



Targeted Stream Restoration

2019 ASFPM Conference
May 23, 2019

NORTHEAST OHIO REGIONAL SEWER DISTRICT



REGIONAL
STORMWATER
MANAGEMENT
PROGRAM



GPD GROUP®



Agenda

- NEORSD Program
- What Is “Targeted” Stream Restoration?
- Natural Channel Design
- Case Studies
- Q&A

Northeast Ohio Regional Sewer District

- Political subdivision of the State of Ohio
- Created by Court Order in 1972
- Regional agency separate and distinct from municipalities and counties
- Own, operate 3 wastewater treatment plants
- 1 million customers



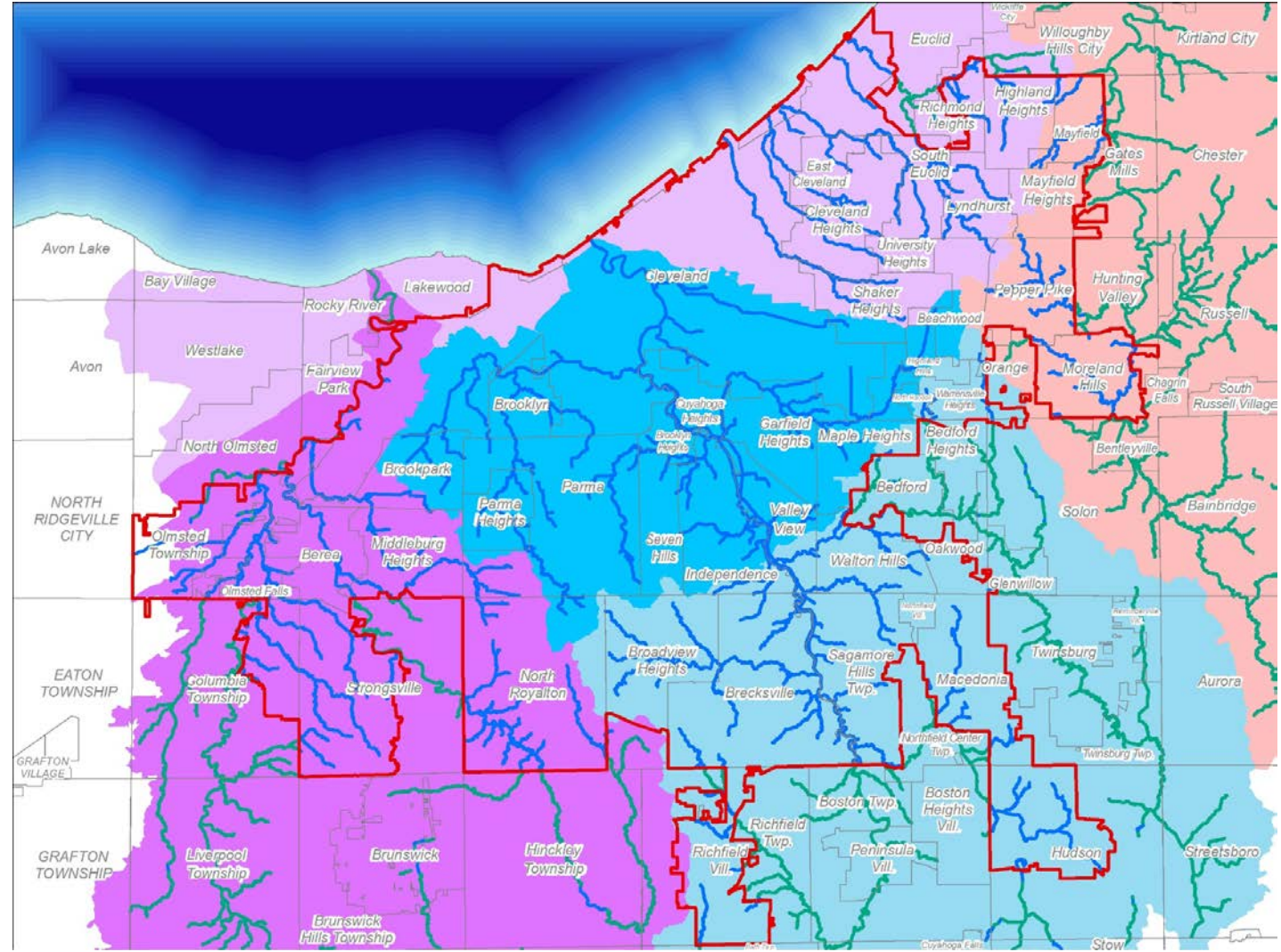
NORTHEAST OHIO REGIONAL SEWER DISTRICT



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Regional Stormwater Management Program

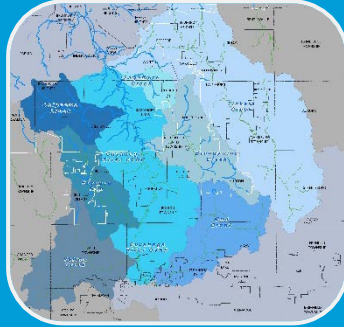
- Service Area: 355 sq. mi.
- Contributing Watershed Area: 1,524 sq. mi.
- Regional Stormwater System (RSS) in Service Area: 445+ mi.
- 300 acre drainage
- Intercommunity drainage



