

# Building a Stormwater Digital Twin for Kane County

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& Water Resources



**Have we built a digital twin of the  
stormwater drainage system for  
Kane County?**

**Sort of...**

# Digital Twins in Architectural & Construction Industry





# Digital Twins in Water Resources Industry





# Digital Twins in Stormwater?





# Five Components of a Stormwater Digital Twin<sup>1</sup>

- **Geospatial representation of the system**
  - Streams, channels, culverts, pipes, inlets, detention basins, Green Infrastructure / BMPs, etc.

<sup>1</sup> From Colby Manwaring, Innovyze 2023

[The 5 Components of the Digital Twin for Water - Innovyze - World WaterTech North America](#)



# Five Components of a Stormwater Digital Twin

- **Direct observation or sensor data about the affecting environment**
  - Rain gages, radar rainfall, water level sensors, stream gages, etc.

# Five Components of a Stormwater Digital Twin

- **Performance Data**
  - Previous event information: high water marks, rainfall records, etc.



# Five Components of a Stormwater Digital Twin

- **Analytics**
  - Geoprocessing of GIS datasets (simplified analytics)
  - Physics-based model using Machine Learning / Geospatial AI (complex analytics).

# Five Components of a Stormwater Digital Twin

- **Digitalization**
  - Translating the analytics into useful visualizations of the results that will lead to action



# Building a Stormwater Digital Twin for Kane County

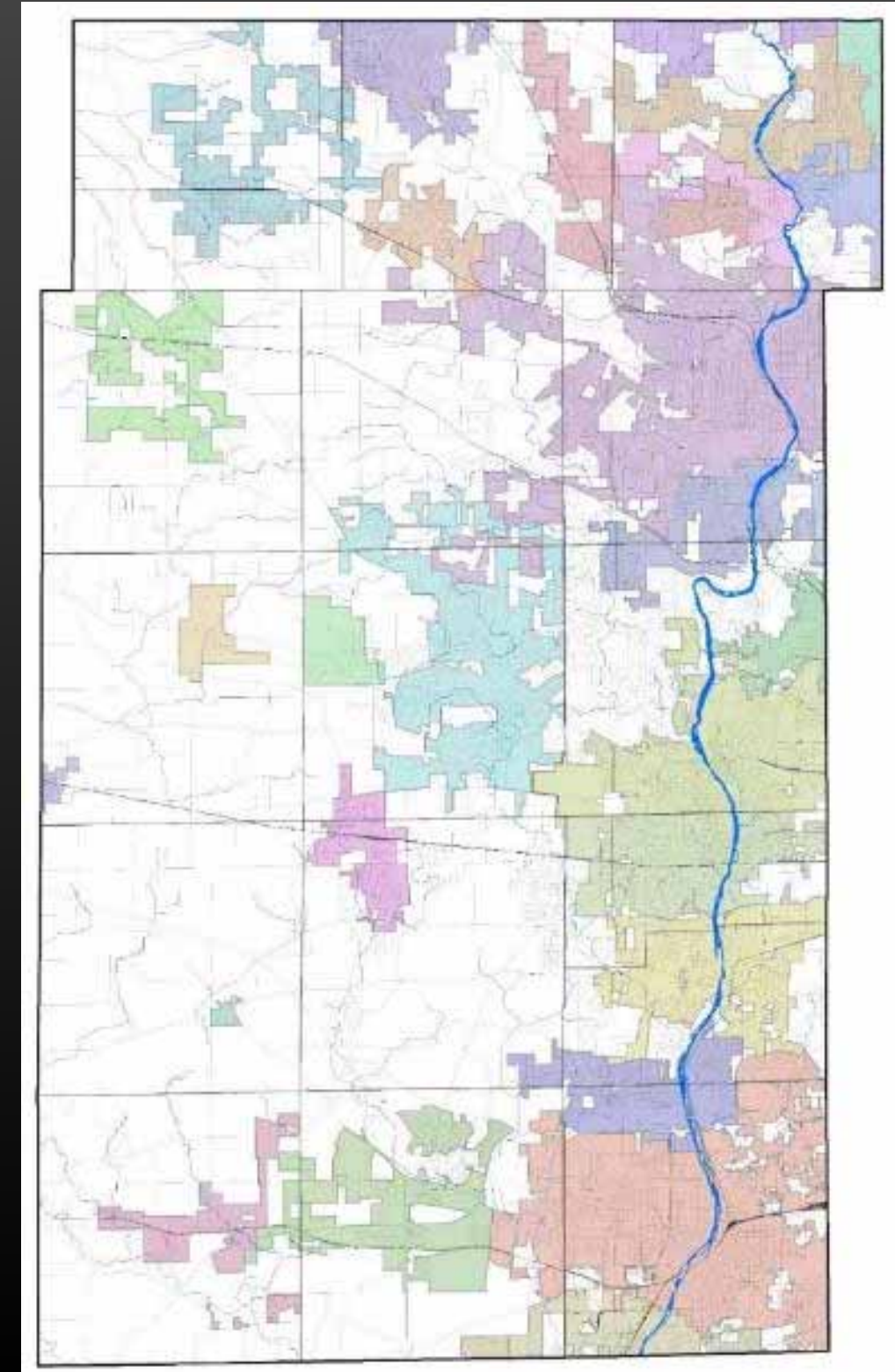
Why is the County taking the lead in this effort?

Kane County Area: 524 mi<sup>2</sup>

Unincorporated Areas: 312 mi<sup>2</sup>

Municipalities: 212 mi<sup>2</sup>

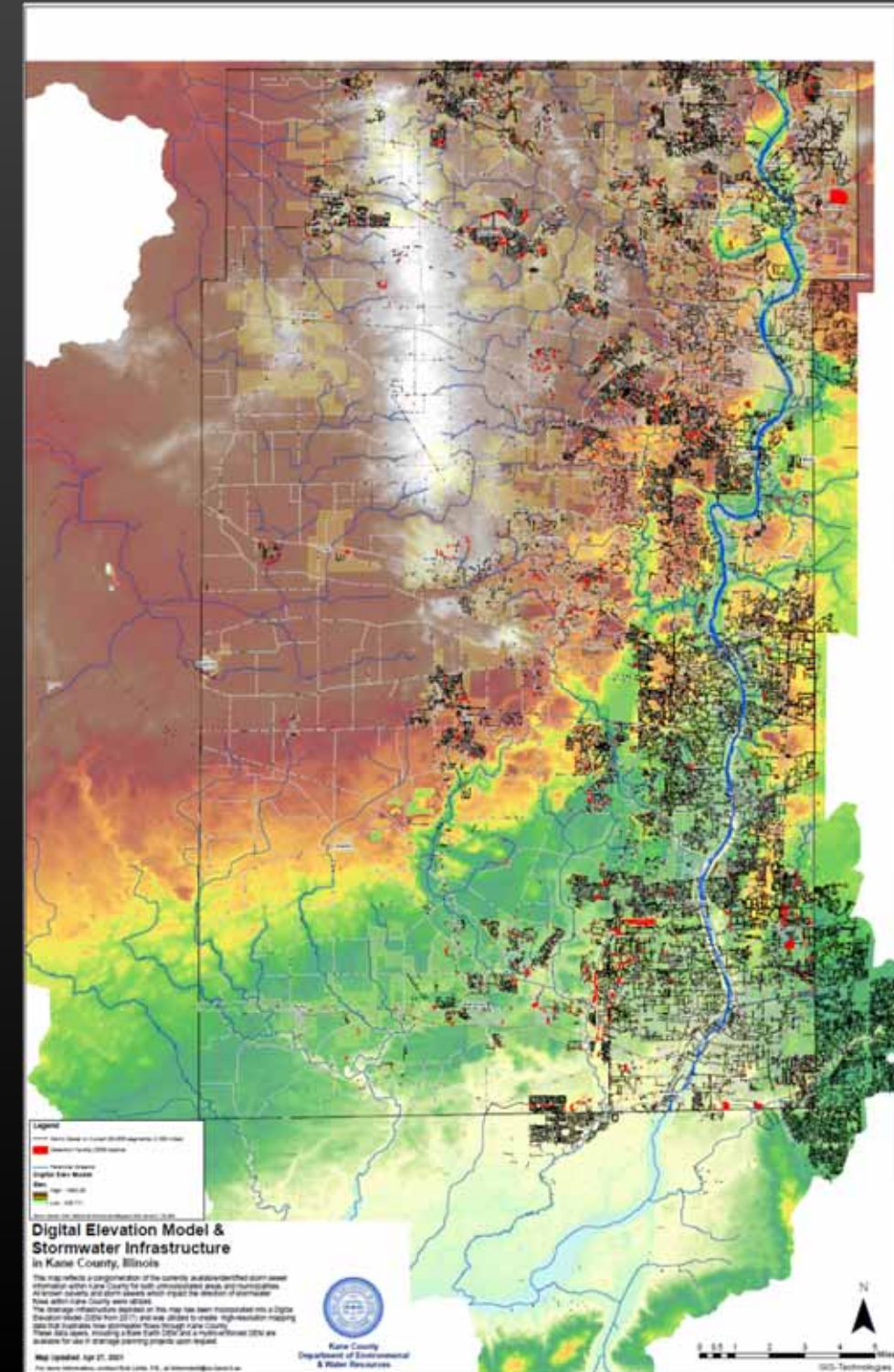
645 miles of shared boundary between the municipalities and unincorporated Kane County



# Building a Stormwater Digital Twin for Kane County

## Our Goal:

- Provide comprehensive, stormwater infrastructure information that traces stormwater's origin & flow path, irrespective of political boundaries.
- Facilitate discussion and improve collaboration between local government agencies to address drainage problems & environmental resource issues from a watershed perspective.
- Create a tools that allows users to accurately answer fundamental questions.
  - Short-Term
    1. How much area drains to the point of concern?
    2. Where does the water flow to and exactly what flow path does it take to get there?
  - Long-term
    3. How much, how deep & how fast is the water



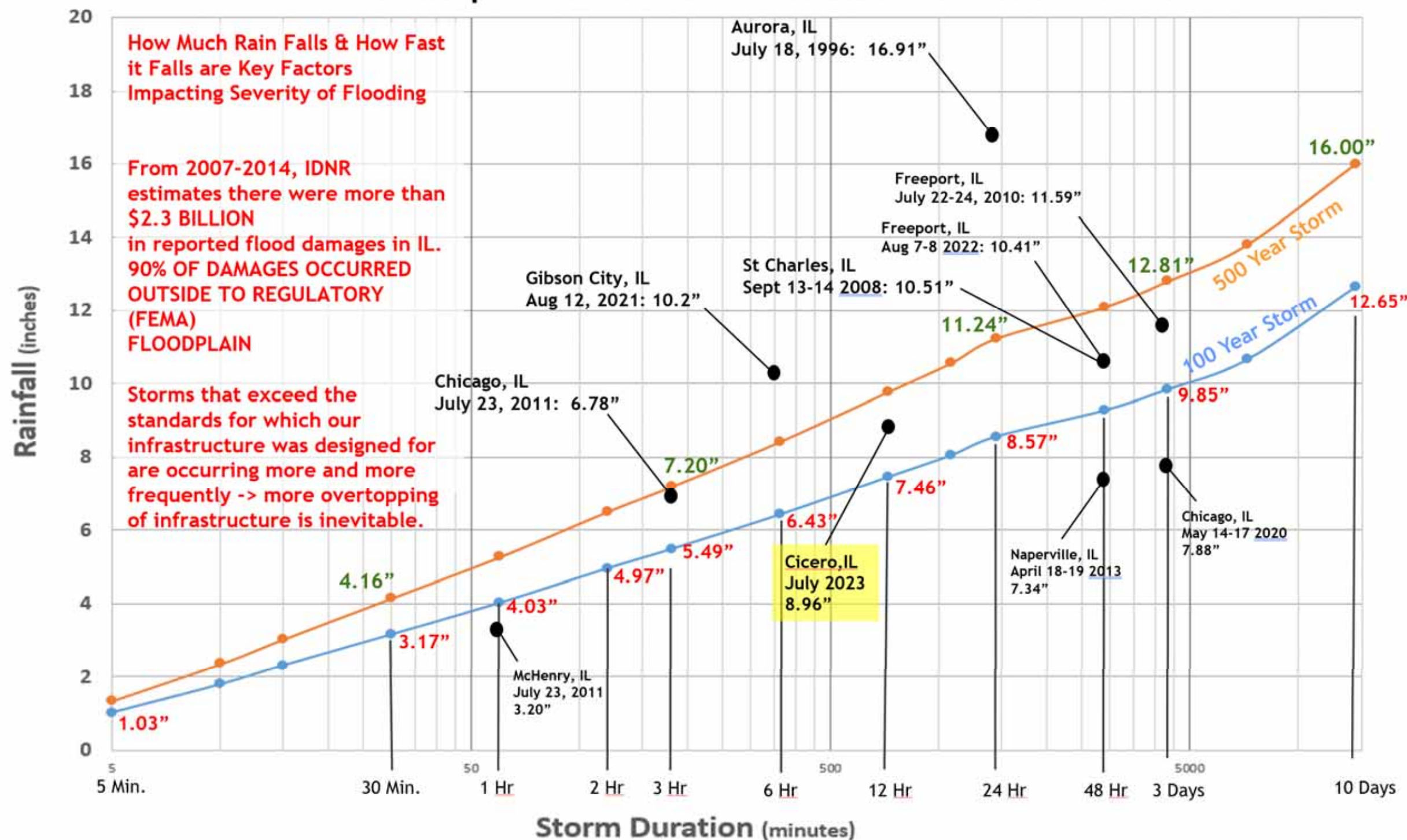
# By creating & maintaining a Stormwater Digital Twin, we can:

