



**Metropolitan Water
Reclamation District
of Greater Chicago**

STORMWATER
MASTER PLANNING

MWRD Masterplan Update

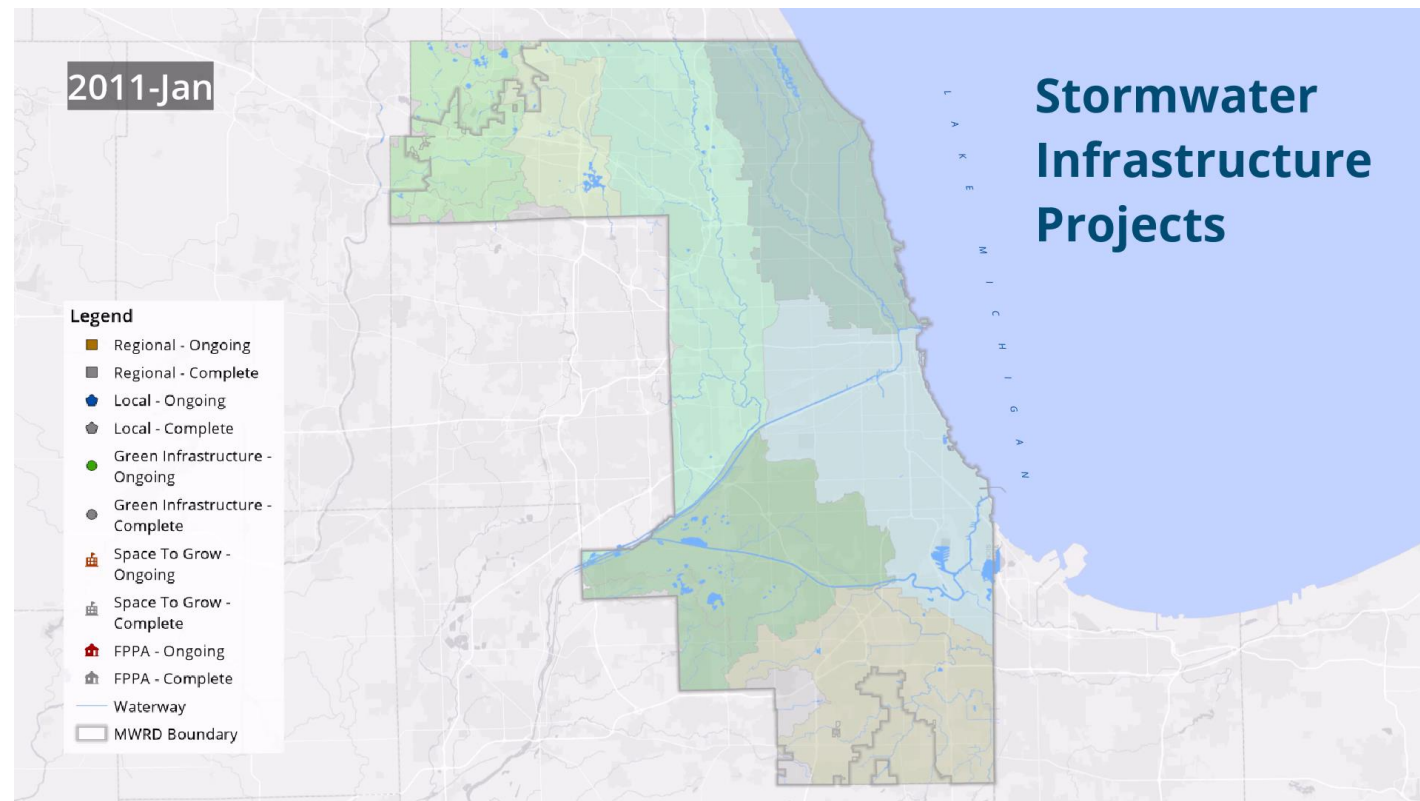
Calumet Stormwater Collaborative

May 7, 2021



Agenda

- Introduction
- Update on the 2 master-planning projects in the Calumet Region
- New GIS-centric approach
 - Stormwater storage metrics
 - Map products
 - Stormwater GIS Portal
- Next steps

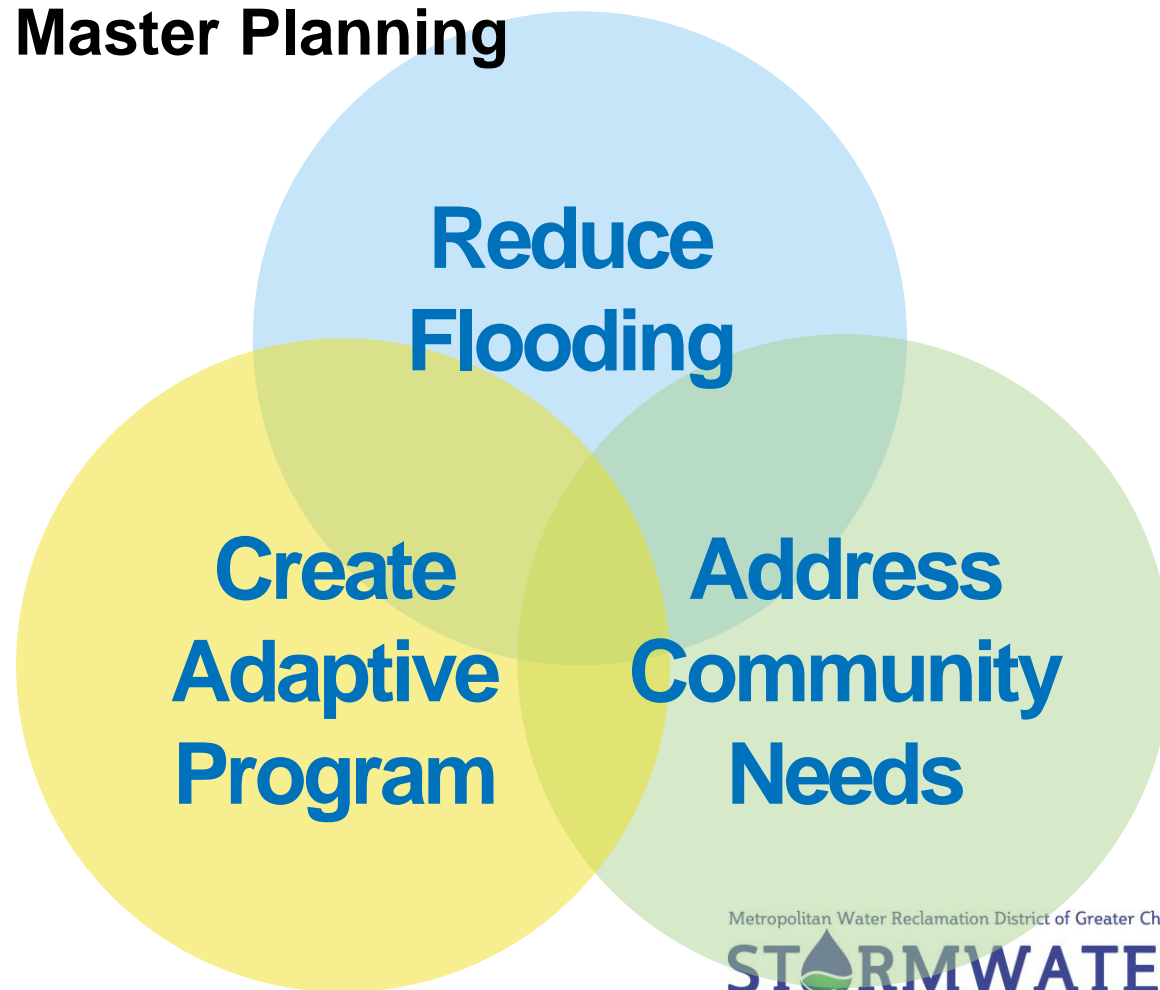




Background & Goals of MWRD Stormwater Master Planning Program

MWRD Identified Need for Stormwater Master Planning Program to address Urban Flooding:

- Empower municipalities to reduce the risk of flooding for Cook County homes, businesses and critical facilities
- Create partnerships among agencies and local communities to plan and implement priority projects
- Institute a transparent methodology to prioritize stormwater management investments





Empowering Municipalities

MWRD

A regional authority providing guidance and county-wide (volumetric) planning

Provides
Technical
Expertise and
Funding

Request for
Assistance

Municipalities

Champion
and manage
stormwater projects

Responsible for prioritizing and developing strategies to address local flooding issues and problems.





Traditional Master Planning Approach

Stormwater Master Planning

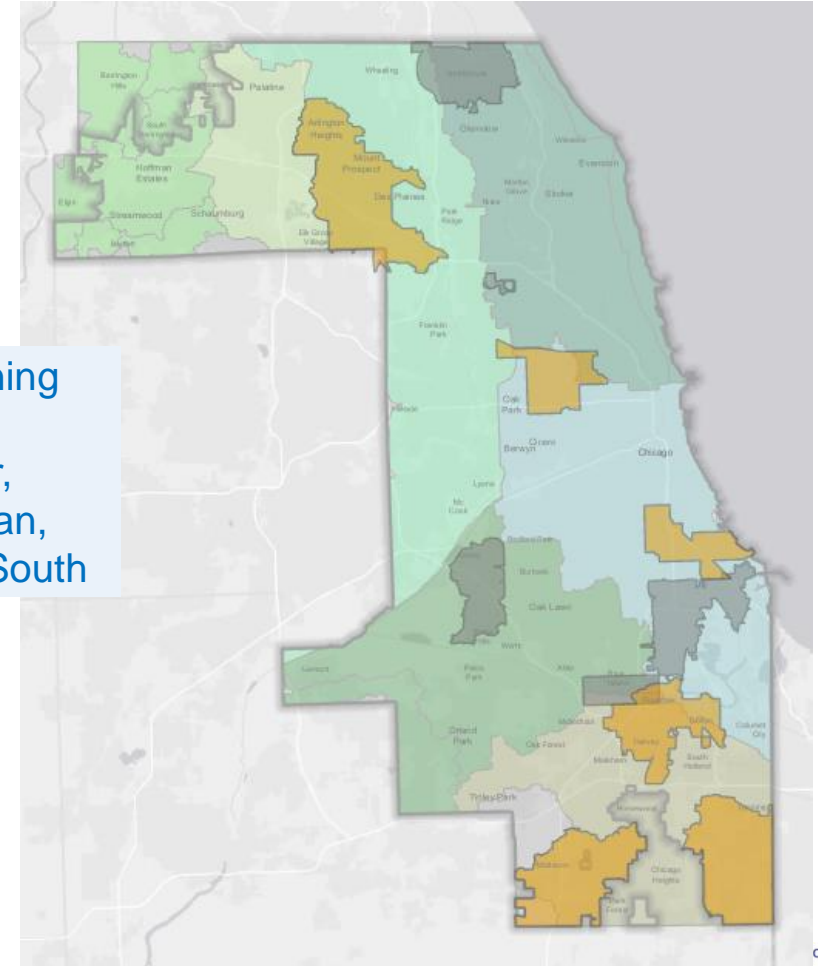
Investigate “urban flooding” issues and evaluate potential green and gray infrastructure solutions.

2015 2016 2017 2018 2019 2020 2021

Initiated Five Master Plan Pilot Studies
Green Infrastructure Plan Adopted

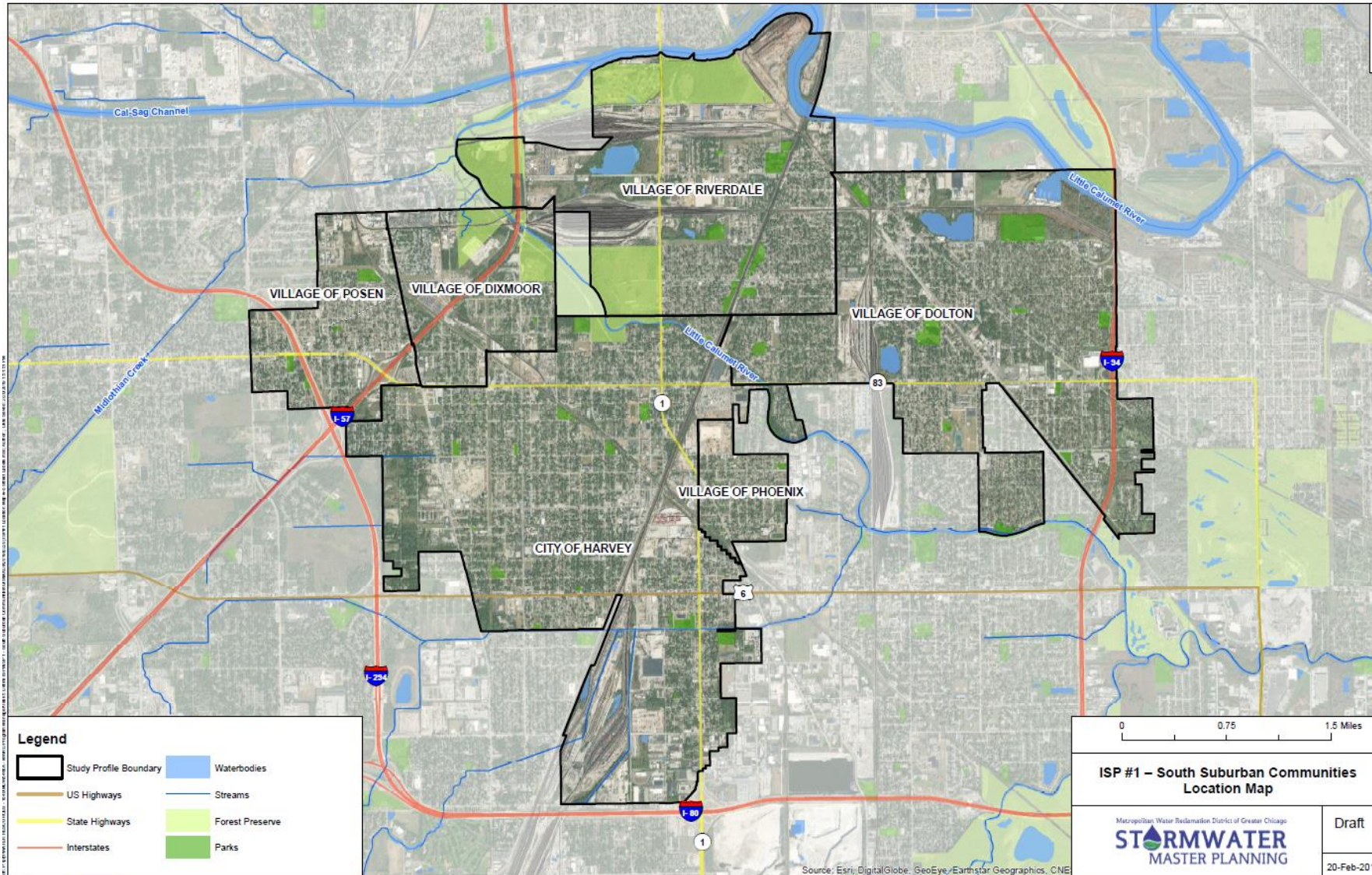
Six Stormwater Master Planning projects:
Butterfield, North Creek/Deer, Willow/Weller, South Suburban, Chicago West and Chicago South