Regional Stormwater Management Program



Inspect &
Maintain



SW
Master
Plans



Construct
Projects



Encourage
Good
Practices



NORTHEAST OHIO REGIONAL SEWER DISTRICT



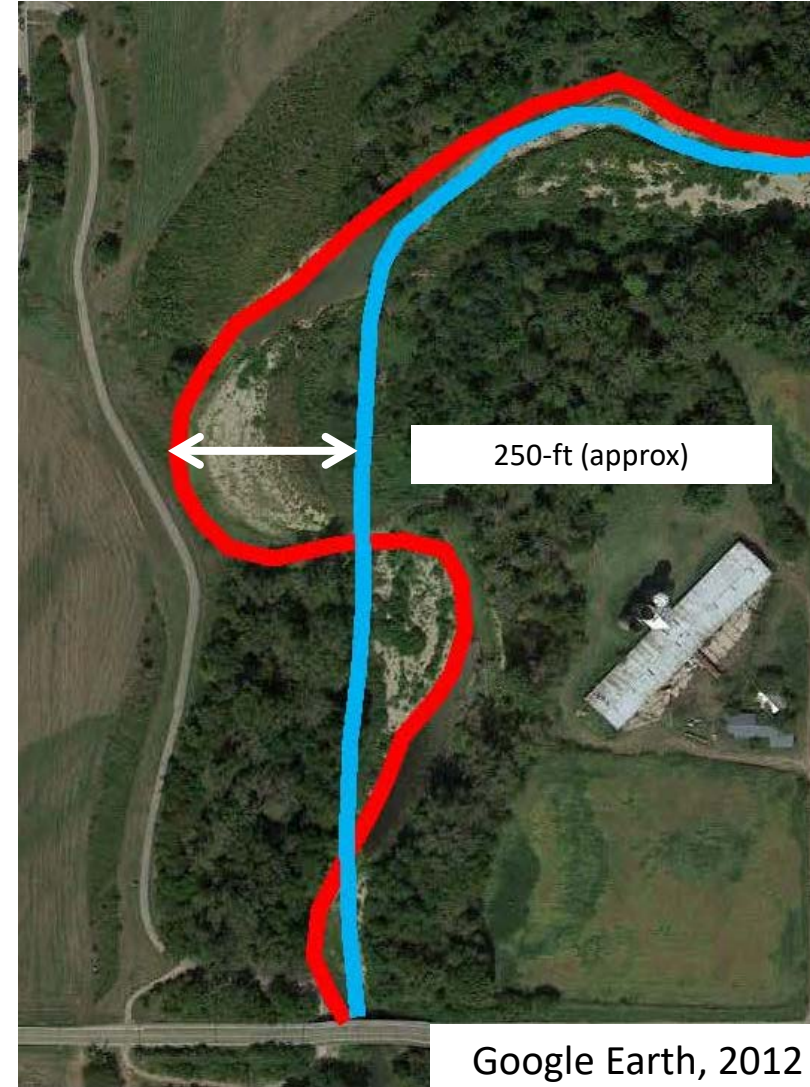
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What is “Targeted” Stream Restoration?

- Streams are dynamic, subject to horizontal and vertical adjustments
- Rate of adjustment can accelerate when disturbed (floodplain loss, hydrologic changes, channel straightening, etc.)
- Asset Protection: utilities, transportation, buildings, recreational amenities (paths, shelters, etc.)



Streams Are Dynamic!