- Confirm current flooding issues
- Predict future flooding issues (in a changing climate)
- Evaluate and prepare mitigation strategies for flooding

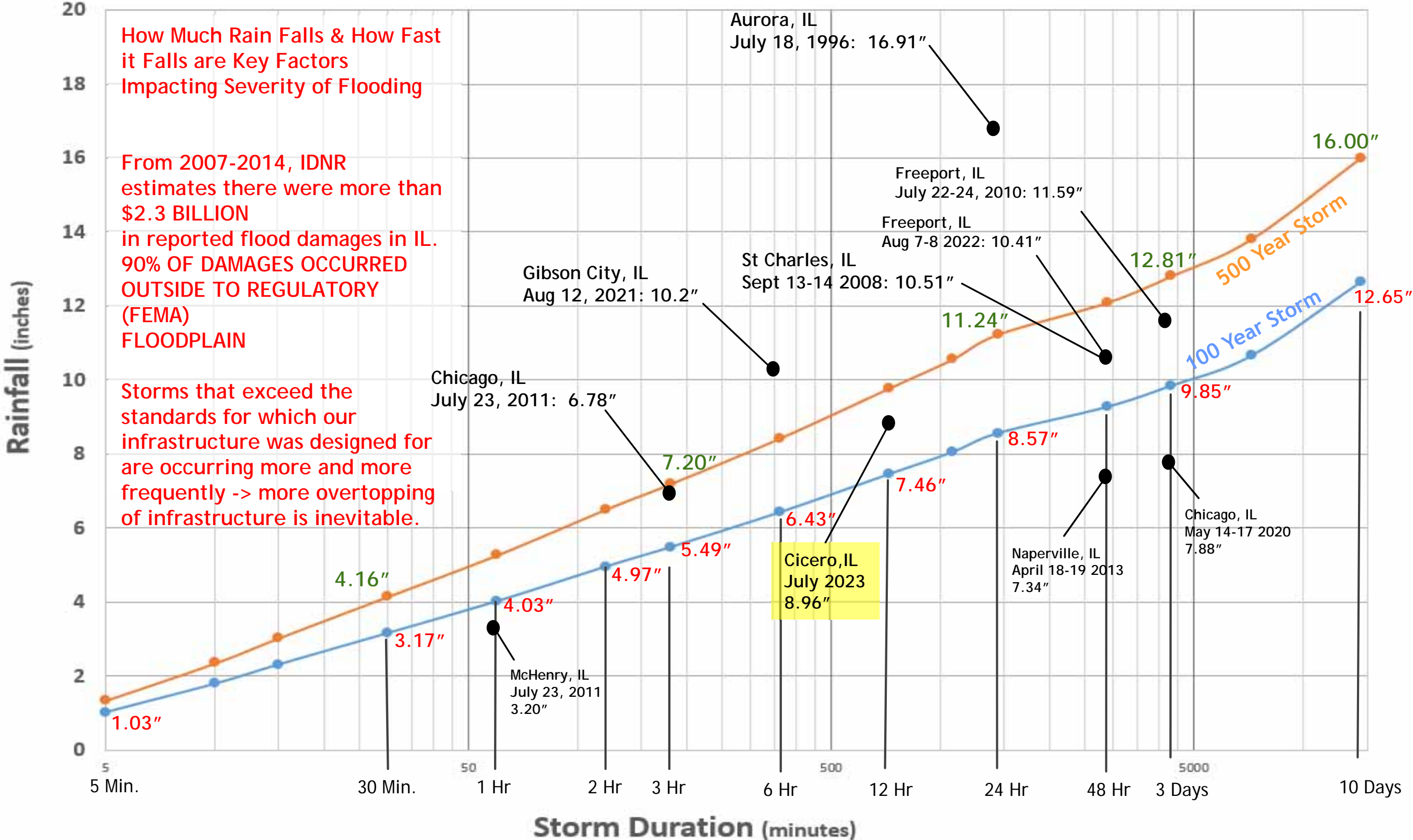


# Why is this important?

## Storm Comparison - Theoretical vs. Real Storm Events



# Storm Comparison - Theoretical vs. Real Storm Events



# By creating & maintaining a Stormwater Digital Twin, we can:

- Better assess water quality and develop BMP strategies to meet state and local water quality goals



**What If...**

# What If...

- **You had an accurate & up to date 3D model of the entire landscape?**





# What If...

- **You had all storm sewers located & knew their sizes and inverts?**





# What If...

- You had all roadway, railroad culverts AND driveway culverts located & measured?



# What If...

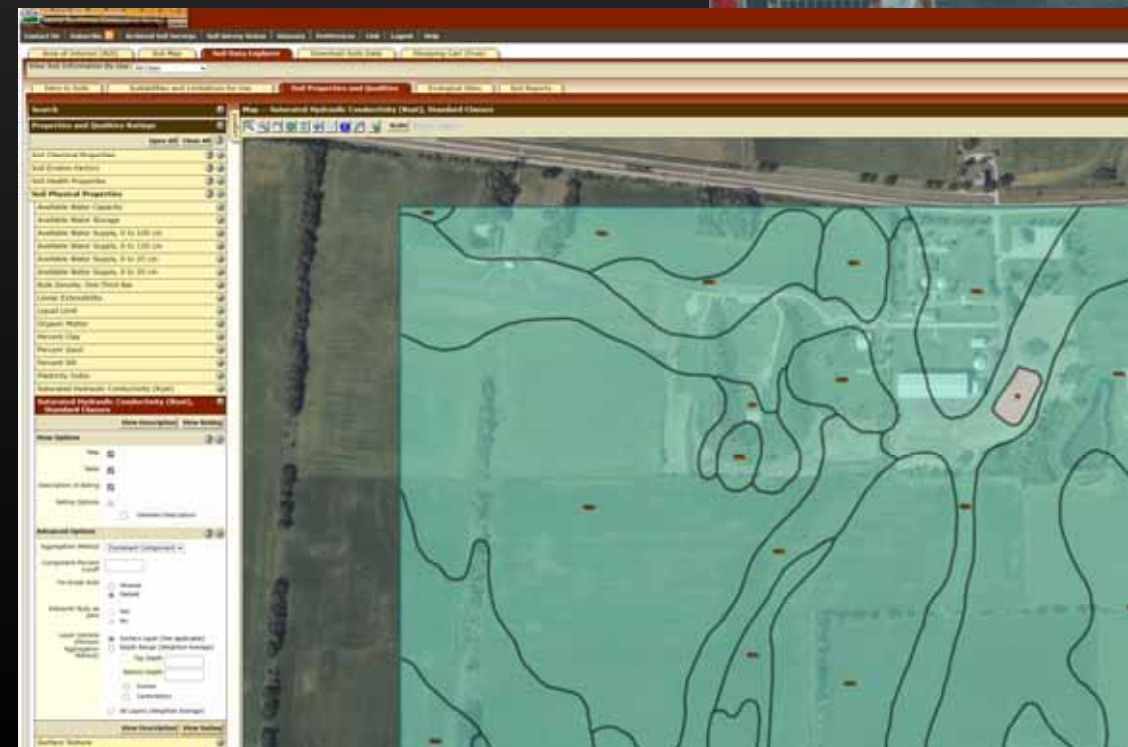
- You had every catch basin, inlet, manhole and flared end section identified? Location, frame type, lid type, etc.





# What If...

- You had impervious surfaces mapped?
- You knew the soil properties?





# Building a Stormwater Digital Twin for Kane County

## Deliverables – GIS Layers

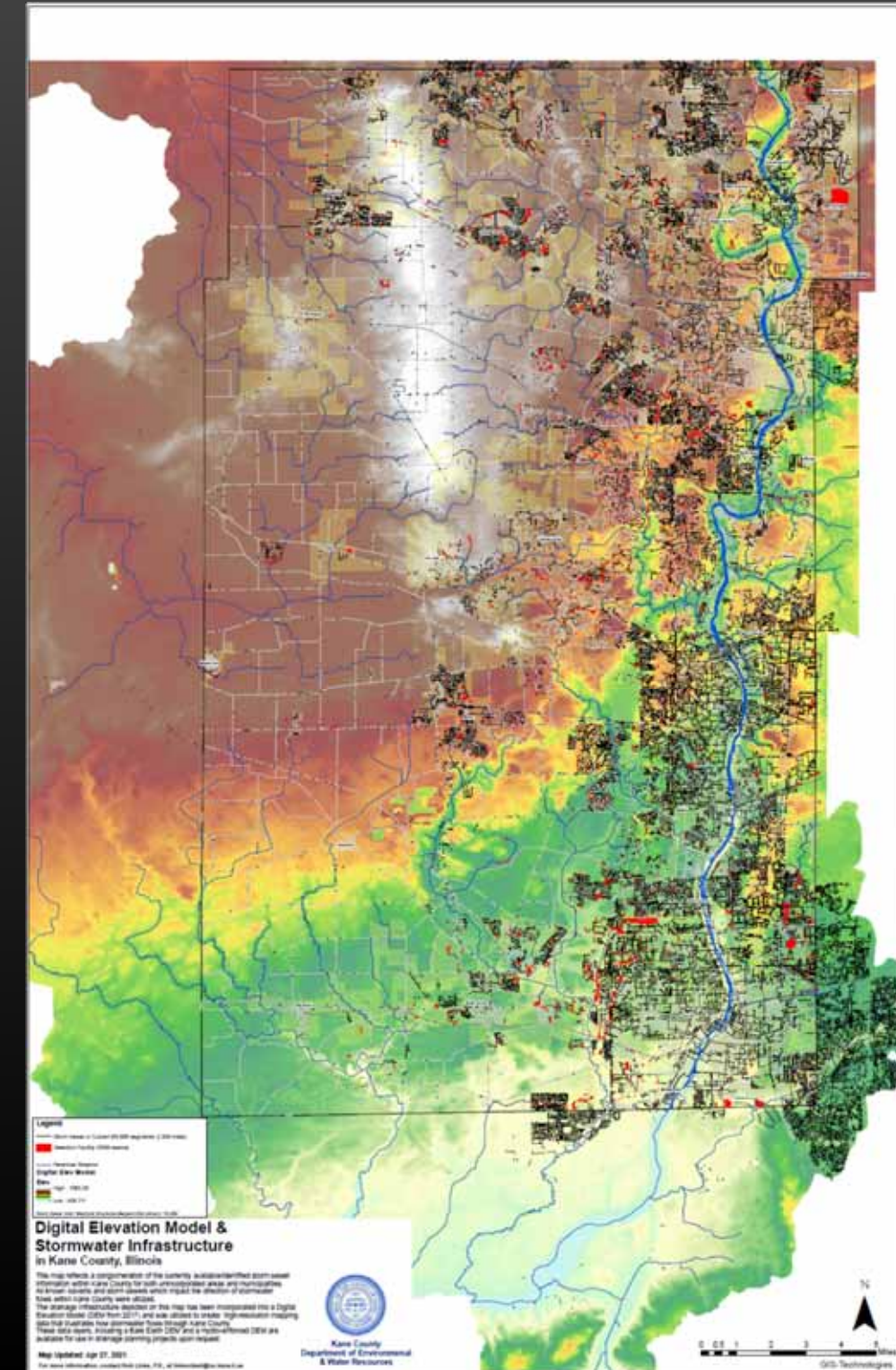
- Stormwater Detention Basins
- Storm sewers, roadway, railroad & driveway culverts
- Storm structures – catch basins, inlets, manholes, etc.
- Countywide storm flow path network
- Potential Flood Inundation Areas & True Depressional Storage Areas
- Bare Earth Digital Elevation Model
- Hydro-enforced Digital Elevation Model

## ~~Deliverables – PDF Maps~~

- ~~• By Township; Showing stormwater basins, storm sewer, culverts, storm flow paths, regulatory floodplain, depressional storage areas, areas potentially vulnerable to urban flooding, hydric soils, ADID wetlands, dams, etc.~~

