Green Approach to Stormwater Management in Algonquin

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CSC November 3, 2022

Christopher B. Burke Engineering, Ltd.

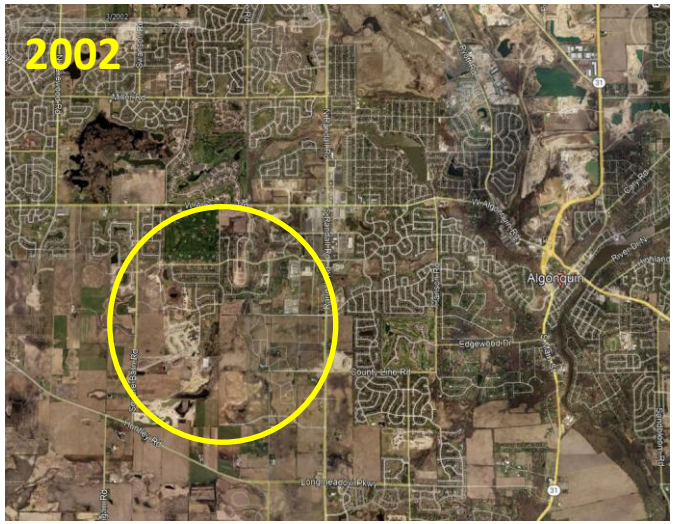
Village of Algonquin

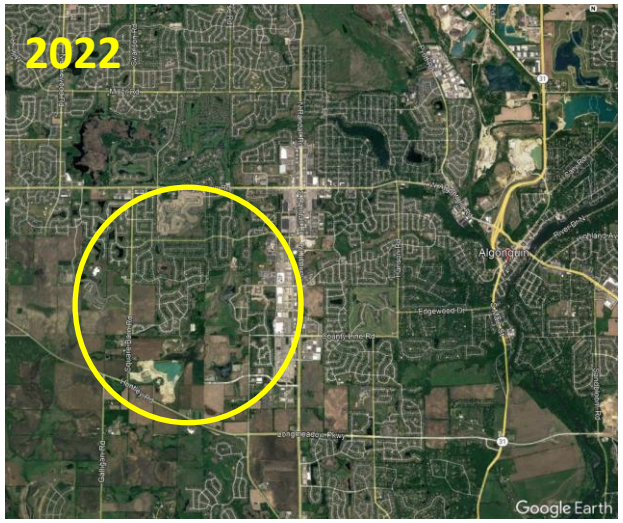
History

- Village was settled in 1834 and incorporated in 1890
- Downtown versus outskirts

History continued

- Village of Algonquin has experienced considerable suburban growth over the last 20 years

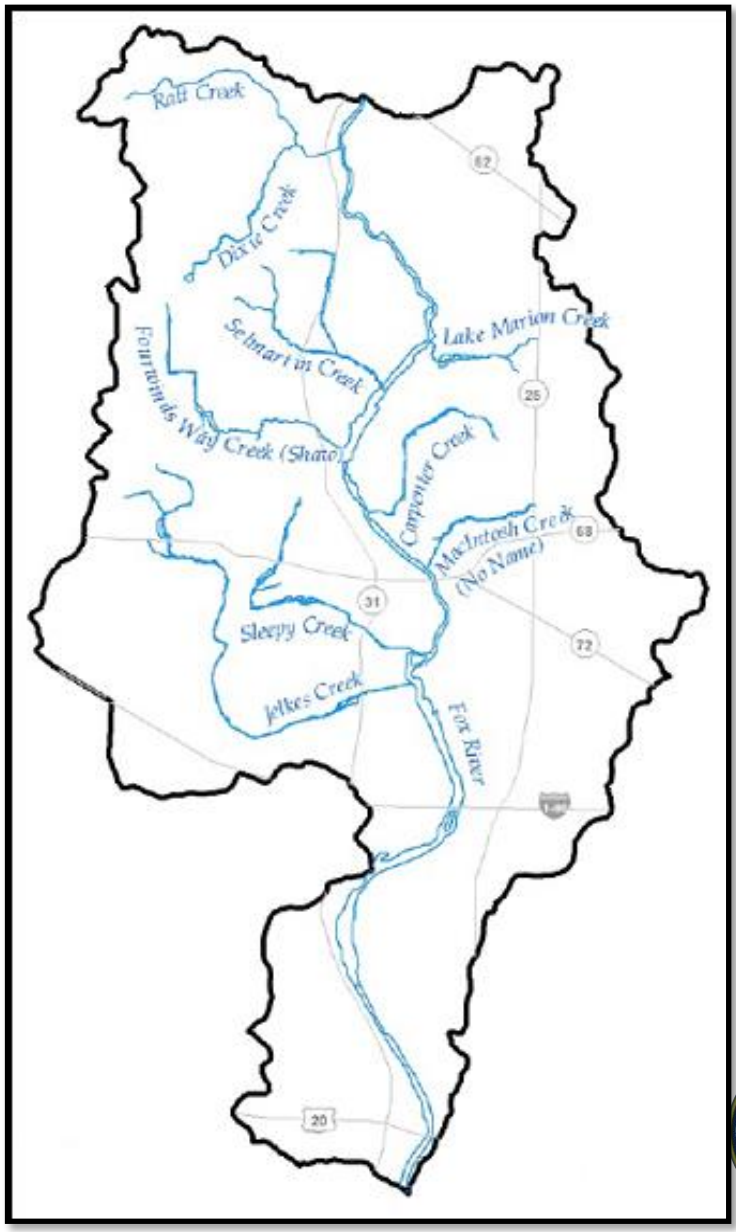




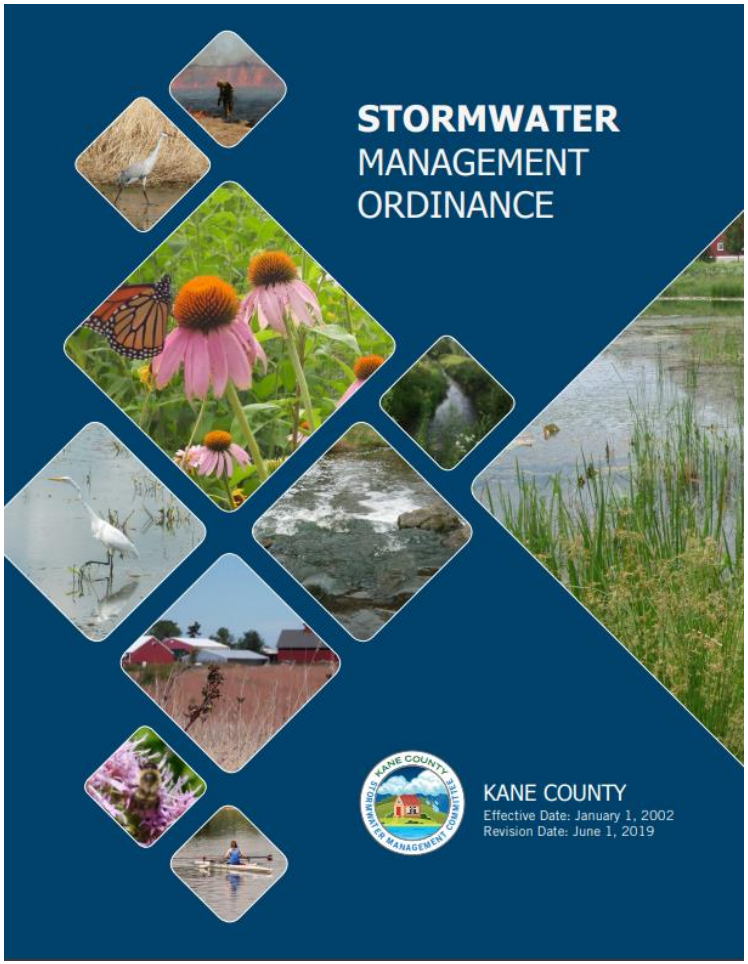
- As the gem of the Fox River Valley, the Village is home to 6 watercourses, including the Fox River, that weave their way throughout the Village's suburban outskirts before reaching the Fox River valley, at the Village's downtown hub

Village of Algonquin Watersheds

- Dixie Creek
- Woods Creek
- Ratt Creek
- Crystal Creek
- Souwanas Creek
- Fox River



Stormwater Management Requirements



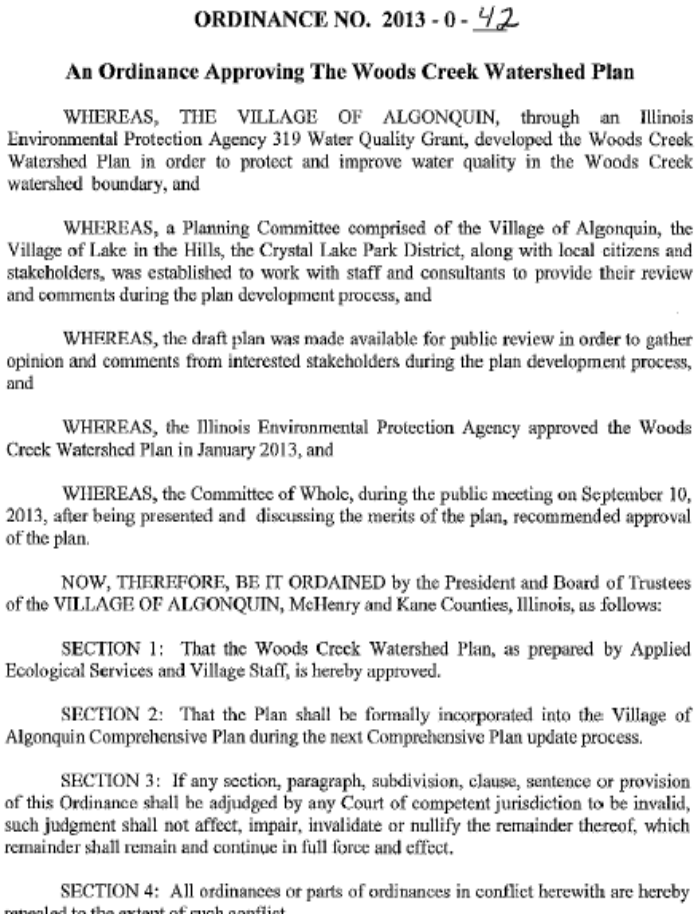
- Kane County Ordinance Requirements for development
- Traditional stormwater requirements outlined in the ordnance
  - Release rate control based
    - 100-year = 0.10 cfs/ac
  - 25,000 new/net new impervious area
  - Ways to reduce impervious pavement

Adapting to Today

- Climate change
- With high intensity storm event more frequent, traditional storm sewer design and flood control basins are becoming too large to accommodate
- The size required for traditional stormwater infrastructure is becoming too large to fund and locate within urban settings

- Non-traditional stormwater practices are being used to offset extremely large and expensive grey practices
- While development of the Village has benefitted from traditional stormwater management practices, natural area preservation and best management practices have enhanced the Village's stormwater management system.