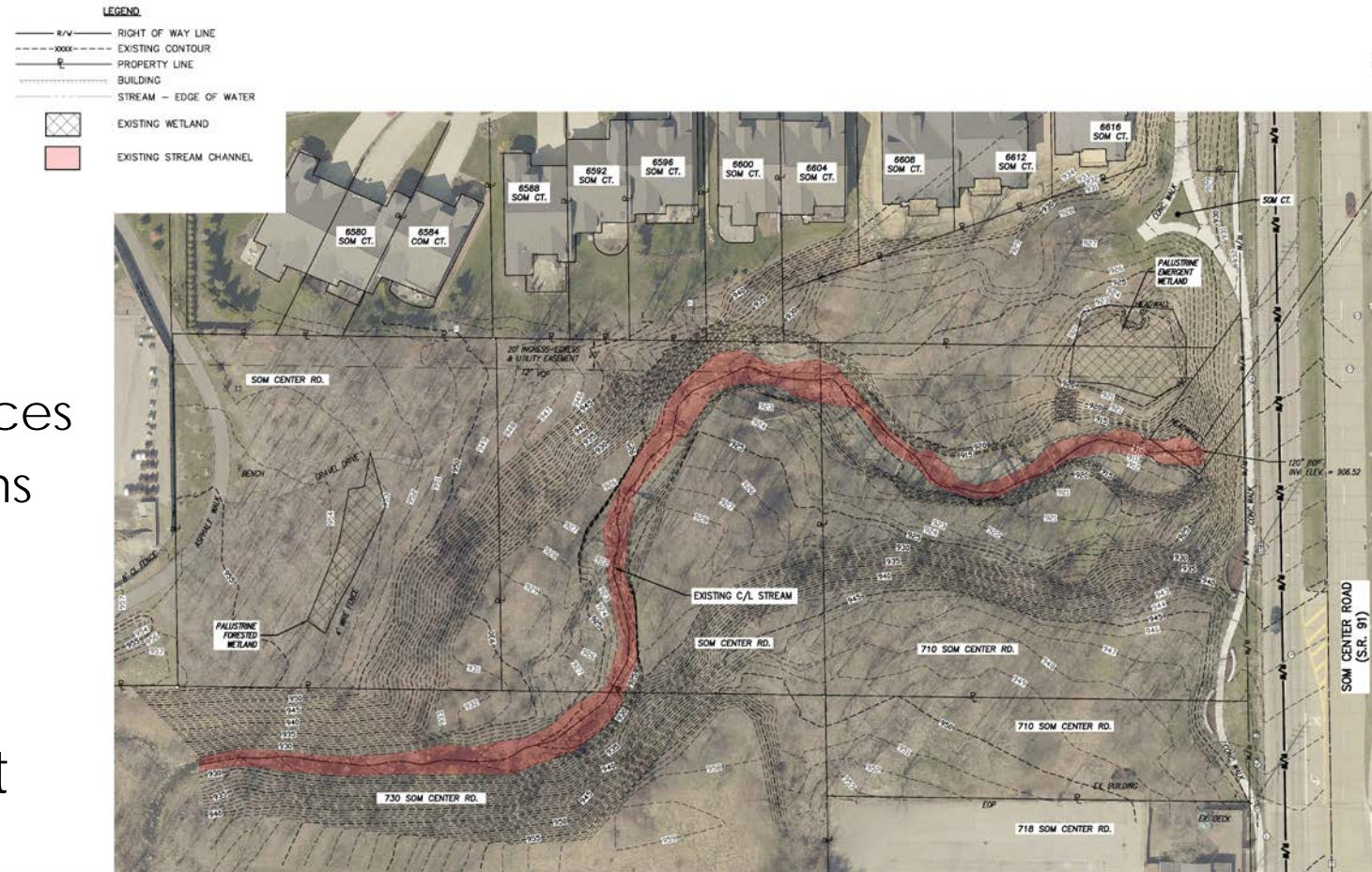
Natural Channel Design

- Initial Stream Assessment
- Grade Control Improvements (riffles/ pools, cross-vanes, J-hooks, etc.)
- Reconfigured Channel Sections (re-established floodplains, reduced bank slopes, bankfull benches)
- Permanent and Temporary Stabilization (toe rock, vegetation, erosion control blanket)



Case Study: Beechers Brook

- Site Conditions:
 - Urbanized Watershed, 1.6 mi²
 - Adjacent Residential neighborhood
- Project Goals
 - Protect / Improve Water Resources
 - Address Flood / Erosion Concerns
 - Enhance Water Quality and Aquatic Habitat
 - Asset Protection
- Total Restoration Length 800-ft

