



City of Batavia Mahoney Creek Stream Assessment

Presented by HR Green, Inc. &
Applied Ecological Services



CITY OF
BATAVIA



APPLIED
ECOLOGICAL
SERVICES

Introductions:

- **City of Batavia – Assistant City Engineer**
Andrea Podraza, P.E., CFM
- **HR Green – Water Resources Engineer**
Logan Gilbertsen, P.E., CFM
- **Applied Ecological Services – Stream Ecologist**
Steve Zimmerman, M.S.

Today's Agenda

- Goals of the Study
- History of Mahoney Creek
- Stream Assessment Results
- Residential Survey Results
- High Priority Projects
- Funding Mechanisms
- Questions and Answers after presentation

Goals of the Study



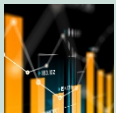
Assess the current condition of Mahoney Creek and the Mahoney Creek Tributary



Identify potential improvements to the waterway and adjacent land



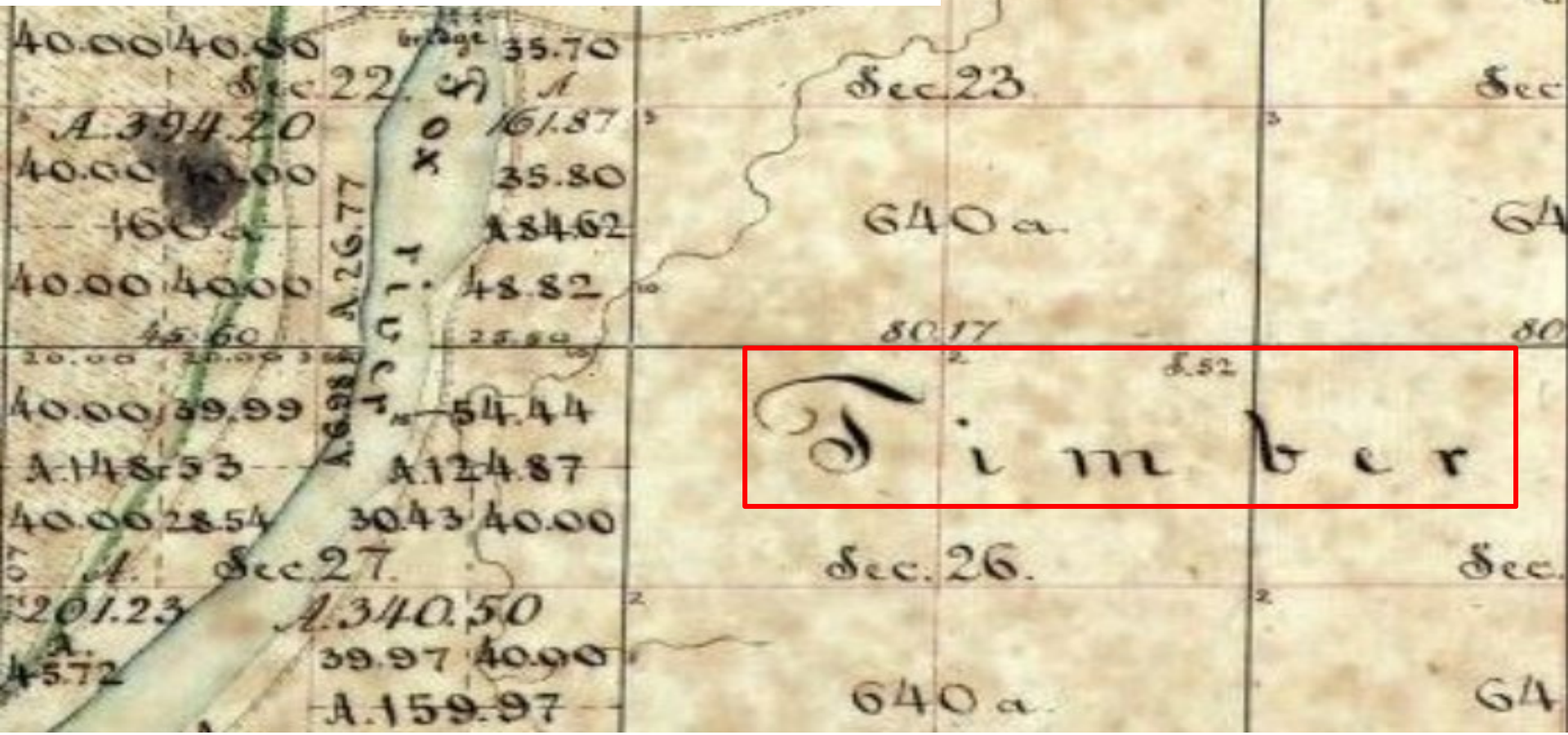
Prioritize projects based on need, accessibility and funding



Identify funding sources for future improvements

History of Mahoney Creek-1840 (pre-settlement) 5

The state of Illinois published plat maps from 1840. 180 years ago the area was identified as “Timber” or what is now referred to as “Savanna or Woodland”

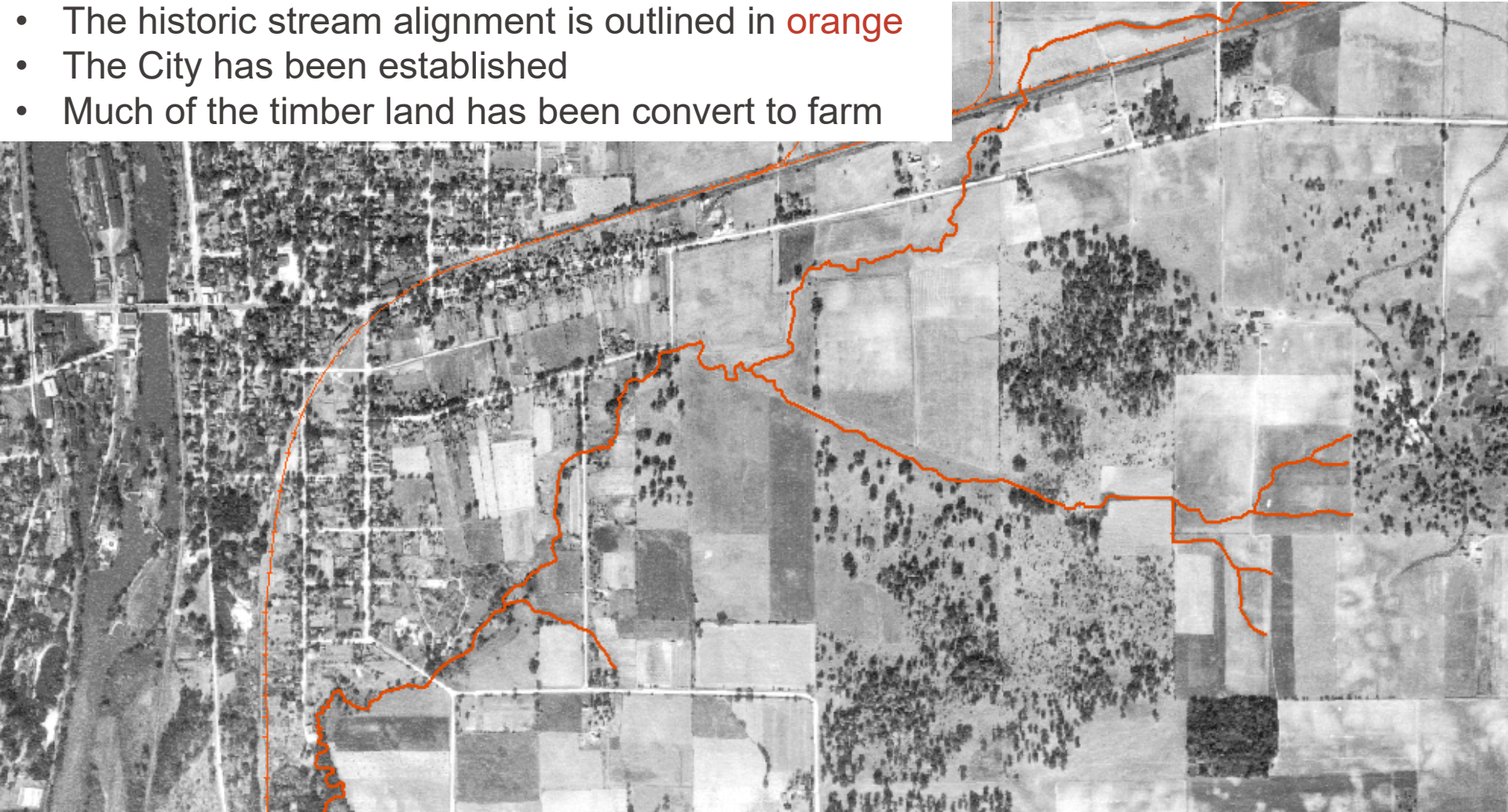


History of Mahoney Creek-1840 (pre-settlement) 6



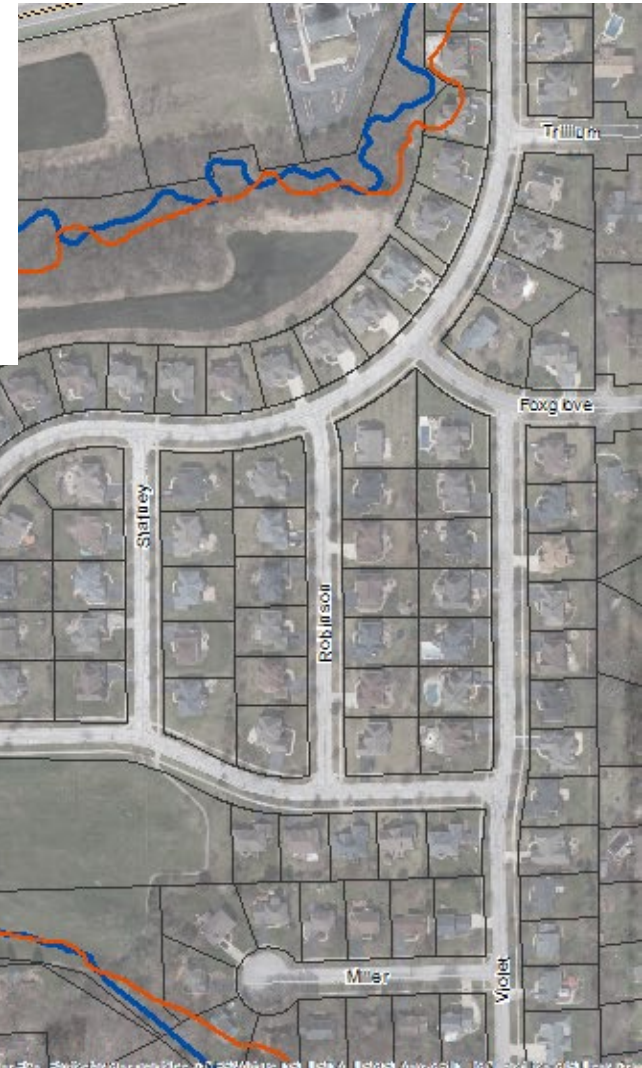
History of Mahoney Creek - 1939

- The historic stream alignment is outlined in orange
- The City has been established
- Much of the timber land has been convert to farm