How Does the Village Plan for Development?



ORDINANCE NO. 2013 - 0 - 42

An Ordinance Approving The Woods Creek Watershed Plan

WHEREAS, THE VILLAGE OF ALGONQUIN, through an Illinois Environmental Protection Agency 319 Water Quality Grant, developed the Woods Creek Watershed Plan in order to protect and improve water quality in the Woods Creek watershed boundary, and

WHEREAS, a Planning Committee comprised of the Village of Algonquin, the Village of Lake in the Hills, the Crystal Lake Park District, along with local citizens and stakeholders, was established to work with staff and consultants to provide their review and comments during the plan development process, and

WHEREAS, the draft plan was made available for public review in order to gather opinion and comments from interested stakeholders during the plan development process, and

WHEREAS, the Illinois Environmental Protection Agency approved the Woods Creek Watershed Plan in January 2013, and

WHEREAS, the Committee of Whole, during the public meeting on September 10, 2013, after being presented and discussing the merits of the plan, recommended approval of the plan.

NOW, THEREFORE, BE IT ORDAINED by the President and Board of Trustees of the VILLAGE OF ALGONQUIN, McHenry and Kane Counties, Illinois, as follows:

SECTION 1: That the Woods Creek Watershed Plan, as prepared by Applied Ecological Services and Village Staff, is hereby approved.

SECTION 2: That the Plan shall be formally incorporated into the Village of Algonquin Comprehensive Plan during the next Comprehensive Plan update process.

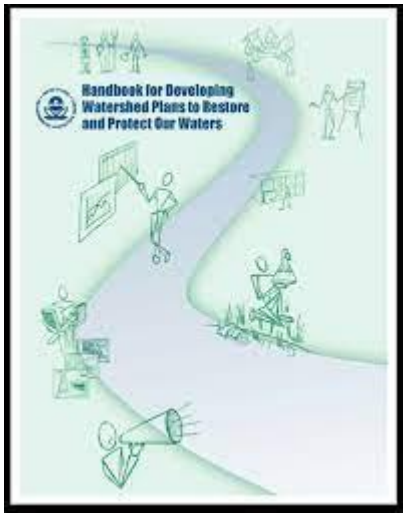
SECTION 3: If any section, paragraph, subdivision, clause, sentence or provision of this Ordinance shall be adjudged by any Court of competent jurisdiction to be invalid, such judgment shall not affect, impair, invalidate or nullify the remainder thereof, which remainder shall remain and continue in full force and effect.

SECTION 4: All ordinances or parts of ordinances in conflict herewith are hereby

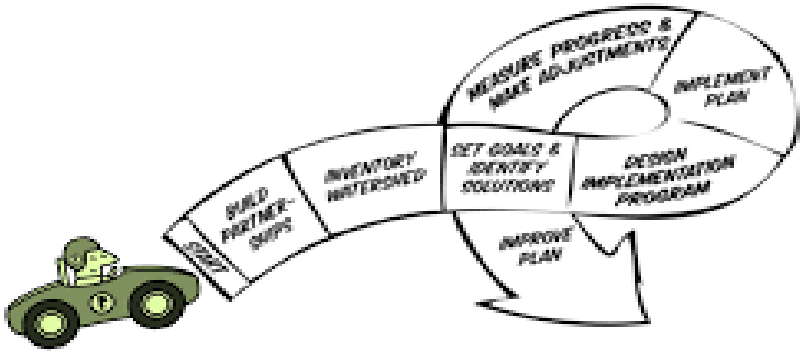
- Change & Create Municipal Codes
- Have the board adopt a watershed-based plan
  - Officials need to understand ordinance adoptions while planning and approving development
- Create a means for implementing the adopted watershed-based plan

What is a Watershed Based Plan?

- Plan to reduce non-point source impairments.
  - Improve water quality
  - Reduce nutrient loadings
  - Habitat restoration (remove or repair dams)
  - Educate the public about impairments
  - Preserve and restore natural aspects in the watershed



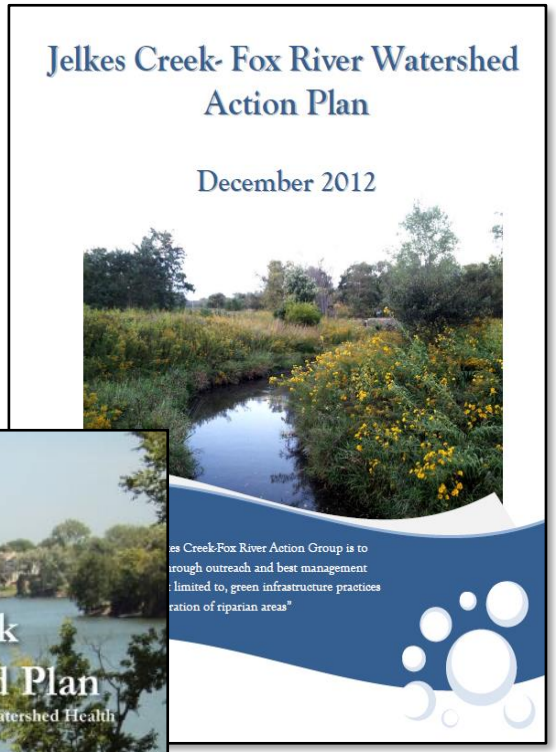
- Opens the door for 319 Grant funding

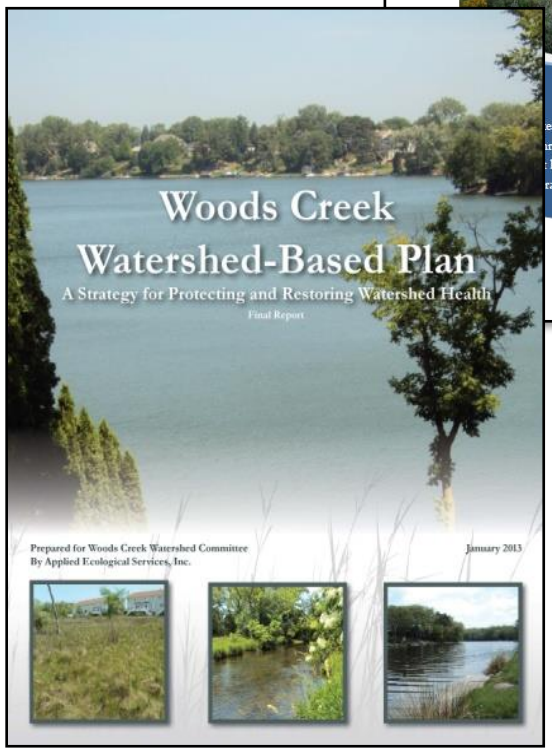


Using Watershed Based Planning

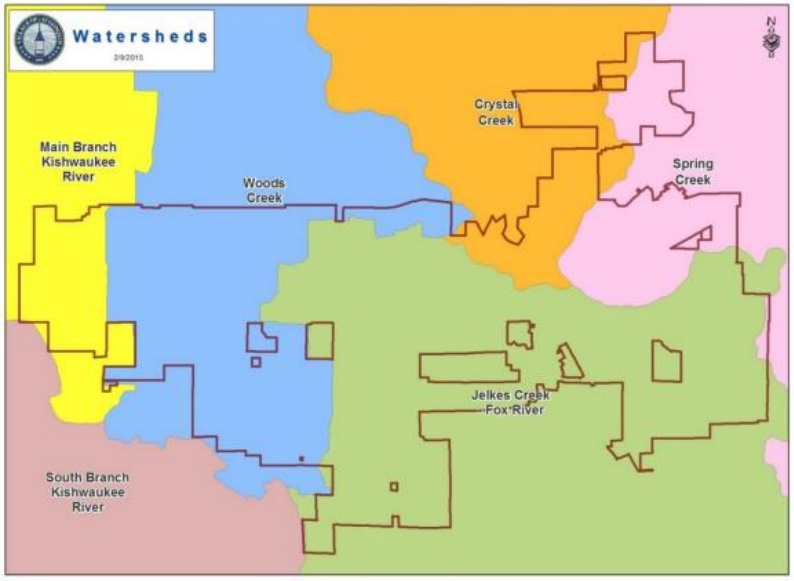
- Watershed Based Plans in Village
  - Woods Creek
  - Jelkes Creek: Fox River Watershed Action Plan