- Began back in 2015 with 5 master planning pilot studies
- In 2019, hired V3 and Geosyntec as our Program Managers
- 6 master planning projects: 4 of which in the Calumet Region



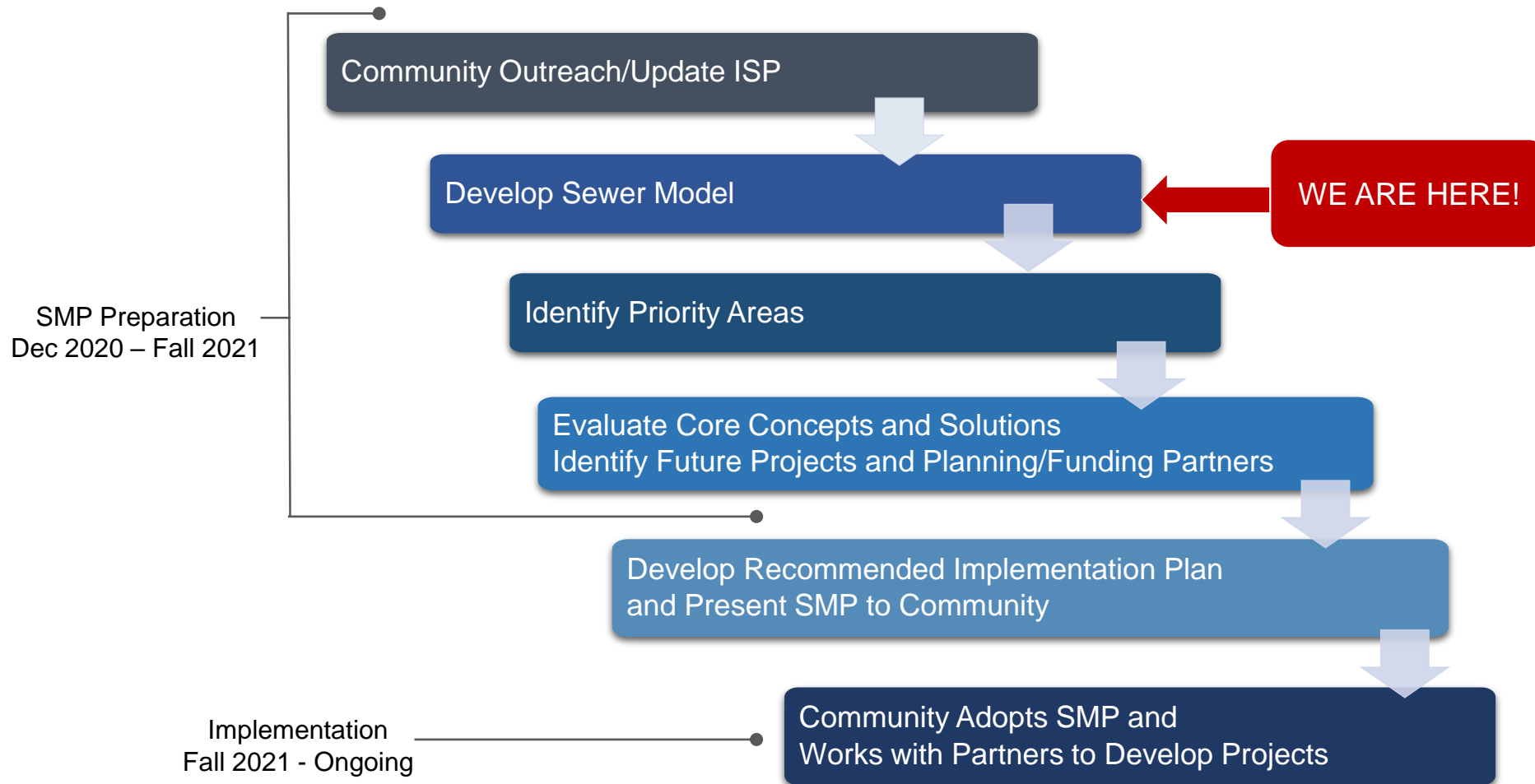


South Suburban Study Area – Communities



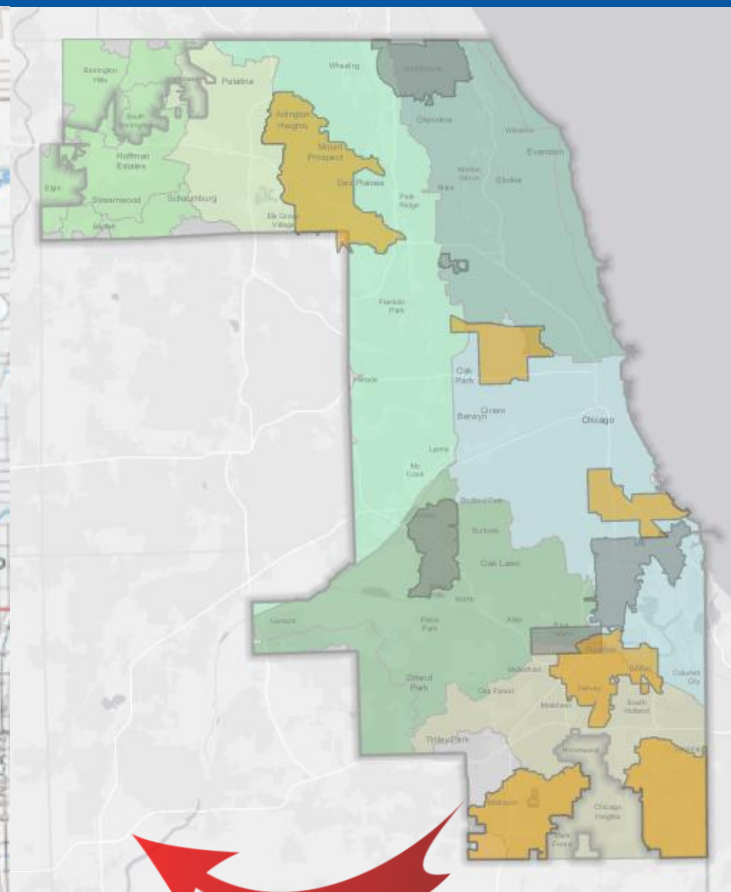
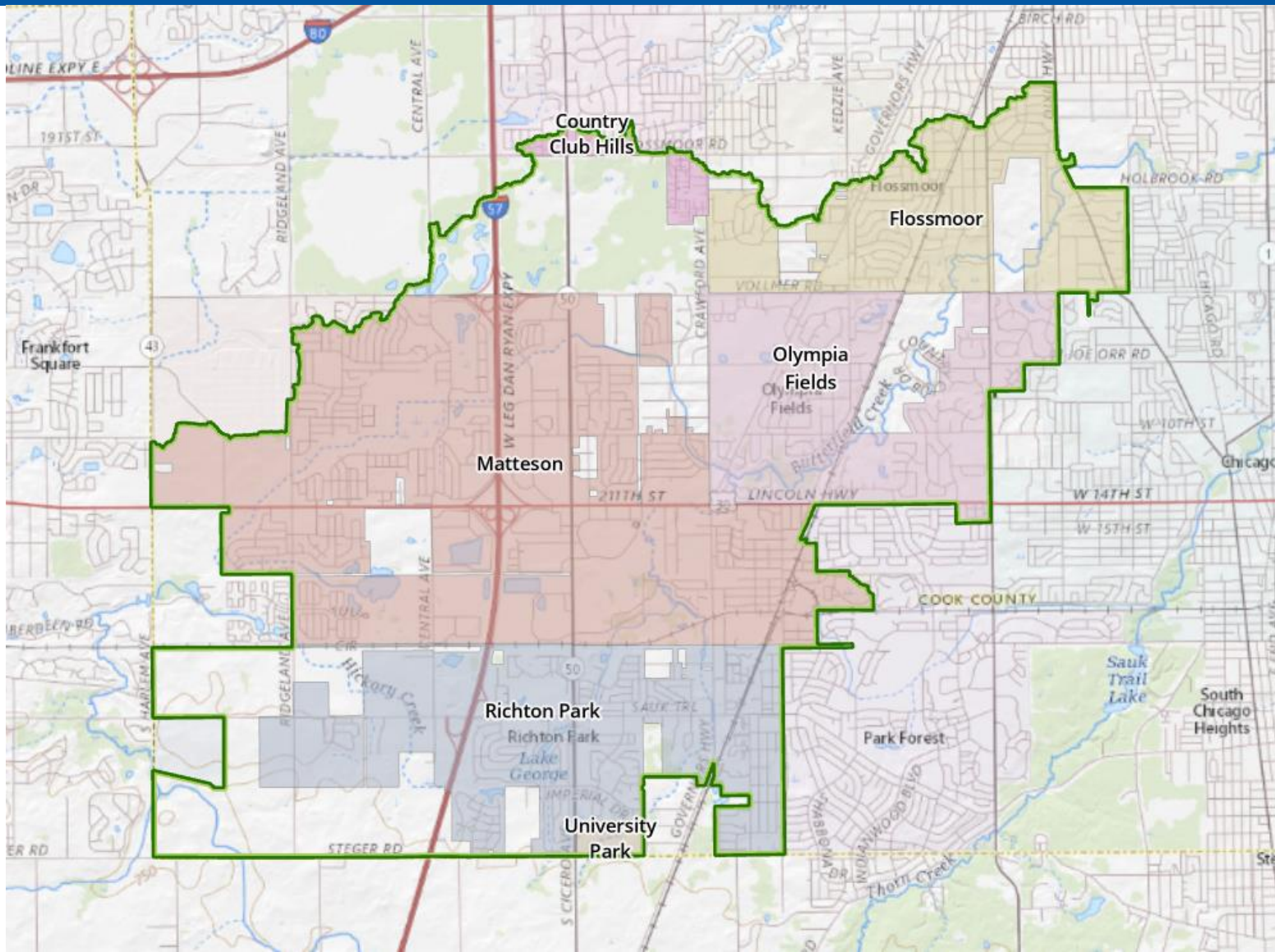