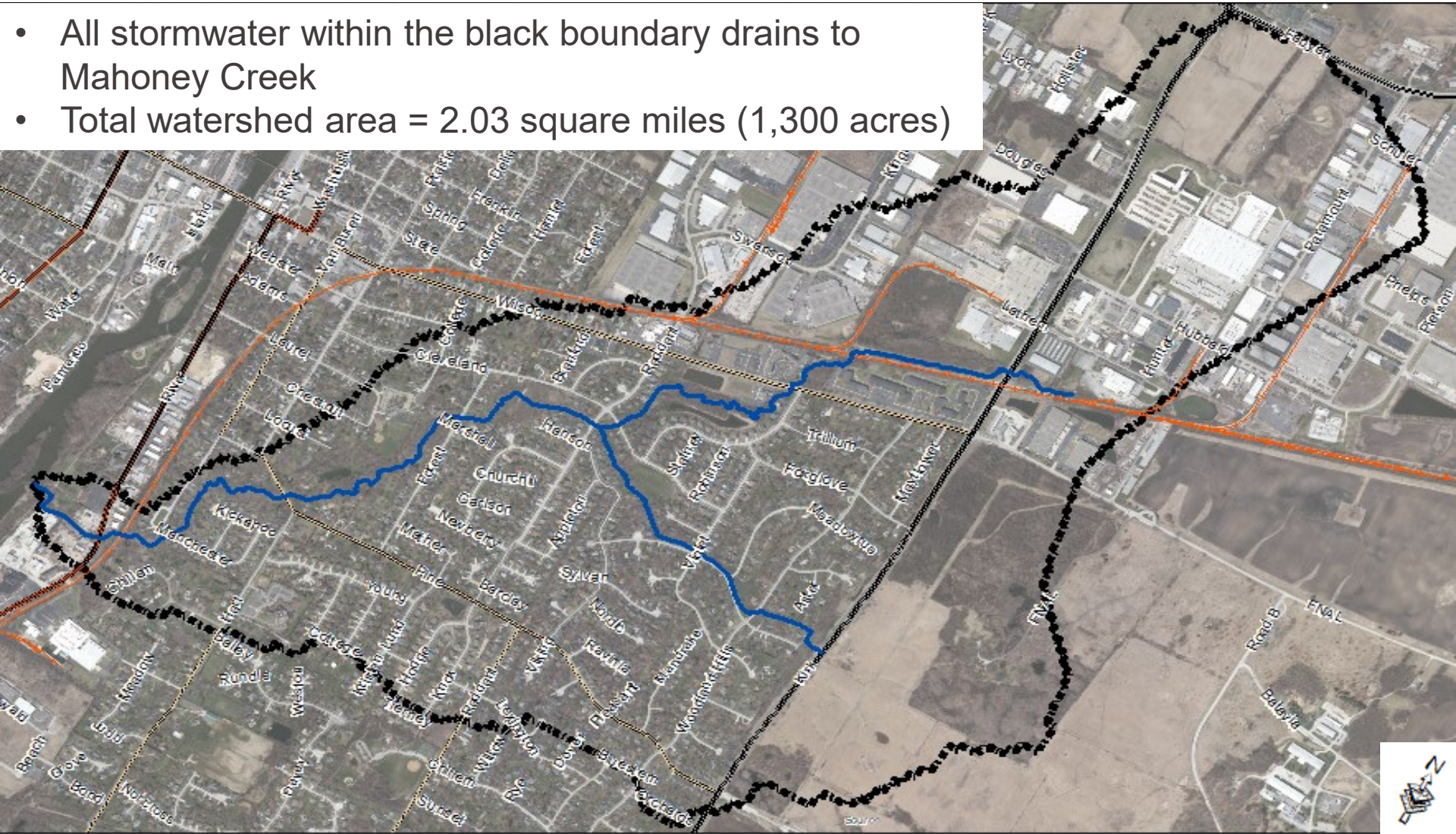
History of Mahoney Creek - 2020

- Over time the stream has been moved and channelized
- The historic stream alignment is outlined in orange
- The current day stream is shown in blue
- Most of the watershed is residential or industrial
- Increased pavement and buildings
- Less meandering of the stream



History of Mahoney Creek - 2020

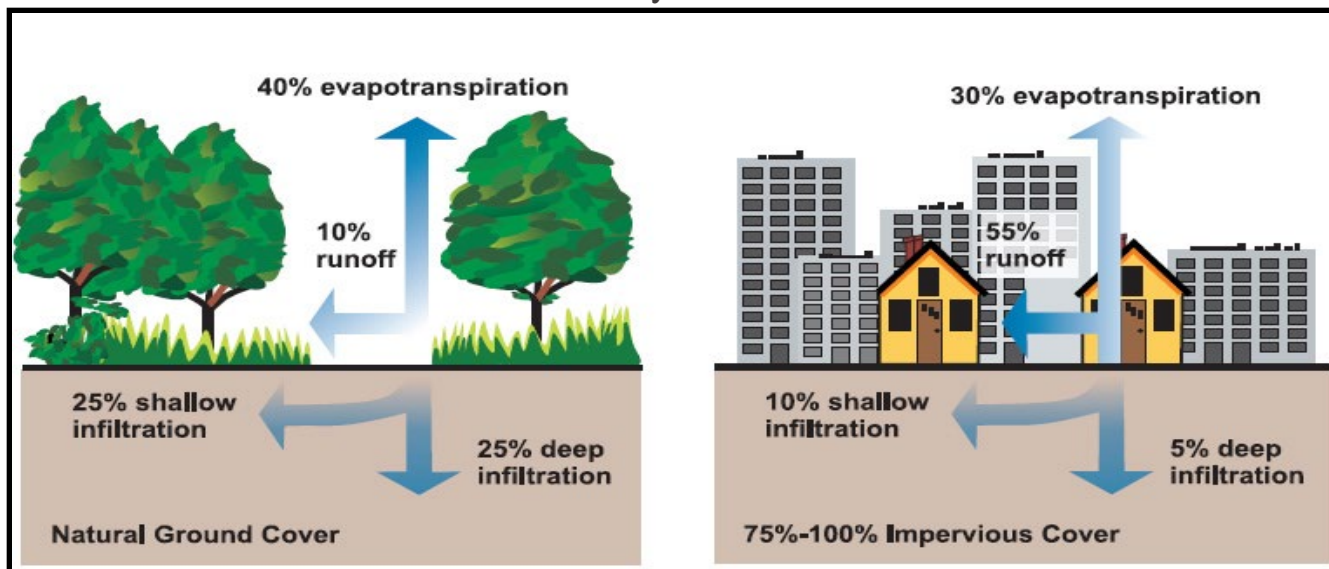
- All stormwater within the black boundary drains to Mahoney Creek
- Total watershed area = 2.03 square miles (1,300 acres)



History of Mahoney Creek

What has changed?

- Increased impervious area → More runoff
- More sewers → Less infiltration
- More sewers → Less groundwater flow
- More detention ponds → Longer flow times in streams
- Construction → Sediment entering waterways
- Turf grass → Fertilizer
- Roads → Salts, oils, heavy metals, etc.