- On behalf of the Kane-DuPage Soil and Water Conservation District
  - Developed using an Illinois EPA Section 319 Grant in December 2012
  - Approved by IEPA and Stakeholders (Village of Algonquin)

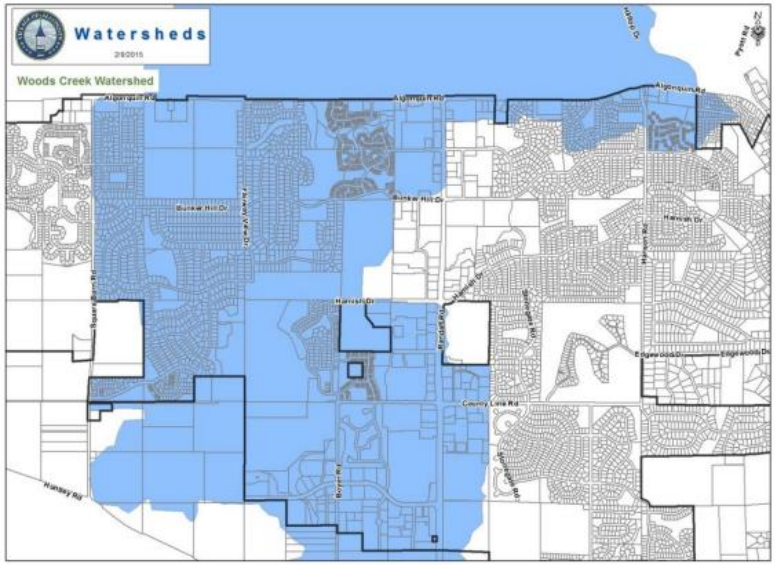




Watershed Protection Overlay District – Algonquin Section 21.13

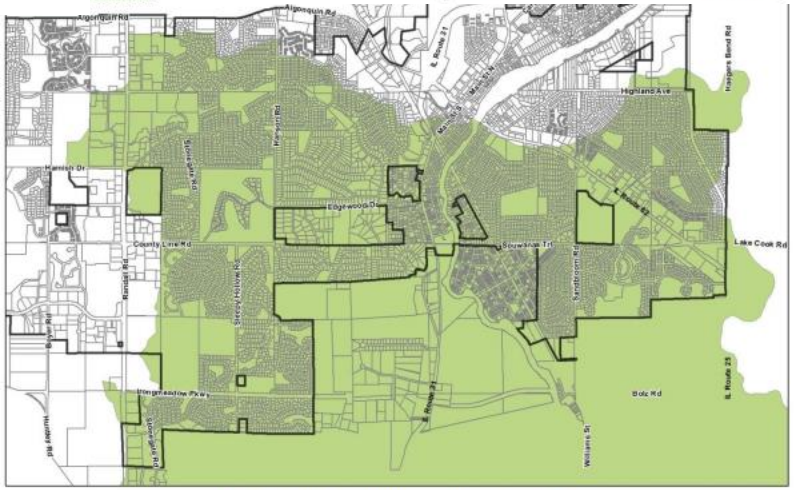


Map 1 Watershed Boundaries



Map 2 Woods Creek Watershed Boundary

- Provide means of implementing adopted Watershed Based Protection Plans
- Ensures appropriate measures are taken to preserve watershed and allow quality development



Map 3 Jelkes Creek Watershed Boundary

Development & Identified Projects

- Plan identifies multiple projects and the overlay districts created from the plan regulate develop

- DEVELOPMENT REQUIREMENTS.

  1. Each development proposed within the District shall conform to section 21.4-Q, Conservation Design Standards and Procedures.

  2. Each development shall take into consideration the size and type of proposed use, proximity to the creek and rare fens and wetlands to determine the best management practices for the development, all in accordance with the approved watershed-based protection plan.

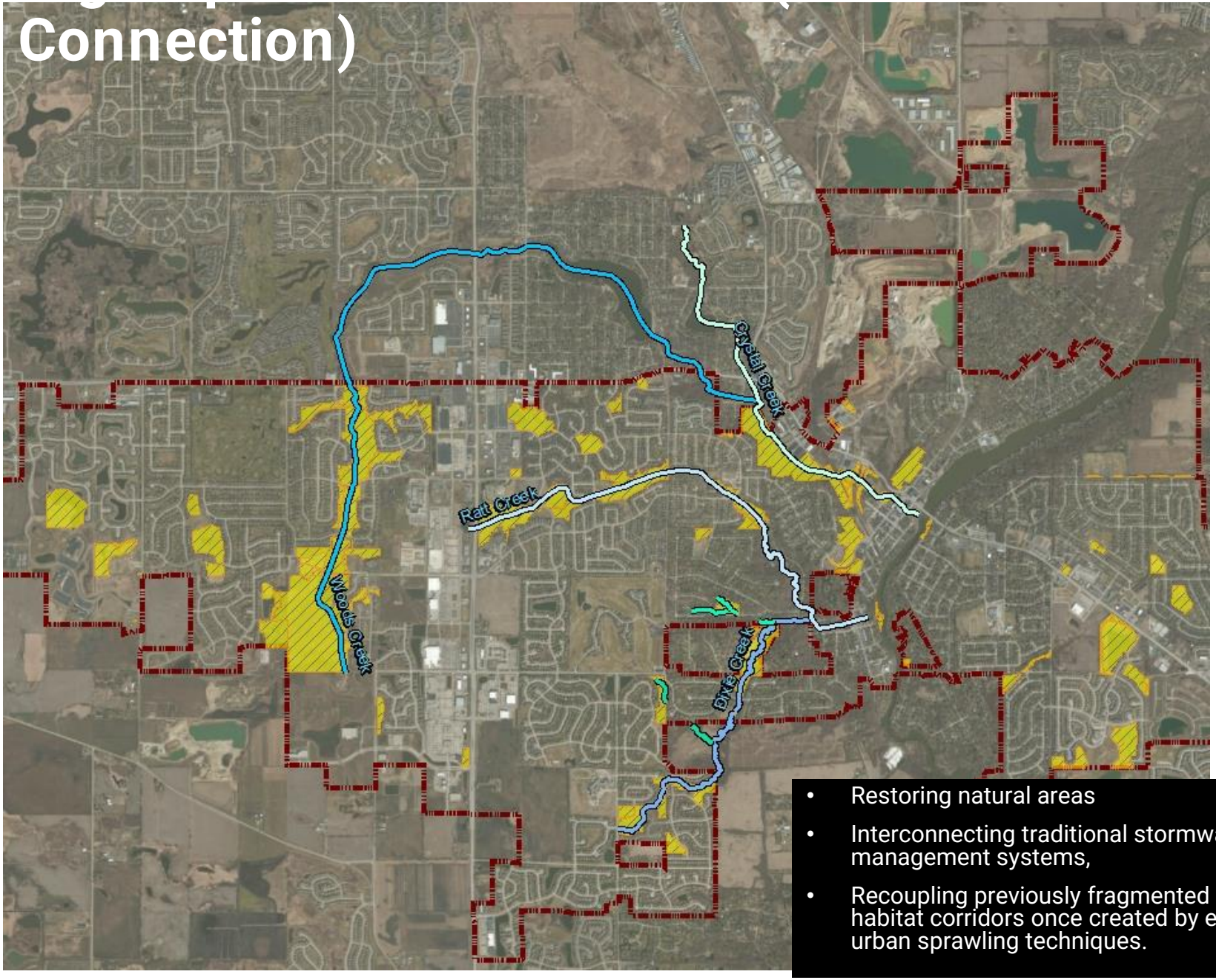
  3. Site design and structural and administrative considerations shall be given to each project to reduce negative impacts to the District.

  4. Eco-corridors. All natural resource areas within the District shall be connected by eco-corridors

Algonquin's Natural Area Preservation & Best Management Practices

- Green infrastructure in Algonquin is in an interconnected network of natural areas and other open space.
  - Redevelopment
    - Detention basin design
  - Management of Headwaters
  - Prairie Restoration
  - Streambank Stabilization

Algonquin's Natural Areas (G
Connection)



- Restoring natural areas
- Interconnecting traditional stormwater management systems,
- Recoupling previously fragmented habitat corridors once created by early urban sprawling techniques.

