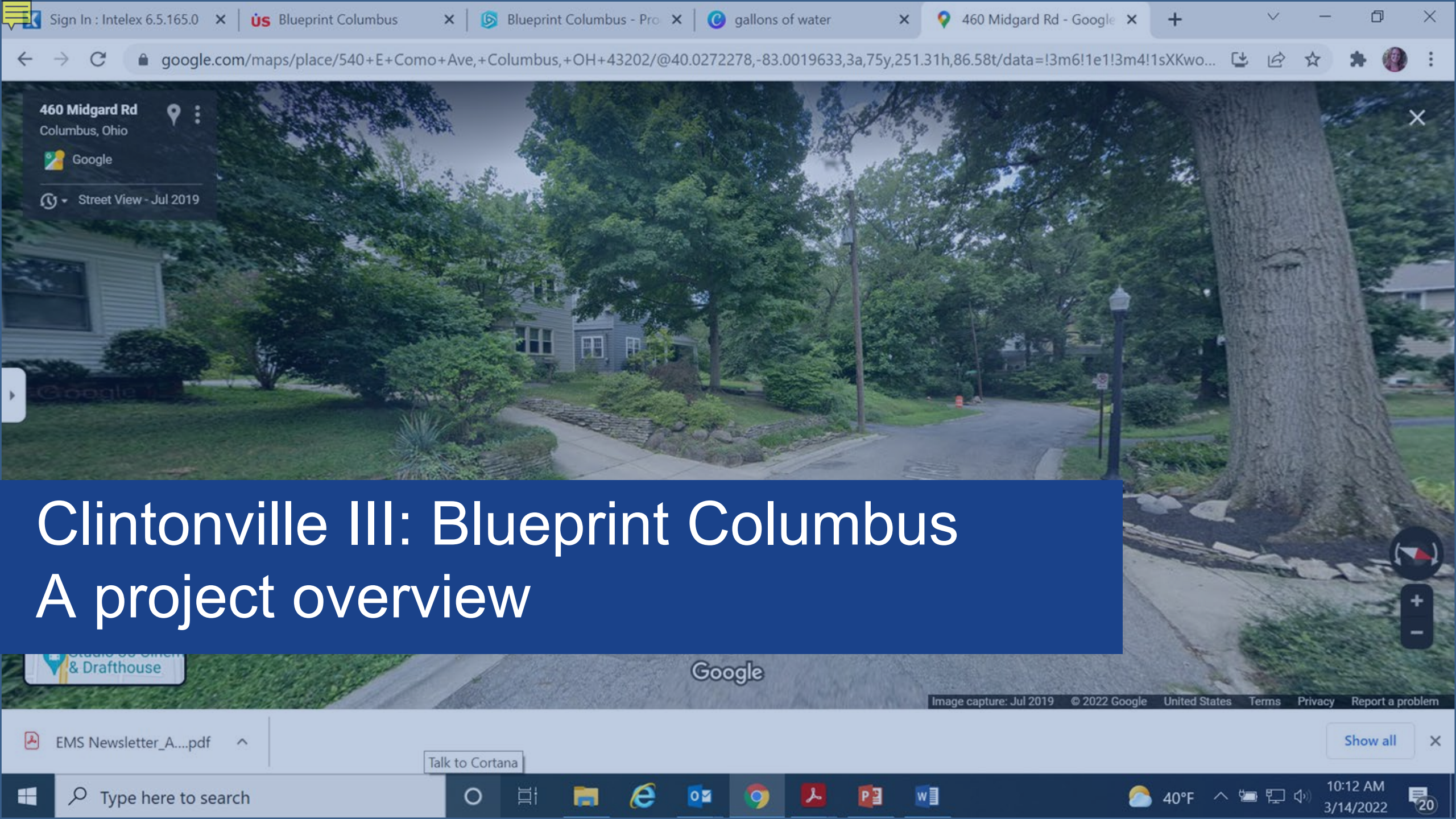

Clintonville III: Blueprint Columbus
A project overview

FOUR PILLAR TIMELINE

2022-2026

SUMP PUMPS

2023

GREEN INFRASTRUCTURE

2026

LATERAL LINING

ROOF WATER REDIRECTION

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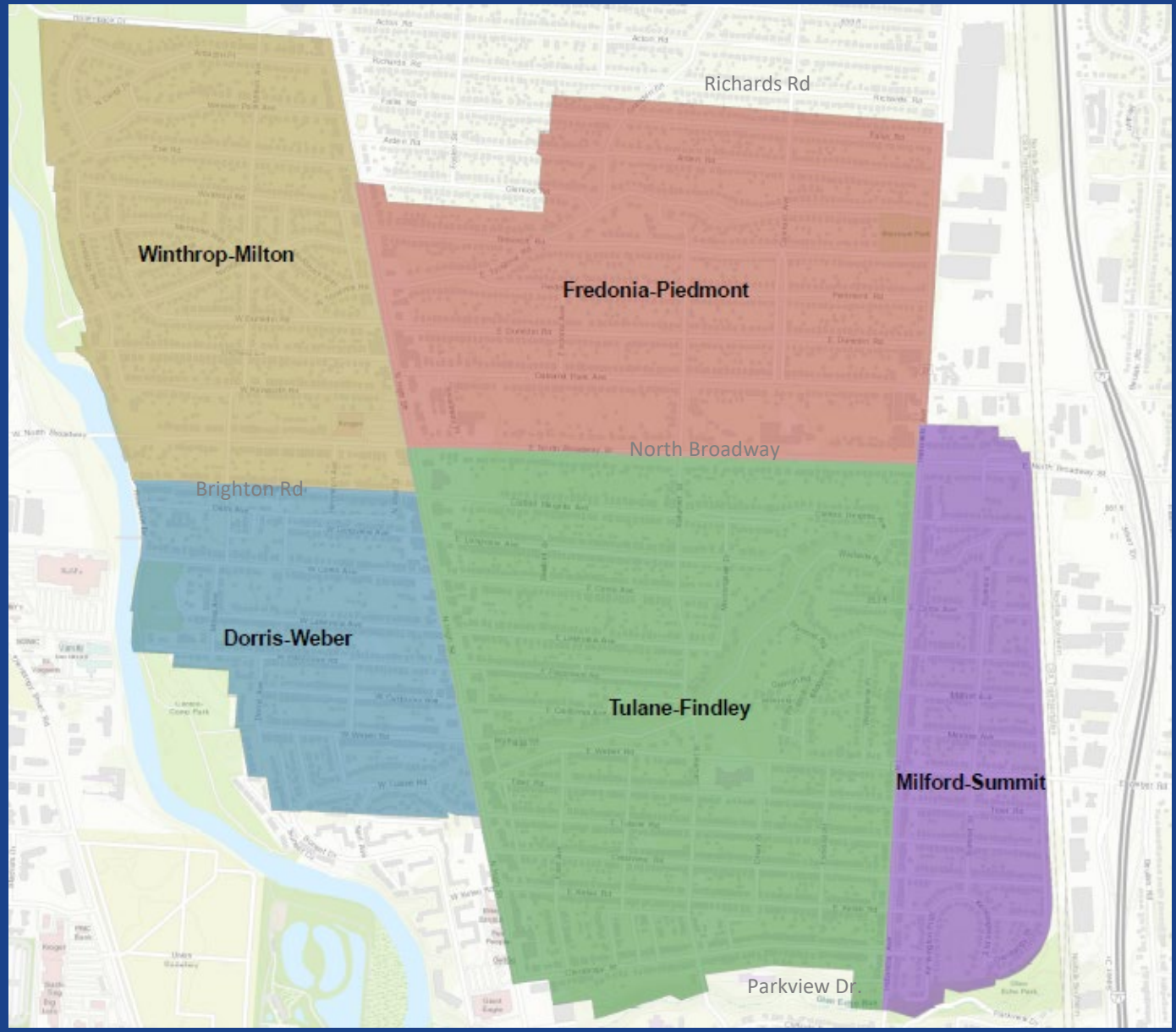
Clintonville 3 Area Overview

- GI design started in 2017
- On hold from 2018 to 2021 due to the Blueprint Program schedule revision
- Resumed in Aug. 2021
- 30% Preliminary Plans in Feb. 2022
- Major changes



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Major Changes - Walhalla Ravine Stream Restoration

Why Stream Restoration?

- Cost effective to remove sediment and nutrient

Protocol 1: Credit for Prevented Sediment during Storm Flow -- This protocol provides an annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that would otherwise be delivered downstream from an actively enlarging or incising urban stream.

Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects

Joe Berg, Josh Burch, Deb Cappuccitti, Solange Filoso, Lisa Fraley-McNeal, Dave Goerman, Natalie Hardman, Sujay Kaushal, Dan Medina, Matt Meyers, Bob Kerr, Steve Stewart, Bettina Sullivan, Robert Walter and Julie Winters

Accepted by Urban Stormwater Work Group (USWG): **February 19, 2013**
Approved by Watershed Technical Work Group (WTWG): **April 5, 2013**
Final Approval by Water Quality Goal Implementation Team (WQGIT): **May 13, 2013**
Test-Drive Revisions Approved by the USWG : **January 17, 2014**
Test-Drive Revisions Approved by the WTWG: August 28, 2014
Test-Drive Revisions Approved by the WQGIT: September 8, 2014

Prepared by:
Tom Schueler, Chesapeake Stormwater Network
and
Bill Stack, Center for Watershed Protection

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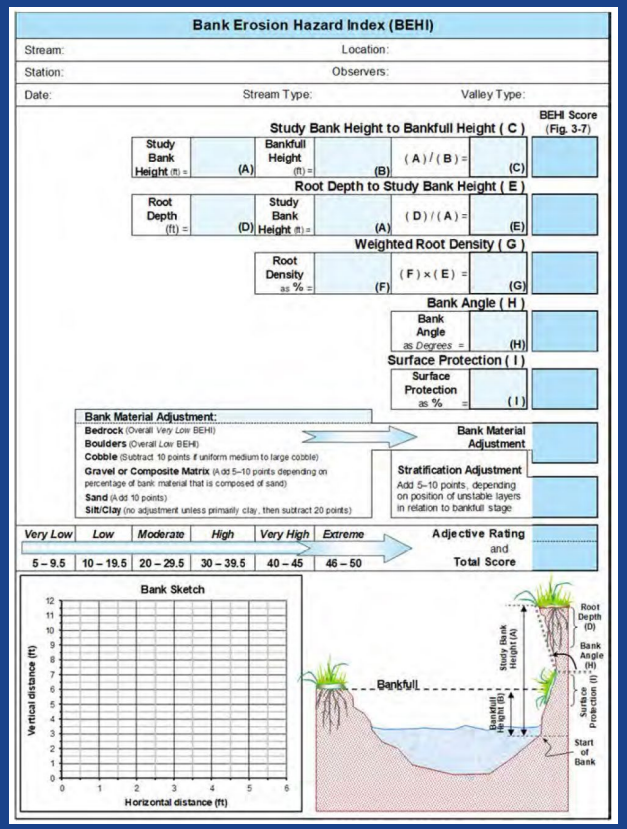
What Happened in Walhalla Ravine Study?