## ➔ Deliverables – On-line Interactive GIS Maps

## ➔ Deliverables – Real Time Flow Trace & Watershed Tools

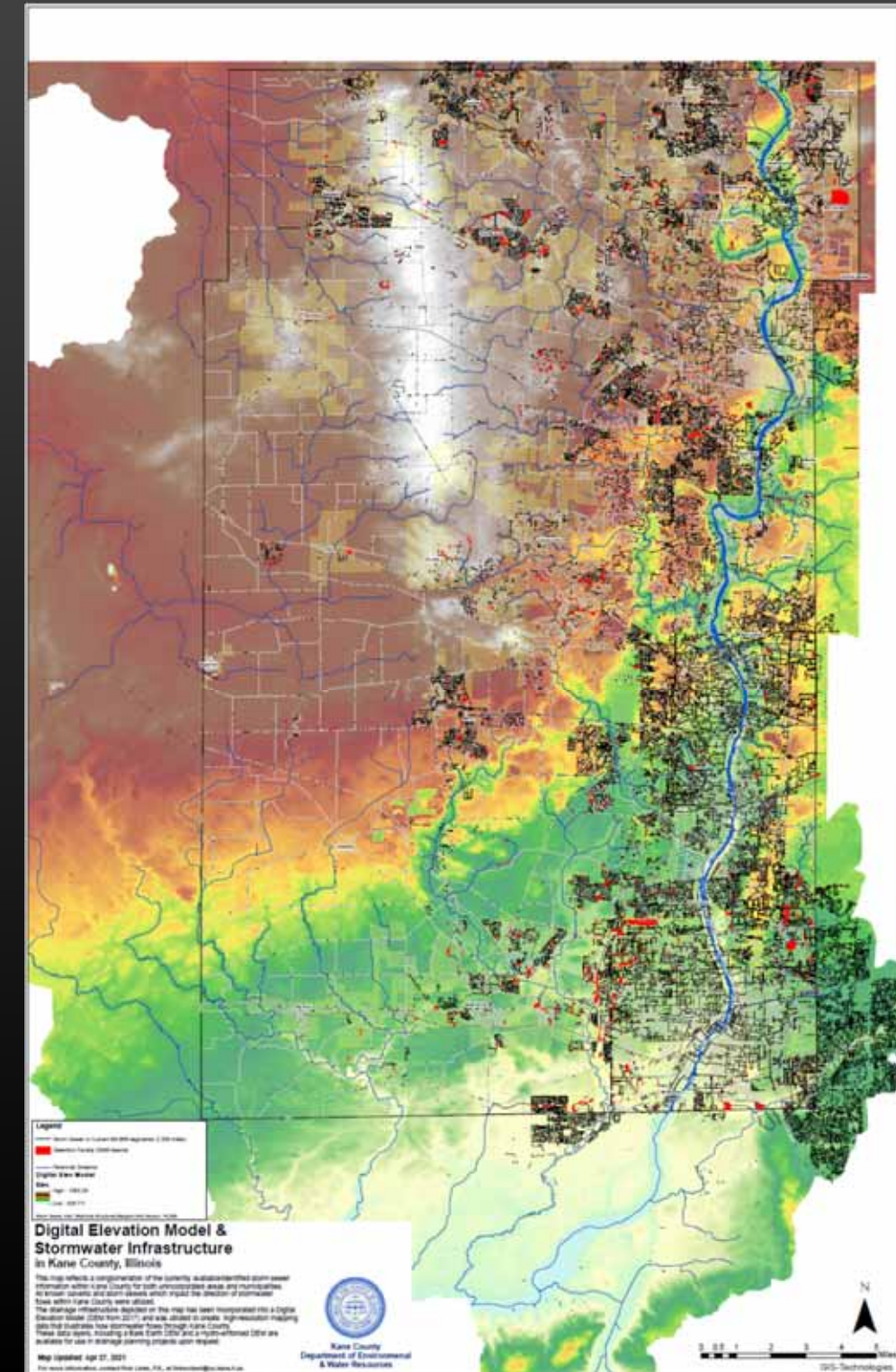




# Building a Stormwater Digital Twin for Kane County

## Data, Maps & Tools can be used for:

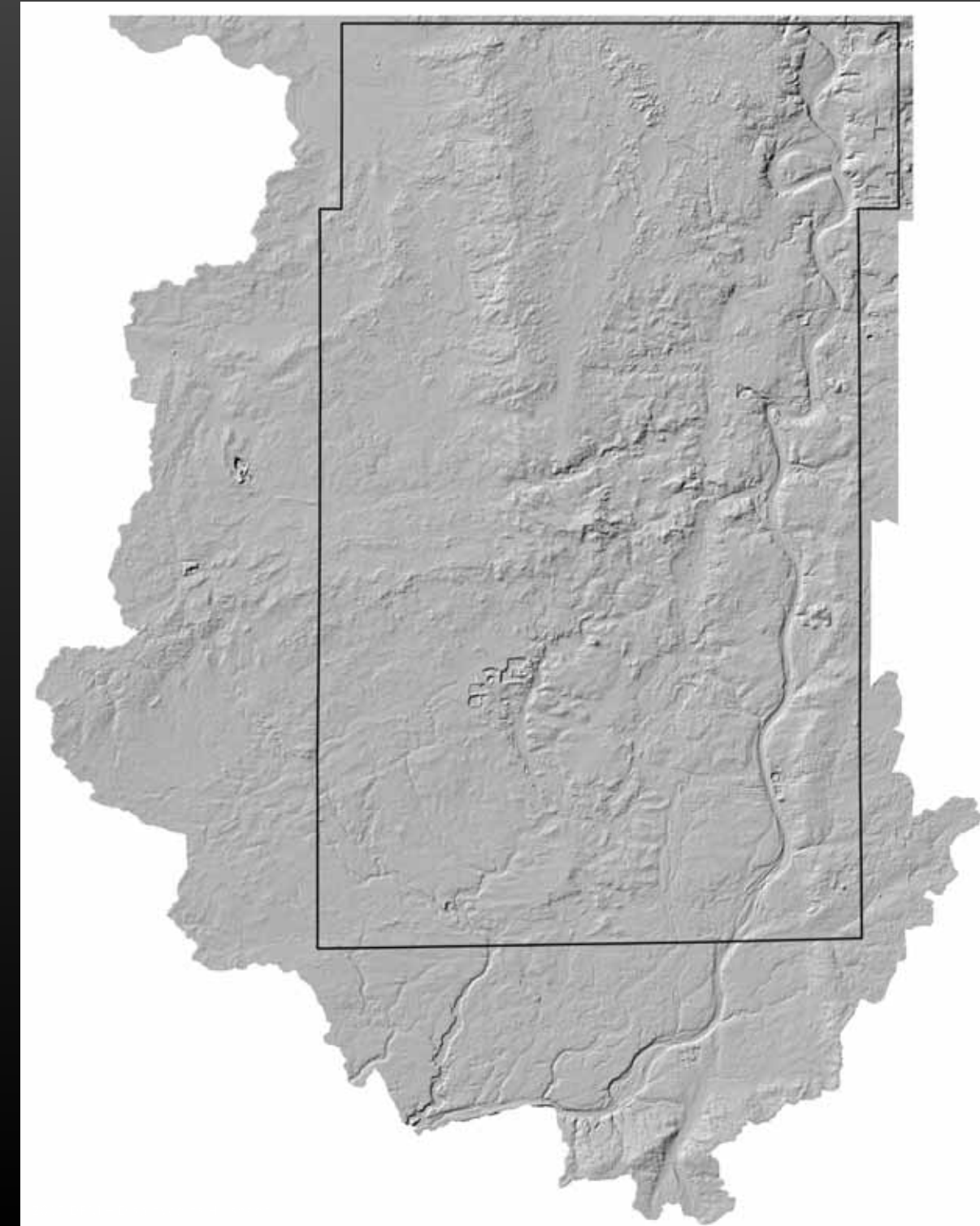
- Drainage Investigations
- Stormwater Permitting
- Watershed Planning
- Stormwater Modeling & Master Planning
- Floodplain Modeling & Remapping
- MS4 Illicit Discharge Tracing
- Hazard Mitigation Planning
- Public Education / Outreach to increase stormwater awareness



# Making the Layers that Drive the Tools

## Digital Elevation Model

- Derived from LiDAR points flown Spring 2017
  - 20 points per square meter;
  - 0.2ft +/- Vertical Resolution (on hard surfaces)
- 2ft X 2ft Horizontal Resolution
- 30.8 miles E-W by 39.3 miles N-S
- 832 sq. miles (Kane County = 524 sq. mi.)
- 5.8 Billion Pixels





# Making the Layers that Drive the Tools

Aerial Imagery

Streams

Detention Ponds

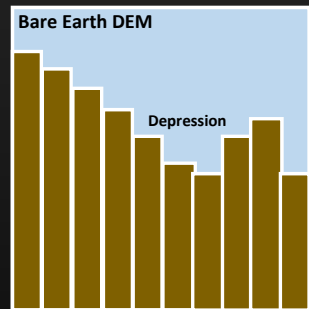




# Making the Layers that Drive the Tools

## 2017 Digital Elevation Model

- **Bare Earth DEM**
  - Bridge decks removed
  - Buildings removed
- **Hydro-flattened**
  - Water surface made flat
- **Underground sewers & culverts are NOT reflected in the DEM**

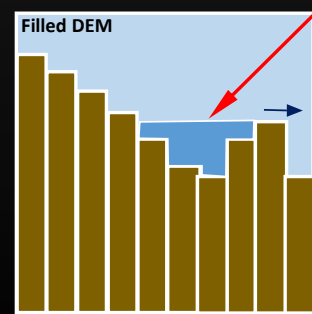
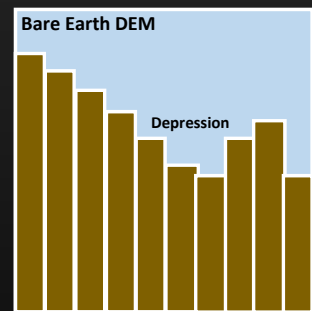




# Making the Layers that Drive the Tools

## 2017 Digital Elevation Model

- "Filled" DEM or "Depressionless" DEM



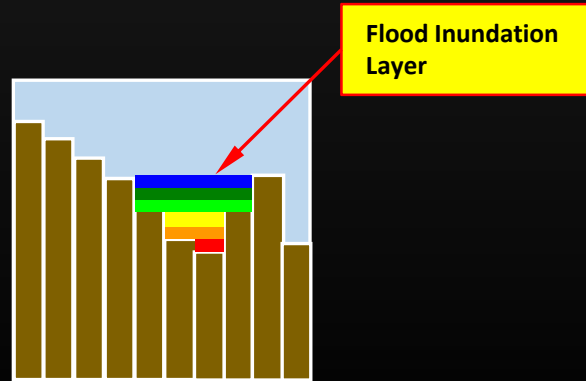
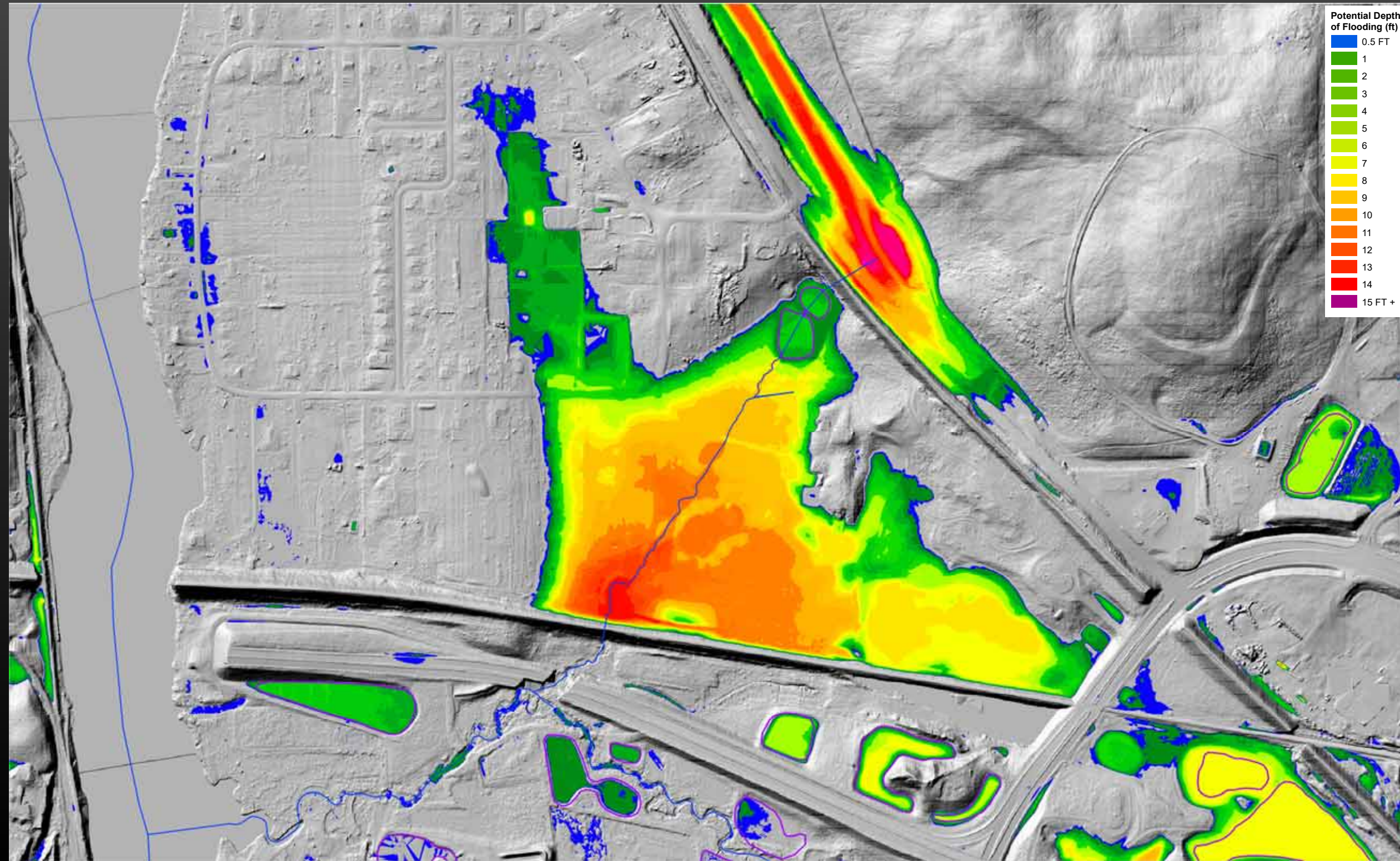
Depression  
"filled" in





# Making the Layers that Drive the Tools

Comparing Bare Earth DEM to the Filled DEM to generate a Flood Inundation Layer





# Making the Layers that Drive the Tools

## Flood Inundation Layer displayed over aerial photography

Aids in identifying & visualizing potential urban flooding problems.