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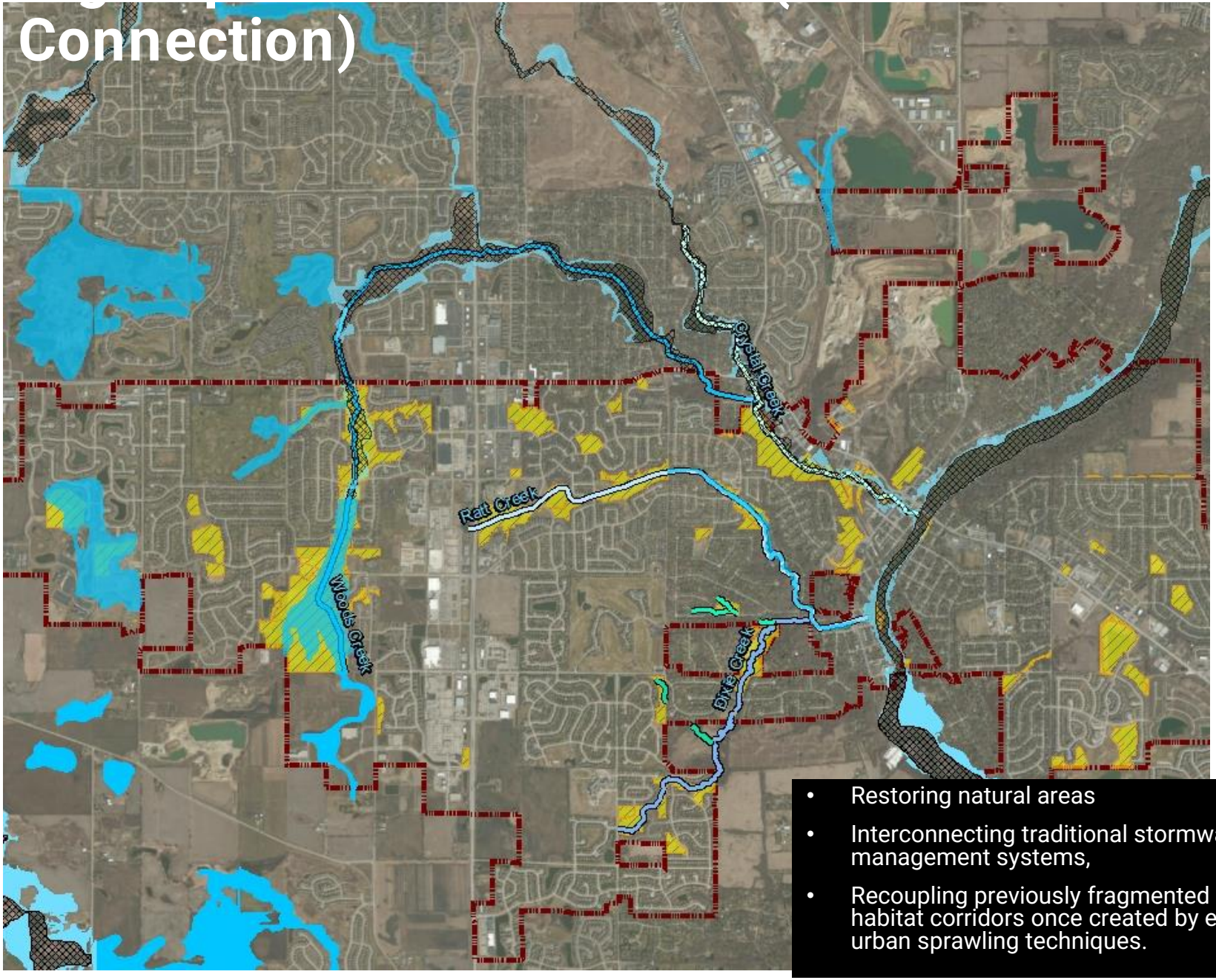

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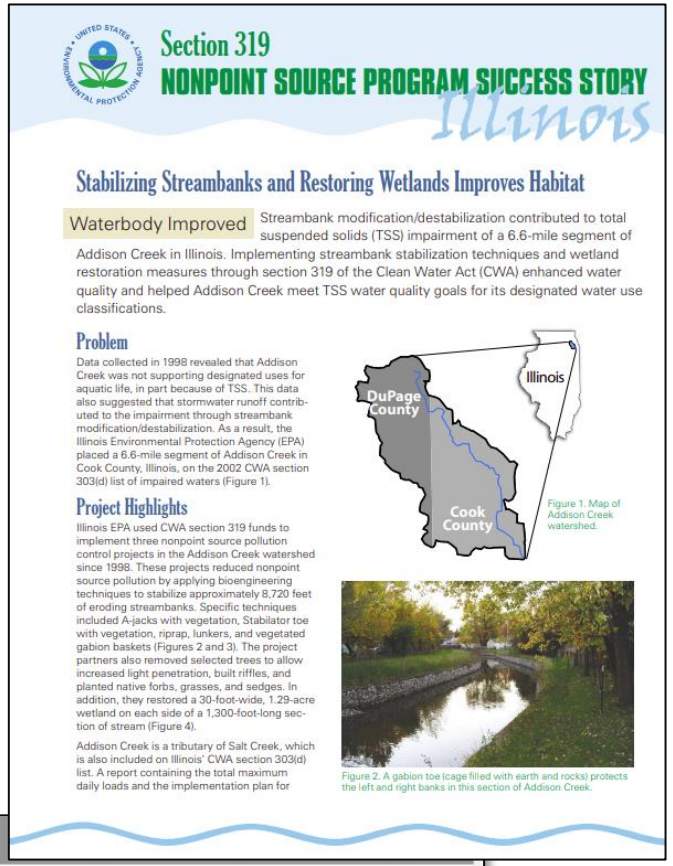
- Interconnecting traditional stormwater management systems,
- Recoupling previously fragmented habitat corridors once created by early urban sprawling techniques.

Flood Reduction Quantification

- How is GI and natural area restoration quantified in 319 planning and accounting?
- If Tons of sediment and pounds of phosphorus are removed, how does the watercourse respond?
- 319 success stories (10)
- 303(d)
- TSS removed as a cause of impairment.

- **How is GI quantified in the flood reduction context?**
  - **Nuisance Storms**
- **Are flood reports/complaints reduced?**



Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Illinois

Stabilizing Streambanks and Restoring Wetlands Improves Habitat

Waterbody Improved

Streambank modification/destabilization contributed to total suspended solids (TSS) impairment of a 6.6-mile segment of Addison Creek in Illinois. Implementing streambank stabilization techniques and wetland restoration measures through section 319 of the Clean Water Act (CWA) enhanced water quality and helped Addison Creek meet TSS water quality goals for its designated water use classifications.

Problem

Data collected in 1998 revealed that Addison Creek was not supporting designated uses for aquatic life, in part because of TSS. This data also suggested that stormwater runoff contributed to the impairment through streambank modification/destabilization. As a result, the Illinois Environmental Protection Agency (EPA) placed a 6.6-mile segment of Addison Creek in Cook County, Illinois, on the 2002 CWA section 303(d) list of impaired waters (Figure 1).

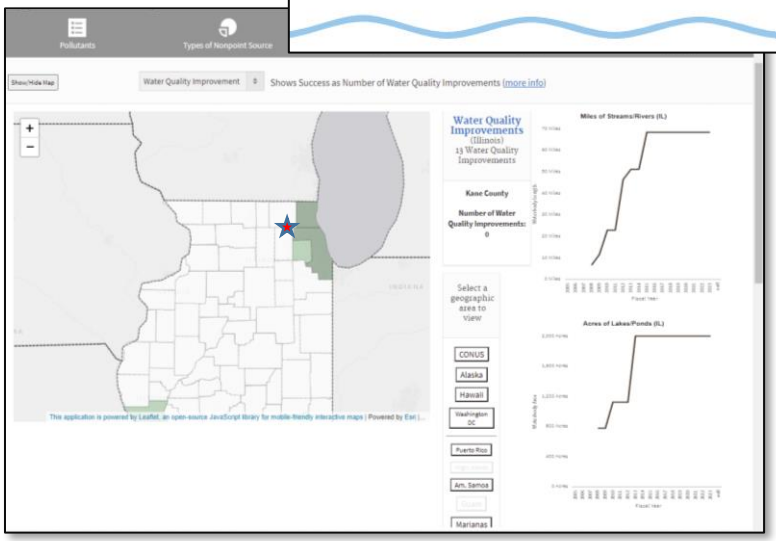
Project Highlights

Illinois EPA used CWA section 319 funds to implement three nonpoint source pollution control projects in the Addison Creek watershed since 1998. These projects reduced nonpoint source pollution by applying bioengineering techniques to stabilize approximately 8,720 feet of eroding streambanks. Specific techniques included A-jacks with vegetation, Stabilator toe with vegetation, riprap, lunkers, and vegetated gabion baskets (Figures 2 and 3). The project partners also removed selected trees to allow increased light penetration, built riffles, and planted native forbs, grasses, and sedges. In addition, they restored a 30-foot-wide, 1.29-acre wetland on each side of a 1,300-foot-long section of stream (Figure 4).