Prediction assessment

- Expected bank erosion rates
- BANCS (Banks Assessment for Non-point source Consequences of Sediment)
- Predicted 5.4 tons/year TSS reduction credit



Bank Erosion Hazard Index (BEHI)

Stream: Location:

Station: Observers:

Date: Stream Type: Valley Type:

BEHI Score (Fig. 3-7)

Study Bank Height to Bankfull Height (C)

Study Bank Height (ft) = (A) Bankfull Height (ft) = (B) (A) / (B) = (C)

Root Depth to Study Bank Height (E)

Root Depth (ft) = (D) Study Bank Height (ft) = (A) (D) / (A) = (E)

Weighted Root Density (G)

Root Density as % = (F) (F) × (E) = (G)

Bank Angle (H)

Bank Angle as *Degrees* = (H)

Surface Protection (I)

Surface Protection as % = (I)

Bank Material Adjustment:

Bedrock (Overall *Very Low* BEHI)

Boulders (Overall *Low* BEHI)

Cobble (Subtract 10 points if uniform medium to large cobble)

Gravel or Composite Matrix (Add 5–10 points depending on percentage of bank material that is composed of sand)

Sand (Add 10 points)

Silt/Clay (no adjustment unless primarily clay, then subtract 20 points)

Bank Material Adjustment

Stratification Adjustment

Add 5–10 points, depending on position of unstable layers in relation to bankfull stage

Very Low	*Low*	*Moderate*	*High*	*Very High*	*Extreme*
5 – 9.5	10 – 19.5	20 – 29.5	30 – 39.5	40 – 45	46 – 50

Adjective Rating and Total Score

Bank Sketch

Vertical distance (ft)

Horizontal distance (ft)

Bankfull

Root Depth (D)

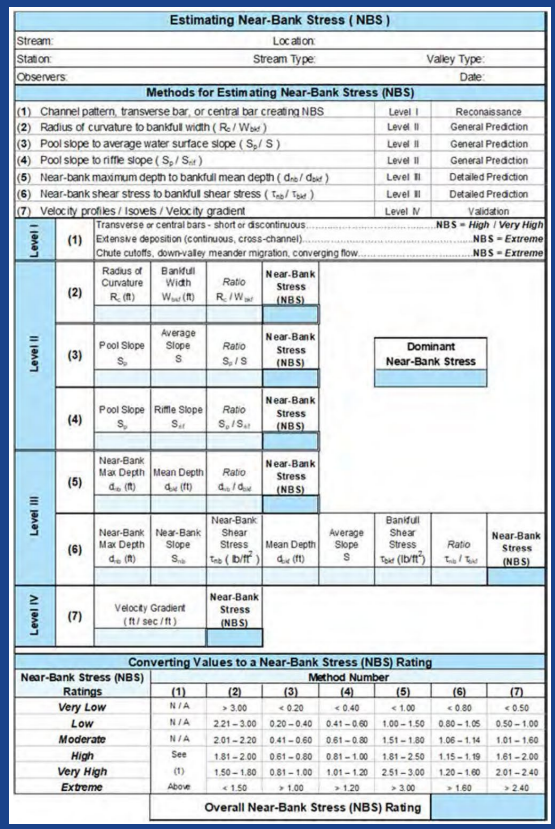
Bank Angle (H)

Surface Protection (I)

Start of Bank

Study Bank Height (A)

Bankfull Height (B)



Estimating Near-Bank Stress (NBS)

Stream: Location:

Station: Stream Type: Valley Type:

Observers: Date:

Methods for Estimating Near-Bank Stress (NBS)

(1)	Channel pattern, transverse bar, or central bar creating NBS	Level I	Reconaissance
(2)	Radius of curvature to bankfull width (R_c / W_{bkf})	Level II	General Prediction
(3)	Pool slope to average water surface slope (S_p / S)	Level II	General Prediction
(4)	Pool slope to riffle slope (S_p / S_{rif})	Level II	General Prediction
(5)	Near-bank maximum depth to bankfull mean depth (d_{nb} / d_{bkf})	Level III	Detailed Prediction
(6)	Near-bank shear stress to bankfull shear stress (τ_{nb} / τ_{bkf})	Level III	Detailed Prediction
(7)	Velocity profiles / Isovels / Velocity gradient	Level IV	Validation

Level I (1)
- Transverse or central bars - short or discontinuous ..... NBS = *High / Very High*
- Extensive deposition (continuous, cross-channel) ..... NBS = *Extreme*
- Chute cutoffs, down-valley meander migration, converging flow ..... NBS = *Extreme*

Level II
- (2) Radius of Curvature R_c (ft) | Bankfull Width W_{bkf} (ft) | *Ratio* R_c / W_{bkf} | Near-Bank Stress (NBS)
- (3) Pool Slope S_p | Average Slope S | *Ratio* S_p / S | Near-Bank Stress (NBS)
- (4) Pool Slope S_p | Riffle Slope S_{rif} | *Ratio* S_p / S_{rif} | Near-Bank Stress (NBS)

Dominant Near-Bank Stress

Level III
- (5) Near-Bank Max Depth d_{nb} (ft) | Mean Depth d_{bkf} (ft) | *Ratio* d_{nb} / d_{bkf} | Near-Bank Stress (NBS)
- (6) Near-Bank Max Depth d_{nb} (ft) | Near-Bank Slope S_{nb} | Near-Bank Shear Stress τ_{nb} (lb/ft^2) | Mean Depth d_{bkf} (ft) | Average Slope S | Bankfull Shear Stress τ_{bkf} (lb/ft^2) | *Ratio* τ_{nb} / τ_{bkf} | Near-Bank Stress (NBS)

Level IV
- (7) Velocity Gradient (ft / sec / ft) | Near-Bank Stress (NBS)