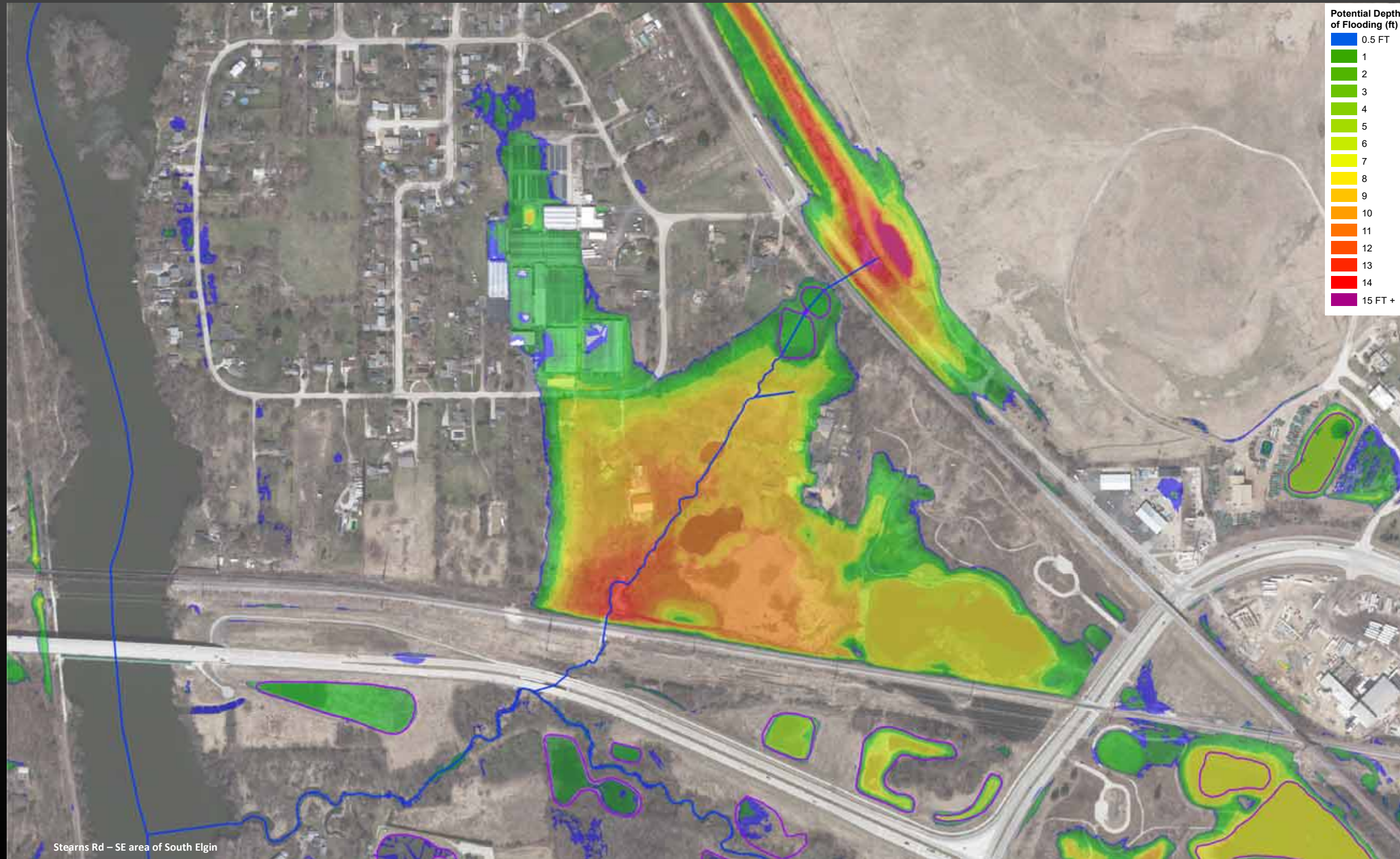
Helps answer questions:

“How deep could the water get around that house?”

“How deep could the water get on our street if the storm sewer failed during a storm & could it impact emergency vehicle access during a flood?”

This summer the dataset will answer:

“How many acre-feet of stormwater is stored in our detention basins & in those potential flood areas?”





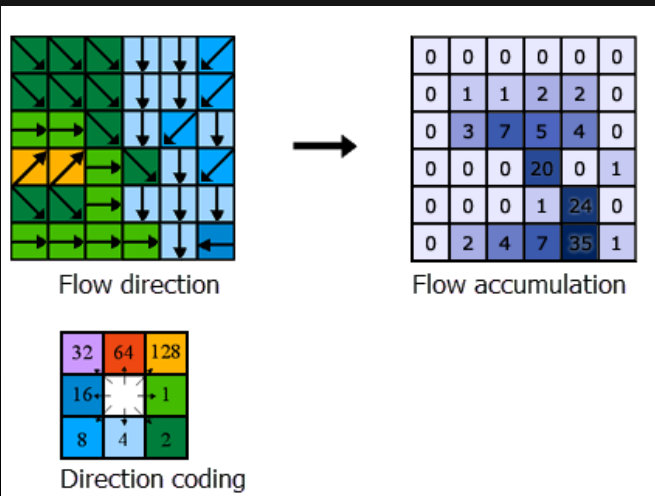
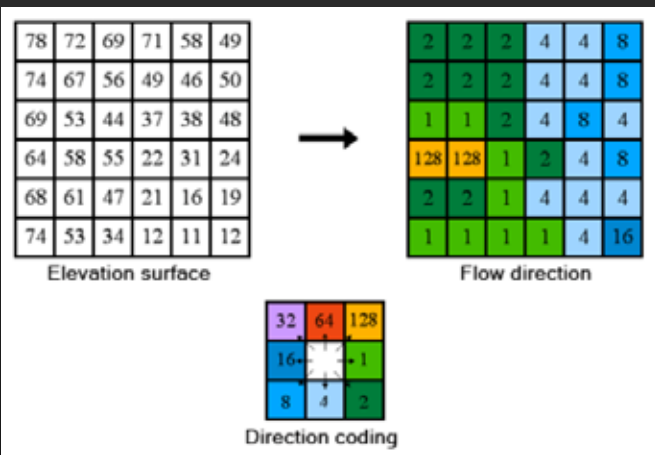
# Making the Layers that Drive the Tools

## Developing an accurate Storm Path Network

Storm flow path without manmade drainage infrastructure incorporated into DEM



Culvert not represented in DEM





# Making the Layers that Drive the Tools

Developing an accurate  
Storm Path Network

Manmade drainage  
infrastructure & stream  
centerlines to be  
incorporated into Bare  
Earth DEM

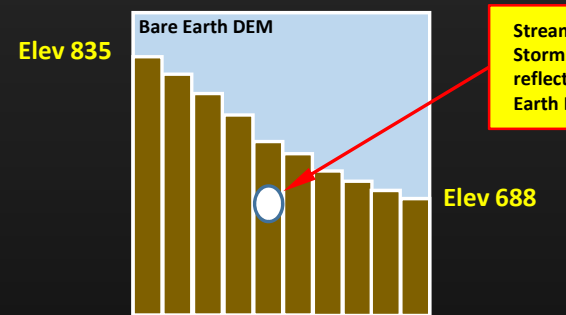




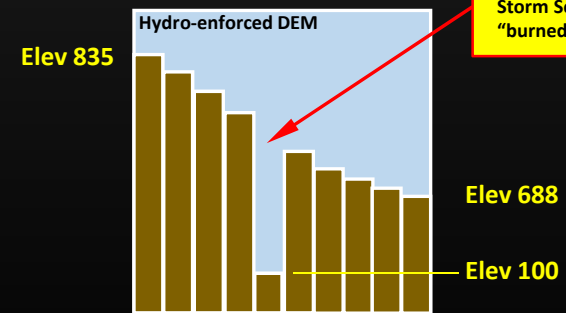
# Making the Layers that Drive the Tools

## Developing an accurate Storm Path Network

Manmade drainage infrastructure & stream centerlines "burned" into Bare Earth DEM



Stream / Culvert / Storm Sewer (not reflected in Bare Earth DEM)



Stream / Culvert / Storm Sewer "burned" into DEM



# Making the Layers that Drive the Tools

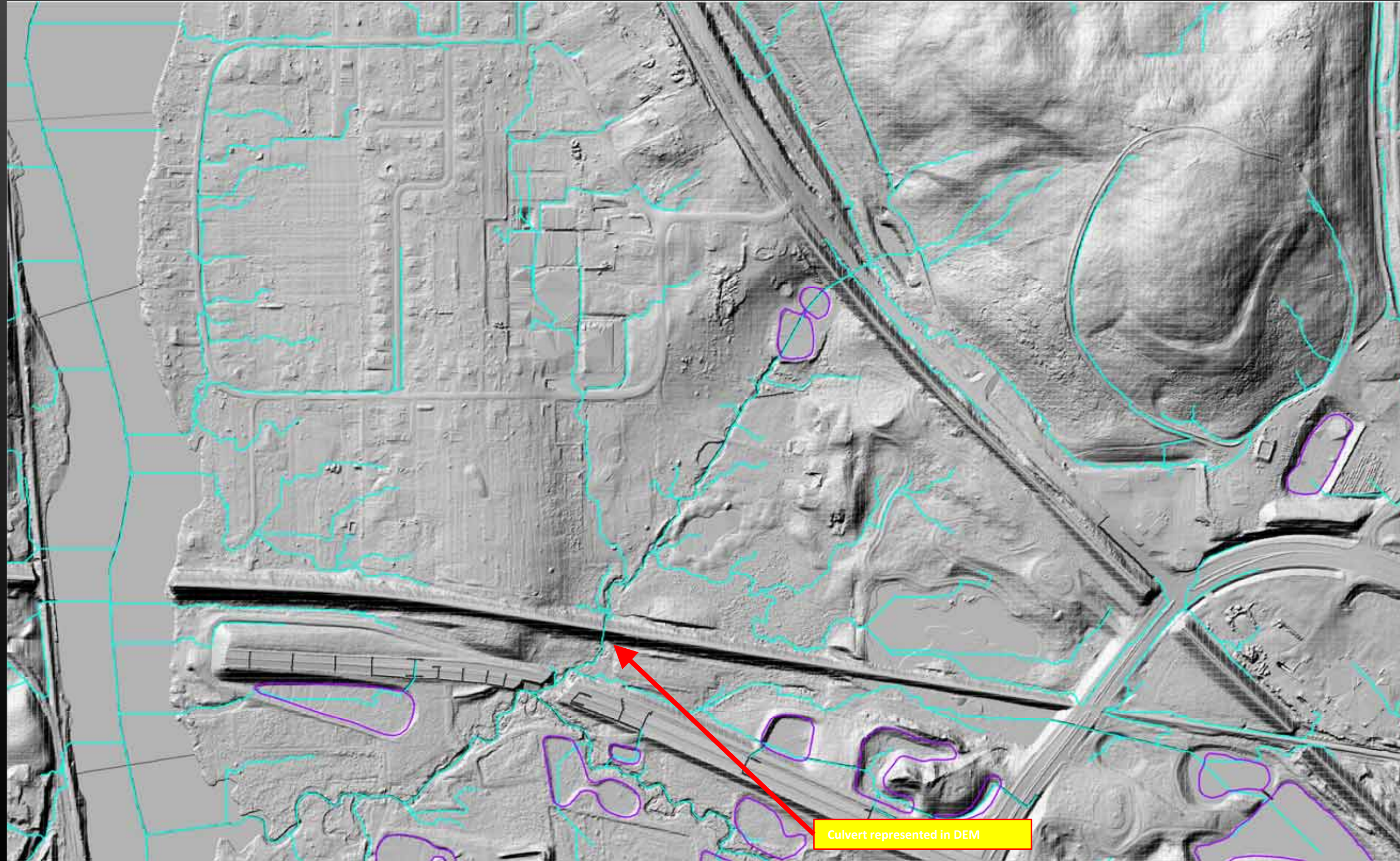
Developing an accurate Storm Path Network

Burning the drainage infrastructure into the Bare Earth DEM creates a hydro-enforced Digital Elevation Model

Storm flow path WITH manmade drainage infrastructure incorporated into DEM



Resolution of Storm Path Network can be adjusted to any drainage area threshold desired (this image shows 1 acre threshold)