South Suburban Study Area – Project Timeline



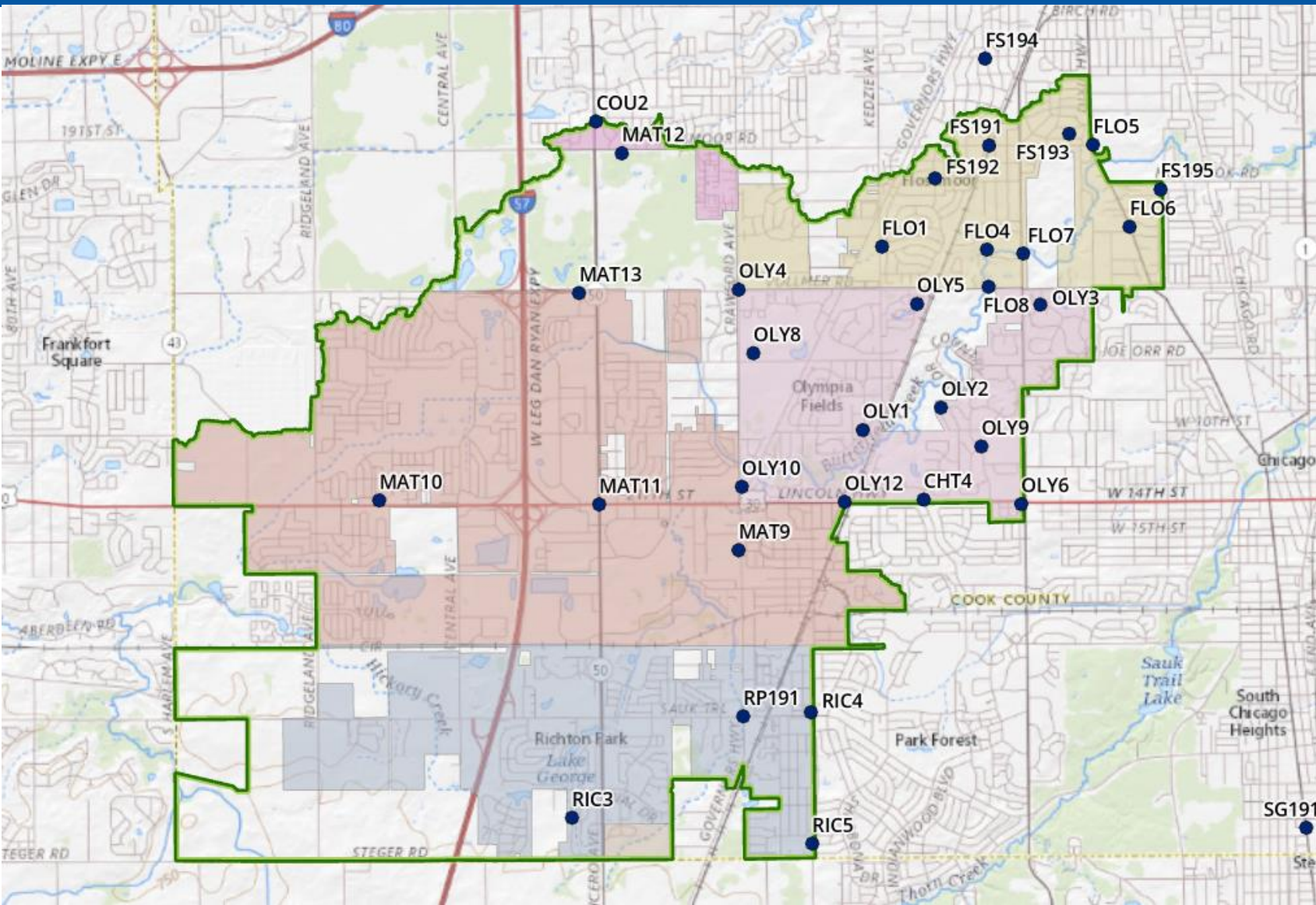


Butterfield Creek Study Area – Communities





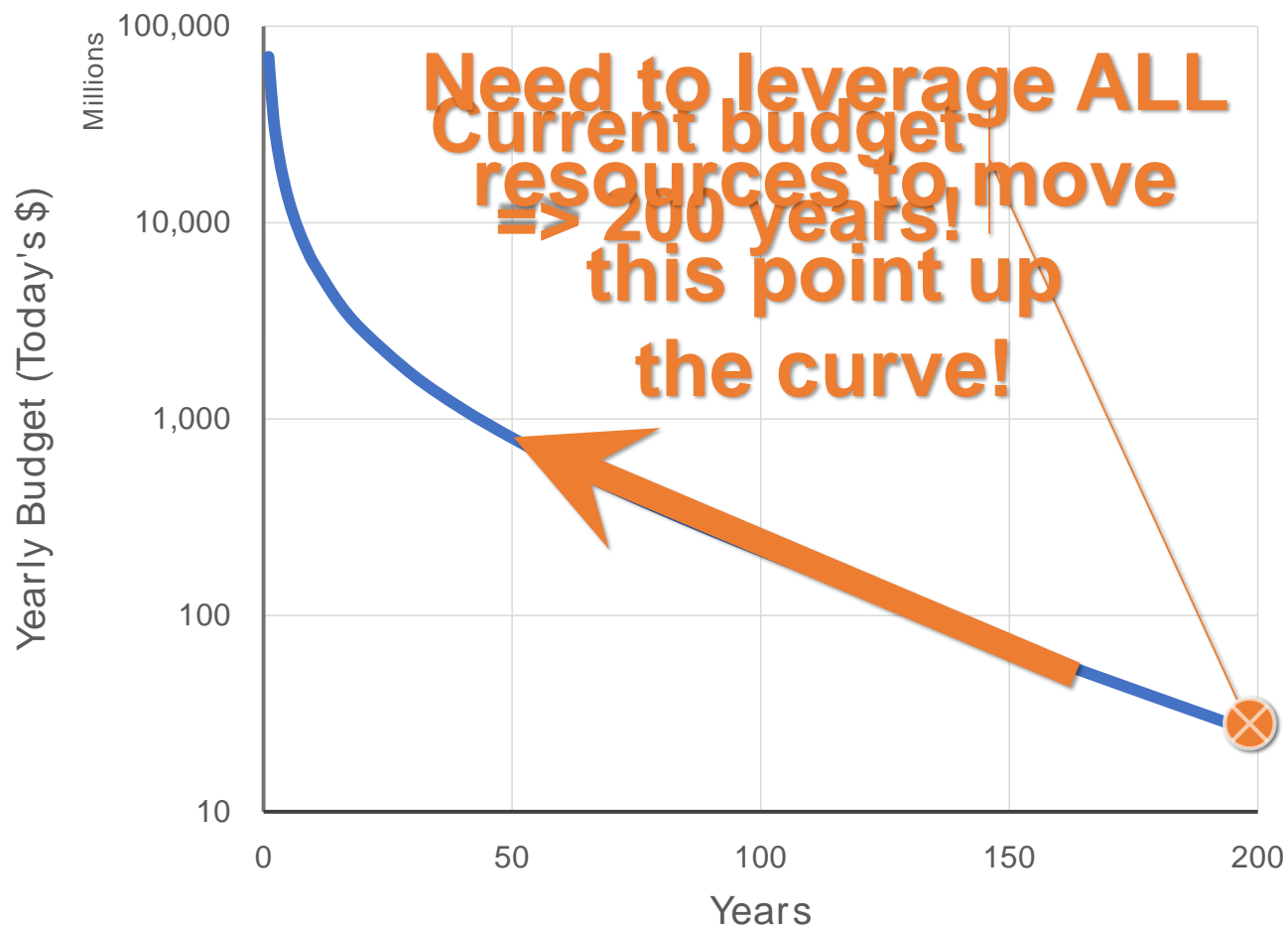
Butterfield Creek Study Area – Flooding Problems



- Met with most of the municipalities and townships
- Currently reviewing and prioritizing all the problems areas
- Next steps:
 - Additional data collection
 - Problem area assessment



The Need for a New Approach

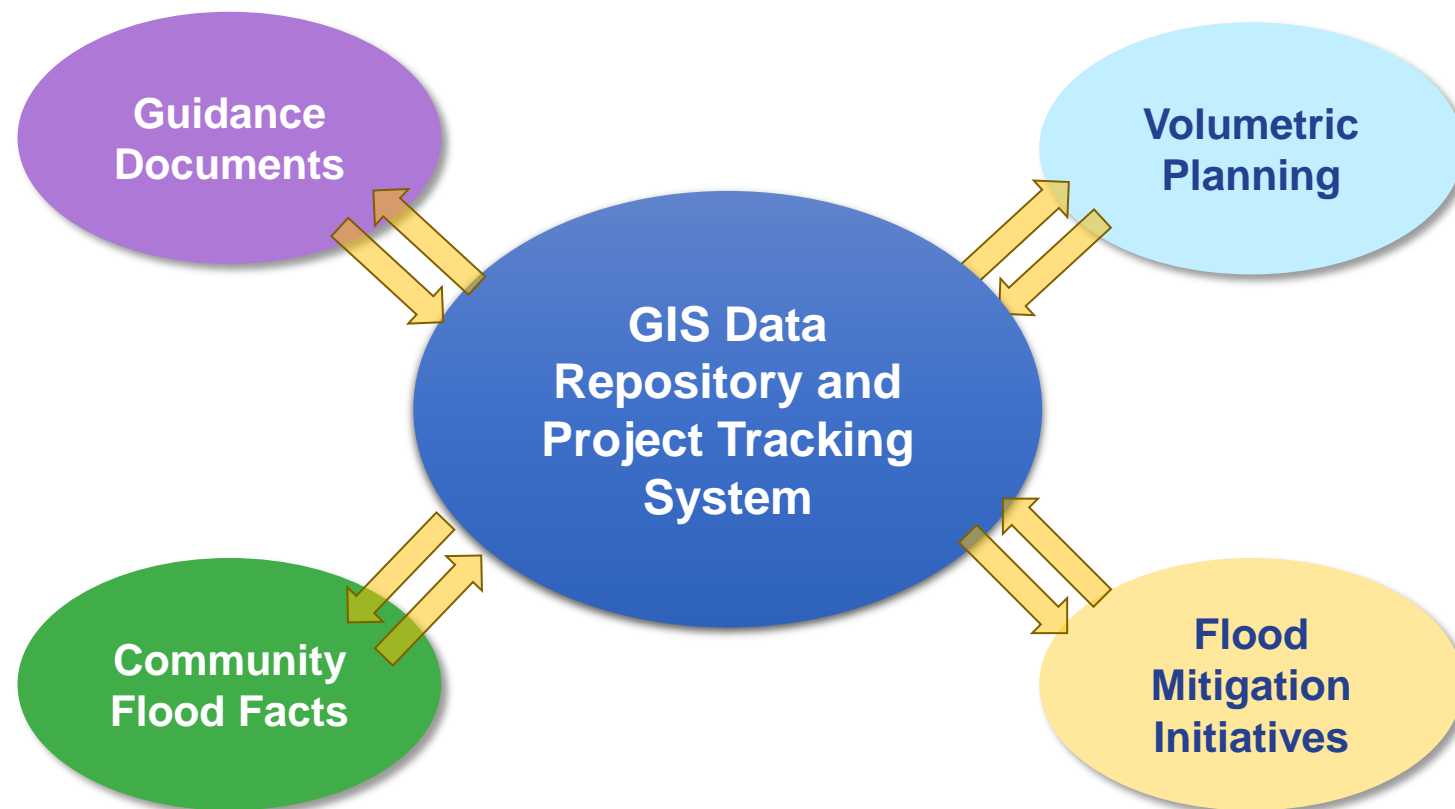


- Patchwork – takes too long and too costly
- Planning fatigue
- Plans expire and are not adaptive/responsive to changing conditions



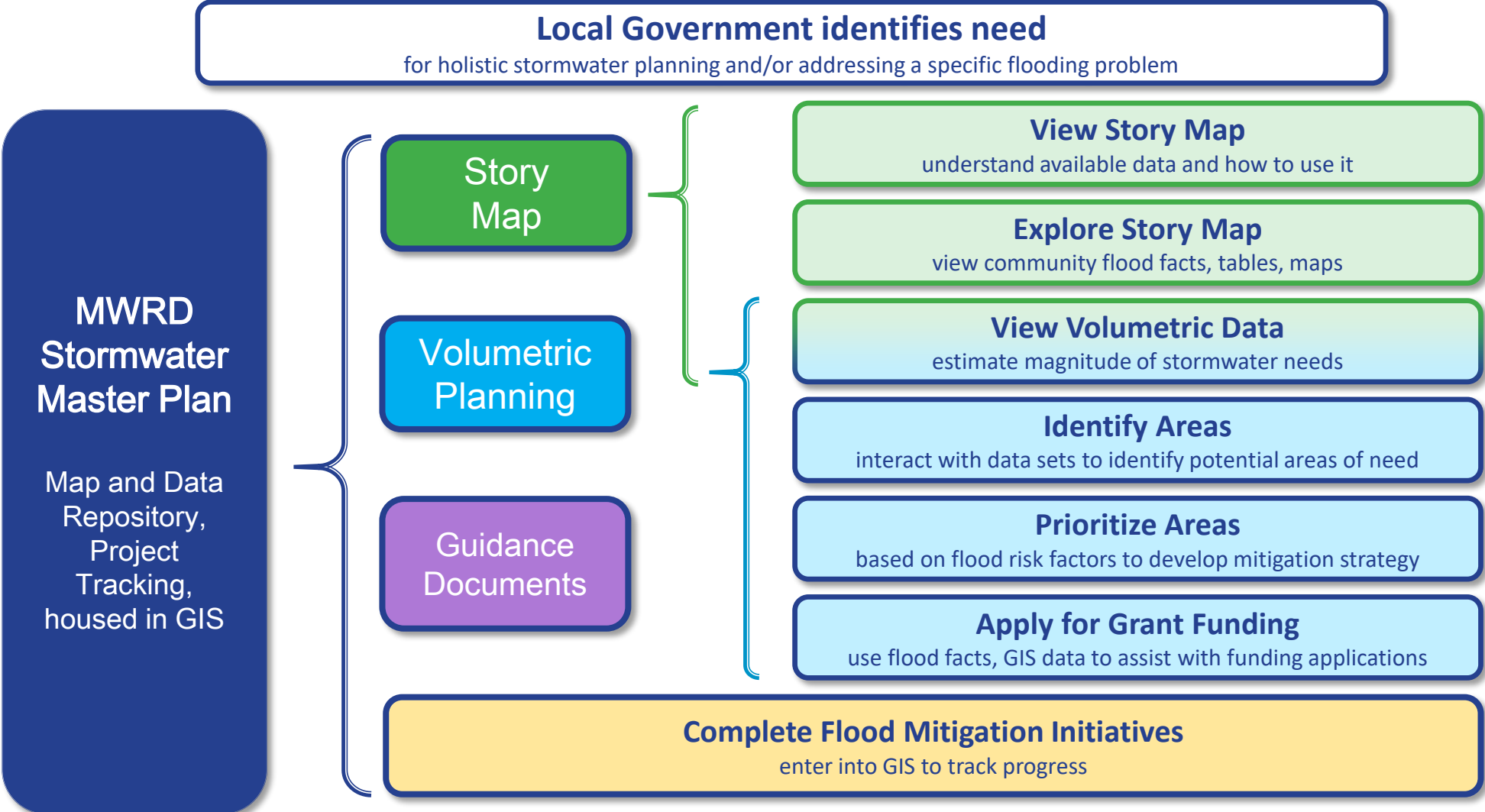
New Approach Based on a GIS Platform

- Better capture the needs and priority of the local communities
- Assist in identifying problem locations/areas
- Avoid the need for extensive modeling
- Identify stormwater projects quickly and allow prioritization
- Adaptive and responsive





Empowering Municipalities





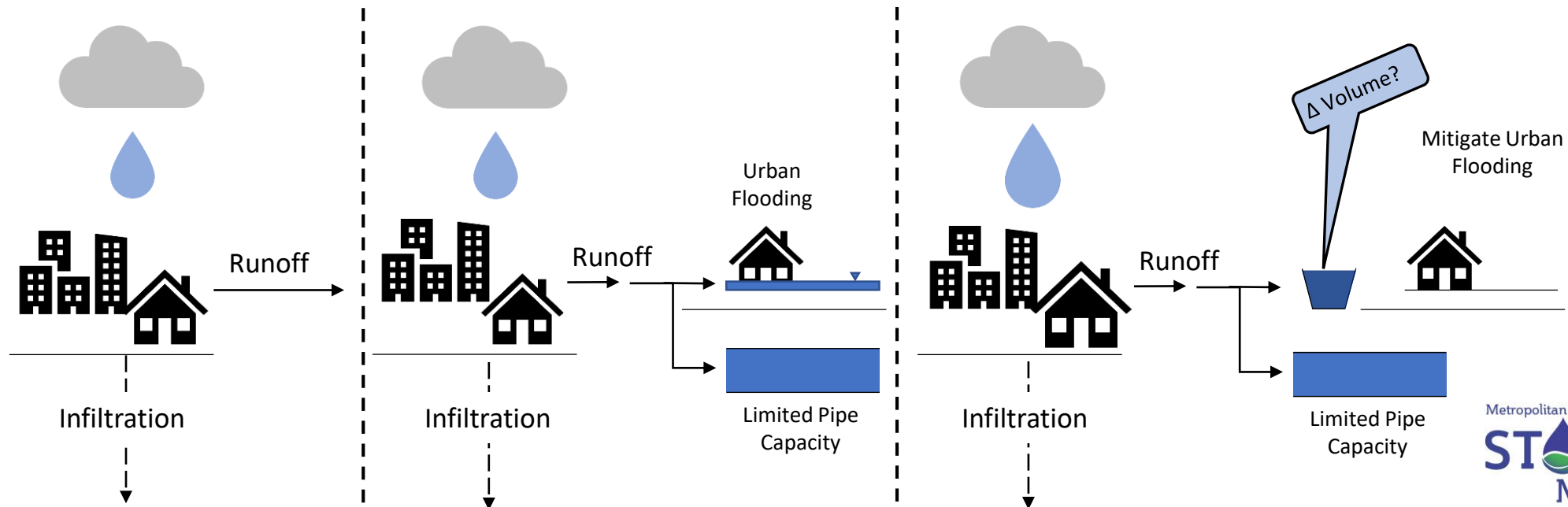
Program Objectives (Moving Forward)

- **Quantify flood mitigation need**
(particularly for urban flooding) throughout Cook County and **measure progress** towards addressing that need.
- **Support local governments and agencies**
in their efforts to: identify feasible flood mitigation projects, programs and/or policies; construct and/or implement these mitigation measures; and maintain these systems over time.
- **Encourage and incentivize local government participation**
in stormwater planning and stormwater solutions to reduce flooding in Cook County.