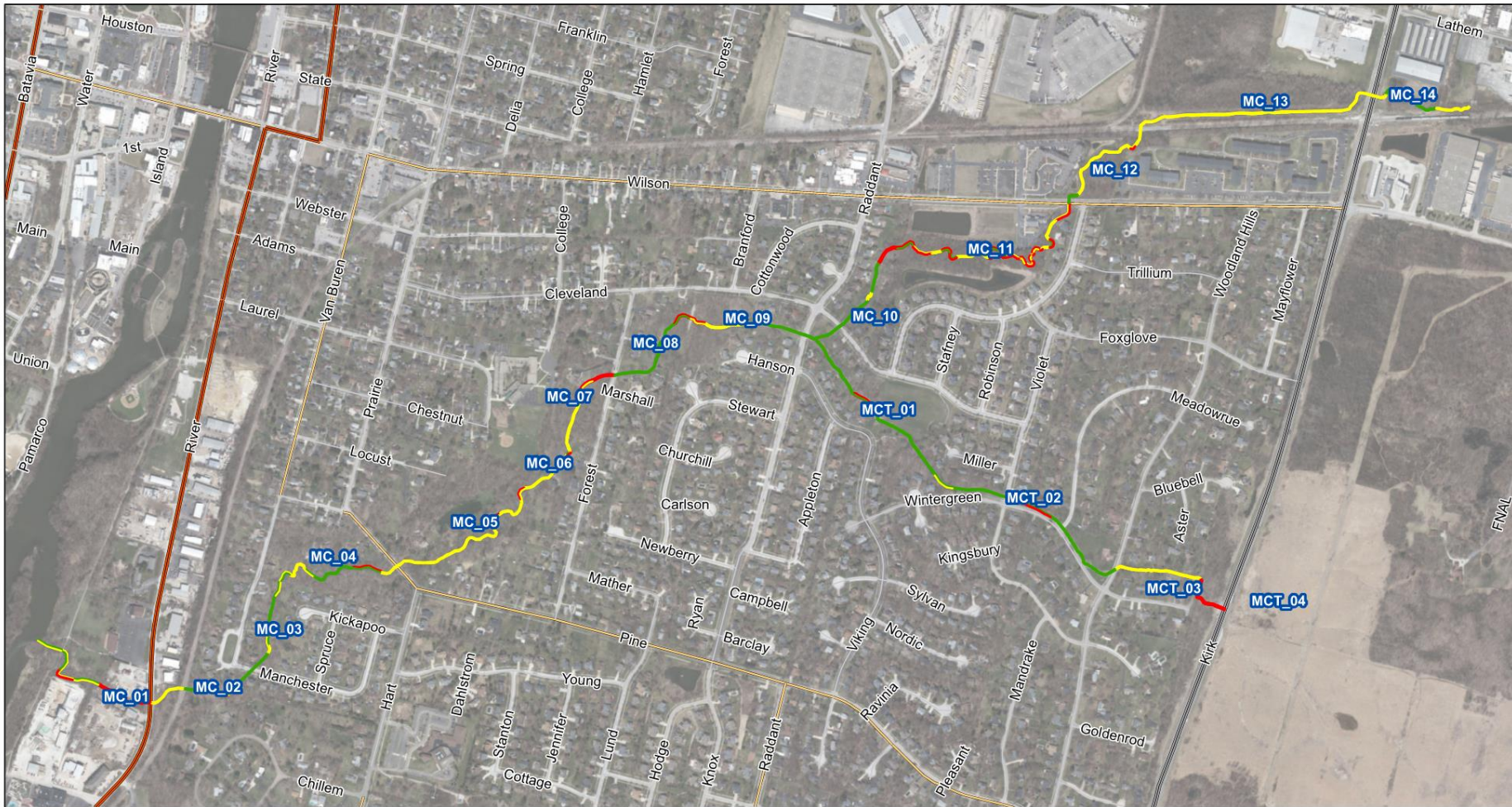


Stream Assessment Results

- The stream was broken into 17 reaches
- Each reach was assessed by an ecologist and an engineer.
- Ratings were assigned based on numerous characteristics of the stream and surrounding vegetation.



Stream Assessment Results



Mahoney Creek Stream Assessment

*City of Batavia
Illinois*

Legend

Major	City Roads	Mahoney Creek Reach ID
Minor	County Roads	Mahoney Creek Tributary Reach ID
Moderate	State Roads	
	Township Roads	

CITY OF BATAVIA

Data Source:
Coordinate System: NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983
Units: Foot US

HRGreen

Stream Assessment Results



Stream Assessment Results

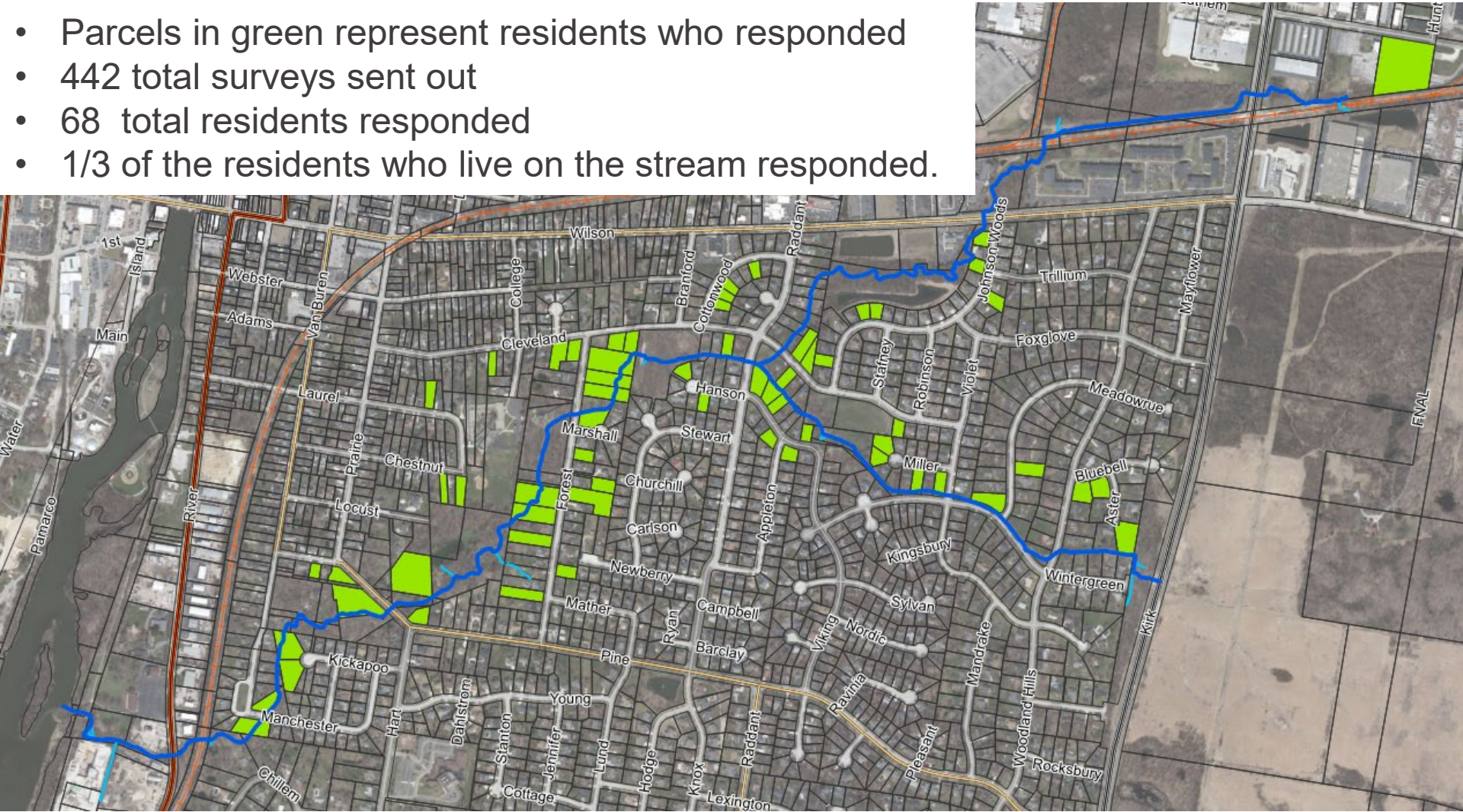


Stream Assessment Results



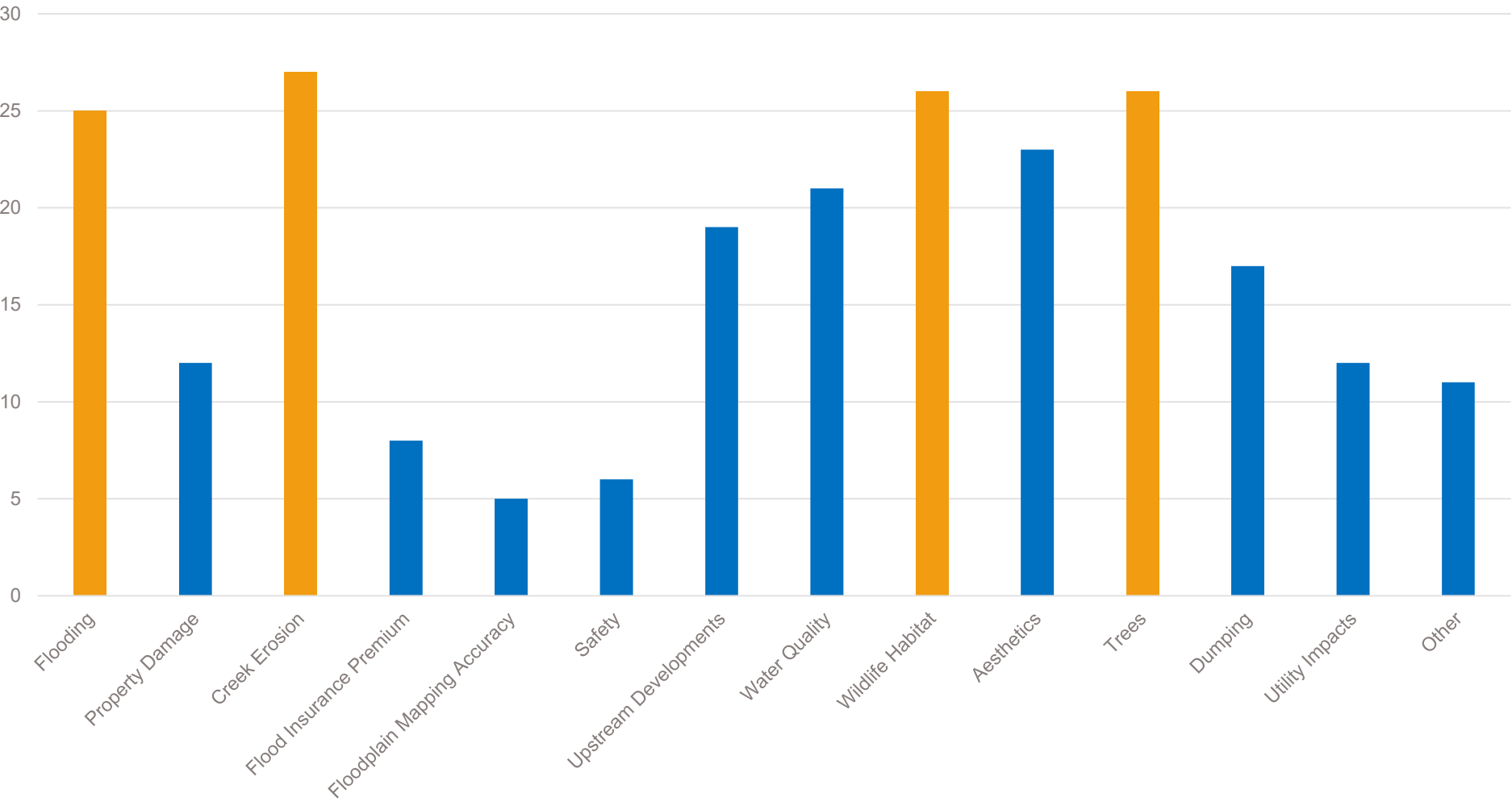
Residential Survey Results

- Parcels in green represent residents who responded
- 442 total surveys sent out
- 68 total residents responded
- 1/3 of the residents who live on the stream responded.