Converting Values to a Near-Bank Stress (NBS) Rating

Near-Bank Stress (NBS) Ratings	Method Number (1)	(2)	(3)	(4)	(5)	(6)	(7)
Very Low	N / A	> 3.00	< 0.20	< 0.40	< 1.00	< 0.80	< 0.50
Low	N / A	2.21 – 3.00	0.20 – 0.40	0.41 – 0.60	1.00 – 1.50	0.80 – 1.05	0.50 – 1.00
Moderate	N / A	2.01 – 2.20	0.41 – 0.60	0.61 – 0.80	1.51 – 1.80	1.06 – 1.14	1.01 – 1.60
High	See	1.81 – 2.00	0.61 – 0.80	0.81 – 1.00	1.81 – 2.50	1.15 – 1.19	1.61 – 2.00
Very High	(1)	1.50 – 1.80	0.81 – 1.00	1.01 – 1.20	2.51 – 3.00	1.20 – 1.60	2.01 – 2.40
Extreme	Above	< 1.50	> 1.00	> 1.20	> 3.00	> 1.60	> 2.40

Overall Near-Bank Stress (NBS) Rating

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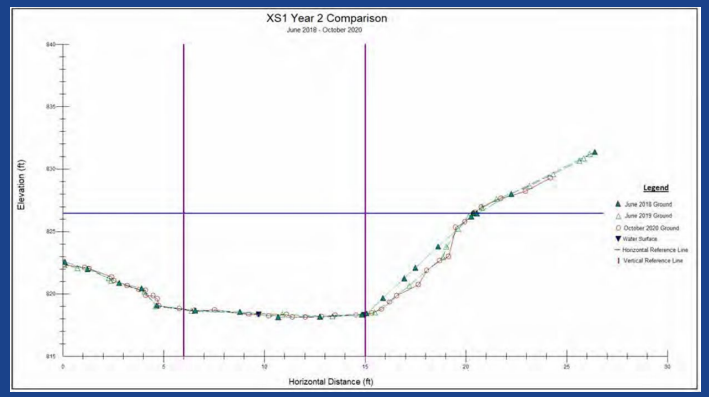
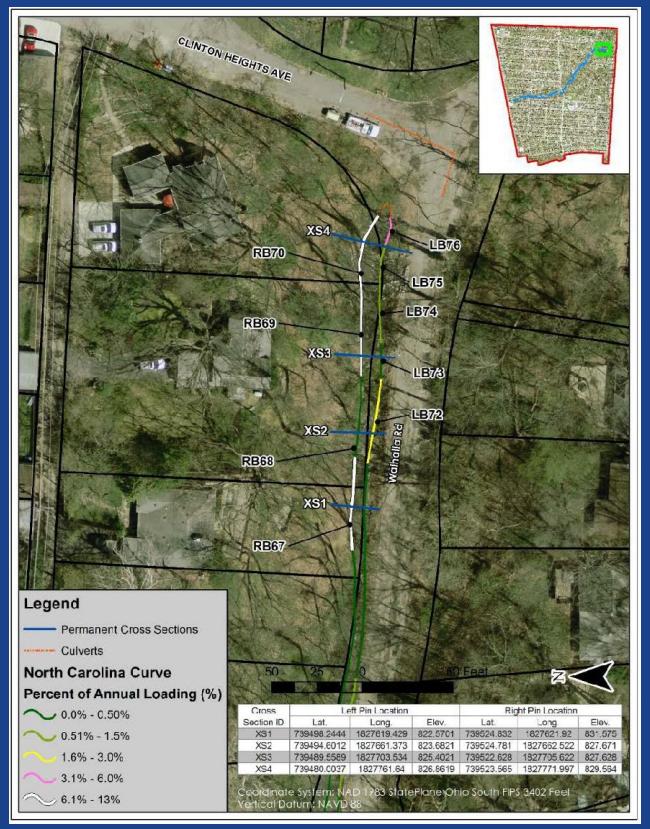
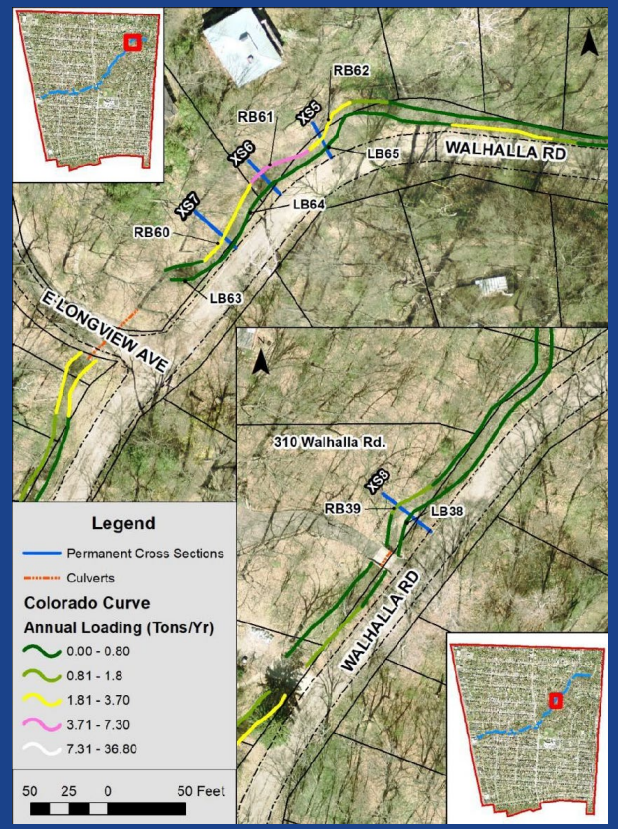
What Happened in Walhalla Ravine Study?