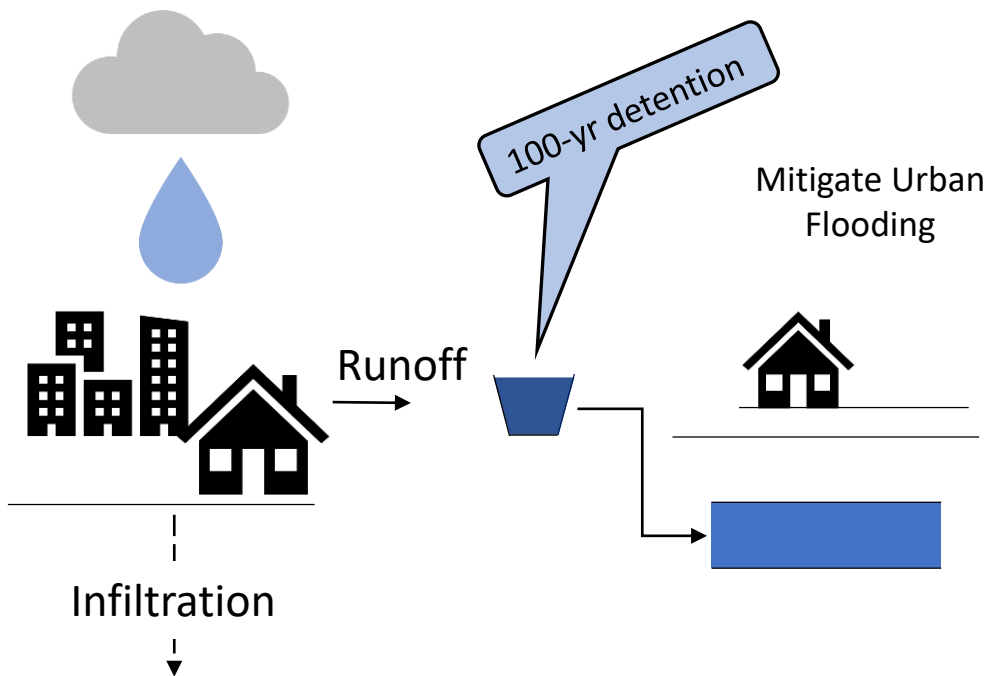
Stormwater Storage Metrics

- A numerical **quantification of the total, cumulative flood mitigation need**, calculated throughout Cook County
- A **common measurement** to track progress toward addressing the overall need for flood mitigation

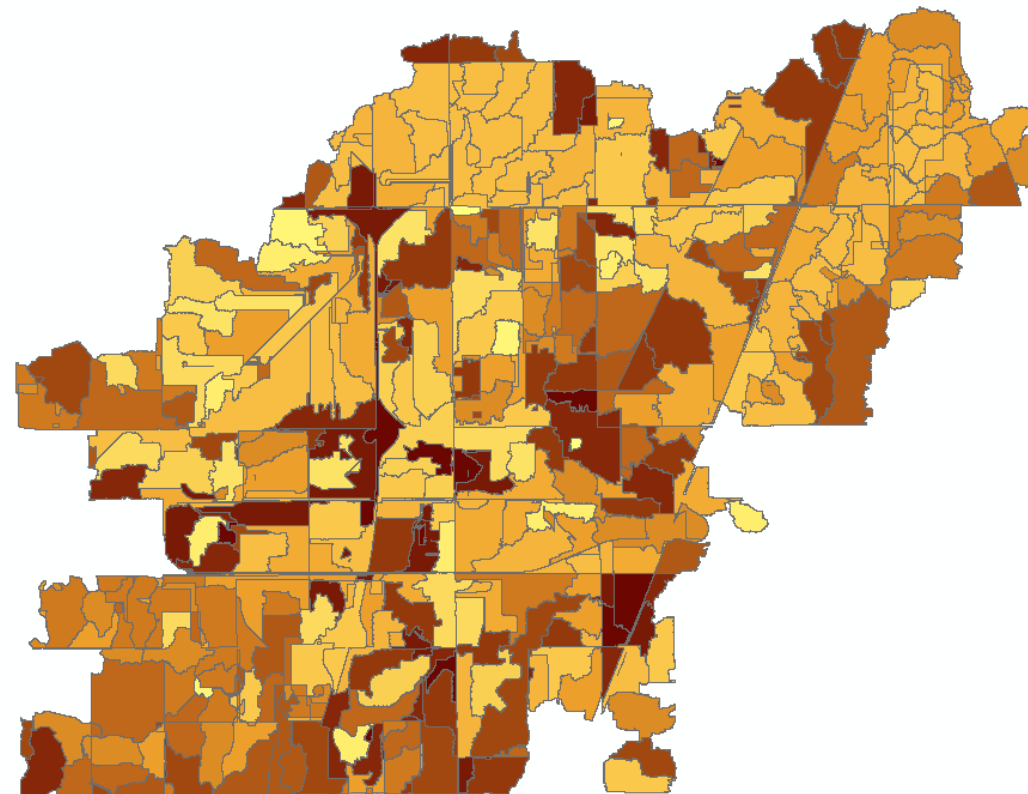




Metric 1: 100-yr Target Storage Volume



- Storage necessary to meet Watershed Management Ordinance (WMO) release rate for 100-yr 24-hr storm (Bulletin 75)
- Calculated in GIS for every catchment, aggregated at municipal and subwatershed level
- Scalable – Site, Catchments, & Municipality



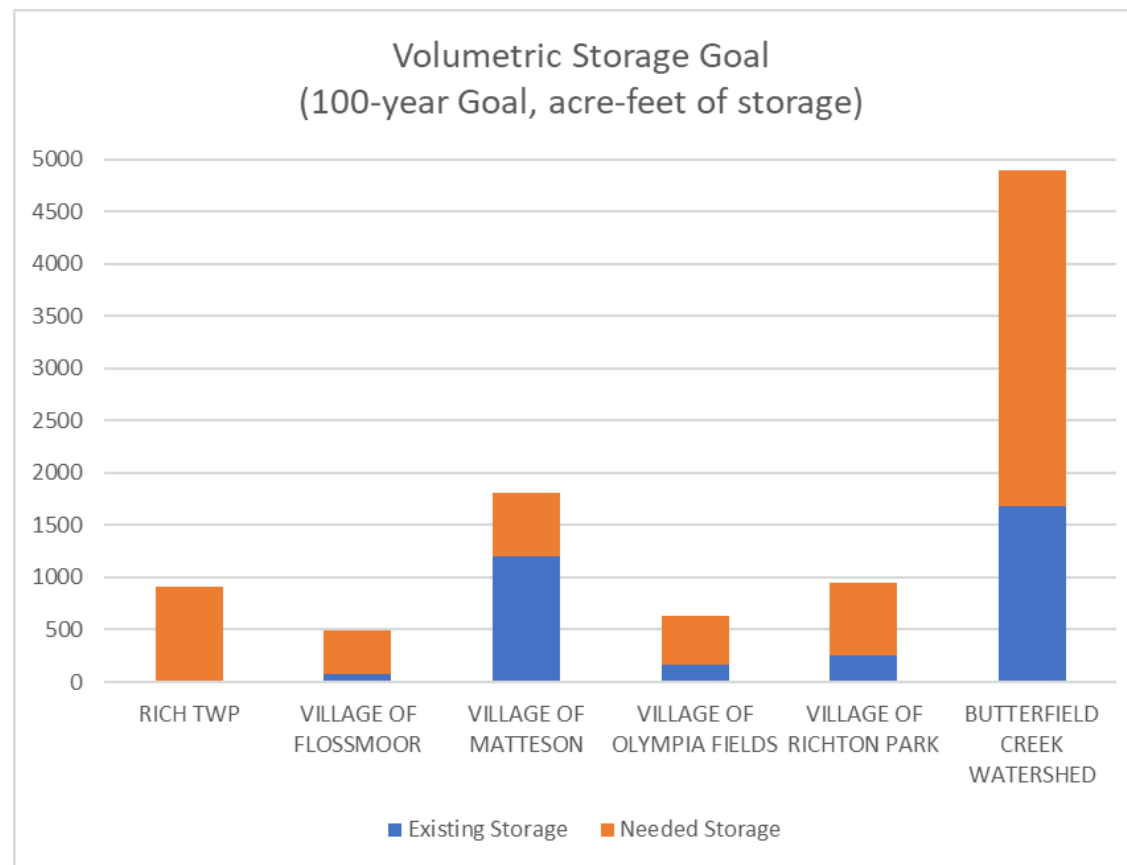
Map depicts the volumetric storage goal, normalized by catchment size, with darker areas having a higher volumetric need.



Metric 1: 100-yr Target Storage Volume

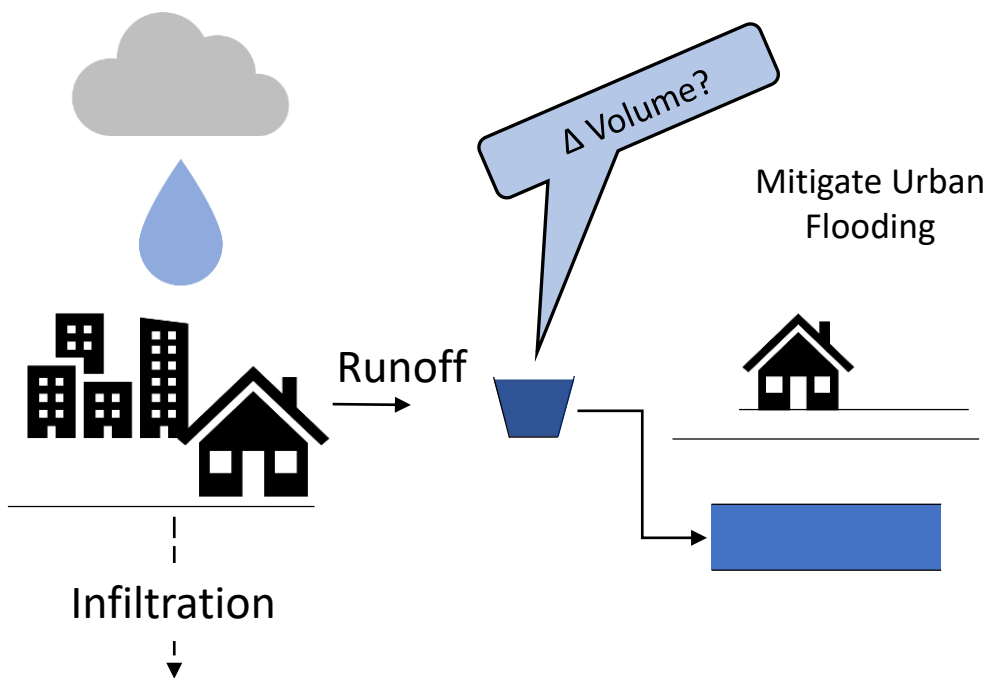
Rationale

- Long term goal, consistent with WMO
- Based on calculations already developed and understood
- Useful as a common, countywide metric





Metric 2: Level of Service Target Storage Volume



Volumetric Storage Targets (ac-ft)								
Baseline 2-Hour Design Storm	Target 2-Hour Design Storm							
	3- Month	6- Month	1- Year	2- Year	5- Year	10- Year	25- Year	100- Year
2-Month	29	90	167	254	407	551	773	1,149
3-Month		61	139	226	378	522	745	1,121
6-Month			78	165	317	461	684	1,060
1-Year				87	239	383	606	982
2-Year					152	296	519	895
5-Year						144	367	743
10-Year							223	599

Example:
1-year to 5-year
level of service

- SCS Runoff equation used to calculate runoff volumes for a range of design storms (Bulletin 75)
- Subtract the “existing level of service” runoff from the “desired level of service” runoff to determine volume target
- Scalable – Site, Catchments, & Municipality