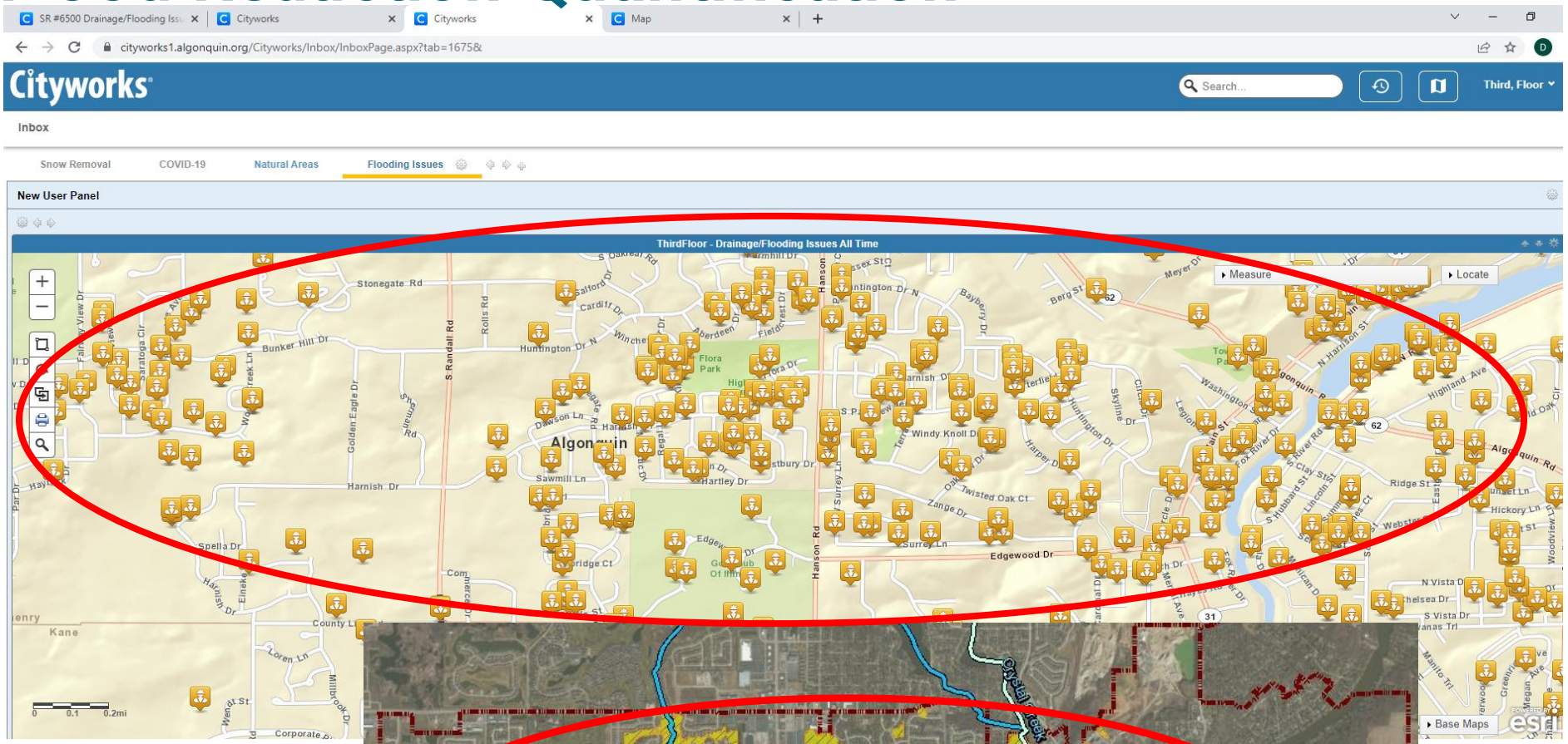
Addison Creek is a tributary of Salt Creek, which is also included on Illinois' CWA section 303(d) list. A report containing the total maximum daily loads and the implementation plan for

Figure 1. Map of Addison Creek watershed.

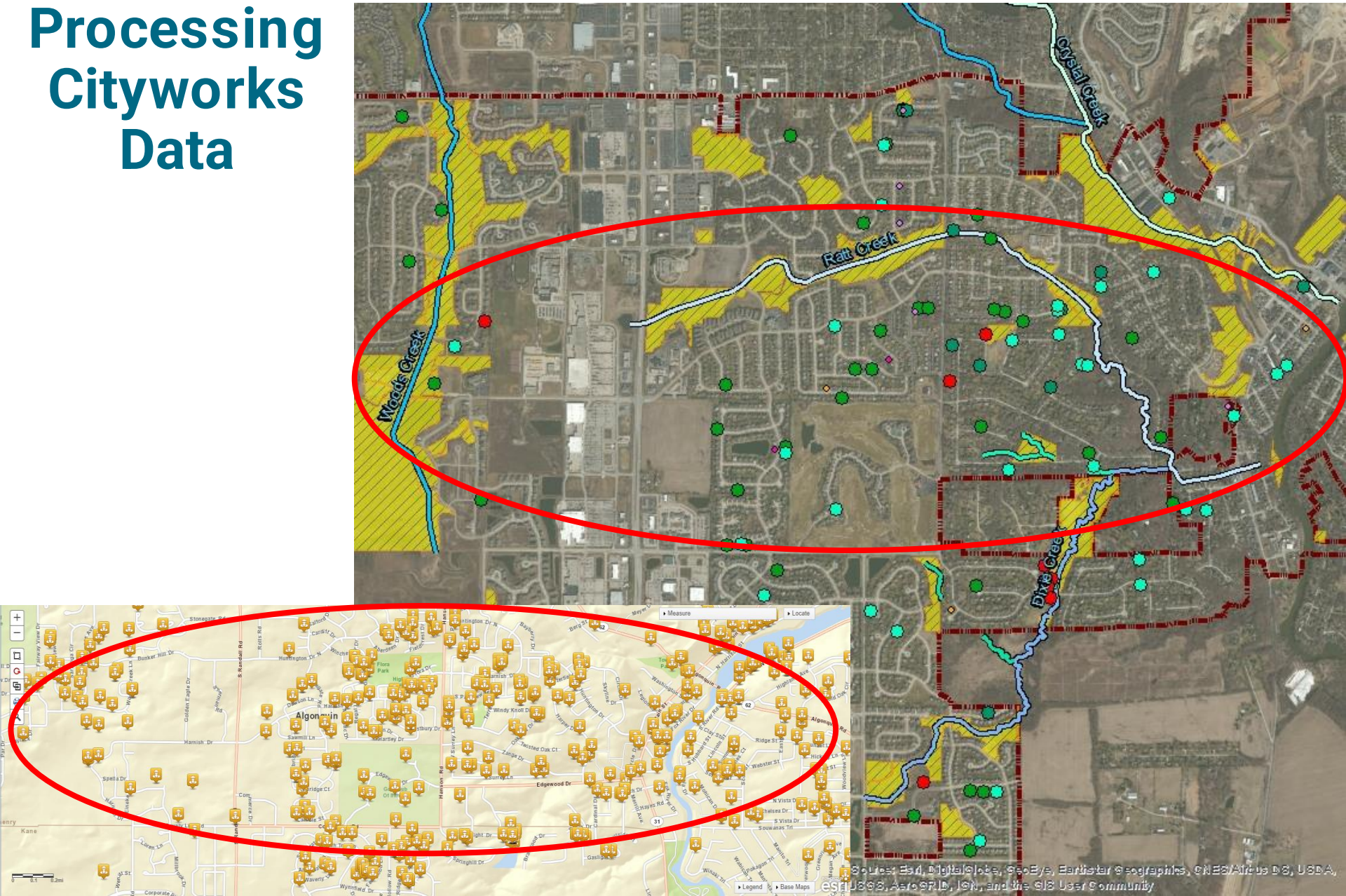
Figure 2. A gabion toe (cage filled with earth and rocks) protects the left and right banks in this section of Addison Creek.



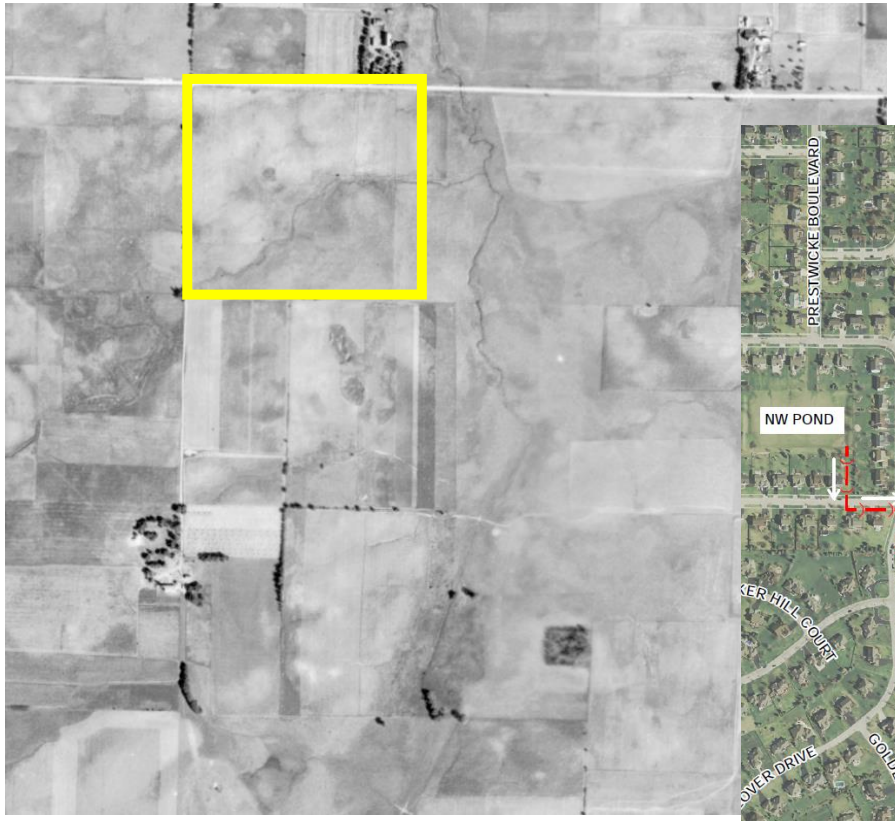
Flood Reduction Quantification



Processing Cityworks Data



Algonquin's Approach to Re/Development in Action (Fragment Connection)