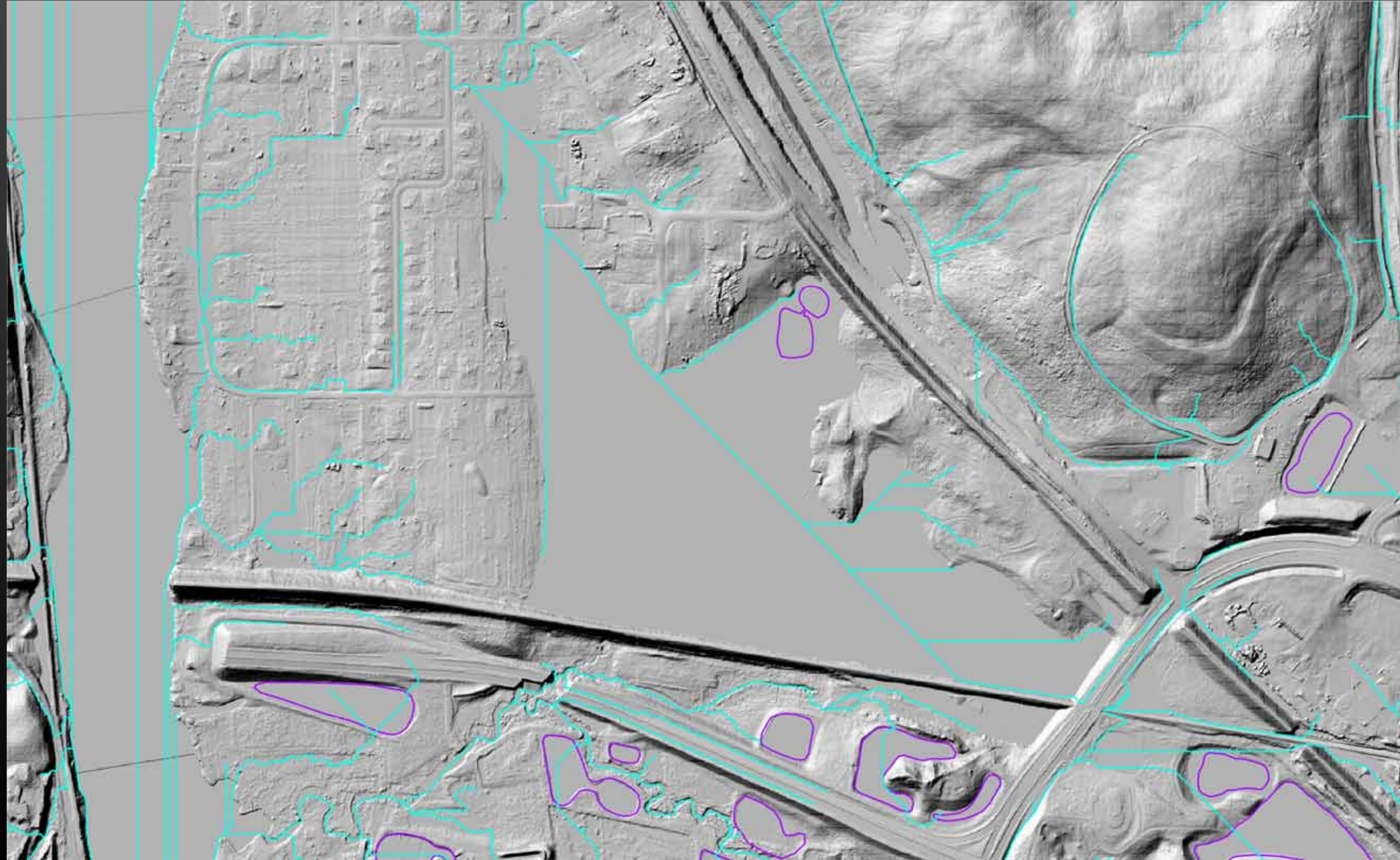




# Making the Layers that Drive the Tools

No hydro-enforcement

Not necessarily an incorrect Storm Path Network – but a Storm Path Network that sheds light on how stormwater may flow during extreme events if parts of the underground drainage infrastructure fails.



# Building a Stormwater Digital Twin for Kane County

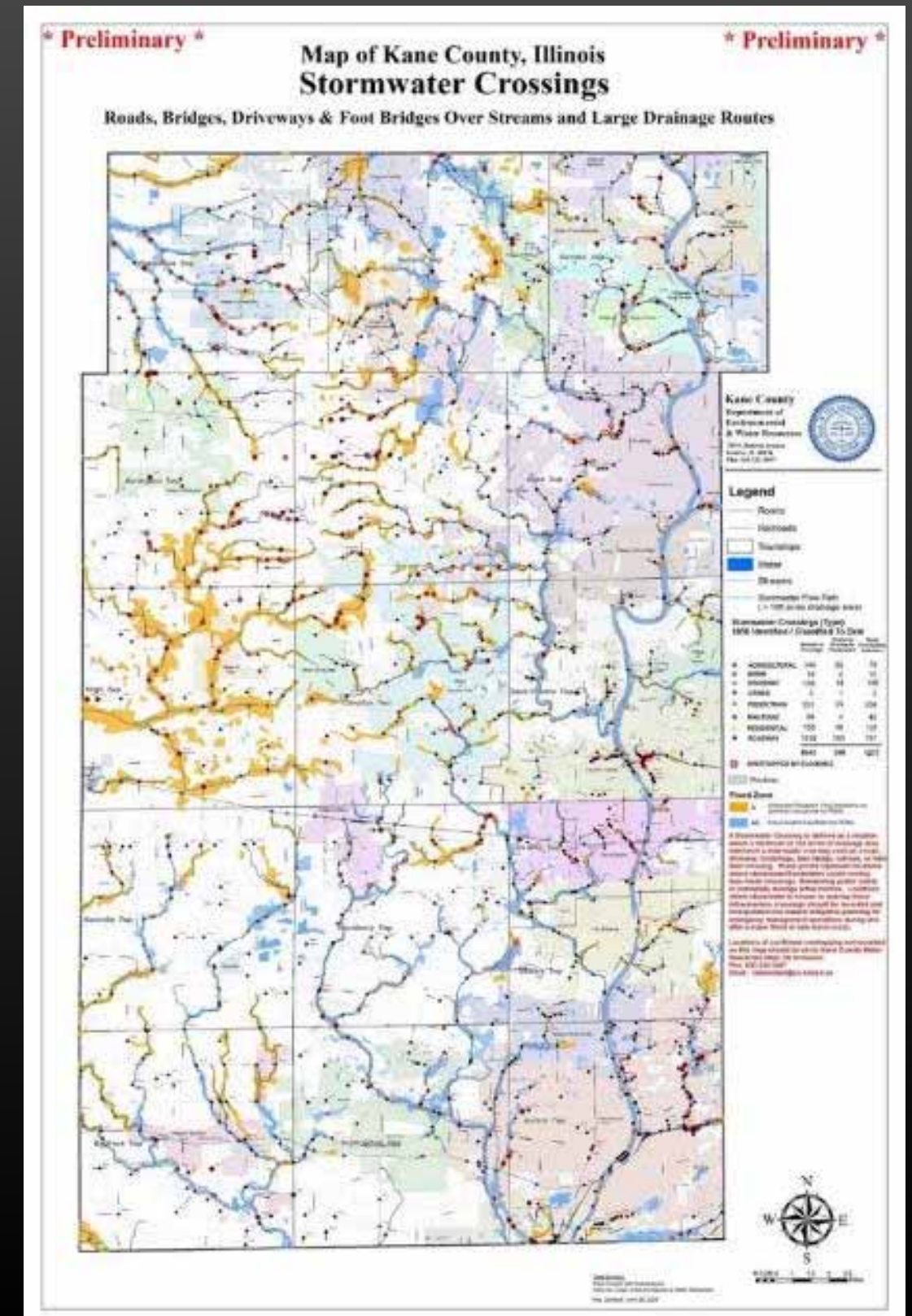
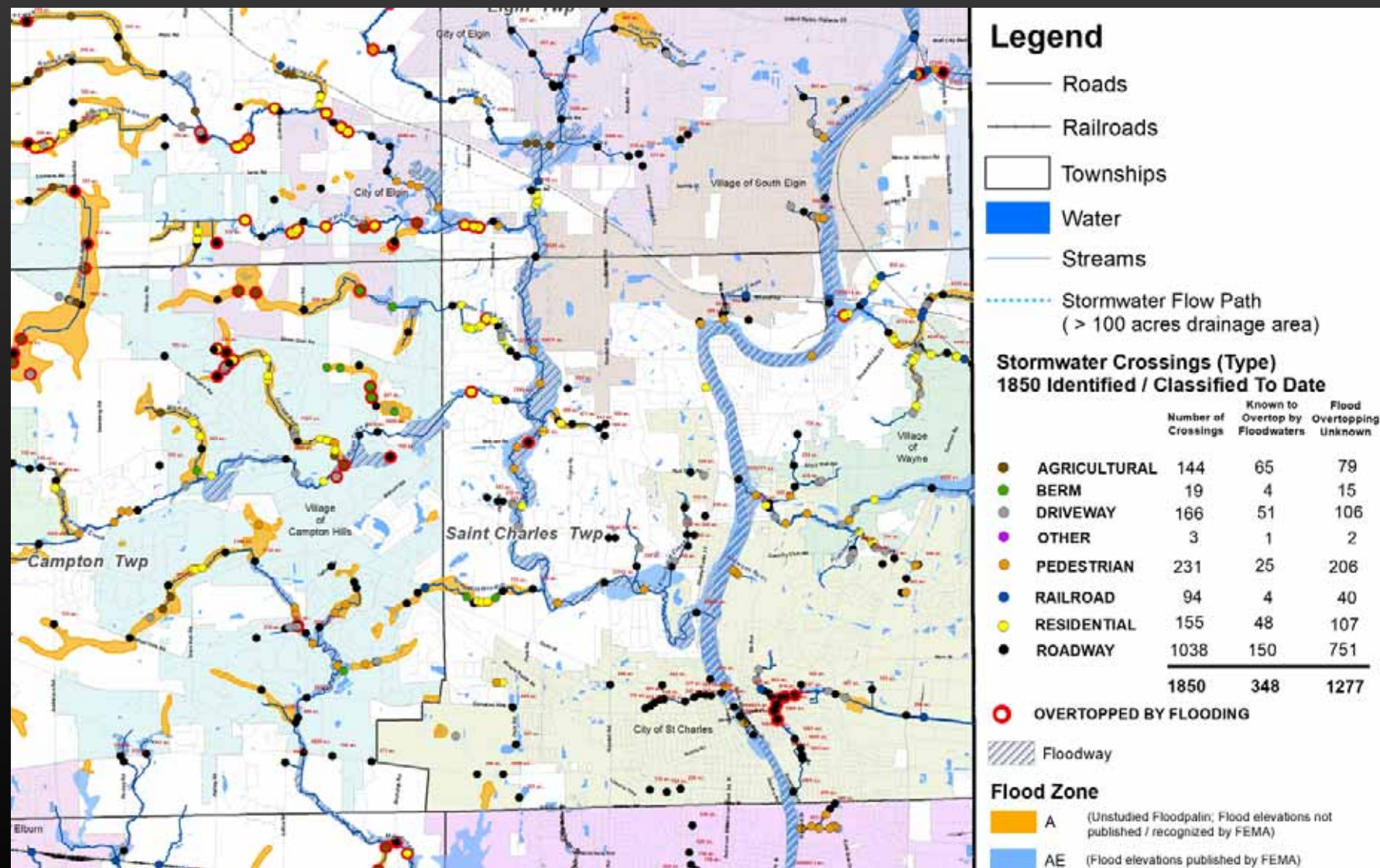
## Other Derivatives from this initiative:

- **Stormwater Crossings (Preliminary)**
- **BMP Mapping Tools (Future Work)**



# Building a Stormwater Digital Twin for Kane County

## Stormwater Crossings





# Building a Stormwater Digital Twin for Kane County

## Local Water Quality Goals

### FOX RIVER IMPLEMENTATION PLAN (FRIP) *Final Draft*

December 2022

#### EXECUTIVE SUMMARY

The Fox River Study Group (FRSG) began meeting in the summer of 2001 after the Illinois Environmental Protection Agency (Illinois EPA) added the Fox River to its list of impaired waters under Section 303(d) of the Clean Water Act. Communities along the Fox River are required to address water quality issues identified by Illinois EPA. The Fox River Implementation Plan (FRIP) was first developed in 2015 to address phosphorus-related dissolved oxygen (DO) and nuisance algae impairments in a 98-mile stretch of the Fox River in Illinois (FRSG, 2015). This document is an update of the FRIP and is based on a new river model framework and recent water quality studies. The major findings of the 2022 FRIP are:



Algae bloom on the Fox River in 2012. Photo Credit: Karen Clementi

- Major wastewater treatment plants (WWTPs) should proceed with capital improvements to achieve a 0.5 milligram per liter (mg/L) annual geometric mean total phosphorus (TP) limit by 2030;
- The FRSG should focus on collaborating with partners to support removal of dams along the mainstem river and monitor the resulting water quality impacts after the U.S. Army Corps of Engineers completes the Fox River Connectivity & Habitat Study (anticipated in 2024);
- **The FRSG should encourage state-of-the-art watershed management practices that can mitigate the impact of projected population growth in the FRIP Study Area;**
- The FRSG should continue to support and direct research into nutrient control and management in the watershed, both natural and anthropogenic. The FRSG should leverage statewide work on evaluation of streambank erosion and quantify its impact on phosphorus loads in the watershed;

#### 4.4.6 MS4 Spreadsheet Tool Update

The 2015 FRIP included the development of an MS4 spreadsheet tool to calculate phosphorus load reductions resulting from BMPs implemented in the tributary watersheds. The following updates should be made to the MS4 spreadsheet tool:

- Updated estimated unit area loadings for phosphorus based on the HSPF model outputs for the period of 2012 to 2016
- Development of a web-based platform for the load calculations
- Incorporation of load reduction calculations for total nitrogen and TSS
- Incorporation of reporting features that auto generate an annual report on proposed and completed projects for submittal to regulatory agencies

The FRSG and member communities can use this tool in several ways to support planning, implementation, and reporting requirements for FRIP projects including:

1. Documenting annual load reductions from completed projects for annual reports to Illinois EPA.
2. Assessing how new and individual site development opportunities can alter nonpoint source loading.
3. Assessing how a community could allocate resources to offset development and reduce community aggregate loading or loads in a specific area (industrial park, near river area, etc.).