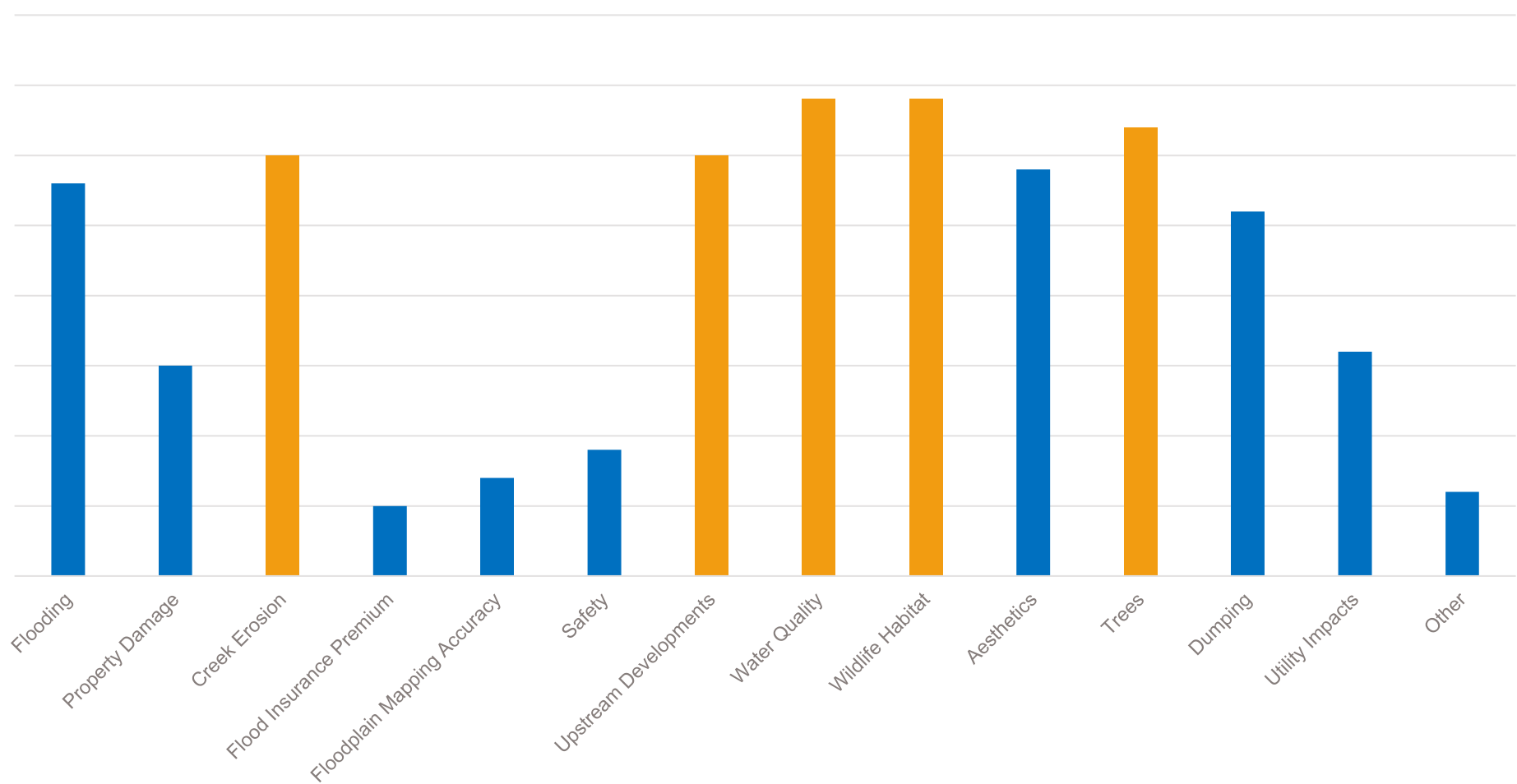
Residential Survey Results

What are your concerns for your individual property?



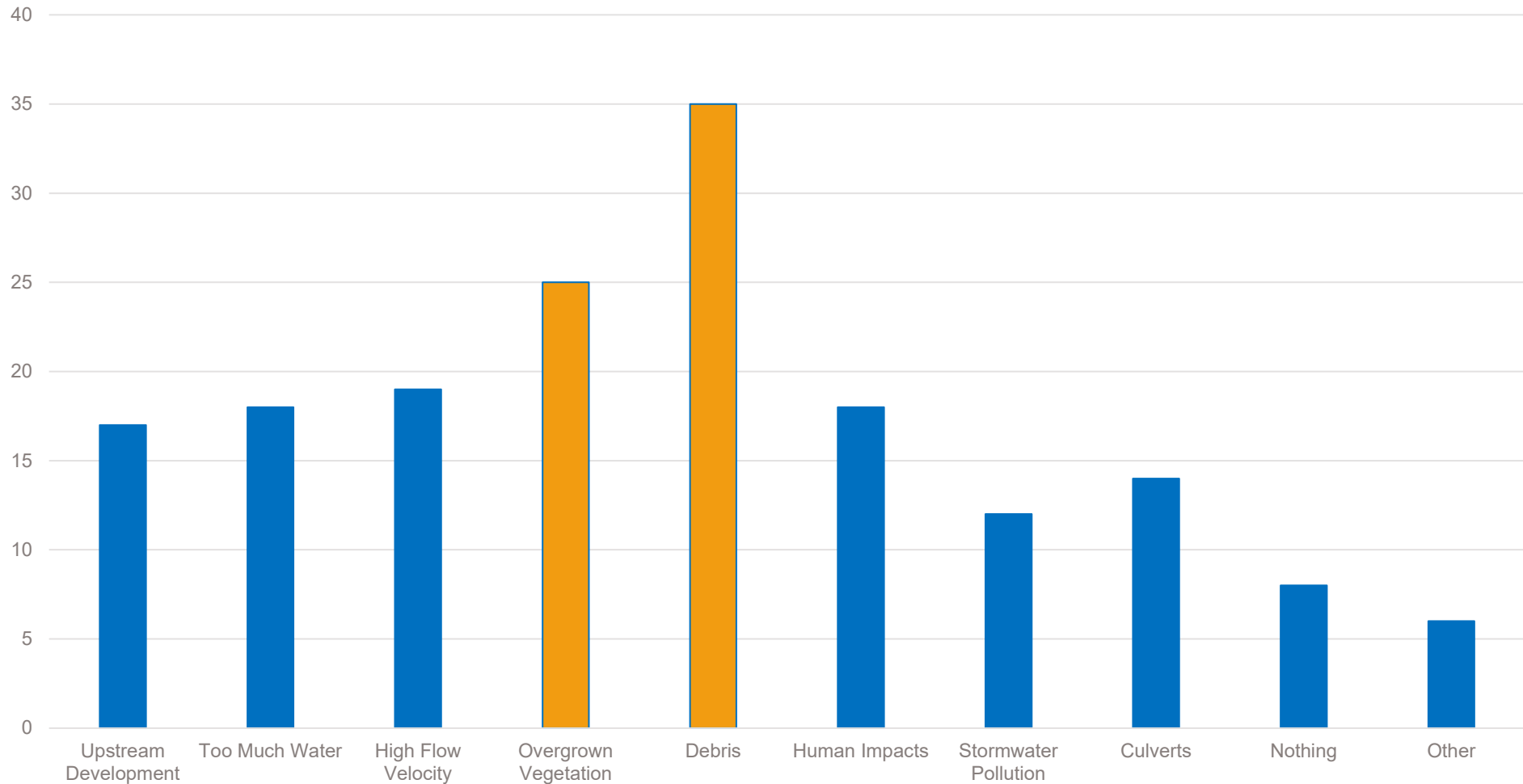
Residential Survey Results

What are your concerns for the watershed as a whole?



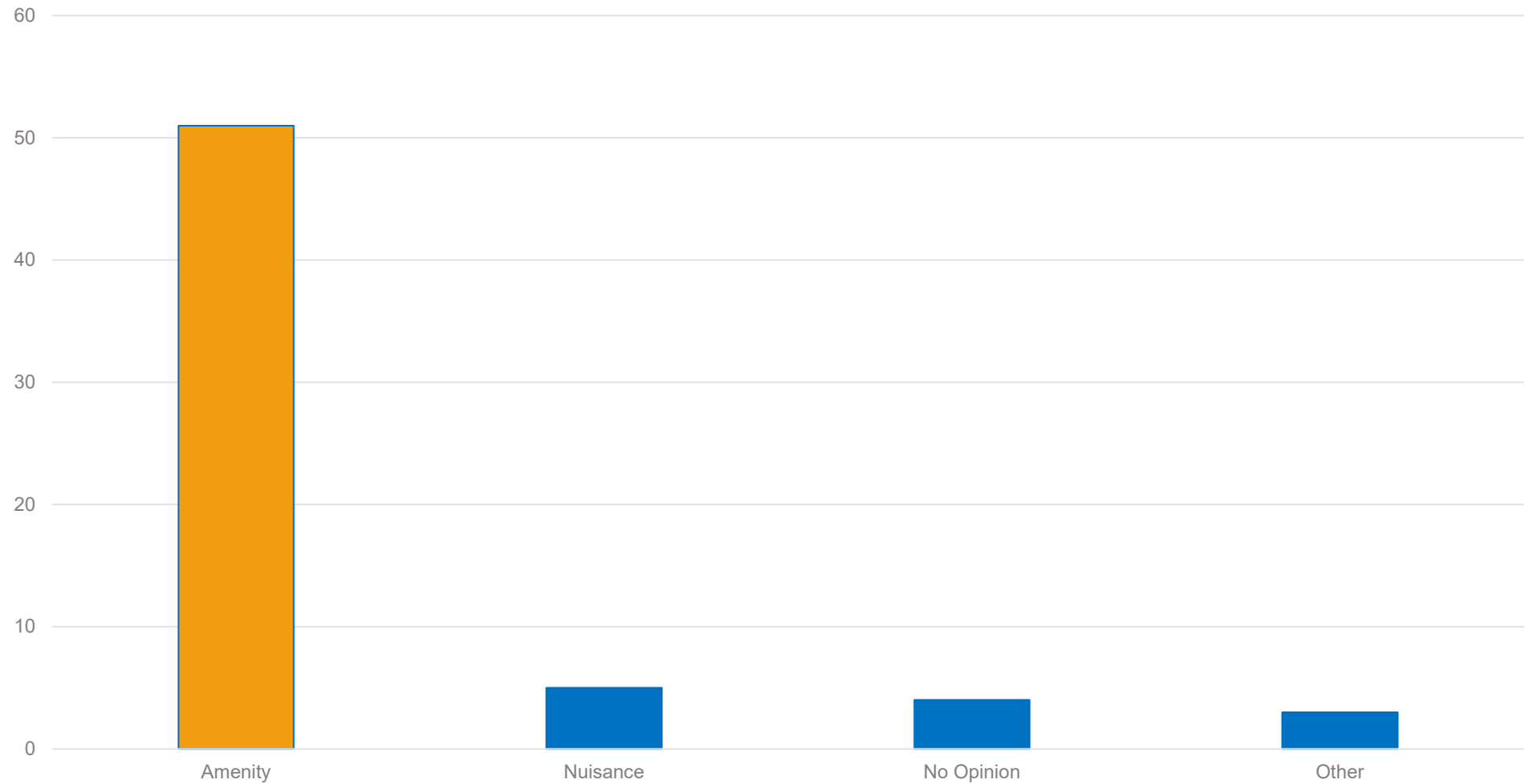
Residential Survey Results

What are some of the causes of negative impacts to Mahoney Creek?