Prediction Validation

- Monitored 8 permanent cross-sections for one to two years (June 2018 – October 2020)
- Measured 4.2 tons/year TSS reduction credit







XS 1-4
Surveyed in:
June 2018
June 2019
October 2020

XS 5-8
Surveyed in:
October 2019
October 2020

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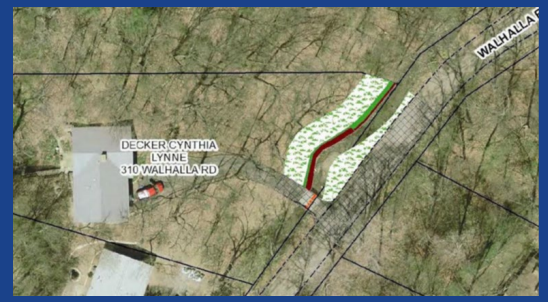
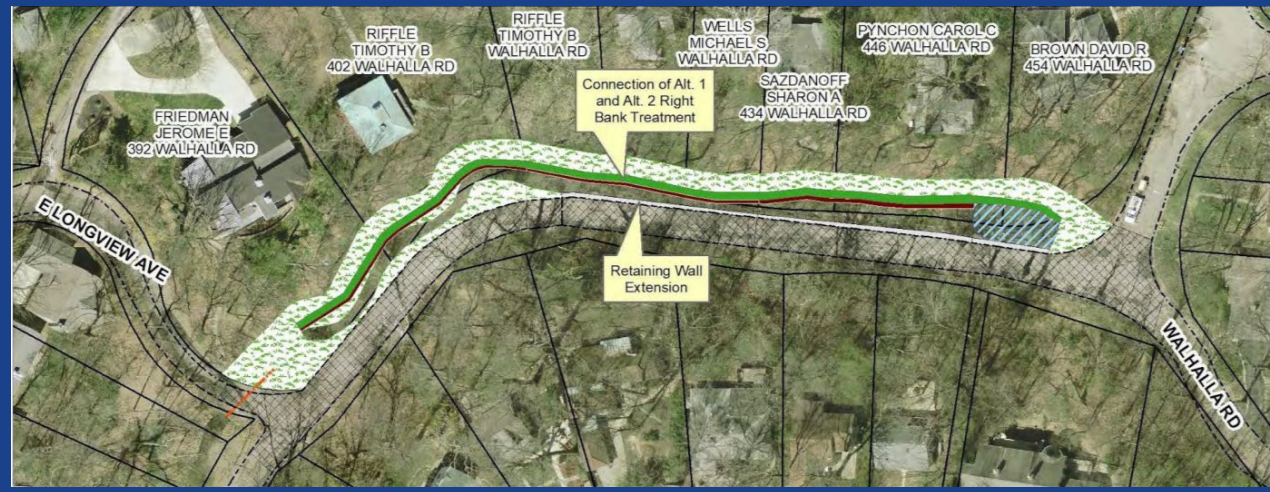
What Happened in Walhalla Ravine Study?

- April 2021
  - COC requested Ohio EPA to allow Walhalla Ravine Stream Restoration using natural channel design as a green infrastructure technology to achieve the TSS (total suspended solid) reduction goal
- August 2021
  - Ohio EPA approved plan to implement stream restoration in Walhalla Ravine
- TSS (total suspended solid) reduction target – 20%
  - 15.4% achieved by Walhalla Ravine Stream Restoration
  - 4.6% to be achieved by green infrastructure
  - Resulted less amount of green infrastructure





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Design Changes/Improvements

- Reduced dimensions of green infrastructure
  - Maintaining 20’ of continuous lot frontage for houses without driveways
  - No more than 60% of the lot frontage may be used for green infrastructure
- Other lessons learned
  - Maximum drop from the top of wall to the bottom of the basin reduced from 18’’ to 12’’
  - Walled basins may be 1, 2, or 4 walled
    - 2 Walled basin with segmental retaining walls is preferred
    - Concrete walls should be utilized adjacent to roadways and sidewalk
  - Permeable Pavers on streets with rear alley access are preferred
  - Minimize impacts to parking
    - Provide 2ft buffer/step-out

Q & A

Walhalla or Design Changes Questions?

Please submit your questions in the chat box at this time.

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614-645-1253

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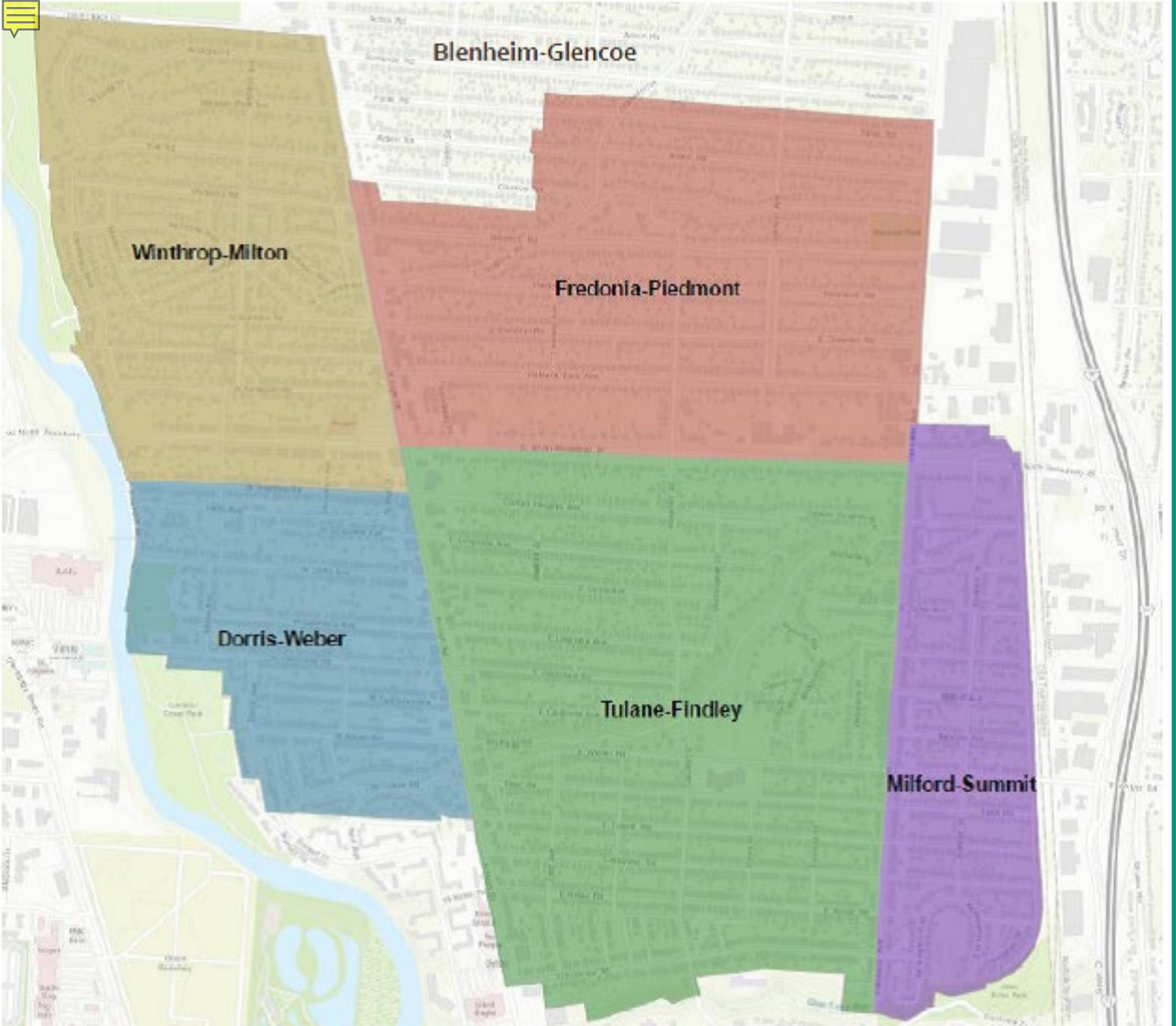
Cleaner streams.
Stronger neighborhoods.