To maximize the benefits of such a tool, the FRSG will need to coordinate with member communities to collect and maintain sufficient data and information for landscape-based improvement and development projects.

### FOX RIVER IMPLEMENTATION PLAN (FRIP)

*Final Draft*

**Fox River, IL**

Submitted to



Submitted by

**Geosyntec**  
consultants

engineers | scientists | innovators



# Building a Stormwater Digital Twin for Kane County

## BMP Mapping

OC stormwater tools | Inventory Module

BMP Inventory | Program Info

TREATMENT BMPs FIND A BMP

Use the map, search box, and filters to locate a BMP. If you are on a mobile device, you can use the "Find nearby BMPs" button.

OC-UGI-WQ140012-3

Find nearby BMPs

Filter by BMP Type: 25 of 25 selected

Filter by Jurisdiction: 12 of 12 selected

BMPs in Map View

- OC-HU-WQ140012-1  
Children for Harvest and Use
- OC-INL-WQ140012-2  
Inlet and Pipe Screens
- OC-INL-WQ140012-4  
Inlet and Pipe Screens
- OC-UGI-WQ140012-3**  
Underground Infiltration

OC-UGI-WQ140012-3

- Type: Underground Infiltration
- Jurisdiction: County of Orange
- Water Quality Management Plan: WQ14-0012
- Notes: Storm chamber on 9' x 14' x 8" gravel base

6/30/22

View Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU Affero General Public License as published by the Free Software Foundation. Disclaimers, copyright, and source code are available here.

TREATMENT BMPs OC-UGI-WQ140012-3

Basics

- Name: OC-UGI-WQ140012-3
- Type: Underground Infiltration
- Jurisdiction: County of Orange
- Owner: Private - WQMP

Year Built: Unknown

ID in System of Record: WQ140012-3

Water Quality Management Plan: WQ14-0012

Sizing Basis: Not Provided

Trash Capture Status: Not Provided

Required Lifespan of Installation: Unknown

Required Field Visits Per Year: Unknown

Required Post-Storm Field Visits Per Year: Unknown

Notes: Storm chamber on 9' x 14' x 8" gravel base

Images

Location

Performance / Modeling Attributes

Attribute	Value
Watershed	Newport Bay
Total Effective BMP Volume	92 cu ft
Infiltration Surface Area	135 sq ft
Underlying Infiltration Rate	0.39 in/hr
Dry Weather Flow Override?	No - As Modeled

Modeled BMP Performance

Total Dry Wet

Water Balance Components	Volume (cu-ft/yr)	Percent of Inflow
To BMP	0	0%
Treated and Discharged	0	0%
Retained or Recycled	0	0%
Untreated (Bypass or Overflow)	0	0%

Pollutant	Load Reduced	Percent Reduced
Total Suspended Solids	0 lbs	0%

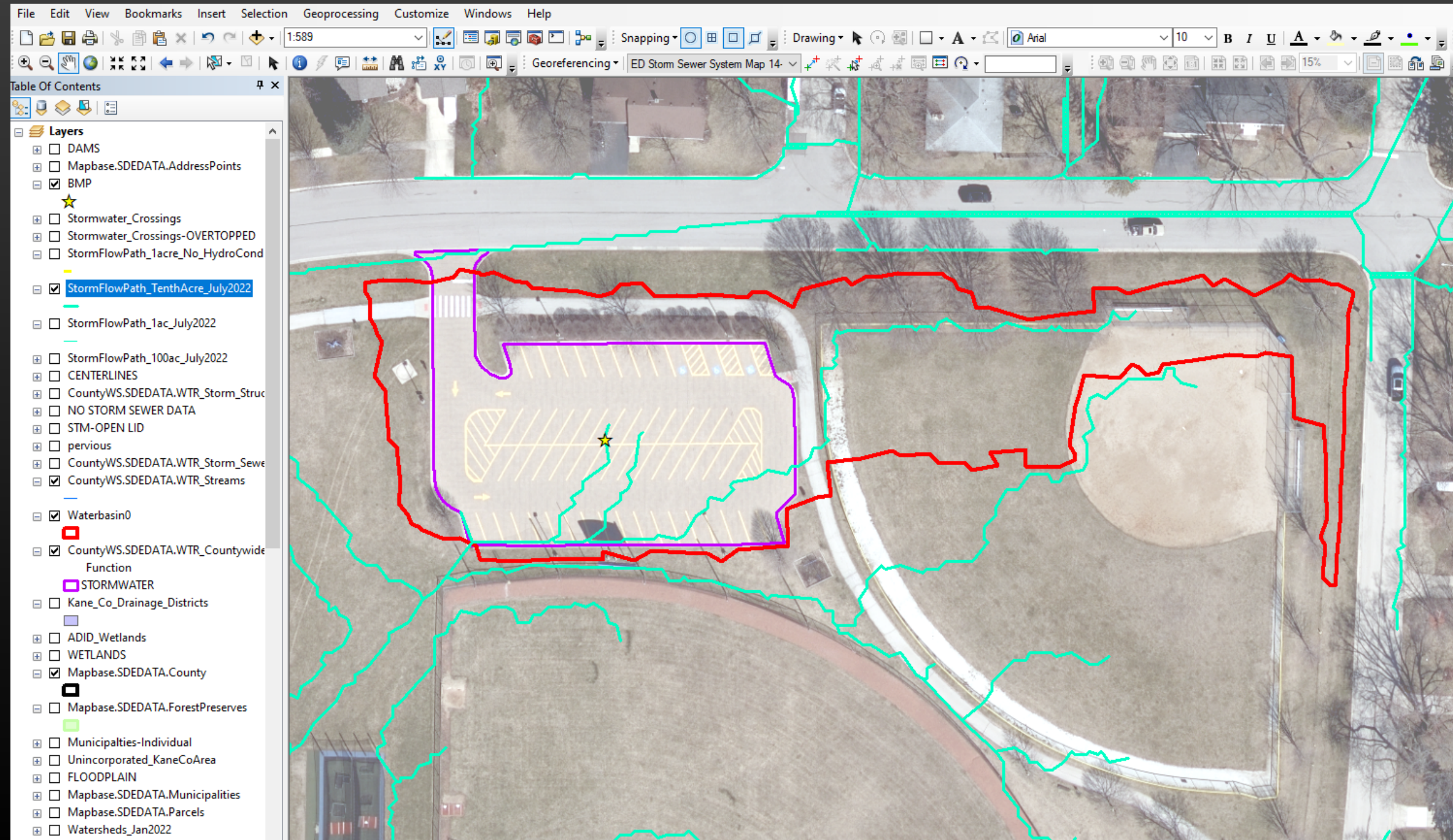
Drainage Area Land Uses

Land Use	Area (ac)	Impervious Area (ac)
Residential - Multifamily	0.03	0.02
Transportation - Local Road	0.06	0.03



# Building a Stormwater Digital Twin for Kane County

## BMP Mapping





# Kane County Stormwater Viewer

## Stormwater Infrastructure Mapping & Tools



Kane County Department of Environmental & Water Resources, working with Kane County GIS Technologies Department has published a set of stormwater mapping layers and tools to help planners, engineers, emergency responders and the general public better understand how stormwater moves through Kane County. These layers include infrastructure features such as storm sewers, culverts, drain tiles, detention basins and represent the best available data. Additionally, storm flow paths and areas of potential flood inundation have been mapped and are included as informational stormwater layers. Accessing these layers on the County's Stormwater Viewer is outlined in the accompanying slides.



# Accessing the Map

The screenshot shows the Kane County, Illinois website. At the top left, the URL 'kanecountyil.gov' is visible. The main header features the Kane County logo and the text 'KANE COUNTY, ILLINOIS ESTABLISHED JANUARY 16, 1836'. To the right of the header are links for 'How Do I' and 'Translate', along with a search bar. Below the header is a dark blue navigation bar with the following menu items: GOVERNMENT, CALENDAR, SERVICES A-Z, BUSINESS, COMMUNITIES, PERMITS, and MAPS. A red arrow points to the 'MAPS' link. Below the navigation bar is a large banner image of a snowy forest. Underneath the banner is a row of seven circular icons representing various services: Property Tax Information, Voter Information, Recycling, Going to Court, Kane County Employment, Adopt a Pet, and Transparency. A second red arrow points to the 'MAPS' link in the navigation bar. Below the icons is a section titled 'Kane County Connects' with four featured articles: 'Homeless Student Enrollment in Kane County', 'Almost 500 Community Members Trained in CPR and Blood Loss by Kane County', 'Osprey Nesting Platform Installed at Dick Young Forest Preserve', and 'March Calendar of Meetings for the Kane County Board'. At the bottom of the page, there is a 'Live Streaming' section with icons for 'County Government' and 'Forest Preserve'. Below this are two columns: 'Meetings' and 'Media Releases'. The 'Meetings' section includes a photo of Corinne Pierog and a list of upcoming meetings: 'Request to Speak' (Mar 12, 8:30am, Forest Preserve), 'Greetings from Madam Chair Corinne Pierog' (Mar 12, 9:45am, County Board), and 'Zoning Board of Appeals' (Mar 12, 7:00pm). The 'Media Releases' section lists several recent releases from 03/06/2024 and 03/05/2024.

kanecountyil.gov

KANE COUNTY, ILLINOIS  
ESTABLISHED JANUARY 16, 1836

How Do I Translate

Search

GOVERNMENT CALENDAR SERVICES A-Z BUSINESS COMMUNITIES PERMITS MAPS

Property Tax Information Voter Information Recycling Going to Court Kane County Employment Adopt a Pet Transparency

### Kane County Connects

HOMELESS ENROLLMENT BY DISTRICT (ACTUAL)

District	2023	2022	2021
101	100	100	100
102	100	100	100
103	100	100	100
104	100	100	100
105	100	100	100
106	100	100	100
107	100	100	100
108	100	100	100
109	100	100	100
110	100	100	100
111	100	100	100
112	100	100	100
113	100	100	100
114	100	100	100
115	100	100	100
116	100	100	100
117	100	100	100
118	100	100	100
119	100	100	100
120	100	100	100
121	100	100	100
122	100	100	100
123	100	100	100
124	100	100	100
125	100	100	100
126	100	100	100
127	100	100	100
128	100	100	100
129	100	100	100
130	100	100	100
131	100	100	100
132	100	100	100
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134	100	100	100
135	100	100	100
136	100	100	100
137	100	100	100
138	100	100	100
139	100	100	100
140	100	100	100
141	100	100	100
142	100	100	100
143	100	100	100
144	100	100	100
145	100	100	100
146	100	100	100
147	100	100	100
148	100	100	100
149	100	100	100
150	100	100	100

Homeless Student Enrollment in Kane County

Almost 500 Community Members Trained in CPR and Blood Loss by Kane County

Osprey Nesting Platform Installed at Dick Young Forest Preserve

March Calendar of Meetings for the Kane County Board

Live Streaming: County Government Forest Preserve

### Meetings

Request to Speak

Mar 12 8:30am Forest Preserve

Mar 12 9:45am County Board

Mar 12 7:00pm Zoning Board of Appeals

### Media Releases

03/06/2024 Kane County Health Department and Elgin Schools Partner to Prevent Youth Vaping in 55 Schools


03/06/2024 Kane County Health Department and Sheriff's Office Train 471 Community Members in CPR and Stop the Bleed in February

03/06/2024 Tune In Online for an In-Depth Look at Bobcats in Illinois

03/05/2024 Spring Adventures for Little Ones at Creek Bend Nature Center

# Accessing the Map

kanecountylil.gov/Pages/Maps.aspx

 **KANE COUNTY, ILLINOIS**  
ESTABLISHED JANUARY 16, 1836

How Do I Translate

Search

GOVERNMENT CALENDAR SERVICES A-Z BUSINESS COMMUNITIES PERMITS MAPS

## Kane County Maps

The following are links to a variety of informational county maps.












Use the maps provided by GIS Technologies below to search for locations by either address, parcel, district, polling place, forest preserve, municipality, or county facility.

For questions or further information: 630-208-8655.