Residential Survey Results

What is your opinion of Mahoney Creek?

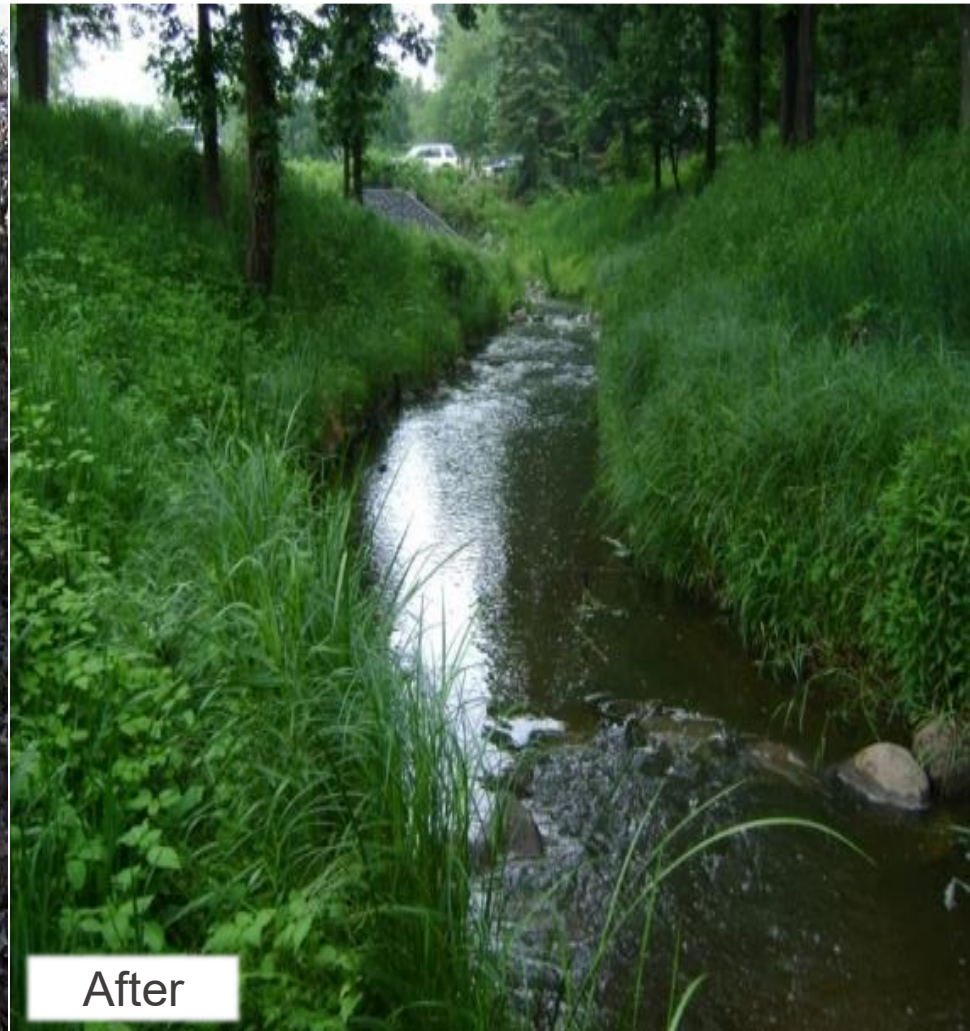


Potential Improvements: Stream & Riparian Restoration

Example Stream/Riparian Restoration: Flint Creek - Barrington



Before



After

Potential Improvements: Stream & Riparian Restoration

Two-Stage Stream Channel Design



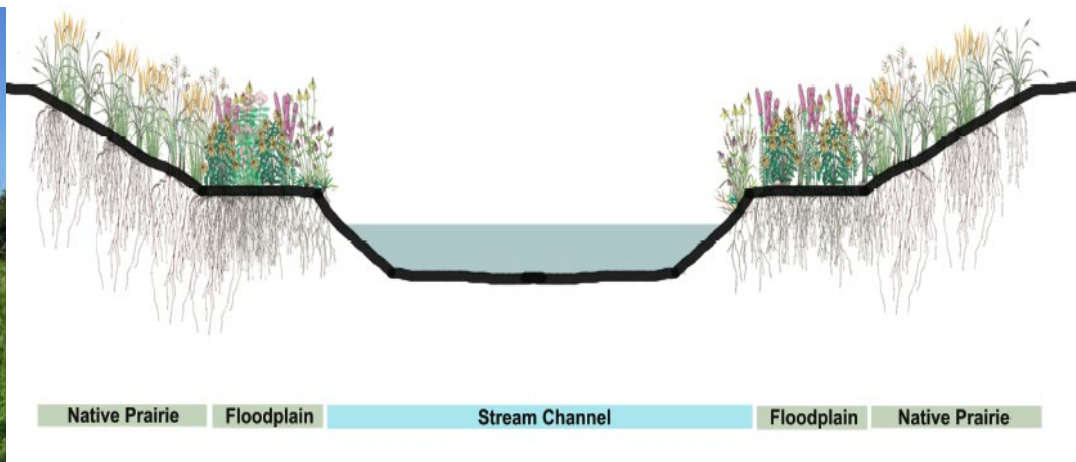
One year after construction

City of Batavia – Mahoney Creek



Potential Improvements: Stream & Riparian Restoration

Two-Stage Stream Channel Design



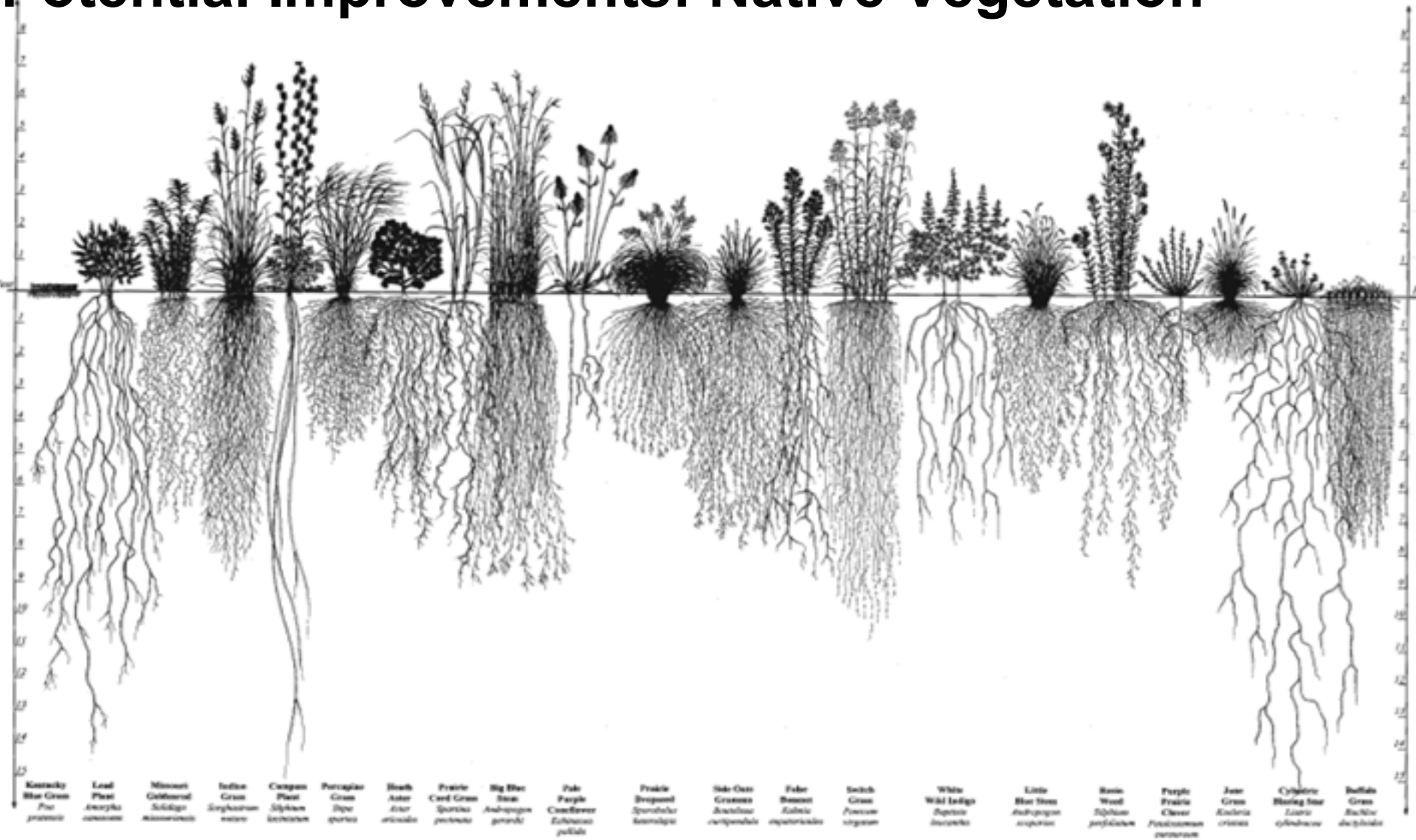
One year after construction

Potential Improvements: Woodland Restoration

Example Woodland Restoration: Buffalo Grove



Potential Improvements: Native Vegetation



High Priority Projects

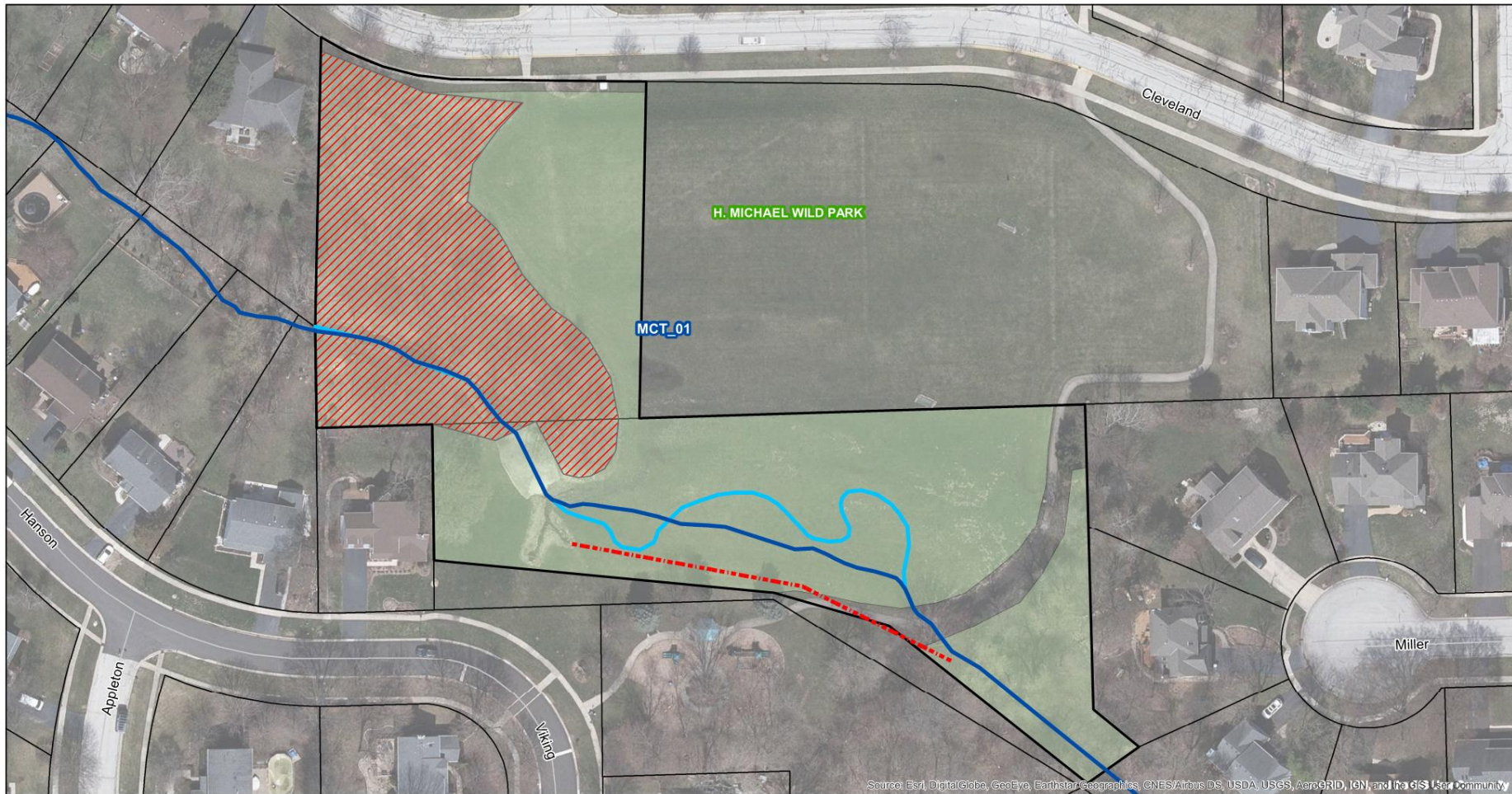
- **Project 1: H. Michael Wild Park (MCT_01)**
- **Project 2: Kirk Road Detention Expansion (MCT_04)**
- **Project 3: Raddant Road to Shanahan Grove Park (MC_09)**
- **Project 4: Mahoney Creek Reach 11 (MC_11)**
- **Project 5: Mahoney Creek Reach 1 (MC_01)**
- **Project 6: Mahoney Creek Reach 5 (MC_05)**




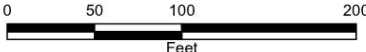
03/17/2020

Project 1: H Michael Wild Park

- Daylight approximately 280 feet of the MCT and replace a meandering channel.
- Convert approximately 1.4 acres of existing turf grass to a native prairie.
- Maintain approximately 1.6 acres of existing turf grass for recreation.
- Remove approximately 0.9 acres of shrubs/trees and restore with native vegetation.