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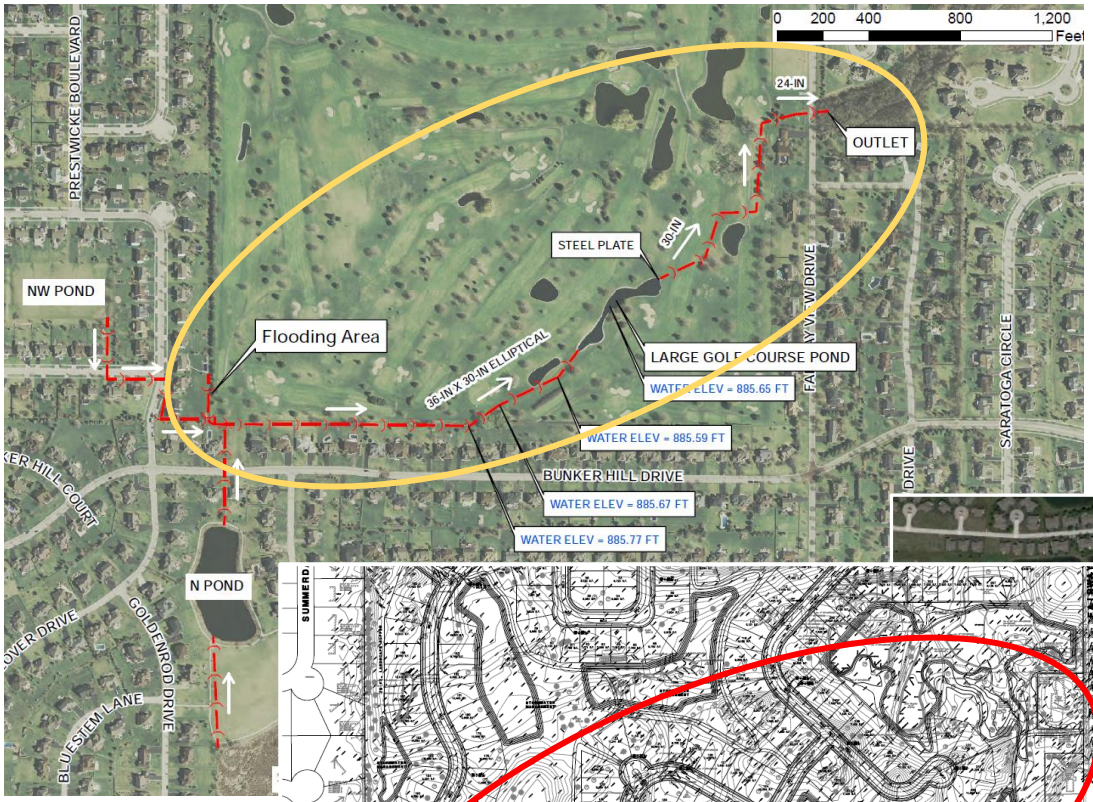
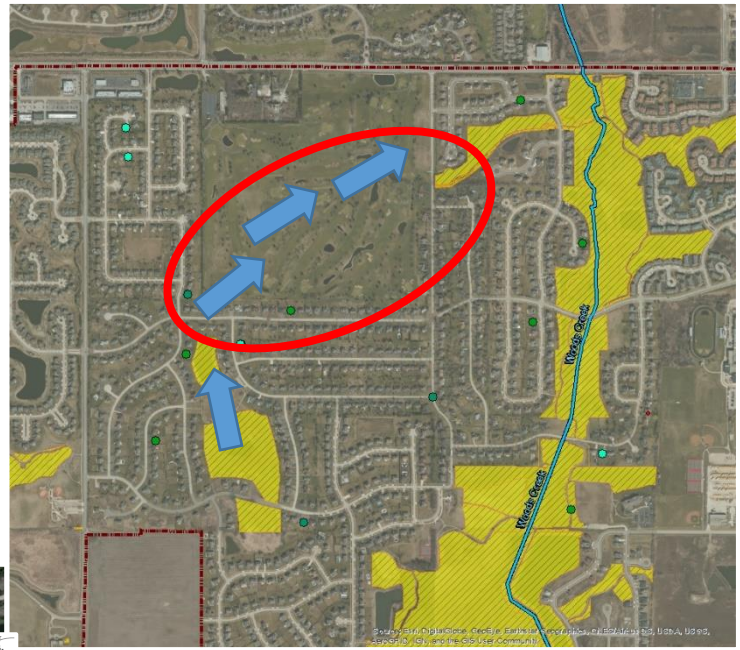
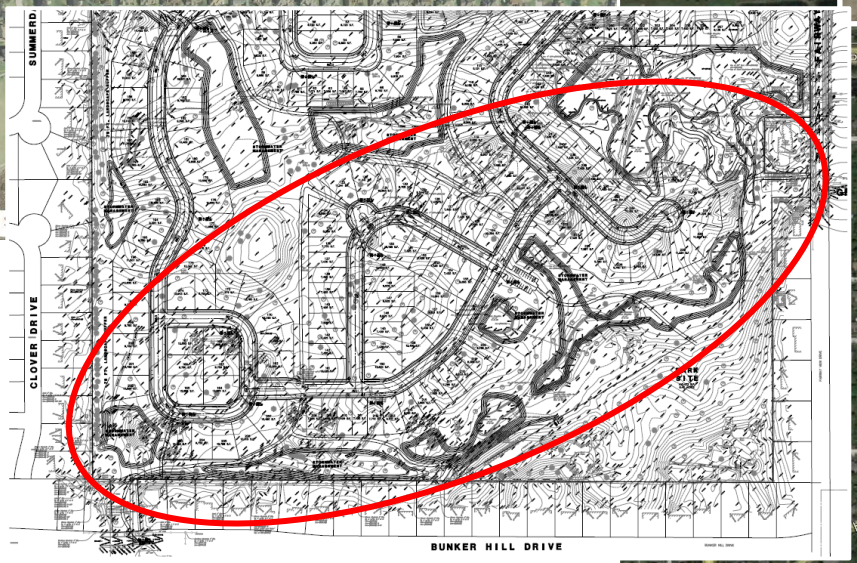
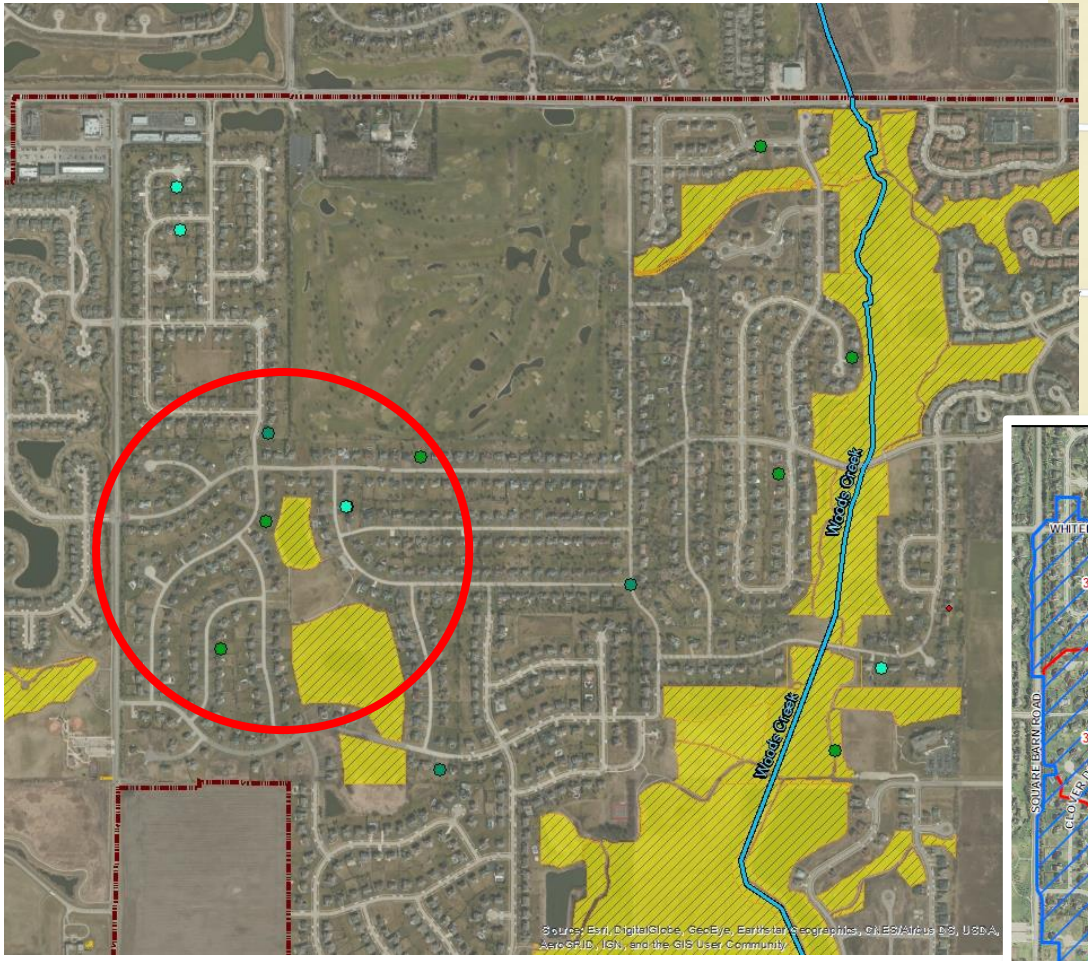