**Map Links**

- [Kane County Facilities and Directions - Google Maps](#)
- [Kane County Highway Map](#)
- [Kane/Northern Kendall Bicycle Map](#)
- [Kane County Government Center Campus](#)
- [Kane County Illinois Census 2020 Demographics](#)
- [Kane County - UIRVDA](#)
- [Individual Maps for all 24 Board Districts](#)
- [2021 Redistricting Maps Page](#)
- [2021 Kane County Board District Map Adopted November 30, 2021 Packet](#)
- [GIS County Board Districts Interactive Map](#)

GIS Interactive Maps

 a.) KaneGIS3 Viewer	 b.) KaneGIS4 Viewer	 c.) Kane County District Maps	 d.) Transportation Maps
 e.) Zoning Atlas	 f.) Kane County 2040 Land Use	 g.) Kane County Landmark	 h.) Floodplain Maps and Res...
 i.) StormWater Viewer	 j.) Health Department Apps	 k.) Facility Maps	



# Navigating the Map

KaneGIS Storm Water Tools

Map Aerials Hybrid LidAR


Find Address, Pin, Scale

Please enter a search term.

Developed by GIS-Technologies

About Help Storm Water Tools Layers

### Kane County's Storm Water Viewer



This enterprise GIS map viewer was created by GIS-Technologies a division of the Information Technologies department. This viewer was developed using HTML5, ESRI's, ARCGIS JAVASCRIPT API, and ESRI Experience Builder.

[Disclaimer](#)

I agree to the above terms and conditions [OK](#)

County Layers Disclaimer

These layers do not represent a survey. No accuracy is assumed for the data delineated herein, either as presented or imported by Kane County or its employees. These layers are compiled from official records, including plats, surveys, recorded deeds, and contracts, and only contains information required for local government purposes. See the recorded documents for more detailed legal information.

MASA, UTIGS, EPA, NPS, USDA, USFWS

Powered by Esri



# Navigating the Map





# Navigating the Map

1. Turn on aerial photo  
2. Use mouse thumbwheel and left button to zoom in and pan to desired area of interest)

2. Access map layers here

3. Access stormwater layers here

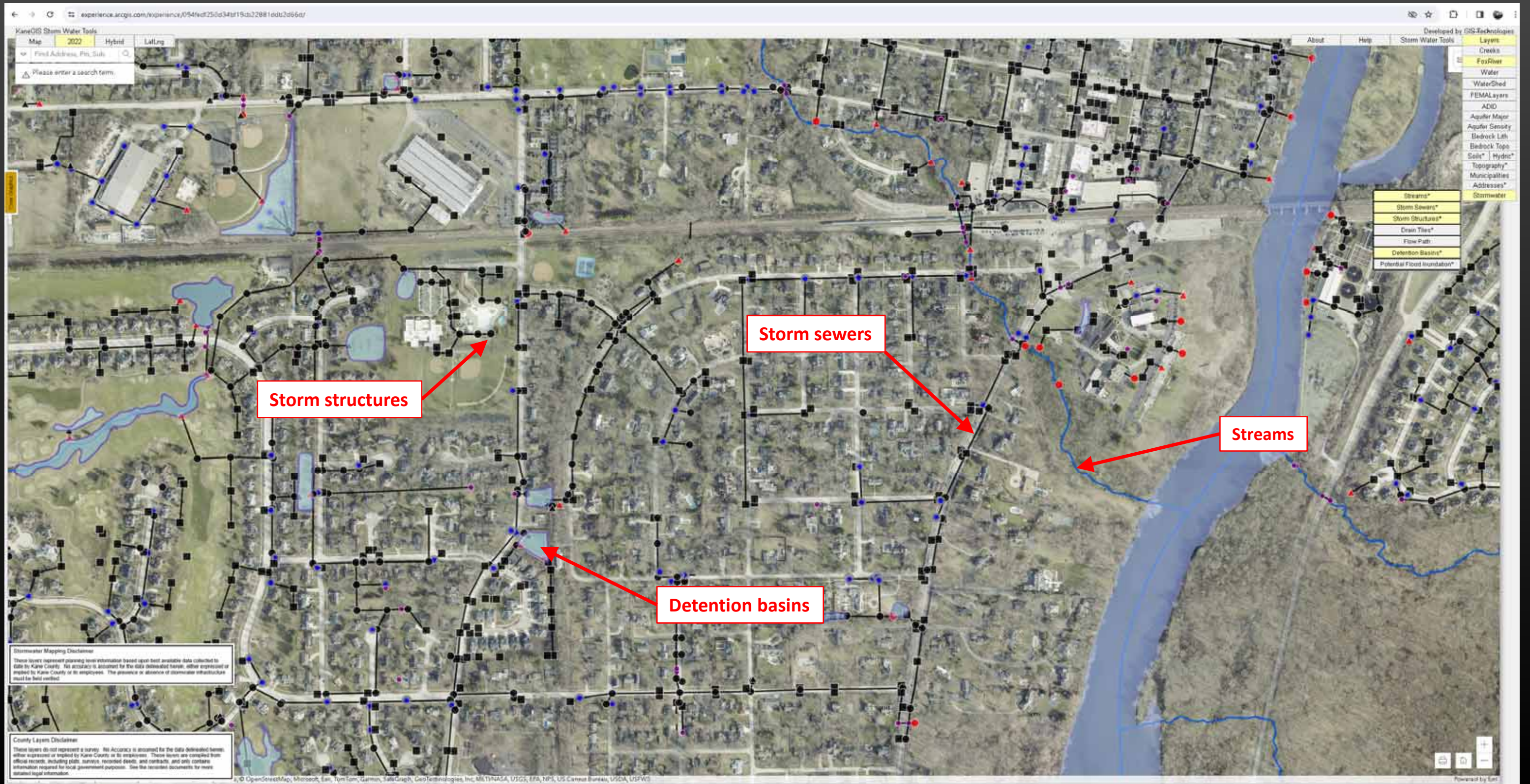
Stormwater Mapping Disclaimer  
These layers represent planning level information based upon best available data collected to date by Korte County. No accuracy is assumed for the data delineated herein, either expressed or implied by Korte County or its employees. The presence or absence of stormwater infrastructure must be field verified.

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Powered by Esri

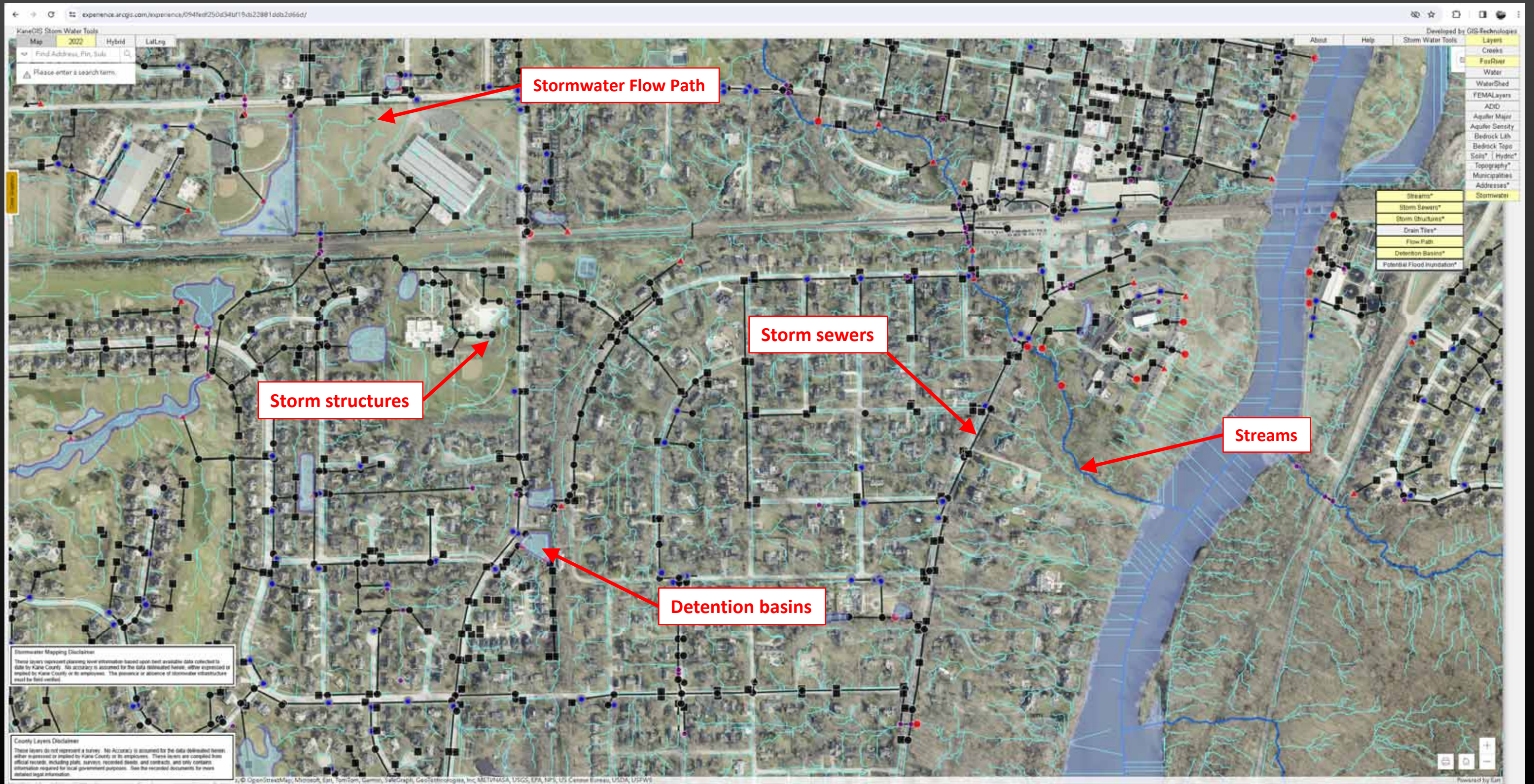


# Navigating the Map



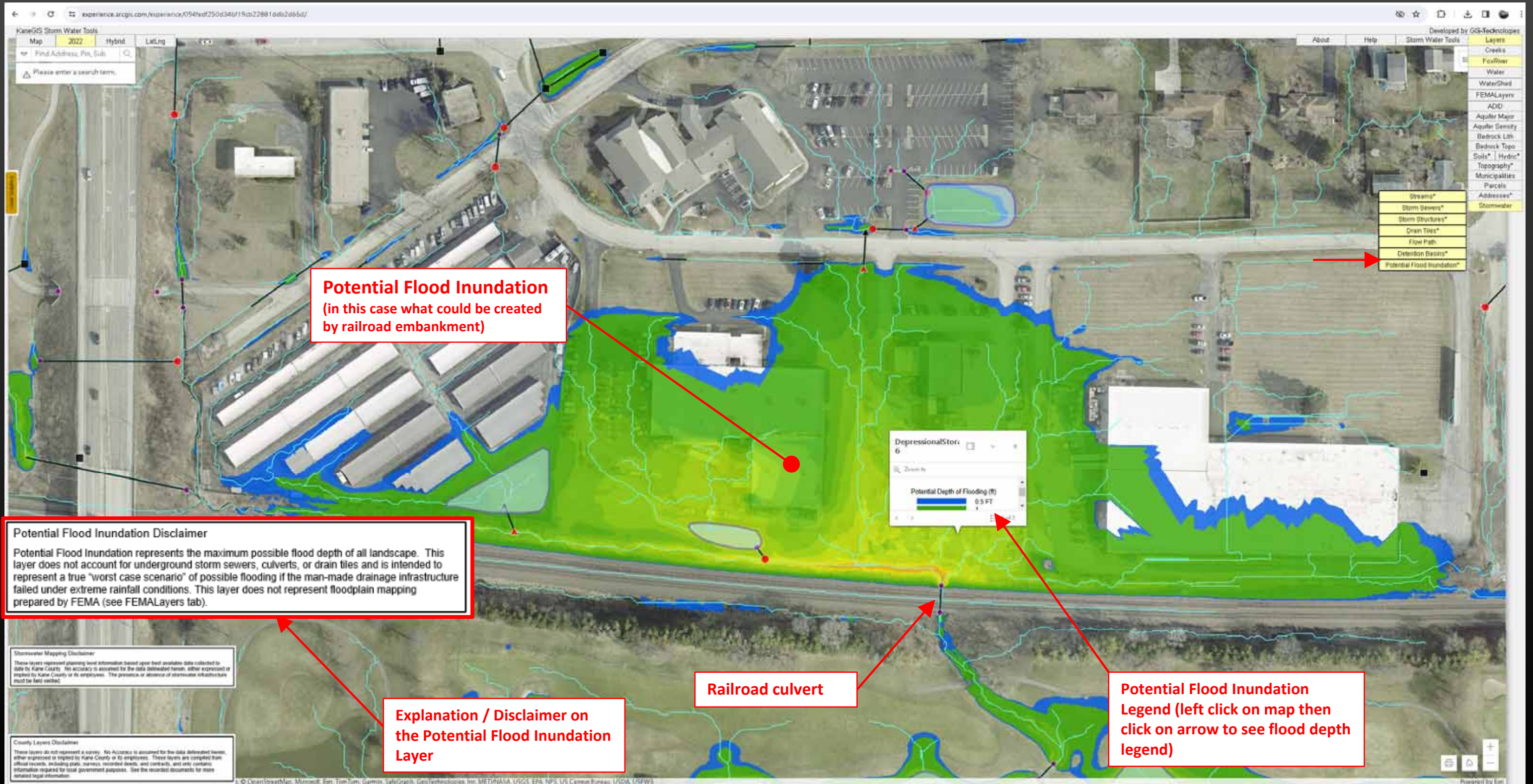


# Navigating the Map





# Navigating the Map





# **Kane County Stormwater Viewer**

## **Part 2: Stormwater Tracing Tool**

**Using the stormwater mapping data compiled by KCDEWR, Kane County GIS Technologies Department has created a Stormwater Tracing Tool which allows a user to trace the flow of stormwater from any point in the County to the nearest river (Fox River/Kishwaukee River). This tracing tool takes into account all channels, culverts, and main storm sewers across the entire county. Accessing the tool on the Stormwater Viewer is outlined in the accompanying slides.**



# Stormwater Tracing Tool

The screenshot displays the KineGIS Storm Water Tools web application. The interface includes a search bar at the top left with the text "Please enter a search term." and a navigation menu at the top right with options for "About", "Help", "Storm Water Tools", and "Layers". The main map area shows a grid of colored polygons representing different municipalities in Kane County, Illinois, including Hampshire, Rutland, Dundee, Burlington, Elgin, Saint Charles, Campton, Virgil, Kaneville, Blackberry, Geneva, Batavia, Sugar Grove, and Aurora. A red arrow points from a red-bordered box containing the text "Select 'Stormwater Trace'" to the "Storm Water Trace" button in the top right corner. The bottom left corner contains a "Civility Layers Disclaimer" and the bottom right corner shows "Powered by Esri".