- Stabilize approximately 266 linear feet of streambank
- Install forebays on the existing storm sewer outfalls into the MCT.
- Approximate Cost = \$260K to \$330K

Project 1: H Michael Wild Park

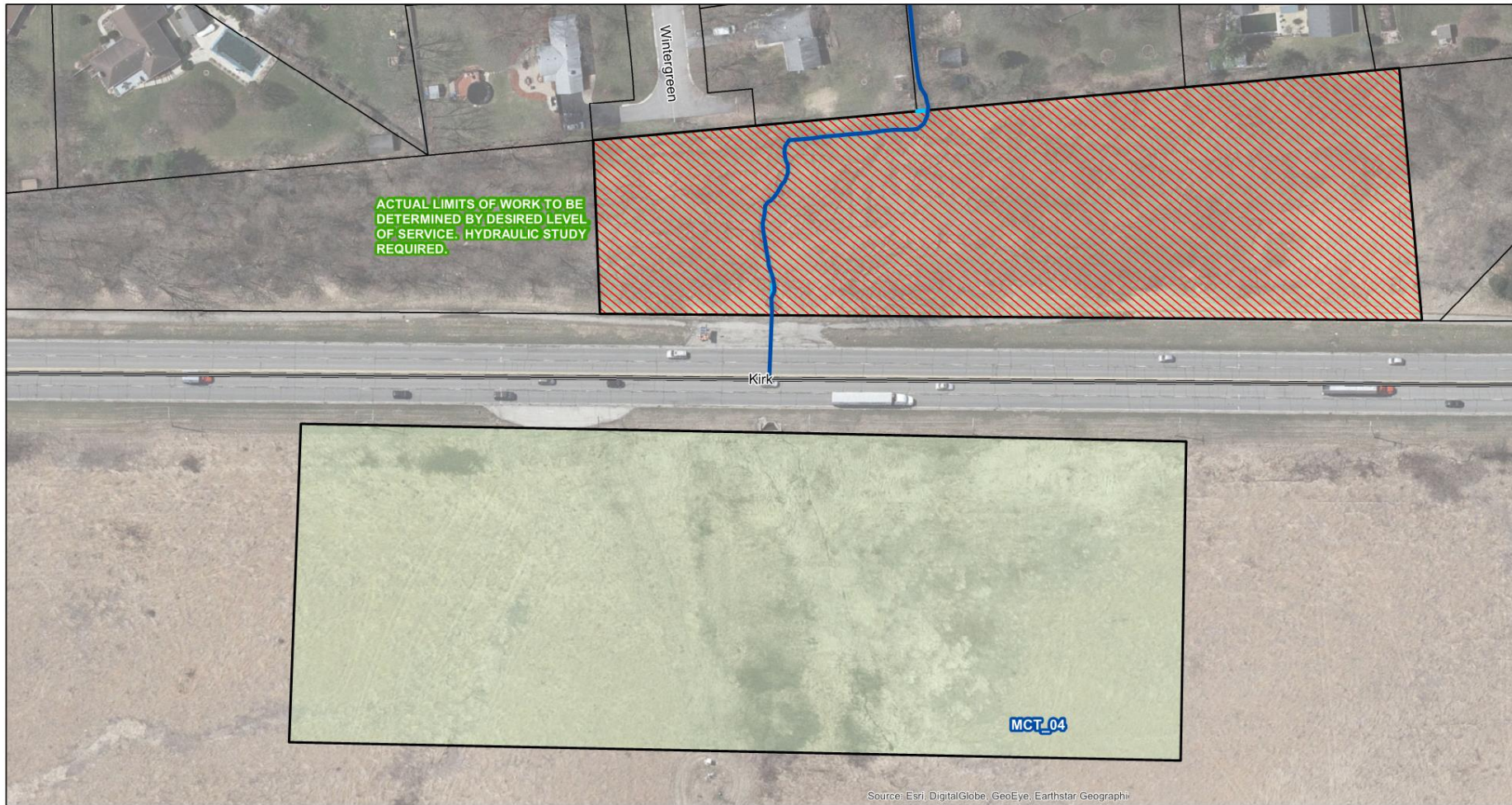


<p>Mahoney Creek Watershed Plan High Priority Improvements</p> <p>City of Batavia Illinois</p>	<p>Legend</p> <ul style="list-style-type: none"> — Mahoney Creek — Channel Modification — Daylight Stream Proposed Project Area Tree and Shrub Clearing Proposed Native Vegetation Parcels City Roads County Roads State Roads Township Roads 	<ul style="list-style-type: none"> MCT_# Mahoney Creek Reach ID MCT_# Mahoney Creek Tributary Reach ID <div style="text-align: right;">   </div>	<p><small>Data Source: Coordinate System: NAD 1983 StatePlane Illinois East FIPS 1201 Feet Projection: Transverse Mercator Datum: North American 1983 Units: Foot US</small></p> <div style="text-align: right;">  </div> <div style="text-align: center;">  </div>
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Project 2: Kirk Road Detention Expansion

- Add additional stormwater detention to achieve the desired flow reductions to the MCT.
- A hydraulic study of the MCT will be necessary to determine the effects of various levels of detention.
- Clear trees and shrubs on the west side of Kirk Road if Option 4 is chosen.
- Restore excavated areas with native vegetation.
- Install forebays and micro-pools in the proposed wetland detention basin.
- Approximate Cost = \$300K to \$1.1M (cost varies greatly with size of basin)