Metric 2: Level of Service Target Storage Volume

Rationale

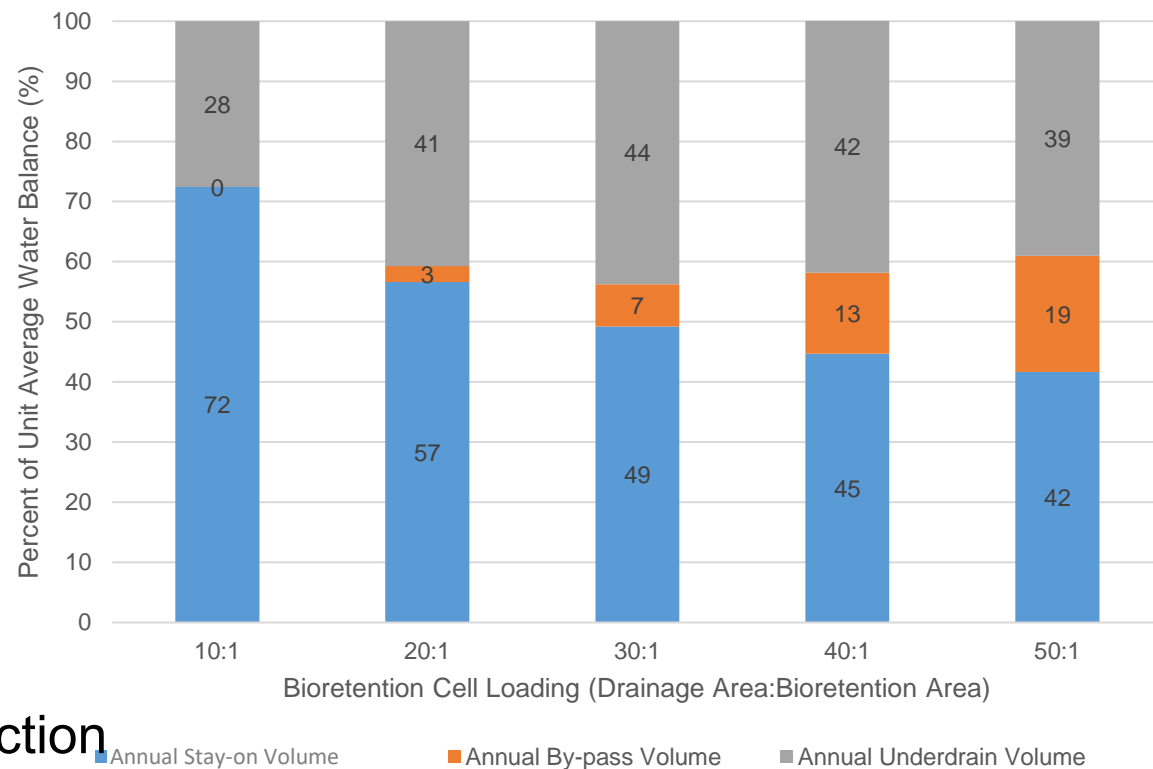
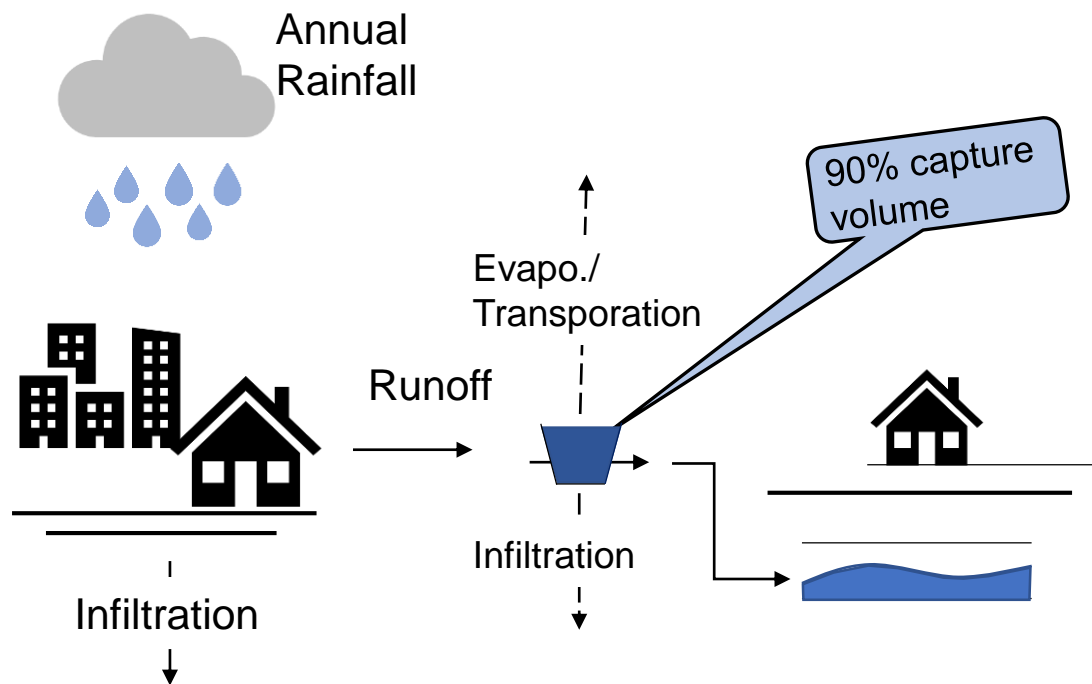
- Intermediate goal, based on local priorities and conditions
- Provides municipalities the flexibility to self-select their own adaptive intermediate goal to measure progress
- Recognizes 100-yr goal may be difficult to reach as the initial goal

Volumetric Storage Targets (ac-ft)								
Baseline 2-Hour Design Storm	Target 2-Hour Design Storm							
	3-Month	6-Month	1-Year	2-Year	5-Year	10-Year	25-Year	100-Year
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Example:
1-year to 5-year
level of service



Metric 3: Annual Runoff Volume Reduction



- Quantify benefit of potential runoff volume reduction
- Annual volume reductions based on bioretention cell using RECARGA (planning level)
- Primarily used in Combined Sewer Area



Metric 3: Annual Runoff Volume Reduction

Rationale

- Shows benefit of green infrastructure to reduce runoff from small storms
- Results in reductions in treatment volumes and costs for collections and treatment





Stormwater Storage Metrics

How are the storage metrics used?

- **To identify areas** here flood mitigation needs...
 - are being met through local government or agency efforts;
 - are not being addressed and where additional assistance or capacity building may be necessary;
- **To quantify total, cumulative flood mitigation need** based on community information and objectives.
- **To compare individual projects** (or policies or programs) against each another, as one means of prioritizing projects.

Volumetric Planning

View Volumetric Data
estimate magnitude of stormwater needs

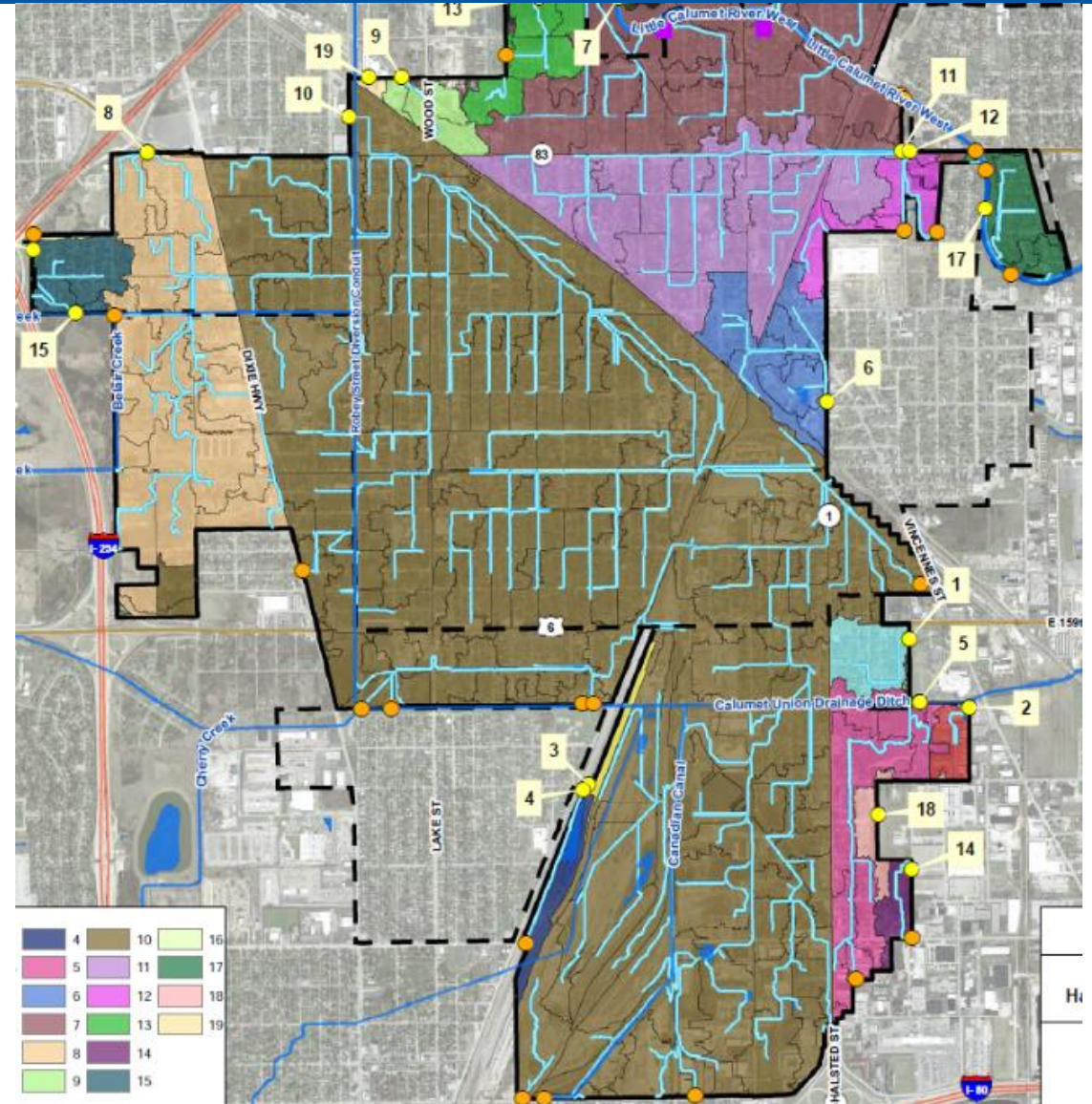
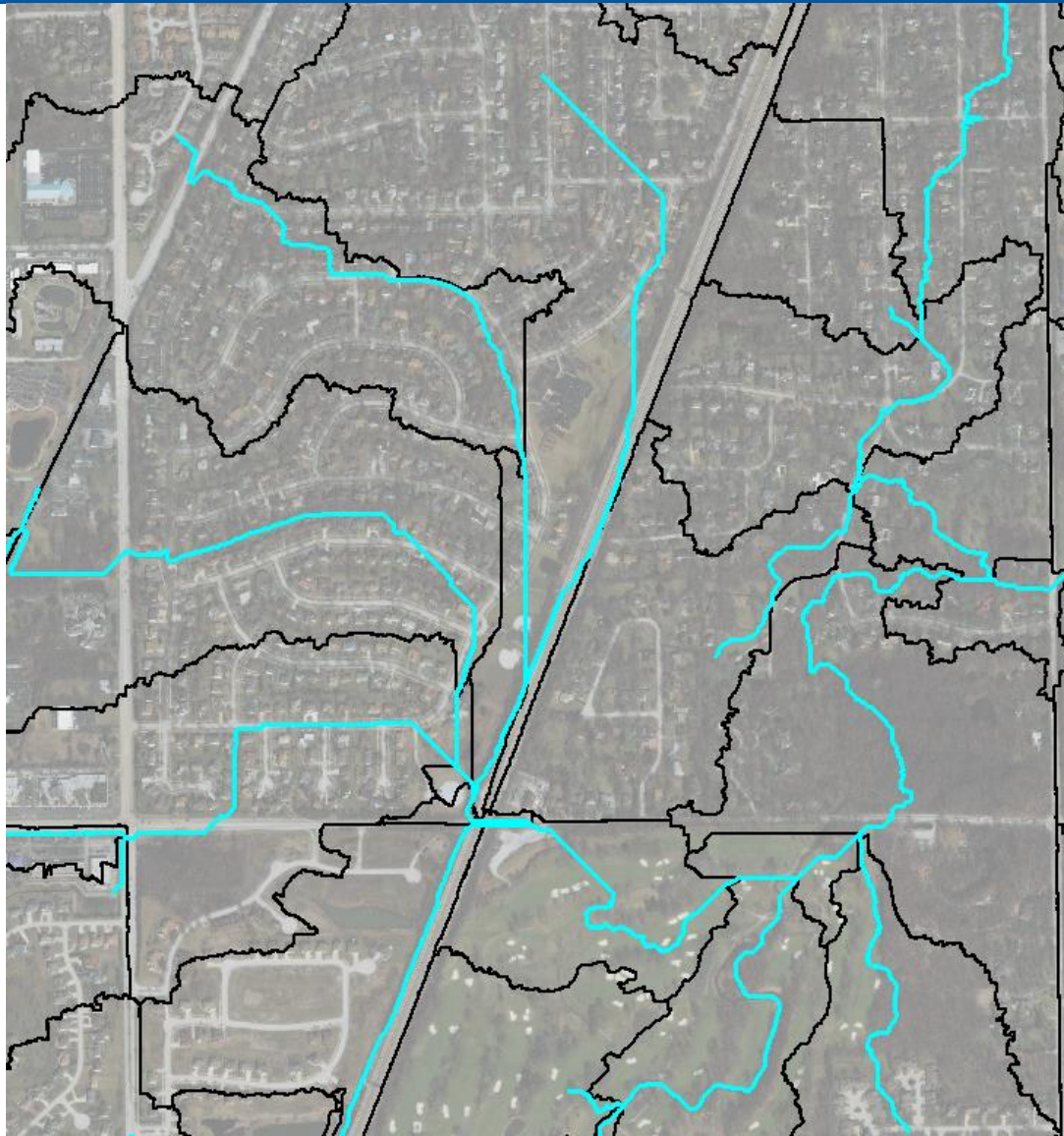
Identify Areas
interact with data sets to identify potential areas of need

Prioritize Areas
based on flood risk factors to develop mitigation strategy

Apply for Grant Funding
use flood facts, GIS data to assist with funding applications