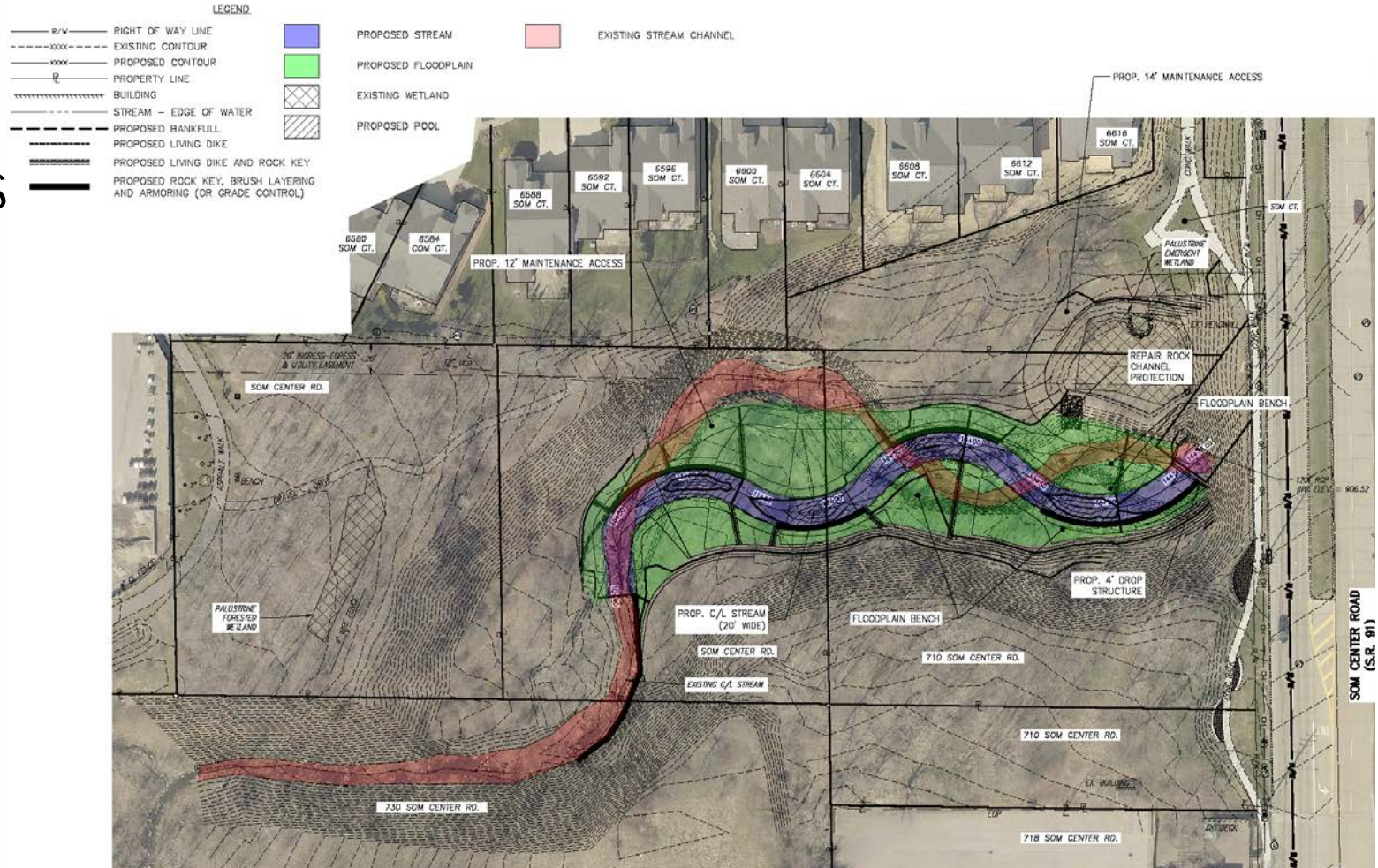


Beechers Brook – Existing Conditions



Beechers Brook

- Raised Grade
- Reestablish Floodplain
- Channel Improvements
 - Riffles / Pools
 - Bank Stabilization
 - Headcut Stabilization
 - Grading
 - Rock Toe
- Outfall Stabilization



Beechers Brook - Floodplain

- Floodplain limits
 - Increase
- Code Requirements
 - Permits
 - Variance



Beechers Brook – Restoration



Beechers Brook – Restoration

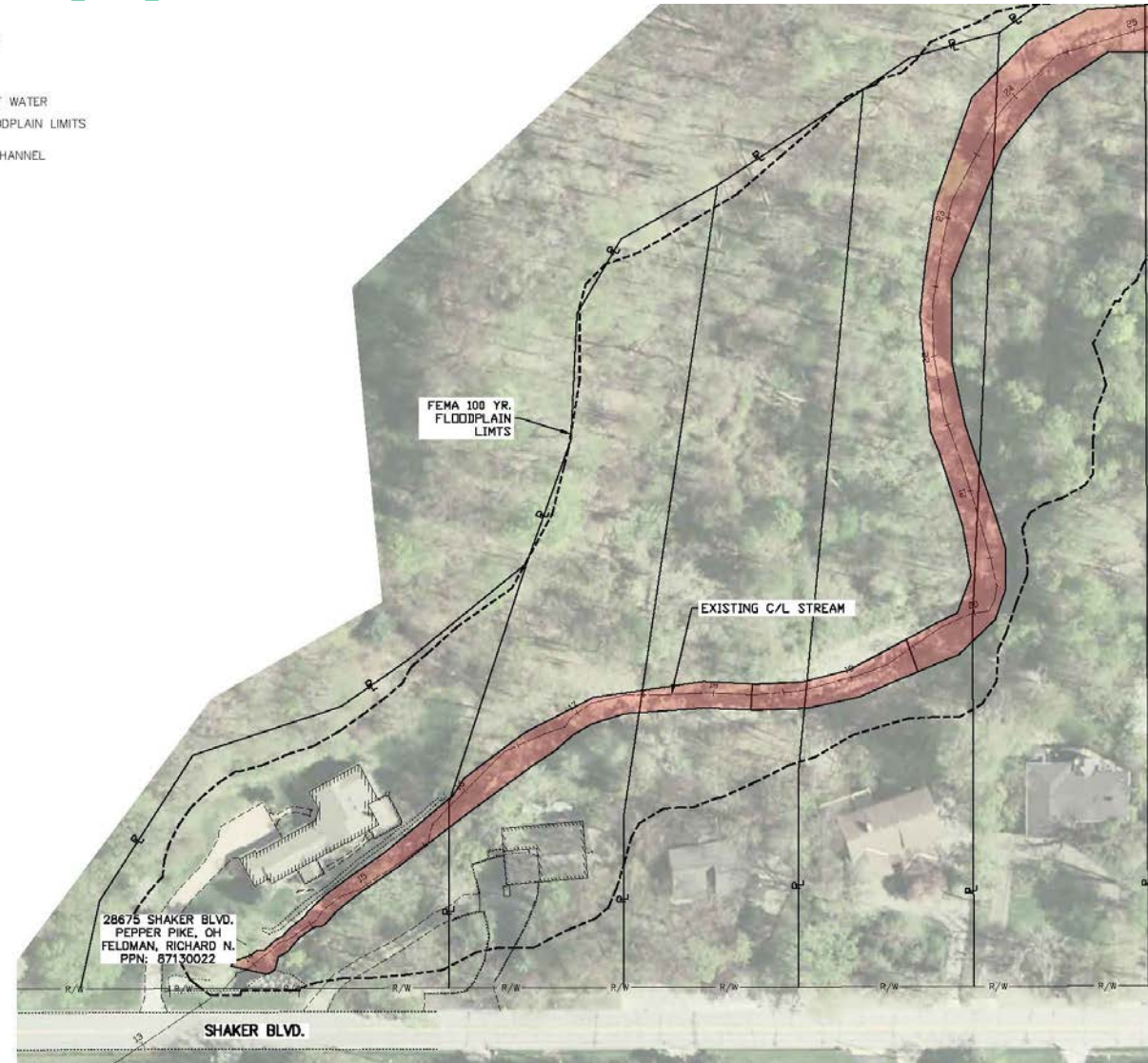
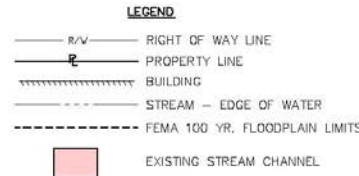