Clintonville III Sub-Areas and their City Project Managers

- Fang Cheng*-Tulane Findley
- Jehan Alkhayri-Fredonia Piedmont
- Grace McInerney-Milford Summit
- C. Jim Arthur-Winthrop Milton
- Rob Herr-Dorris Weber

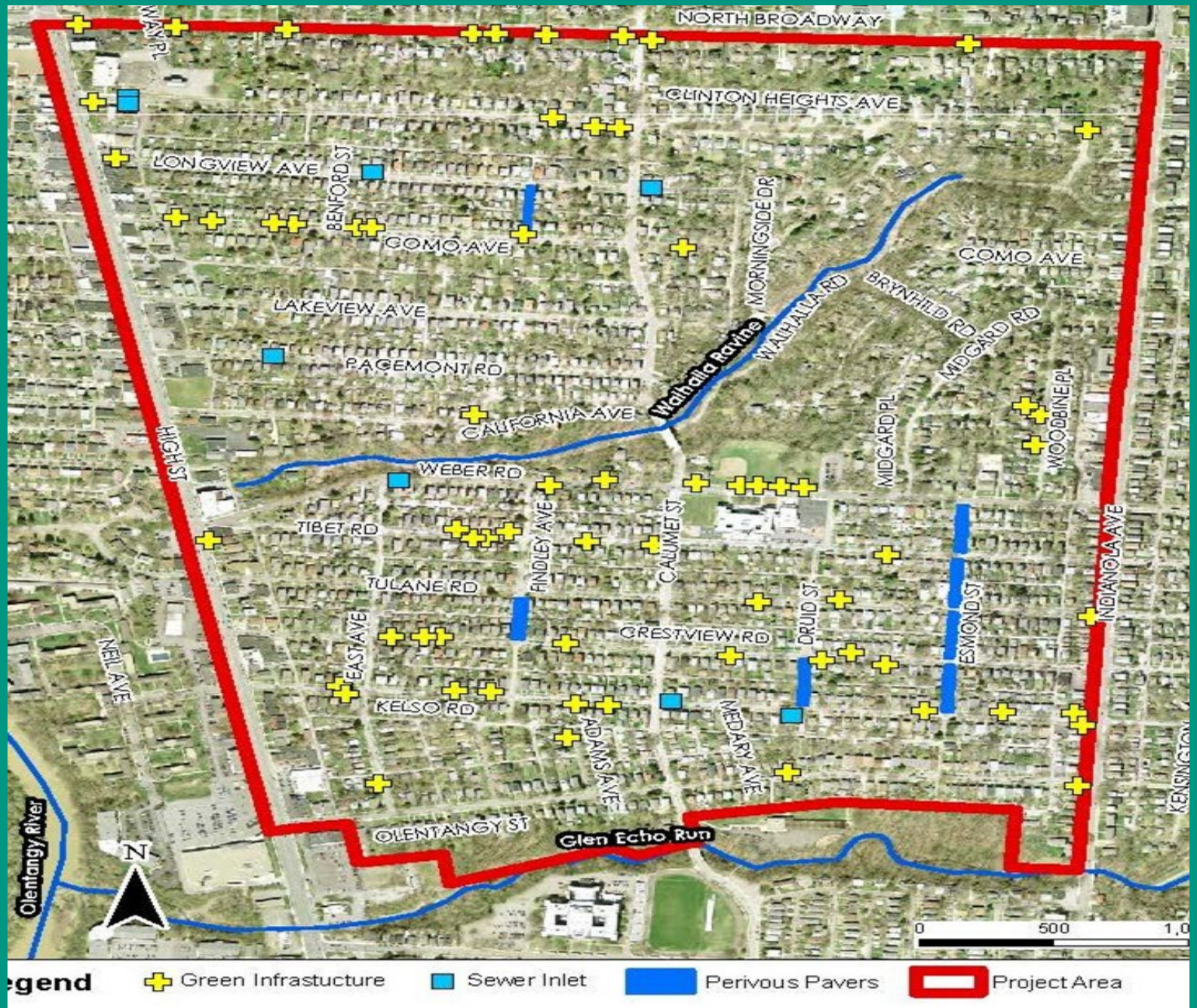
THE CITY OF COLUMBUS
ANDREW J. GINTHER, MAYOR
DEPARTMENT OF PUBLIC UTILITIES

BLUE PRINT COLUMBUS
Cleaner streams. Stronger neighborhoods.