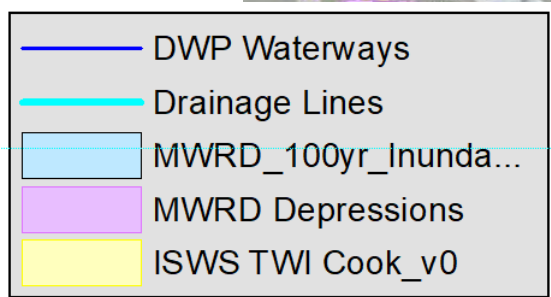
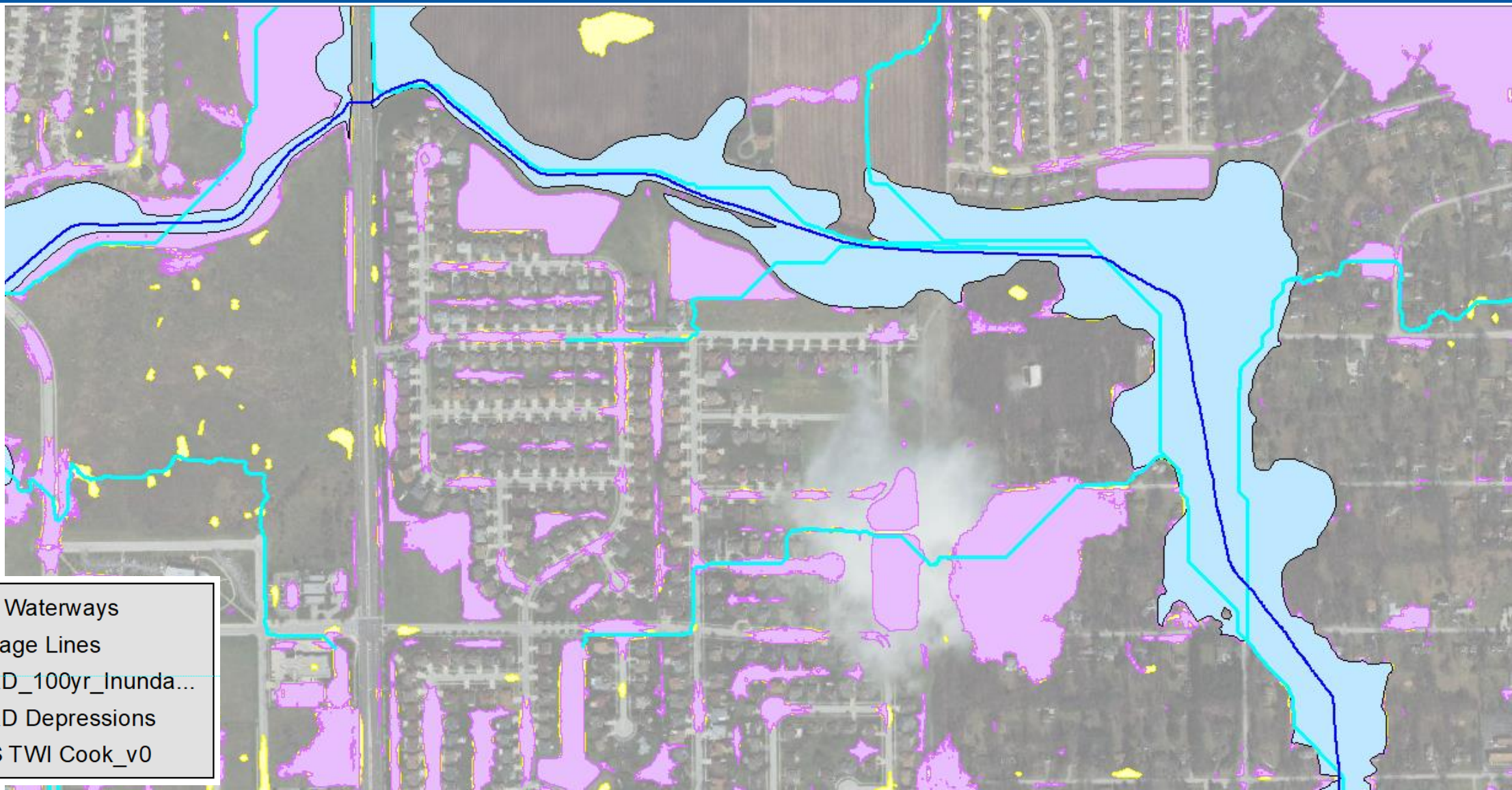


Map Products: Local Drainage Map



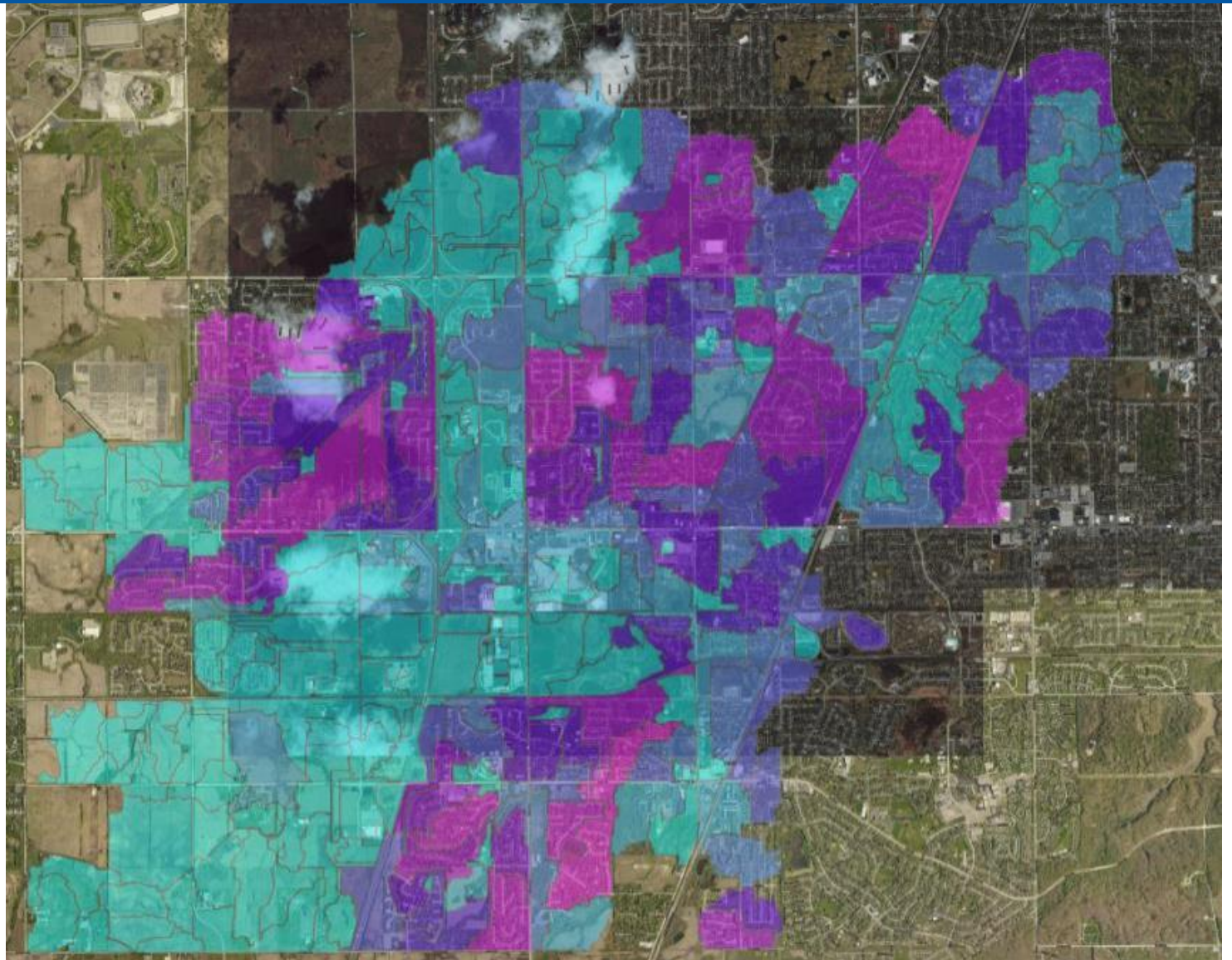
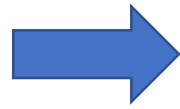


Map Products: Poor Drainage Indicator Map



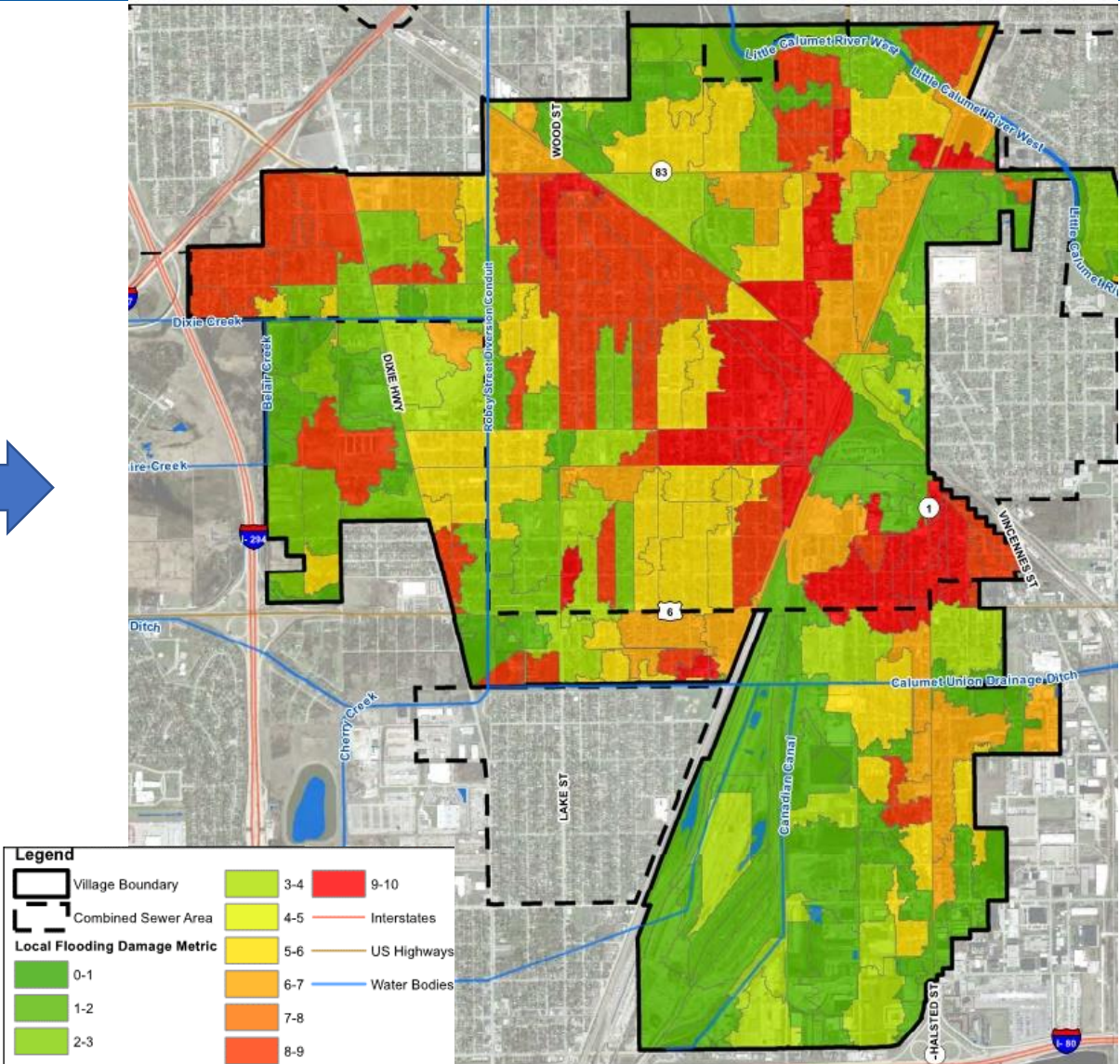
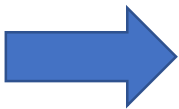
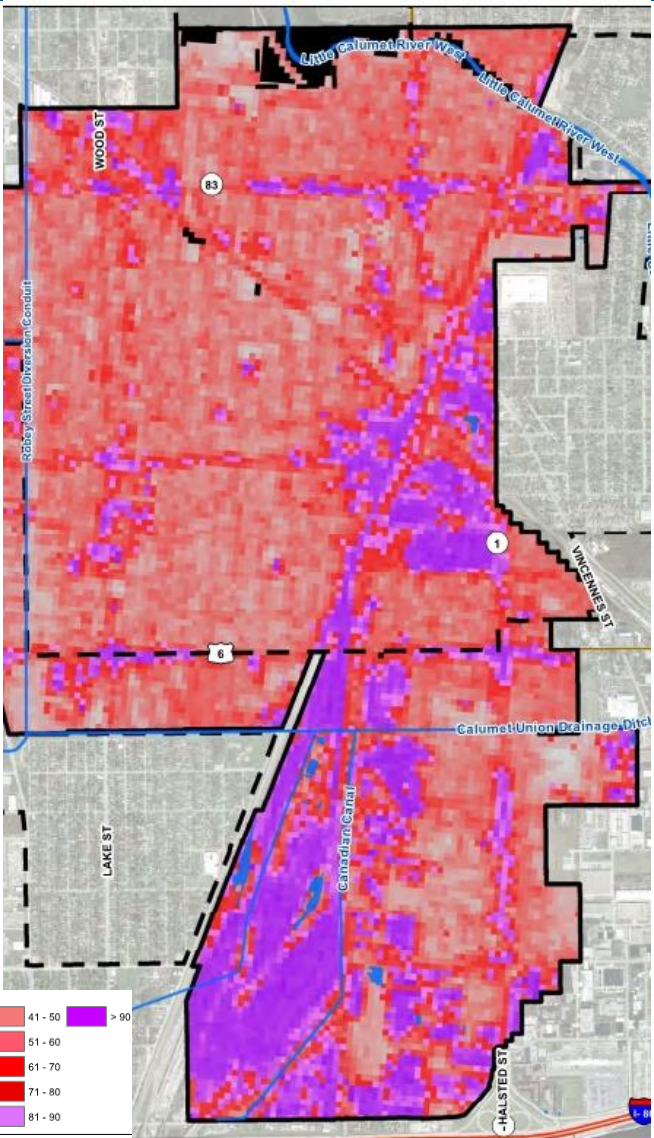


Map Products: Risk Map (structural flooding)