Beechers Brook – Restoration

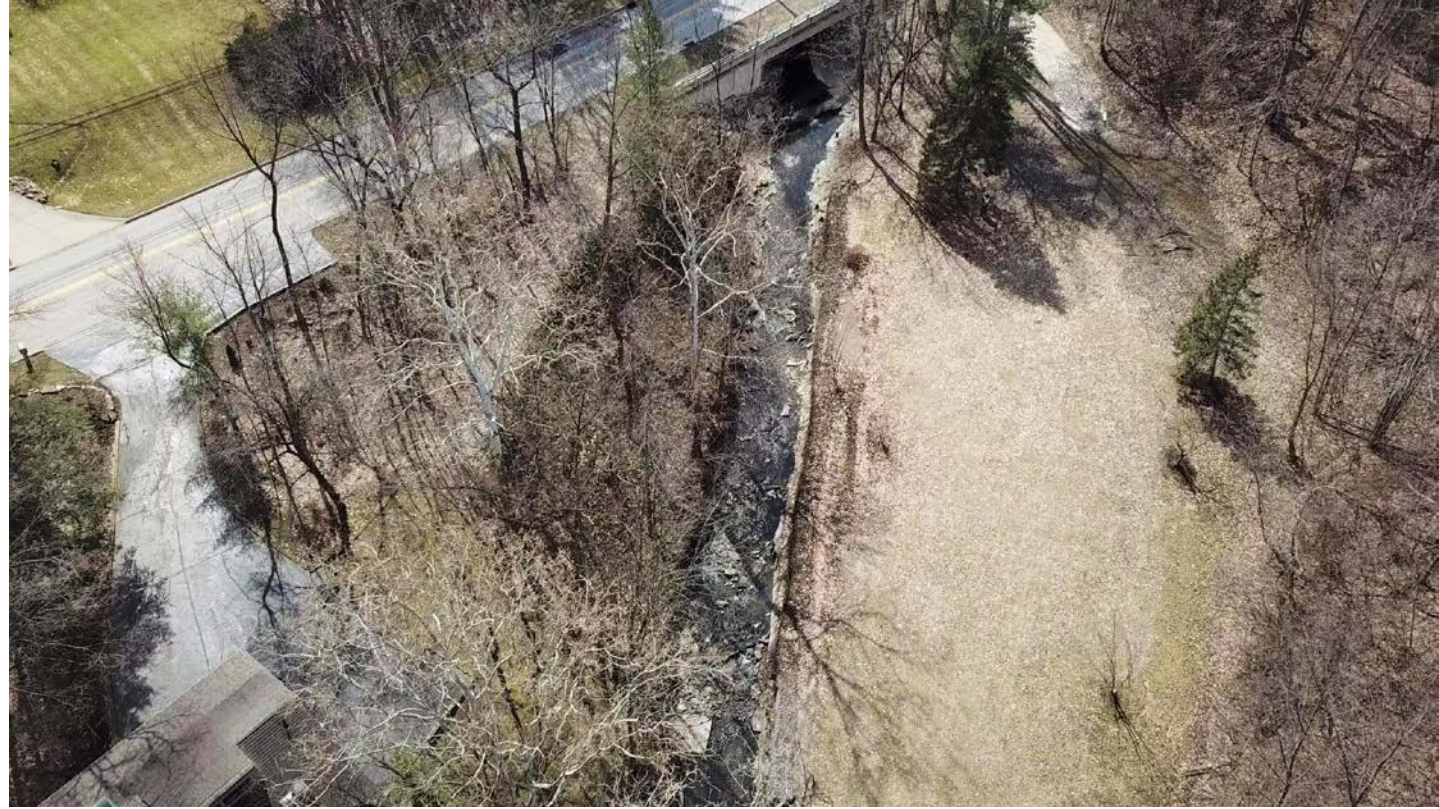


Case Study: Pepper Creek

- Site Conditions:
 - Urbanized Watershed, 1.36 mi²
 - Existing homes adjacent to stream
 - Entrenched stream
- Project Goals
 - Protect / Improve Water Resources
 - Address Flood / Erosion Concerns
 - Enhance Water Quality and Aquatic Habitat
 - Asset Protection
- Total Restoration Length 900-ft