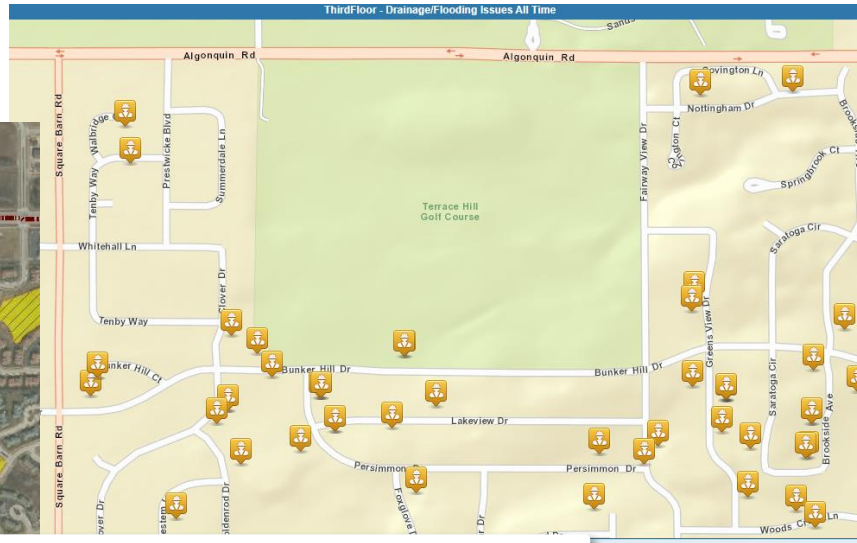


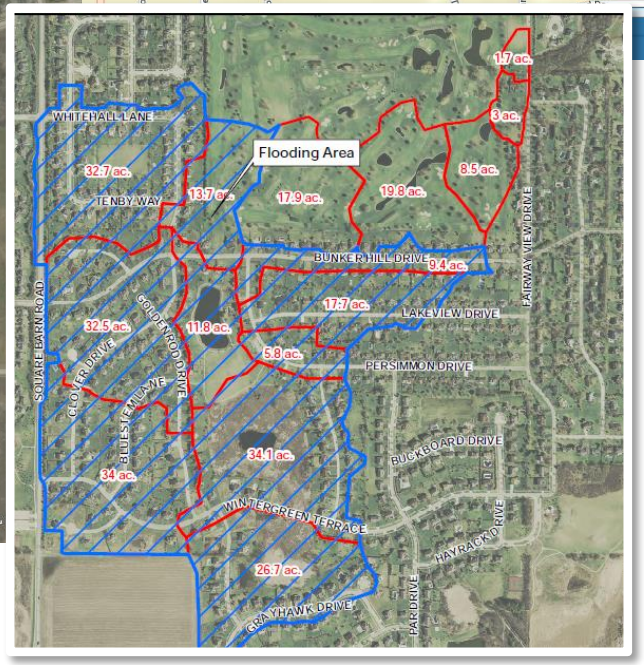


Flood Reduction Quantification

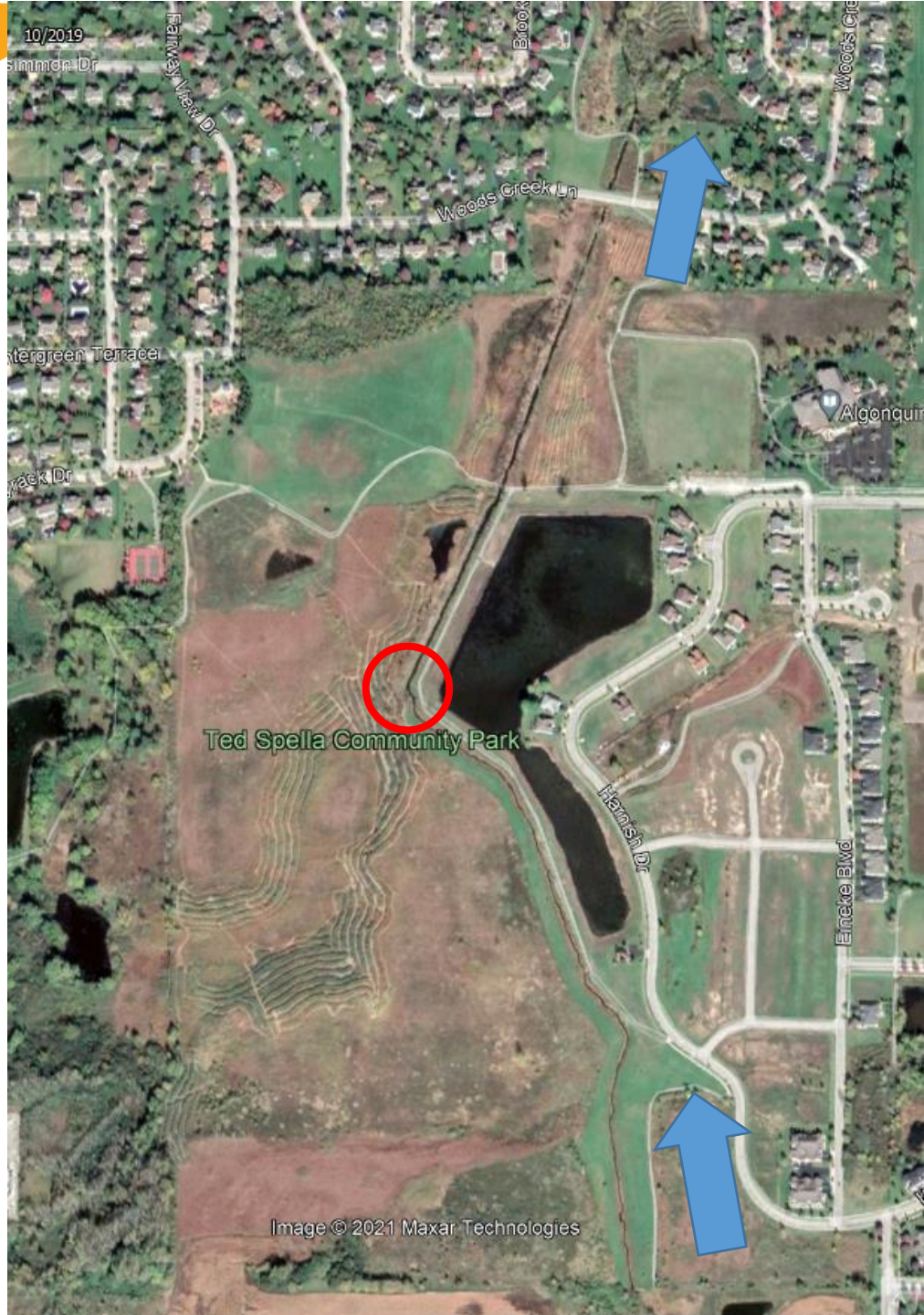
- **Nuisance Storms**





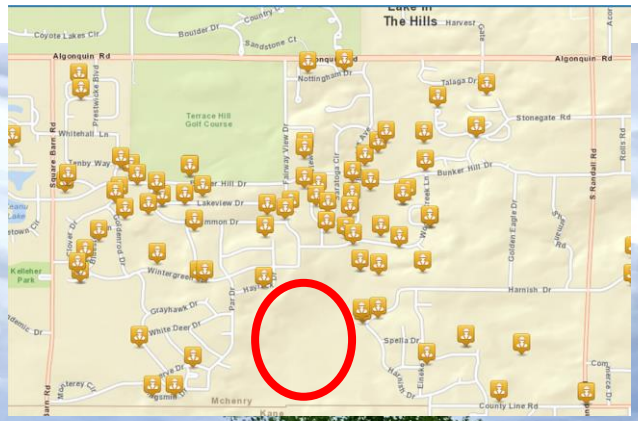


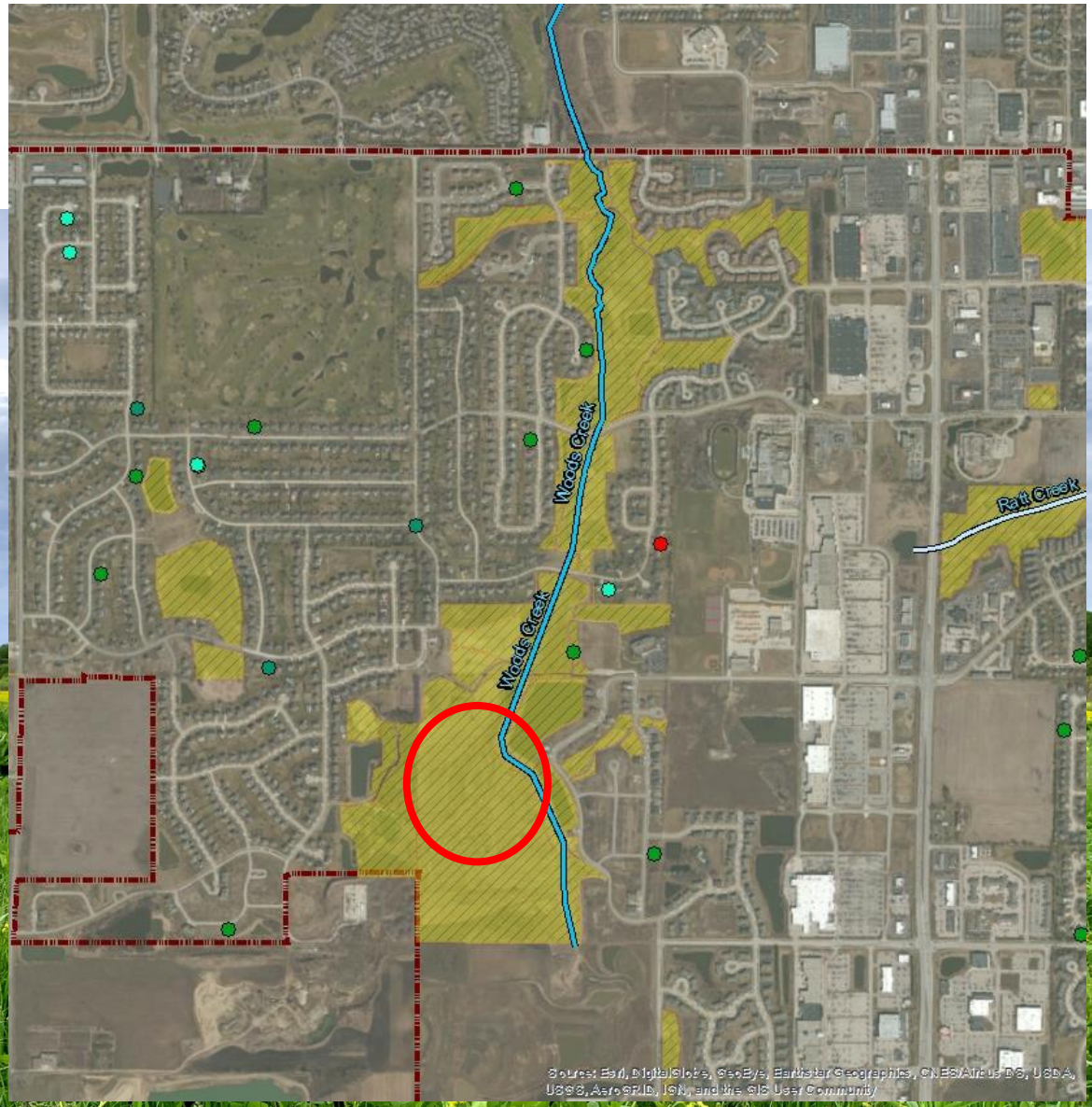
Woods Creek (Headwater Restoration) Spella Wetland