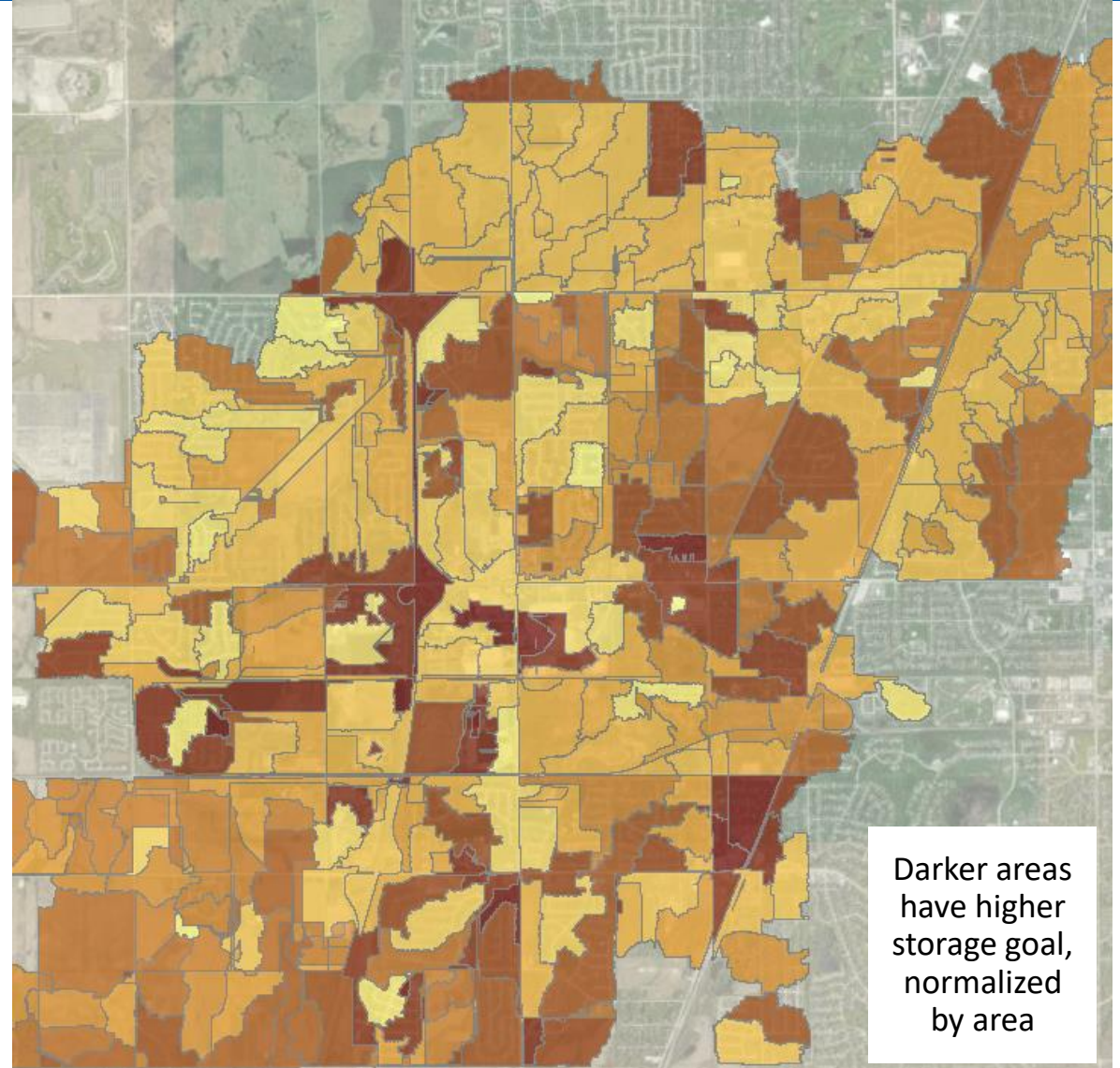
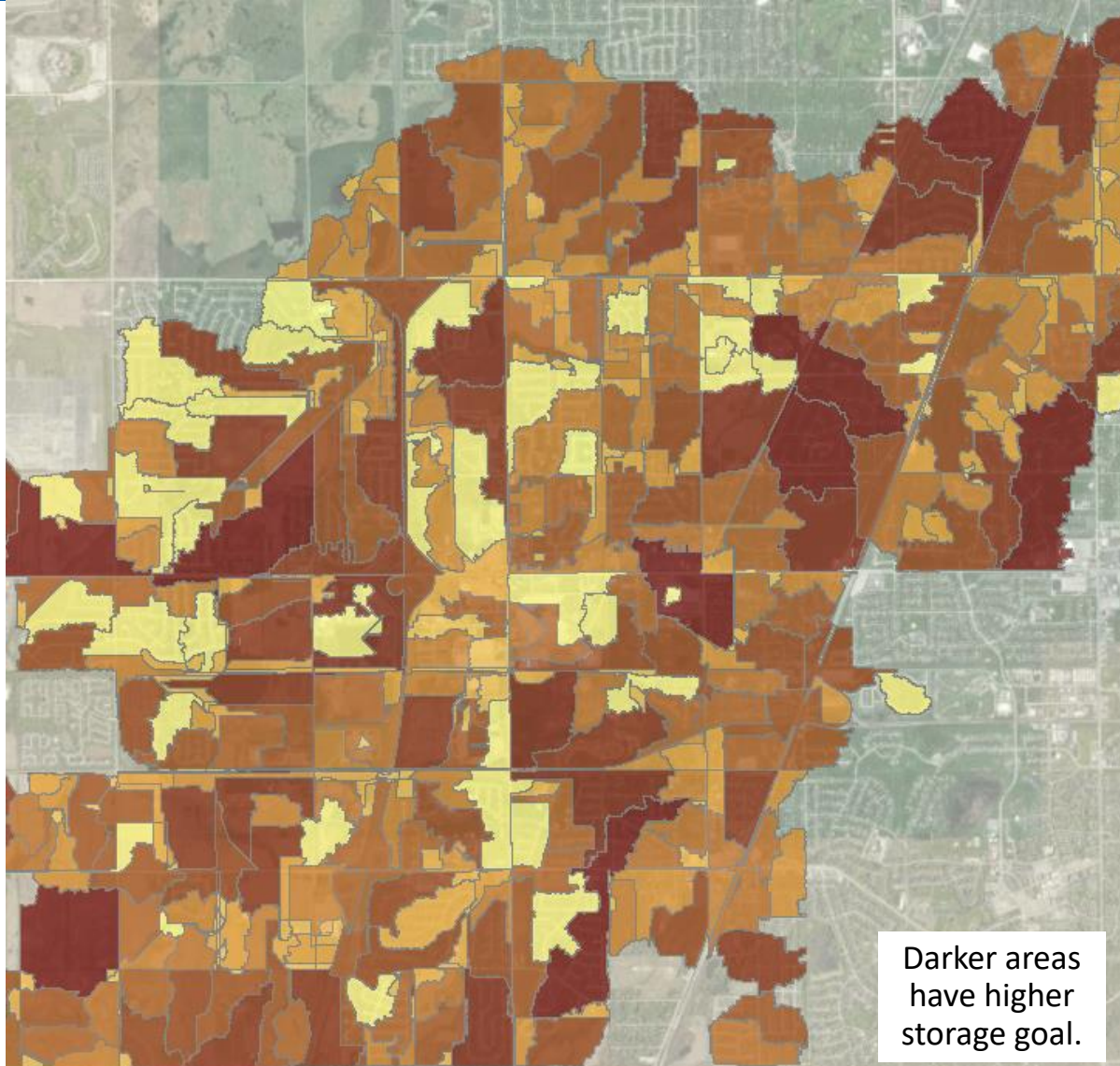


Map Products: Risk Map (land cover, building density)





Map Products: Stormwater Storage Metric (100-yr goal)





Other Map Products

Flood Risk Data

Flood Susceptibility Index
Topographic Wetness Index
FEMA floodplains
MWRD inundation maps
Municipal survey responses

Hydrologic Data

Watersheds/Subwatersheds
Depressional Areas
WMO Release Rates
Soil Survey & Hydric Soils
National Wetland Inventory
National Hydrography Data

Geo-Political Data

Municipal Boundaries
Public Land Survey System
MWRD Corporate Boundary

Topographic Data

DEM, topography, contours

Planimetric Data

Land Use
Building polygons
Address points
Streets
MWRD permit data
Flood control reservoirs
Stormwater project locations
Impervious Area
Open space
USGS quadrangles
US Geographic Names

Sanitary Sewer Data

MWRD WRP service areas
Combined sewer area

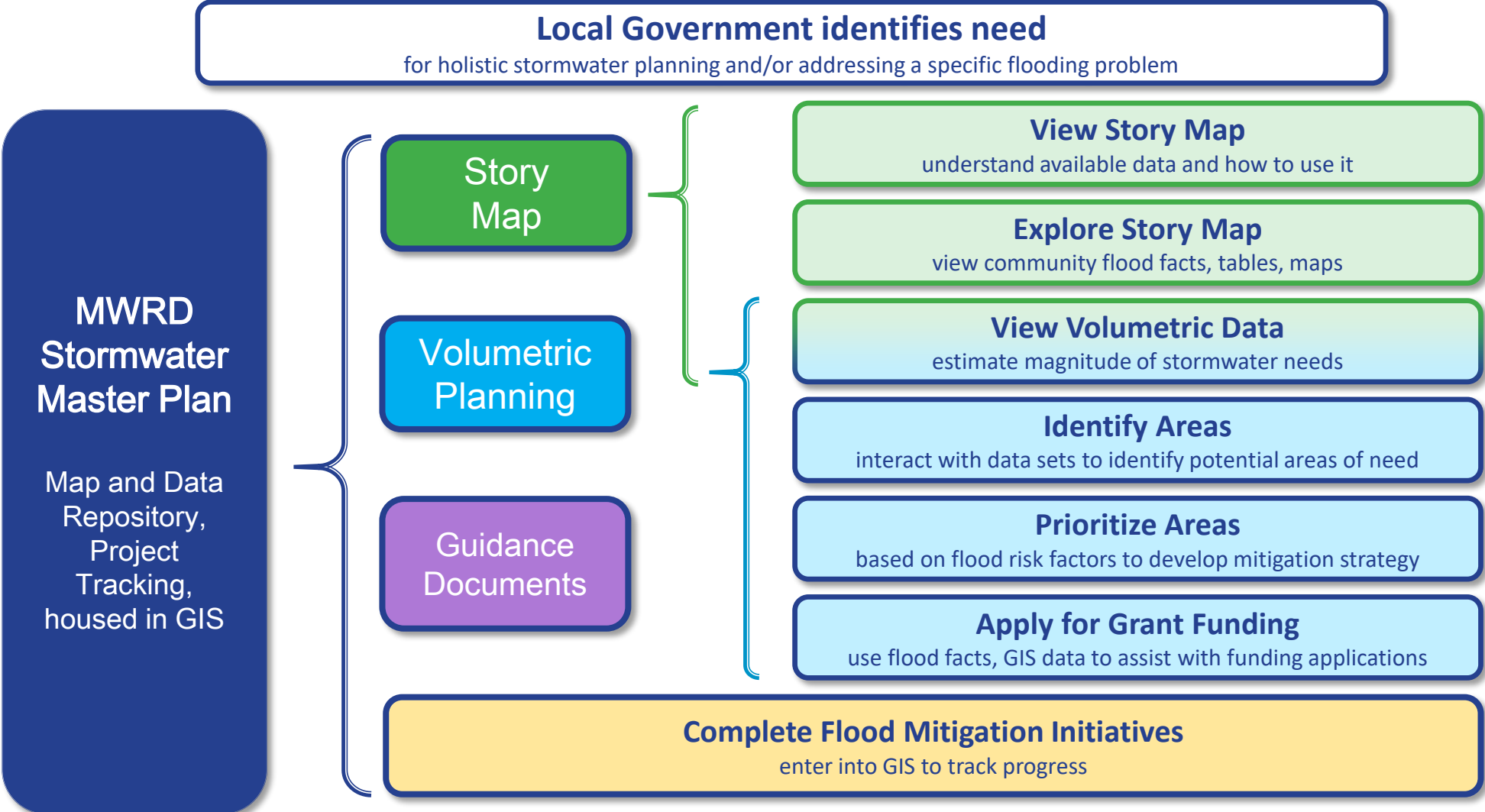
Socio-Economic Data

Population
Percent low income
Race
Economically disconnected
Economically disinvested
Equalized assessed value
TIF districts
Economic opportunity zones

*Not an all-inclusive list,
including data/map
products by others.*



MWRD Stormwater GIS Portal

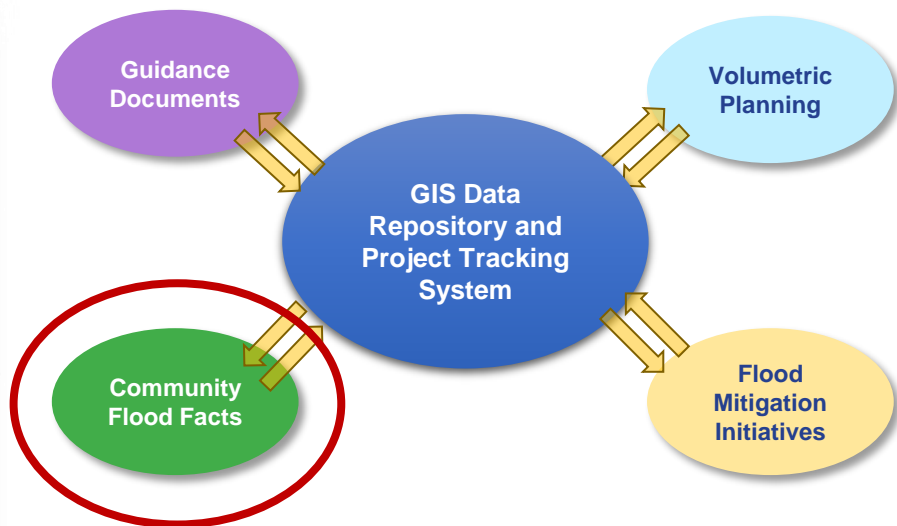
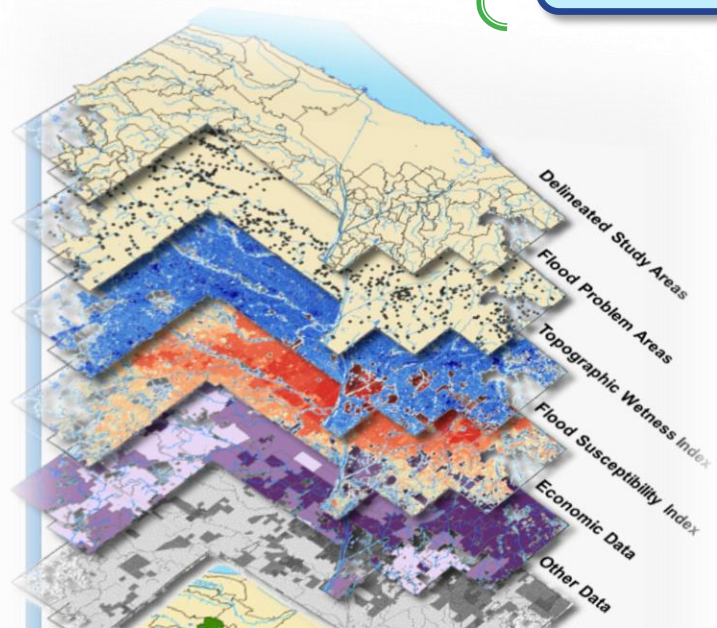




MWRD Stormwater GIS Portal

Story Map

- View Story Map**
understand available data and how to use it
- Explore Story Map**
view community flood facts, tables, maps
- View Volumetric Data**
estimate magnitude of stormwater needs



City of Harvey
Community Flooding
Fact Sheet

**STORMWATER
MASTER PLANNING**

0 Introduction
This Community Flooding Fact Sheet provides data, information, and context regarding flood risk areas within a community. As a first step, communities can use the information presented in this Fact Sheet to guide the development of a flood mitigation strategy and the implementation of projects, policies, and programs that mitigate urban flooding and meet their needs. The Fact Sheet is designed to make the information accessible and understandable. Communities can then build upon the presented information to enhance their knowledge of their stormwater drainage systems, to define flood mitigation solutions, and to establish partnerships with other communities and/or regional agencies to implement specific flood mitigation actions. These enhancements can include digitizing sewer atlases, mapping sewer catchments, and using hydraulic models to evaluate sewer system capacity.