Pepper Creek– Existing Conditions



Pepper Creek– Existing Conditions



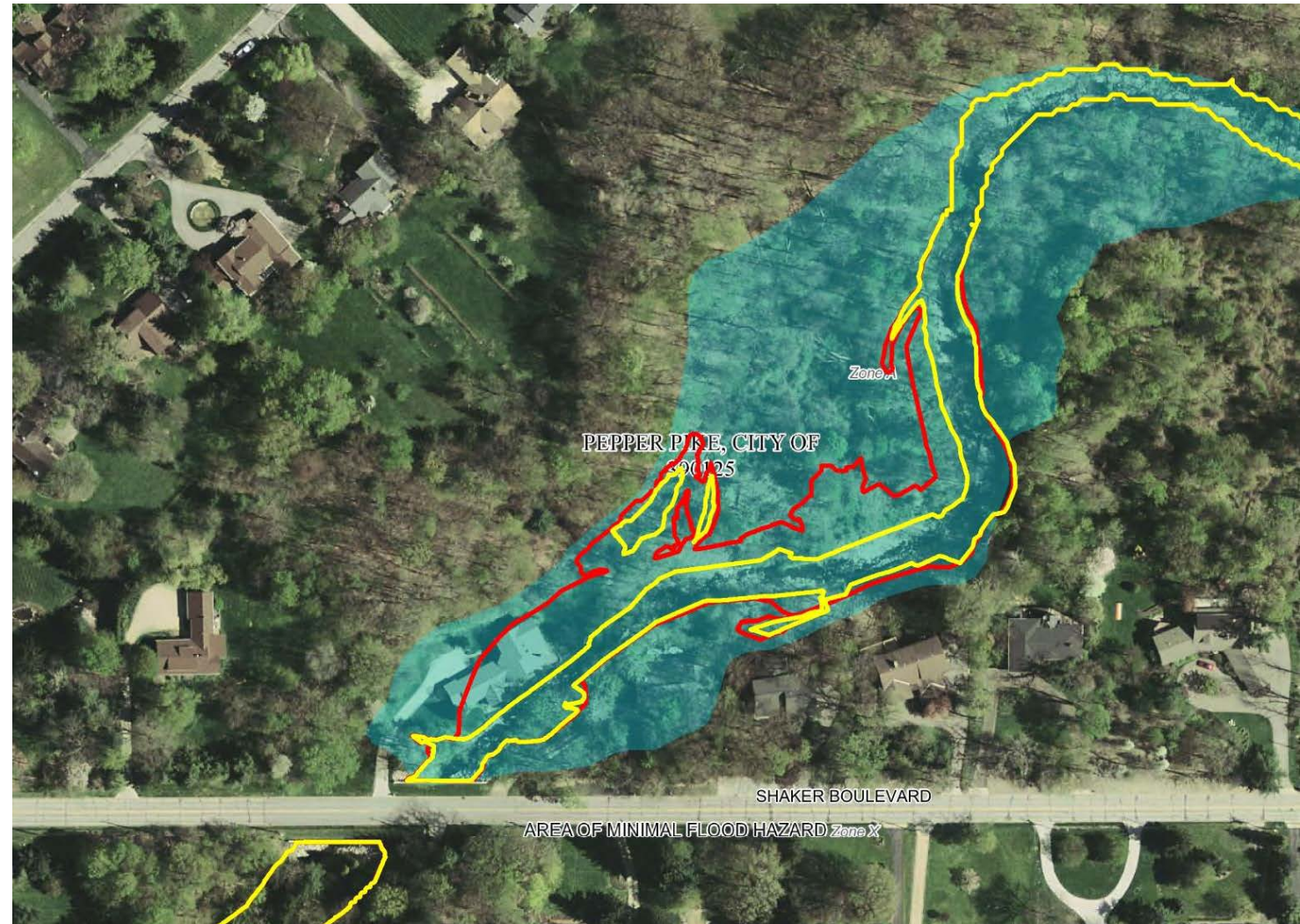
Pepper Creek

- Raised grade
- Reestablish Floodplain
- Channel Improvements
 - Riffles / Pools
 - Bank Stabilization
 - Grading
 - Rock Toe



Pepper Creek - Floodplain

- Floodplain limits
 - Increase
- Code Requirements
 - Permit
 - Variance



Case Study: West Creek

- Site Conditions:
 - Urbanized Watershed, 9.2 mi²
 - Adjacent Landfill
 - Historic Stream Impacts
- Project Goals
 - Asset Protection
 - Protect / Improve Water Resources
 - Address Flood / Erosion Concerns
 - Enhance Water Quality and Aquatic Habitat
- Total Restoration Length 6,000-ft