Tulane Findley Neighborhood Overview-Fang Cheng

Rain Gardens

- 8 on North Broadway (south side only)
- 4 on Indianola Ave.
- 4 on Clinton Heights
- 4 Rain Gardens on High St.
- 8 on Como Ave.
- 1 on California Ave.
- 6 on Weber Rd.
- 1 on Calumet St.
- 7 on Tibet Rd.
- 2 on Tulane Rd.
- 8 on Crestview Rd.
- 8 on Kelso Rd.
- 2 on Olentangy St.
- 1 on Adams Ave.
- 3 on Woodbine Pl.



Pervious Pavement

- 1 Block on the Alley West of Calumet between Longview Ave. and Como Ave.
- 4 Blocks on Esmond St. from Weber Rd. to Kelso Rd.
- 1 Block on Druid St. from Crestview Rd. to Kelso Rd.
- 1 Block on Findley Ave. from Tulane Rd. to Crestview Rd.

8 New Inlets

Fredonia Piedmont Neighborhood Overview-Jehan Alkhayri

Rain Gardens

- 17 on Fallis
- 12 on Arden
- 2 on Glencoe
- 6 on Oakland Park
- 5 on North Broadway (north side only)

Regional rain gardens

- 2 at North Broadway and Calumet
- 2 on Torrence Rd

Milford Summit Neighborhood Overview-Grace McInerney

Rain Gardens

- 2 on Walhalla Road
- 10 on Summit Street
- 3 on Midgard Road
- 4 on Crestivew Road

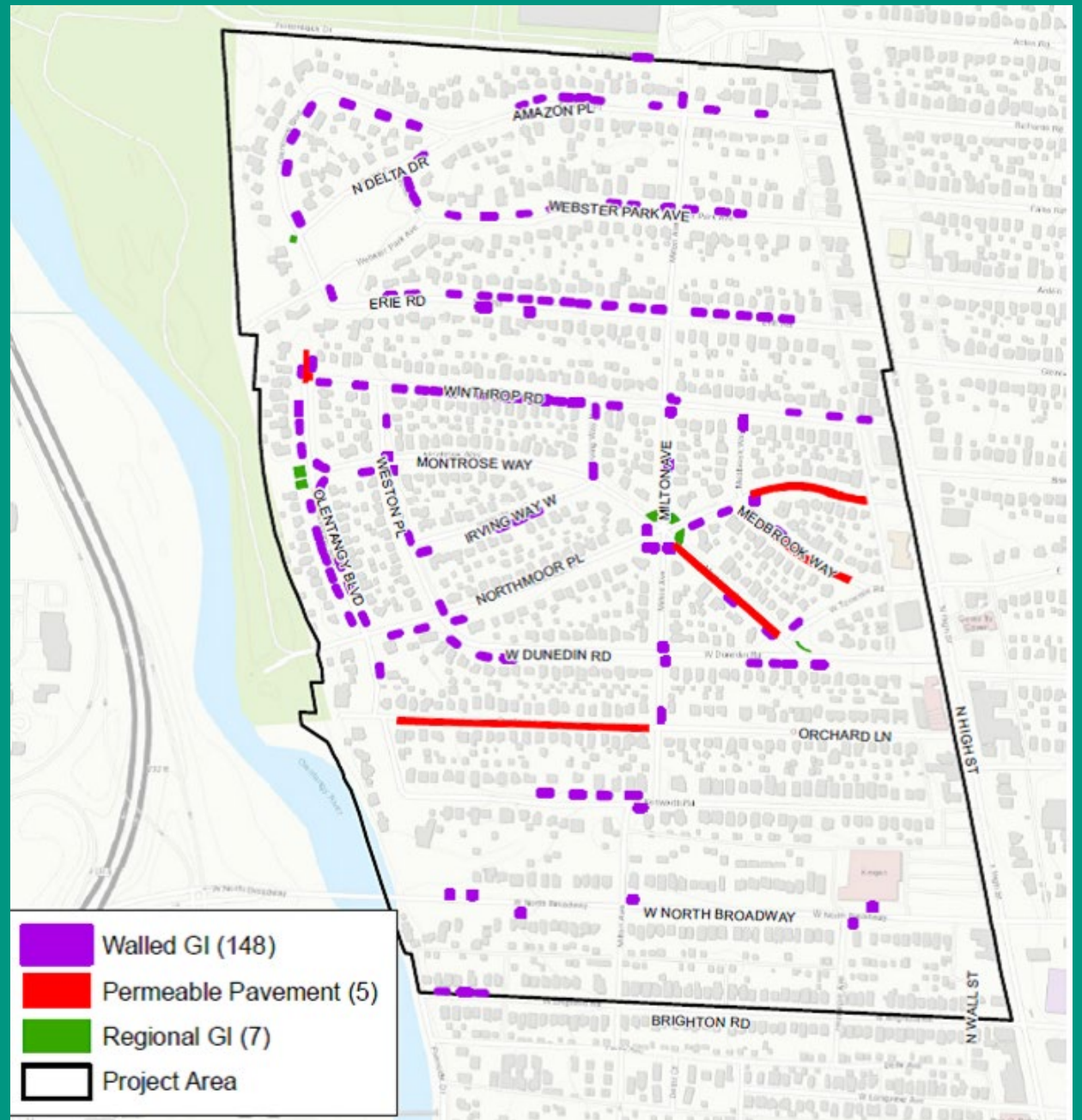
Permeable Pavement

- 2 blocks on Midgard Rd.
- 3 blocks on Summit St.