Project 2: Kirk Road Detention Expansion



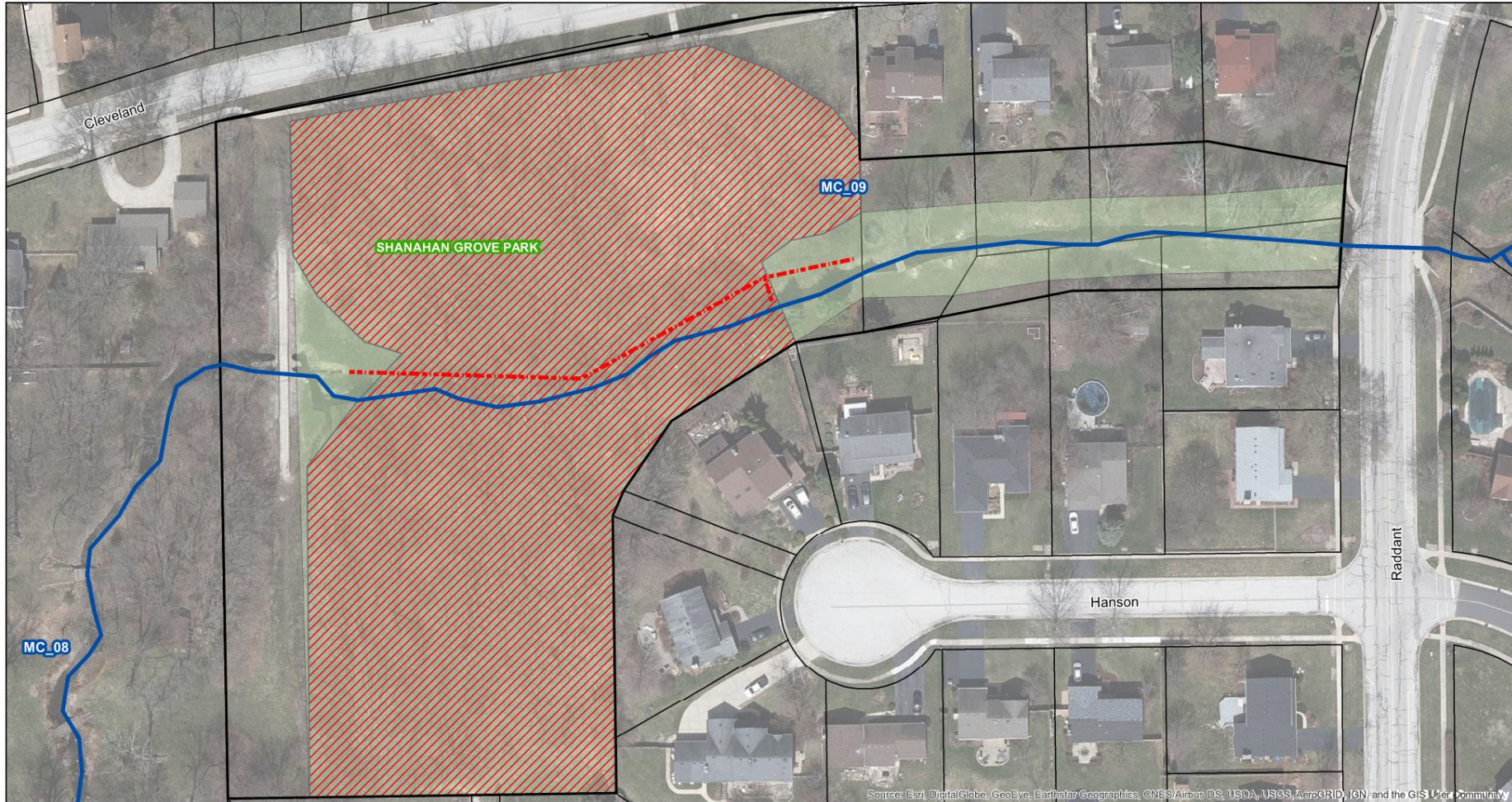
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics

<p>Mahoney Creek Stream Assessment High Priority Improvements</p>	<p>Legend</p>	<ul style="list-style-type: none"> Mahoney Creek Channel Modification Daylight Stream Proposed Project Area Tree and Shrub Clearing Proposed Native Vegetation Parcels City Roads County Roads State Roads Township Roads 	<ul style="list-style-type: none"> Mahoney Creek Reach ID Mahoney Creek Tributary Reach ID 	<p><small>Data Source: Coordinate System: NAD 1983 StatePlane Illinois East FIPS 1201 Feet Projection: Transverse Mercator Datum: North American 1983 Units: Foot US</small></p>				
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Project 3: Raddant Rd. to Shanahan Grove

- Daylight approximately 315 linear feet of 18" storm sewer and restore channel.
- Install approximately 3 riffles or cross vane weirs through the reach
- Remove approximately 4.3 acres of invasive shrubs and restore the oak woodland
- Stabilize approximately 872 linear feet of streambank (436 linear feet centerline) using bio-engineered techniques through Shanahan Grove Park
- Retrofit the Raddant Road culvert
- Install a riparian area buffer strip along approximately 390 linear feet of MC_09
- Maintain existing flow control structure at west end of the park.
- Approximate Cost = \$320K to \$390K

Project 3: Raddant Rd. to Shanahan Grove



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


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<p><i>City of Batavia Illinois</i></p>	<ul style="list-style-type: none"> Mahoney Creek Channel Modification Daylight Stream Proposed Project Area Tree and Shrub Clearing Proposed Native Vegetation 				

Project 4: Mahoney Creek Reach 11

- Removing invasive tree and shrub species from the riparian area.
- Restore the riparian area with native vegetation similar to the banks of the adjacent Johnson Woods Subdivision detention basin
- Stabilize the streambanks through the entirety of MC_11 using bio-engineered methods (2,057 centerline feet, 4,114 feet of streambank).
- Remove all debris jams and install grade control structures (riffles, cross vanes or J-hooks) as needed.
- Approximate Cost = \$1.01M to \$1.24M

Project 4: Mahoney Creek Reach 11

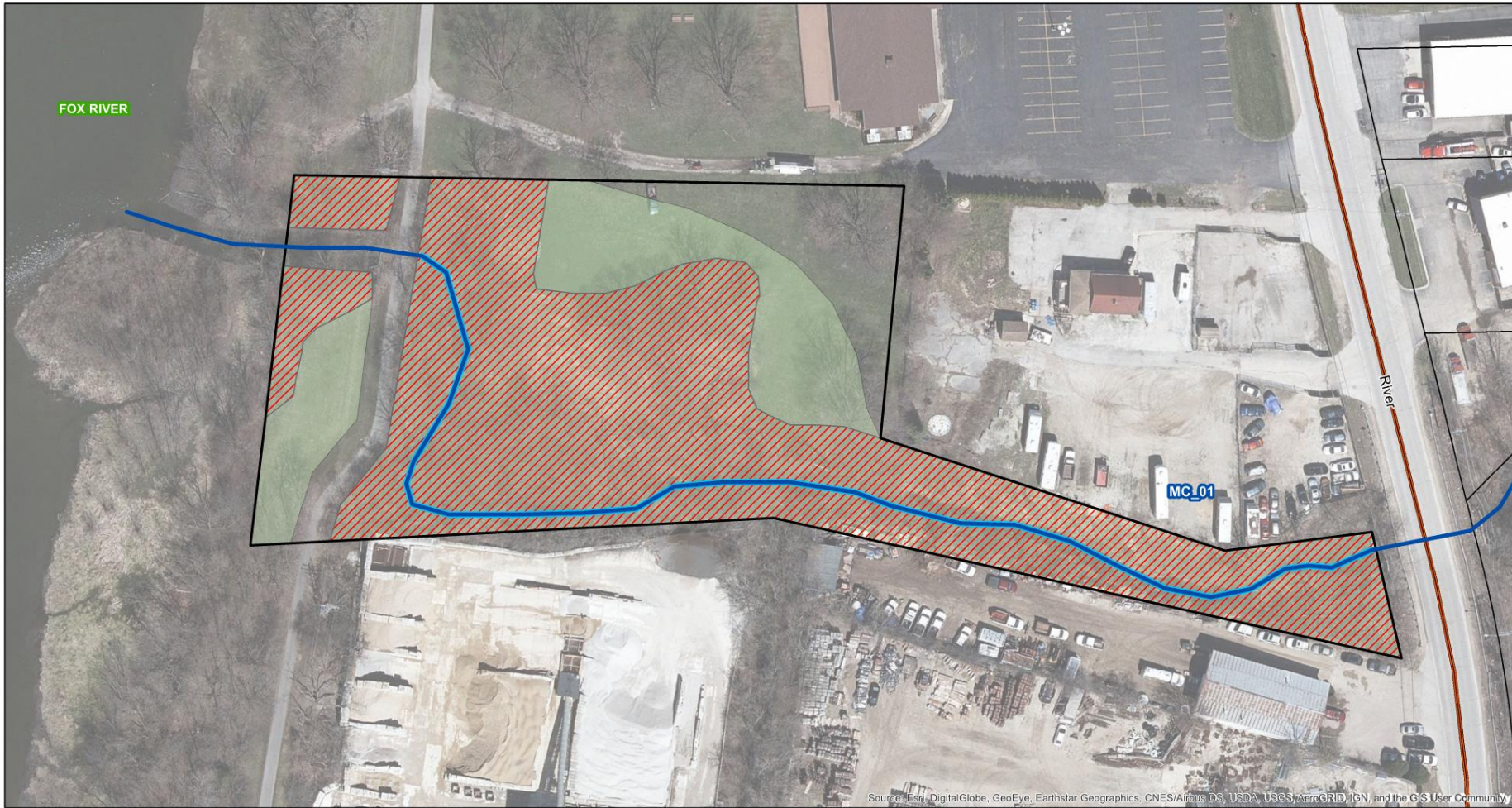


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Project 5: Mahoney Creek Reach 1

- Stabilization of approximately 2,182 linear feet of streambank including potentially 410 linear feet of structural stabilization.
- Invasive shrub and selective tree clearing through a 1.46 acre portion of the riparian area.
- Debris jam removal and replacement with a riffle or cross vane weir.
- Installation of grade control structures including cross vane weirs.
- Educate adjacent property owners about storing materials in the floodway and monitor.
- Approximate Cost = \$610K to \$750K