Woods Creek (Headwater Restoration)
Spella Wetland

- 20 Acre wetland complex

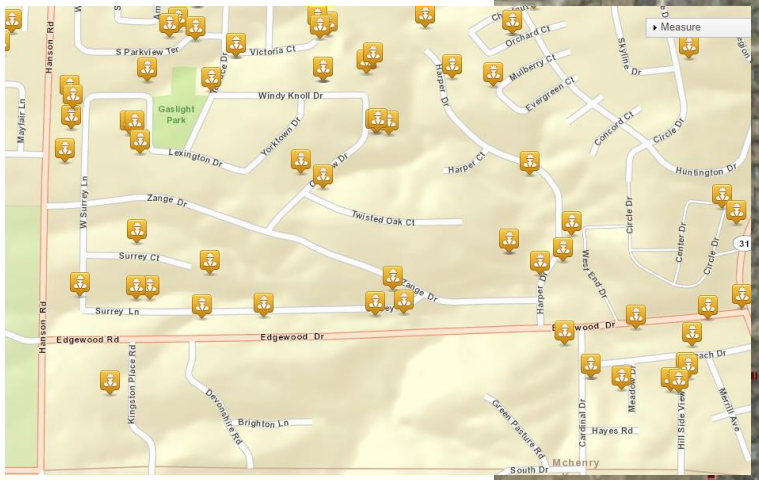




Woods Creek (Headwater Restoration)
Spella Wetland

- >1 mi^2 of tributary area

Surrey Lane Drainage Complaints (Cityworks)



Surrey Lane Prairie Restoration

Surrey Lane Prairie Restoration

- Wetland bottom detention basin and adjacent oak savanna

Dixie Creek Watershed (Streambank Stabilization)

Future Corridor

Current Project Corridor 2022

Previously Restored Area (Creeks Crossing)

Previously Restored Area (Dixie Briggs Fromm Conservation Area)

Ratt Creek

Dixie Creek

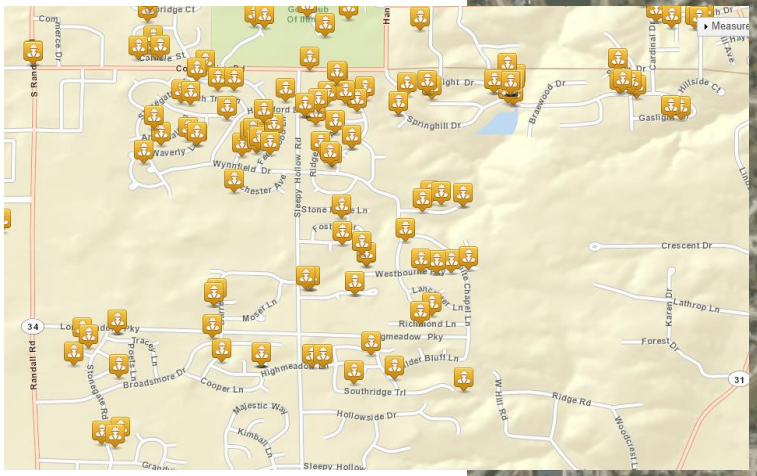
Fox River

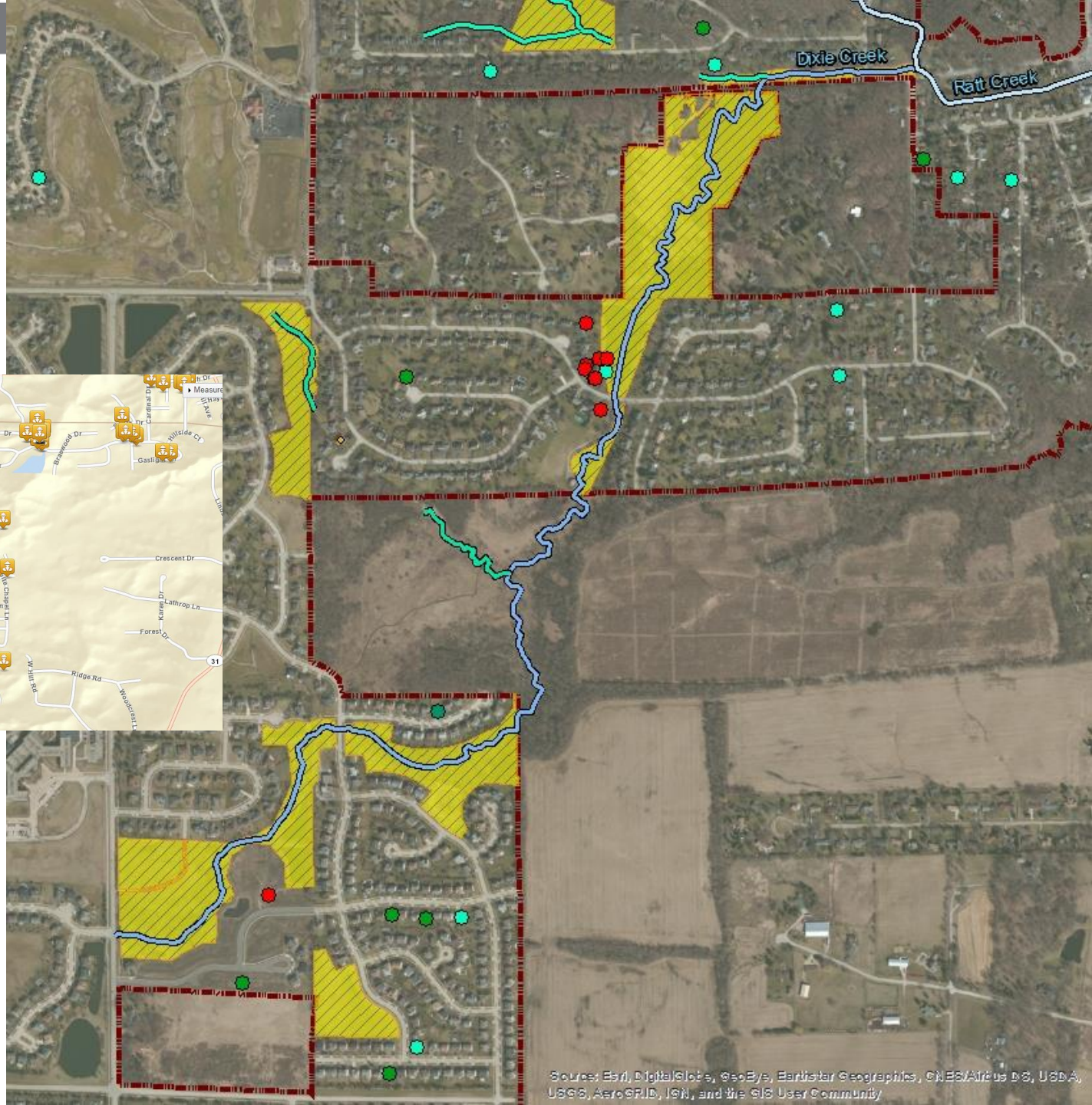
McHenry County

Kane County

Dixie Creek Watershed Boundary
Area = 1.8 Square Miles

Dixie Creek Drainage Complaints (Cityworks)





Dixie Briggs Fromm Conservation Area

- Upstream
- Link corridor into a continuous system
- Eliminate fragmentation

Dixie Creek Watershed

- 4,000 L.F. Stream Restoration
- RES/HRG Design
- Encap Construction

Lessons Learned

- Appropriate seed mixes
- Drain down times
- Chinking (Streambank Installation)

Maintenance & Monitoring

- The Village maintains over 200 acres of restored areas with a M&M budget of approximately $60-70K per year.

- Conversely, the Village maintains 300 acres of manicured parks with a M&M budget of approximately $300K per year.

Project (s) Funding

- Approximately $450,000 in Grant Funding (SSRP, IDOT, DCEO, 319)
- Watershed Protection Fees
- Village Funding

- D. WATERSHED PROTECTION FEES.
- A means of providing funding for ongoing management of these resources is through an **impact fee paid by developers and property owners as land is developed** within the approved Watershed Based Protection Plan boundaries.
- Through annexation agreements and planned developments approved by the Village, a watershed protection fee pursuant to Appendix B of this Code **may be required to be paid and shall be payable to the Village**.