Winthrop Milton Neighborhood Overview-Jim Arthur

Rain gardens

- 16 on Amazon Pl.
- 5 on Brighton Rd.
- 3 on N. Delta Dr.
- 15 on Webster Pk Av.
- 14 on W. Dunedin Rd.
- 25 on Erie Rd.
- 8 on Kenworth Rd.
- 2 on Milton Ave.
- 1 on Orchard Ln.
- 3 on Montrose Way
- 28 on Olentangy Blvd.
- 3 on Northmoor Pl.
- 19 on Winthrop Rd.
- 3 on Weston Pl.
- 2 on Irving Way N
- 5 on Irving Way W



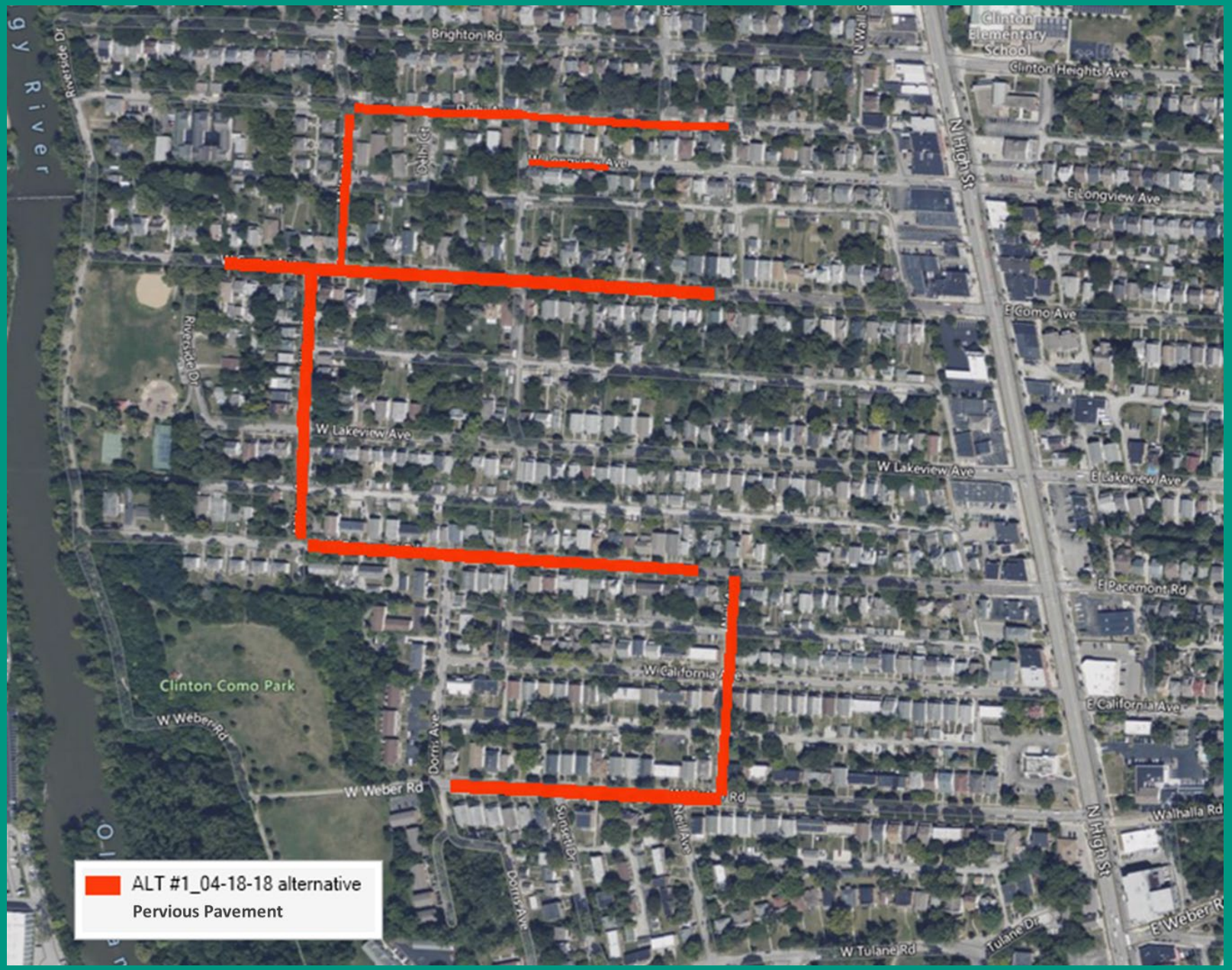
Regional Rain gardens

- 3 at Milton Ave., Montrose Way and Northmoor Pl
- 2 at Olentangy Blvd. and Montrose Way
- 1 at Dunedin Rd. and Montrose Way
- 1 at Olentangy and N. Delta

Permeable Pavement

- Orchard Ln from Olentangy Blvd to Milton Ave.
- Medbrook Way from W. Torrence to Northmoor Pl.
- Northoor Pl from the alley to Medbrook Way
- Montrose Way from W. Torrence to Northmoor Pl

Dorris Weber Neighborhood Overview-Rob Herr



Permeable Pavement

- Delhi Ave. between Milton Ave. and the alley west of N High St.
- Longview Ave. from the 2nd alley west of N. High St. to a few hundred feet east of the 2nd alley west of N. High St.
- W. Como Ave. between Milton Ave. and N. High St.
- Milton Ave. between Delhi Ave. and W. Como Ave.
- Milton Ave. between W. Como and W. Pacemont Rd.
- W. Pacemont Rd. between Milton Ave. and Neil Ave.
- Neil Ave. between W. Pacemont Rd. and W. Weber Rd.
- W. Weber Rd. between Dorris Ave. and Neil Ave.

Breakout sessions

Clintonville III Blueprint Project Area

Fredonia Piedmont

Tulane Findley

Milford Summit

Winthrop Milton

Dorris Weber