Project 5: Mahoney Creek Reach 1



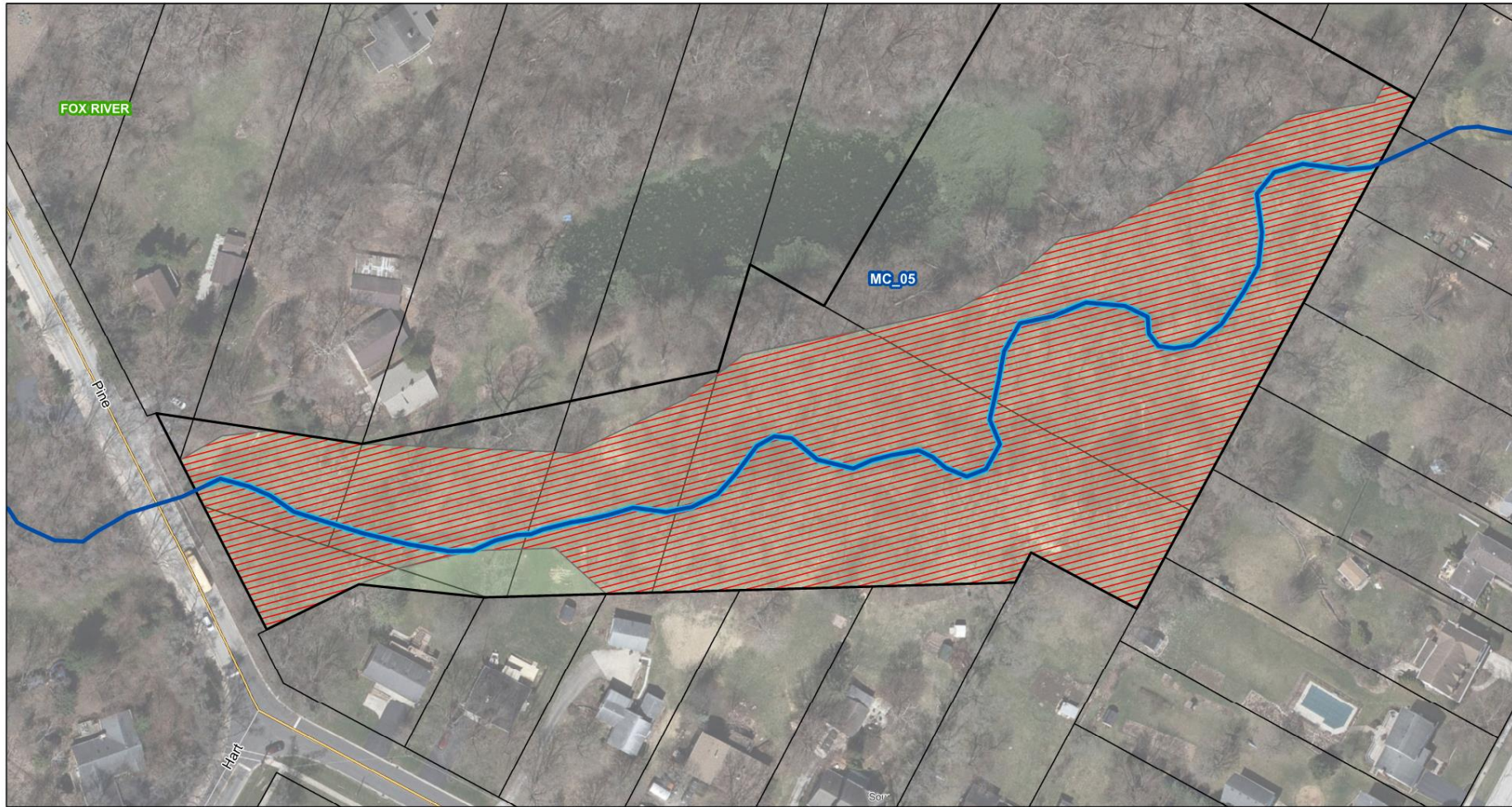
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Project 6: Mahoney Creek Reach 5

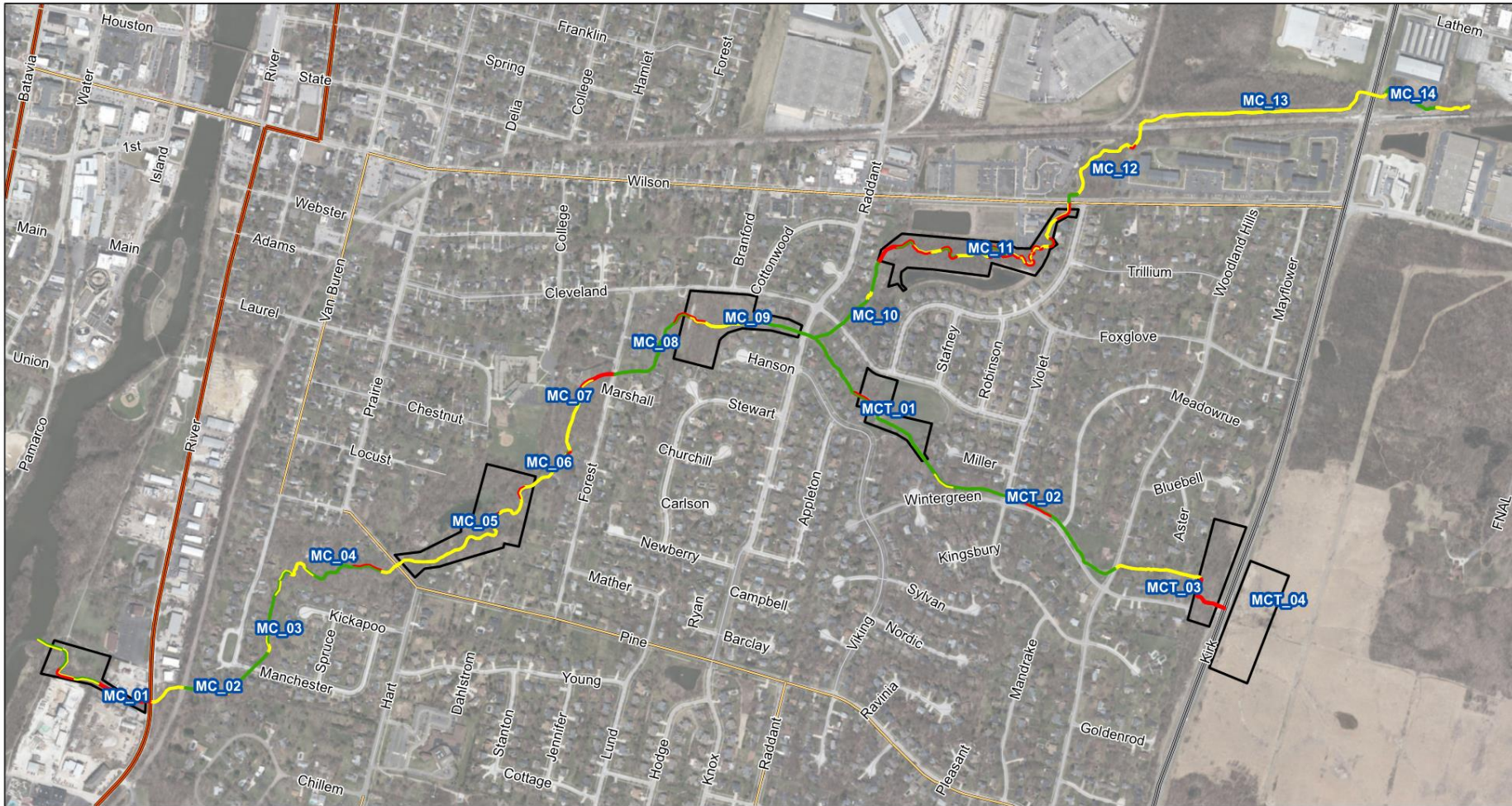
- Streambank stabilization of approximately 2,720 linear feet of streambank using bio-engineered techniques
- Removal of all debris jams and installation of riffles if necessary
- Removal of invasive species and selective tree clearing through 4.3 acres of riparian area
- Restoration of the riparian area with native vegetation.
- Approximate Cost = \$660K to \$810K

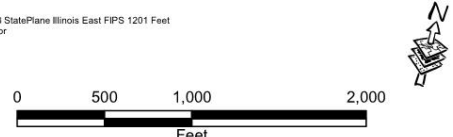
Project 6: Mahoney Creek Reach 5



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<p>City of Batavia Illinois</p>	<ul style="list-style-type: none"> Mahoney Creek Channel Modification Daylight Stream Proposed Project Area Tree and Shrub Clearing Proposed Native Vegetation 				

General Recommendations



<p>Mahoney Creek Stream Assessment</p> <p>City of Batavia Illinois</p>	<p>Legend</p> <p>Erosion Severity</p> <ul style="list-style-type: none"> — Major — Minor — Moderate Proposed Project Area <ul style="list-style-type: none"> City Roads County Roads State Roads Township Roads <ul style="list-style-type: none"> MC_# Mahoney Creek Reach ID MCT_# Mahoney Creek Tributary Reach ID 	<p>Data Source: Coordinate System: NAD 1983 StatePlane Illinois East FIPS 1201 Feet Projection: Transverse Mercator Datum: North American 1983 Units: Foot US</p>  <p>CITY OF BATAVIA</p> <p>HRGreen</p>
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General Recommendations

- Remove invasive species particularly non-native honeysuckle and buckthorn species
- Plant native vegetation along the stream banks and within the riparian buffer
- Encourage residential stormwater BMPs throughout the watershed including rain gardens, native plant gardens and rain barrels
- Stabilize moderate and severely eroded streambanks using bio-engineered techniques
- Overall costs to improve entire waterway:

Summary Table		
Reach	Price Range	
	High Estimate	Low Estimate
Total Main Branch	\$ 6,446,254	\$5,274,208
Total Tributary	\$ 2,404,042	\$1,366,944
Total Waterway	\$ 8,850,296	\$6,641,152

Funding Mechanisms

- Many projects are on private property or property owned by entities other than the City
- City has the option to coordinate design, permitting and potentially contribute to construction as these projects will provide an overall public benefit
- Special Service Areas (SSA) can be created to help fund improvements
- Grant funding is common for projects of this nature. Many grants require that projects benefit water quality.
- Tax Increment Financing (TIF) districts
- Fee in lieu



QUESTIONS FROM THE AUDIENCE

Ask away!

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