West Creek – Existing Conditions

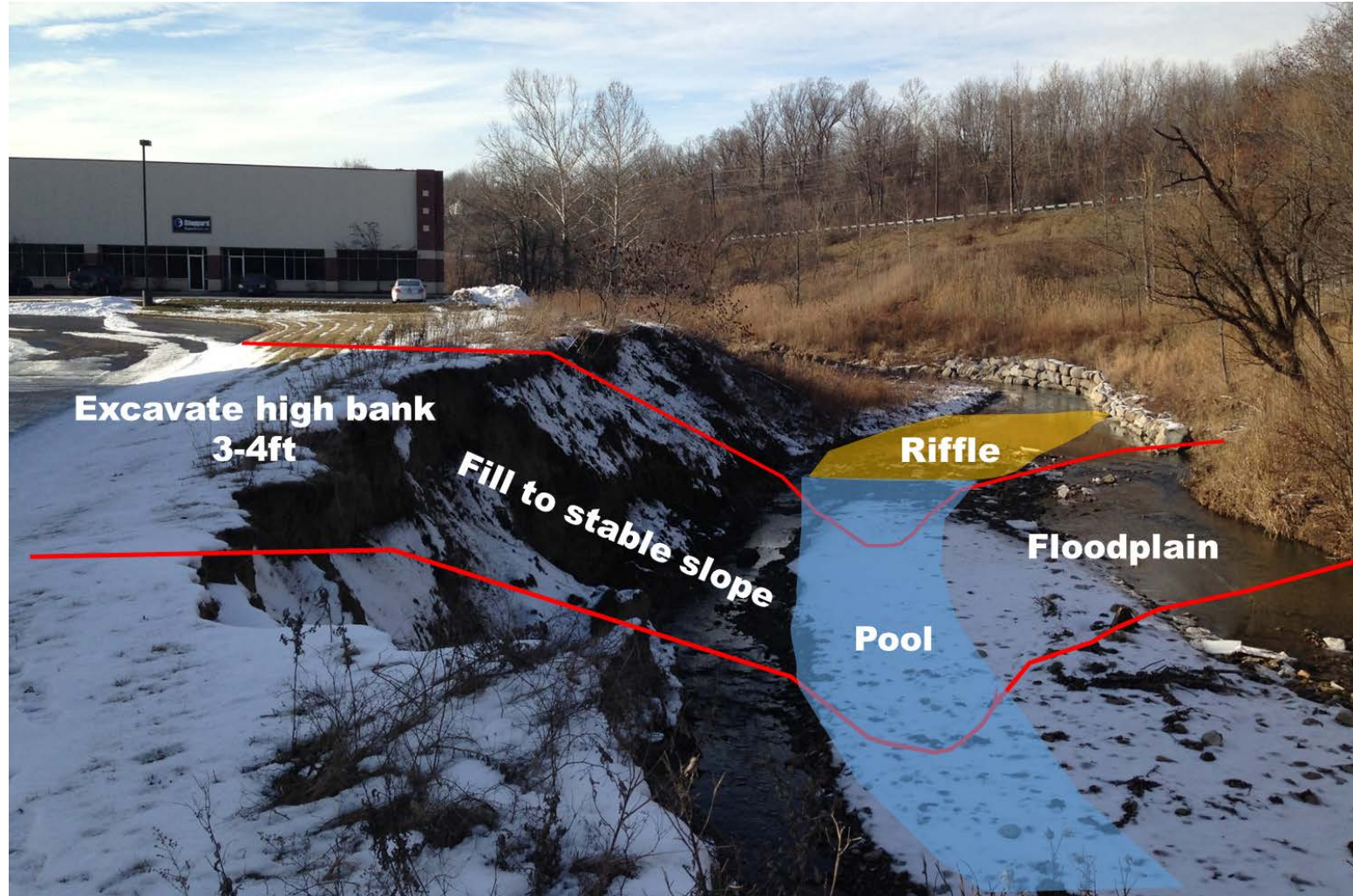


West Creek – Existing Conditions

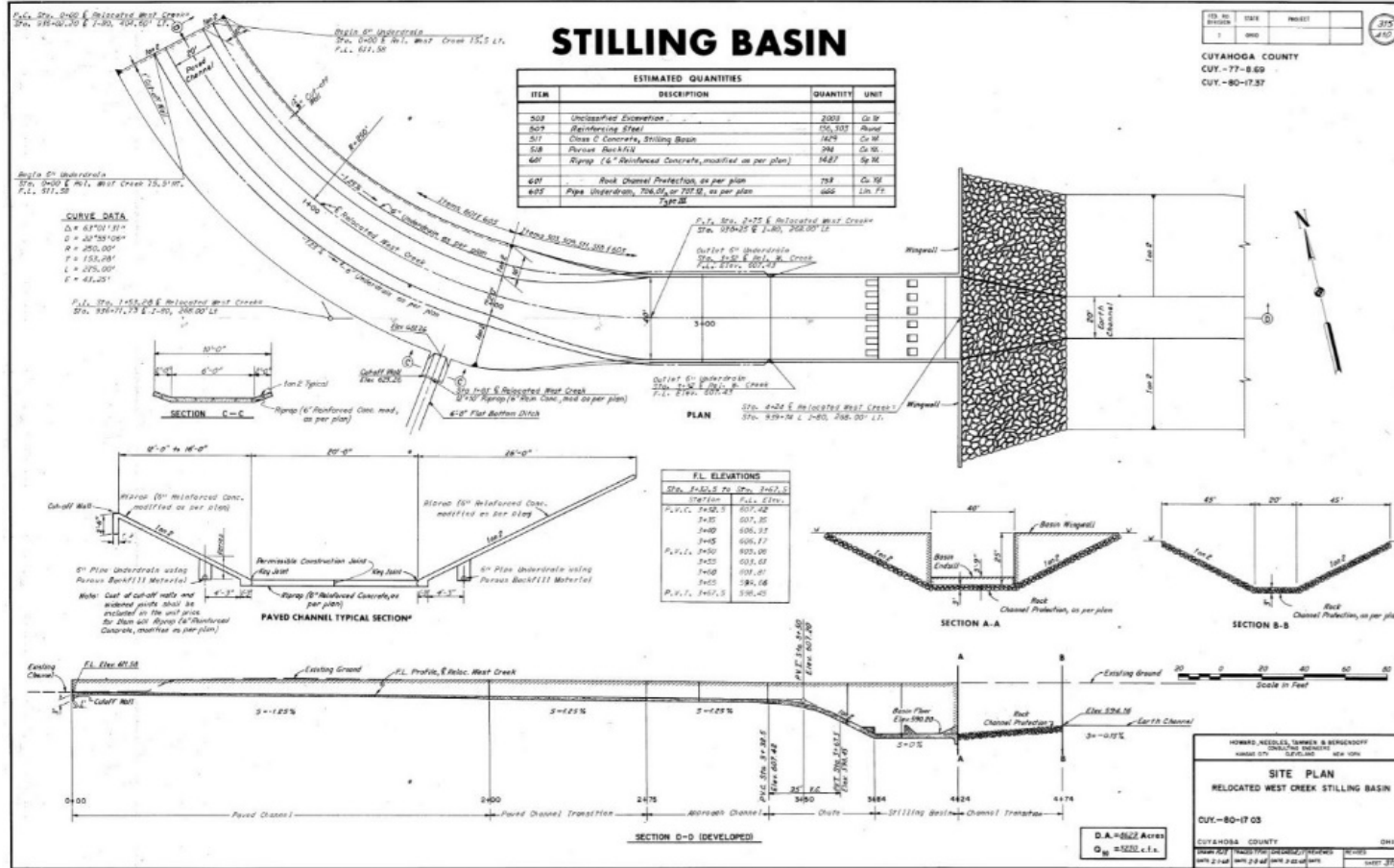


West Creek Improvement Options

- Reestablish Floodplain
- Channel Improvements
 - Riffles / Pools
 - Bank Stabilization
 - Headcut Stabilization
 - Grading
 - Rock Toe
- Outfall Stabilization
- Utility Protection
- Flume Restoration