1 Demographics, and Land Use
A community's existing demographics and land use are key factors in evaluating various stormwater management strategies. Right-of-way and vacant land uses are often ideal for stormwater runoff projects, because of the scale and the range of green and grey infrastructure practices that can be implemented during public infrastructure improvements. Add text on socio-economic. Add Map 1B.

Population: 24,599¹
Total Area: 3,923 acres
Economically Disconnected Areas: 52%
Disinvested Areas: 47%
Dominant Land Uses

- Right of Way – 1,044 acres
- Single Family – 1,021 acres
- Vacant/Under Construction – 456 acres

Impervious Surfaces: 53%
See Map 2 for an impervious heat map.

Land uses that are less than 4% of the total area were grouped together as Miscellaneous. See Map 1 for a community land use map.

2. Local Stormwater Drainage
An understanding of overland flow patterns and the locations where stormwater runoff can enter and exit community boundaries is critical for successful stormwater planning. This section provides an overview of the community's location within the regional stormwater drainage system focusing on overland flow paths. It also presents the combined sewer area, adjacent water bodies/streams, drainage ditches and other defined conveyance features, drainage areas within the community, and the locations of overland flow path inlets and outlets.

Combined Sewer Area (bs): 2,324 acres (60%)
Regional Drainage Features: Robey Street Diversion Conduit, Dixie Creek, Belair Creek, Calumet Union Drainage Ditch, Canadian Canal, and Little Calumet River
Community Drainage Patterns: – See Map 3 for overland flow path and subcatchment delineations.

- No. of Subcatchments: 265
- Average Size: 14.8 acres

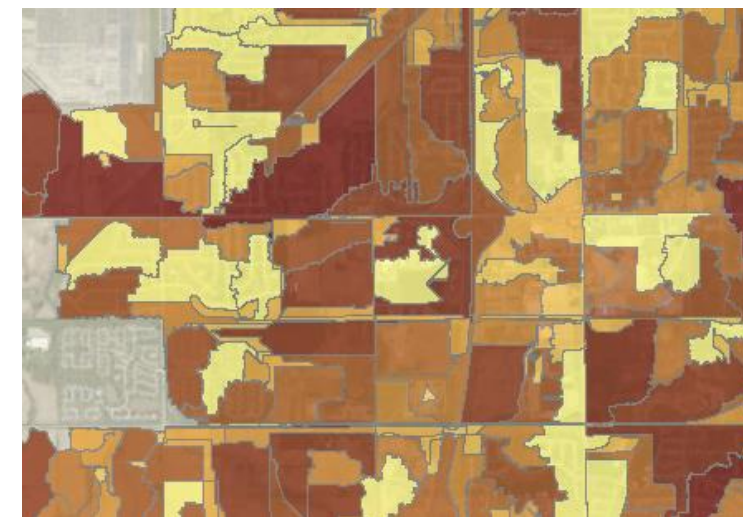
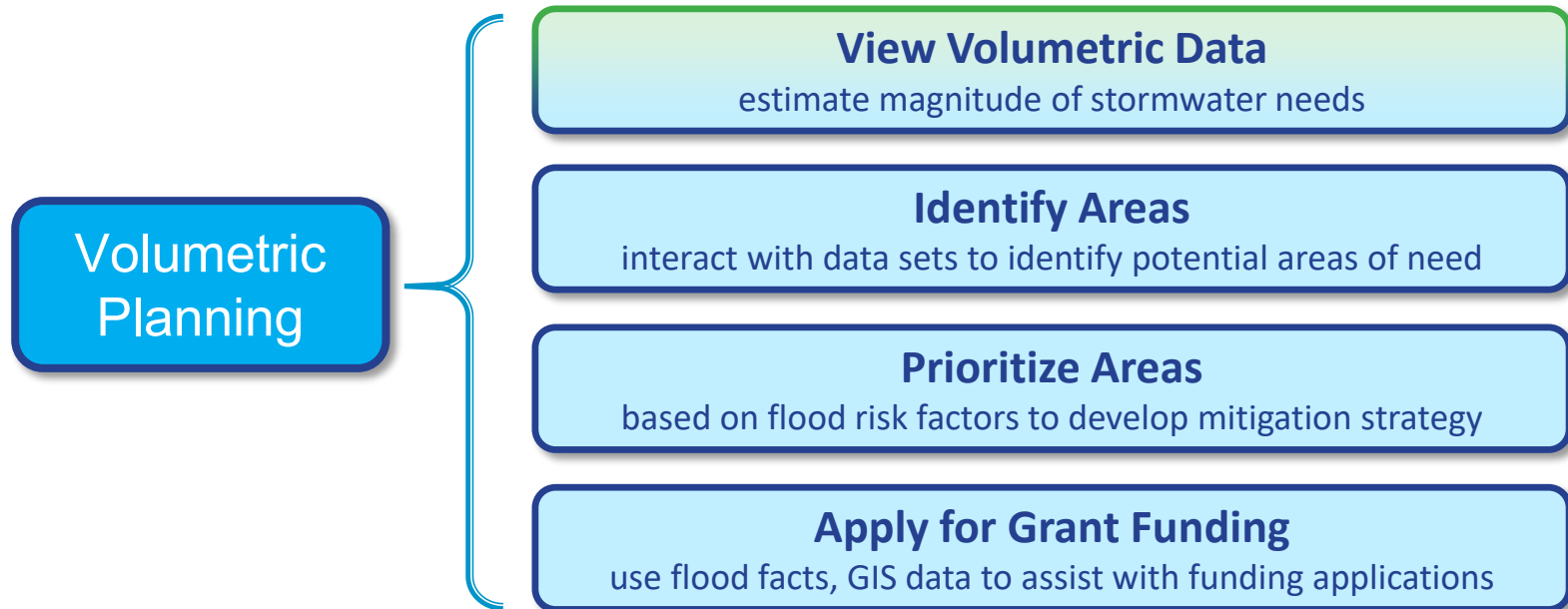
No. of Overland Flow Path Inlets: 16
No. of Overland Flow Path Outlets: 19 flow path outlets (drainage areas >= 3 acres). See Map 4 and Table 3 for tributary areas for each outlet.
No. of MWRD Tie-Ins: 2 locations, where the community's local sewers connect and discharge into MWRD trunk sewers and/or TARP.

Overland flow path outlets and drainage areas in northwest Harvey (Map 4).

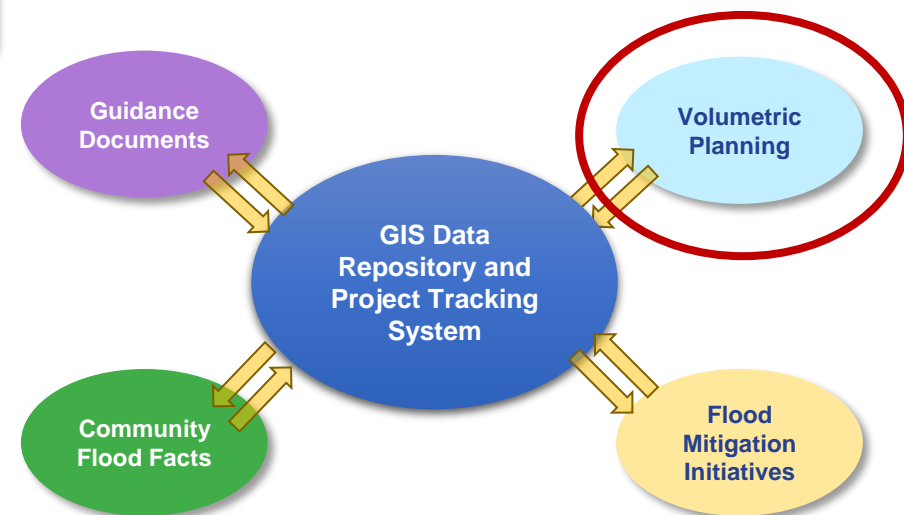
¹2018 American Community Survey 5-Year Estimates.
MWRD Stormwater Master Planning Program



MWRD Stormwater GIS Portal



- Phase 1: Static delivery of data
- Phase 2: One-way interaction (municipalities add data)
- Phase 3: Fully interactive (municipalities manipulate data, with MWRD approval of edits)



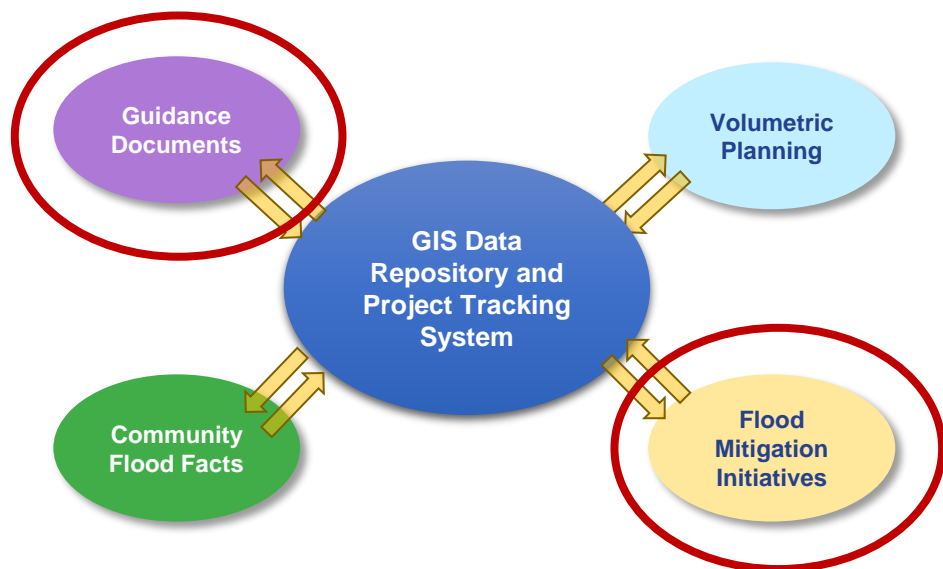


MWRD Stormwater GIS Portal

Complete Flood Mitigation Initiatives

enter into GIS to track progress

Guidance Documents



- **Guidance Documents (to aid municipal efforts)**

- Springboard for municipal-led planning
- Support for MWRD funding applications
- Support other agency grant applications
- Update map products

- **Resources**

- Stormwater Master Plan checklist / template
- Action Plan template
- Core concepts (best practices)
- Programs and policies (for non-constructed solutions)
- Funding partners and available grants
- Green Guides for homeowners, and for professionals



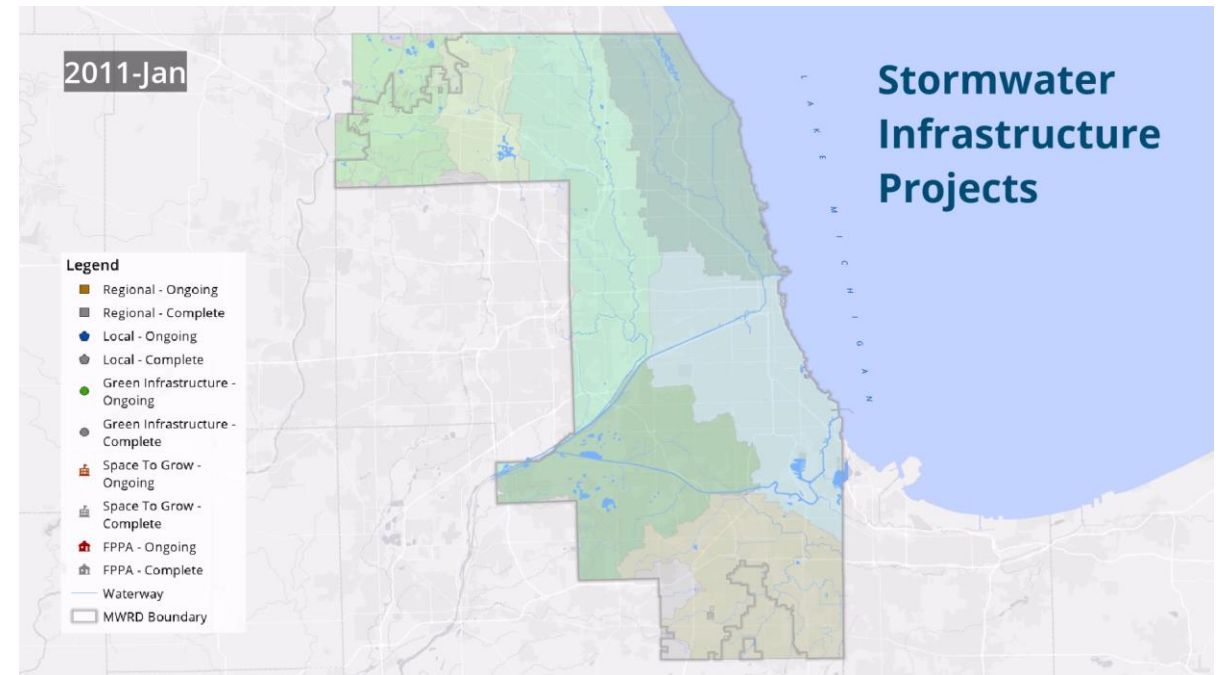
Next Steps

MWRD:

- Develop GIS system

Stormwater Program Managers:

- Finish development of maps and metrics
- Complete Guidance Document
- Prepare Story Map and deliver GIS content





Thank you!

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