# Stormwater Tracing Tool

The screenshot displays the KaneGIS Stormwater Tracing Tool interface. The main map area shows an aerial view of a residential and commercial area with overlaid stormwater flow paths in cyan and blue. A red arrow points to the 'Activate Stormwater Trace' button in the top right corner. A white box with a red border contains the text: '1. Click "Activate Stormwater Trace" Then use mouse to navigate to point of interest and then click to activate the tool and trace the stormwater flow path to river'. A yellow arrow points to a specific location on the map with the text: 'Click here to trace stormwater from this point (example)'. A white box with a red border on the left side contains the text: 'Stormwater Trace Tool status window'. The interface includes a search bar at the top left, a map style selector (Map, Aerial, Hybrid, Latt,ng), and a layers panel on the right side. The layers panel lists various data layers such as Creeks, FourRivers, Water, WaterShed, FEMA Layers, ADD, Aquifer Major, Aquifer Sensity, Bedrock Lith, Bedrock Tipo, Soils, Hydr, Topography, Municipalities, Parcels, Addresses, and Stormwater. The bottom of the screen contains several disclaimer boxes and a footer with copyright information.

Stormwater Trace  
Click a location on the map to trace stormwater flow to the river

Stormwater Trace Tool status window

1. Click "Activate Stormwater Trace" Then use mouse to navigate to point of interest and then click to activate the tool and trace the stormwater flow path to river

Click here to trace stormwater from this point (example)

Stormwater Mapping Disclaimer  
These layers represent planning level information based upon best available data collected to date by Kane County. No accuracy is assumed for the data delineated herein, either expressed or implied by Kane County or its employees. The presence or absence of stormwater infrastructure must be field verified.

County Layers Disclaimer  
These layers do not represent a survey. No Accuracy is assumed for the data delineated herein, either expressed or implied by Kane County or its employees. These layers are compiled from official records, including plats, surveys, recorded deeds, and contracts, and only contains information required for local government purposes. See the recorded documents for more detailed legal information.

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Layers

- Creeks
- FourRivers
- Water
- WaterShed
- FEMA Layers
- ADD
- Aquifer Major
- Aquifer Sensity
- Bedrock Lith
- Bedrock Tipo
- Soils
- Hydr
- Topography
- Municipalities
- Parcels
- Addresses
- Stormwater

Map Aerial Hybrid Latt,ng

Find Address, Pin, Sub

Please enter a search term.

Activate Stormwater Trace

Storm Water Trace

Watershed Basin Trace

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# Stormwater Tracing Tool

The screenshot displays the KaneGIS Storm Water Tools web application. The main map area shows an aerial view of a residential and commercial area with a blue line tracing a stormwater flow path from a selected point in the center towards a river on the right. A red horizontal line is drawn across the map, and a red box with an arrow points to the 'Export Results' button in the 'Stormwater Trace' panel on the left. Another red box with an arrow points to the blue flow trace line, and a third red box with an arrow points to the 'Export Results' button, indicating that the trace can be exported as a KML file.

**Stormwater Trace**  
Options to export to SHP or KML.  
Click Activate Stormwater Trace button to create a new trace.

Export Results

**Stormwater flow trace**  
(from selected point to the river)

**The stormwater trace can be exported as a KML file for use in GIS software or Google Earth**

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Layers:  
Stormwater  
Addresses\*  
Parcels  
Municipalities\*  
Topography\*  
Hydric\*  
Soils\*  
Bedrock Lith\*  
Bedrock Type\*  
Aquifer Sensity  
Aquifer Major  
ADD  
FEMA Layers  
WaterShed  
Creeks  
FoxRiver  
Storm Water Trace  
Watershed Basin Trace  
Activate Stormwater Trace

Streams\*  
Storm Sewers\*  
Storm Structures\*  
Crown Tiles\*  
Flow Path\*  
Detention Basins\*  
Potential Flood Inundation\*



# **Kane County Stormwater Viewer**

## **Part 3: Watershed Delineation Tool**

Using the stormwater mapping data compiled by KCDEWR, Kane County GIS Technologies Department has created a Watershed Tracing Tool which allows a user to map the land area draining to any point in the County. This tracing tool takes into account all channels, culverts, and known storm sewers across the entire county. Accessing the tool on the Stormwater Viewer is outlined in the accompanying slides.



# Watershed Delineation Tool





# Watershed Delineation Tool

The screenshot displays the 'KaneGIS Storm Water Tools' web application. The main map area shows an aerial view of a residential neighborhood with a cyan-colored watershed boundary and a blue stream. A red dashed line indicates a road crossing. The interface includes a search bar at the top left, a toolbar at the top right, and a layers panel on the right side. A 'Watershed Basin Trace' window is open on the left, and a 'Stormwater Mapping Disclaimer' and 'County Layers Disclaimer' are visible at the bottom left.

**Watershed Basin Trace**  
Click a location on the map to trace Watershed Basin

**2. Watershed Basin Trace Status & Results Window**

**Select "Activate Watershed Basin Trace". Then click on a location on the map and tool will perform automatic watershed delineation.**

**Click here to delineate watershed to this road crossing (example)**

**Activate Watershed Basin Trace** Watershed Basin Trace

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# Watershed Delineation Tool

The screenshot displays the Watershed Delineation Tool interface. The main map area shows a satellite view of a city with a green-shaded watershed boundary and a blue line representing a stream. A red dot on the stream indicates the selected point. A red box highlights the watershed area, and another red box points to the selected point. A third red box points to the 'Export Results' button in the 'Watershed Basin Trace' pop-up window. The pop-up window displays the text: 'Watershed Basin Trace', 'Watershed: 1050.53 acres', and 'Options to export to SHP or KML. Click Activate Watershed Basin Trace button to create a new trace.' Below this is an 'Export Results' button. The interface includes a search bar at the top left, a map style selector (2022, Hybrid, Li/Lng) at the top, and a layers panel on the right. The layers panel lists various data layers such as 'Storm Water Trace', 'Watershed Basin Trace', 'Creeks', 'FezRiver', 'Water', 'WaterShed', 'FEMALayers', 'ADID', 'Aquifer Major', 'Aquifer Sensity', 'Bedrock Lith', 'Bedrock Topo', 'Soils\*', 'Hydro\*', 'Topography\*', 'Municipalities', 'Addresses\*', and 'Stormwater'. The bottom of the screen contains a 'Stormwater Mapping Disclaimer' and a 'County Layers Disclaimer'.

**Watershed area tributary to point selected reported in acres**

**Watershed boundary of area tributary to point selected**

**The watershed boundary polygon can be exported as a KML file for use in Google Earth (or shapefile for use in GIS software)**

**Point selected**

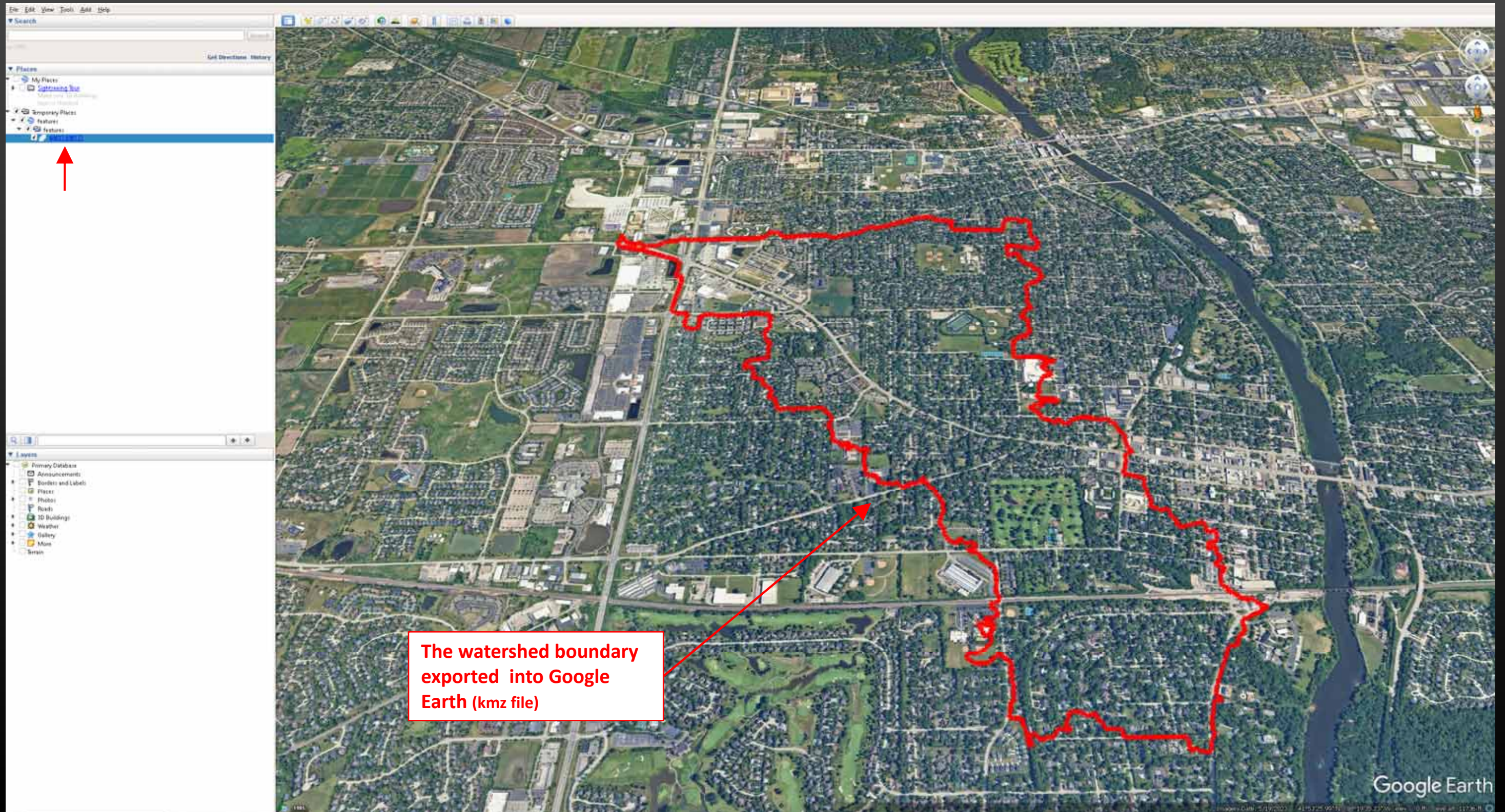
**Watershed Basin Trace**  
Watershed: 1050.53 acres  
Options to export to SHP or KML.  
Click Activate Watershed Basin Trace button to create a new trace.  
Export Results

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# Watershed Delineation Tool





# Building a Stormwater Digital Twin & Sharing it with Practitioners and the Public will:

- Expedite solutions to current urban flooding problems
- Provide tools & data to help prevent future flooding exacerbated by changing climate conditions
- Allow for better assessment of current and proposed water quality BMPs to maximize their effectiveness
- Allow for better assessment of the true impacts of past and future development decisions.
- Allow for the public to be better informed about the impacts of their choices on the water that they (and the local environment) depend on



A photograph of a creek at dawn. The sky is filled with dramatic, dark clouds illuminated from below by the rising sun, creating a vibrant orange and yellow glow. The sun is visible as a bright orb on the horizon, partially obscured by the silhouettes of trees. The water of the creek is calm, reflecting the colors and clouds of the sky. In the foreground, there are silhouettes of tall grasses on the left and a large tree on the right. The overall mood is serene and contemplative.

**The future you see is the future you get**

*- Robert G Allen*

Nippersink Creek at dawn  
Photo by Ray Mathis



# Questions?

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**& Water Resources**

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**Appendix:**  
**Stormwater Infrastructure Mapping**  
**& Tools Guide**



# Real-time Demonstration of Mapping Tools