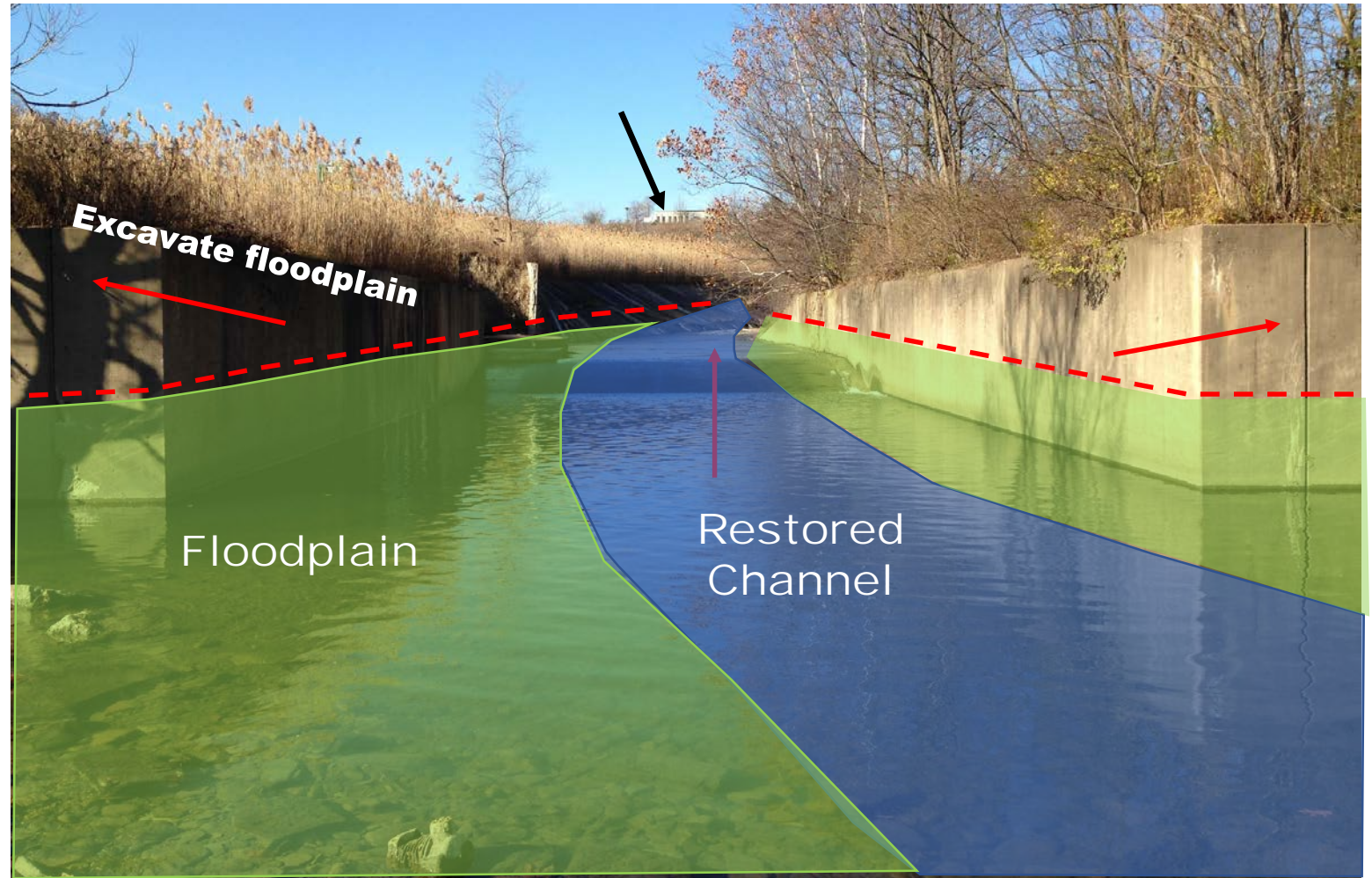
West Creek Flume – Existing Conditions



West Creek Flume - Restoration

Design Considerations

- Eliminate Fish Passage Barrier
- Lower Stream Energy (gradient, floodplain)
- Maintain Conveyance Capacity
- Plan for Public Outreach



Flume Concept Plan



West Creek - Floodplain

- Floodplain limits
 - Increase
- Code Requirements
 - Permits
 - Variance





Q&A