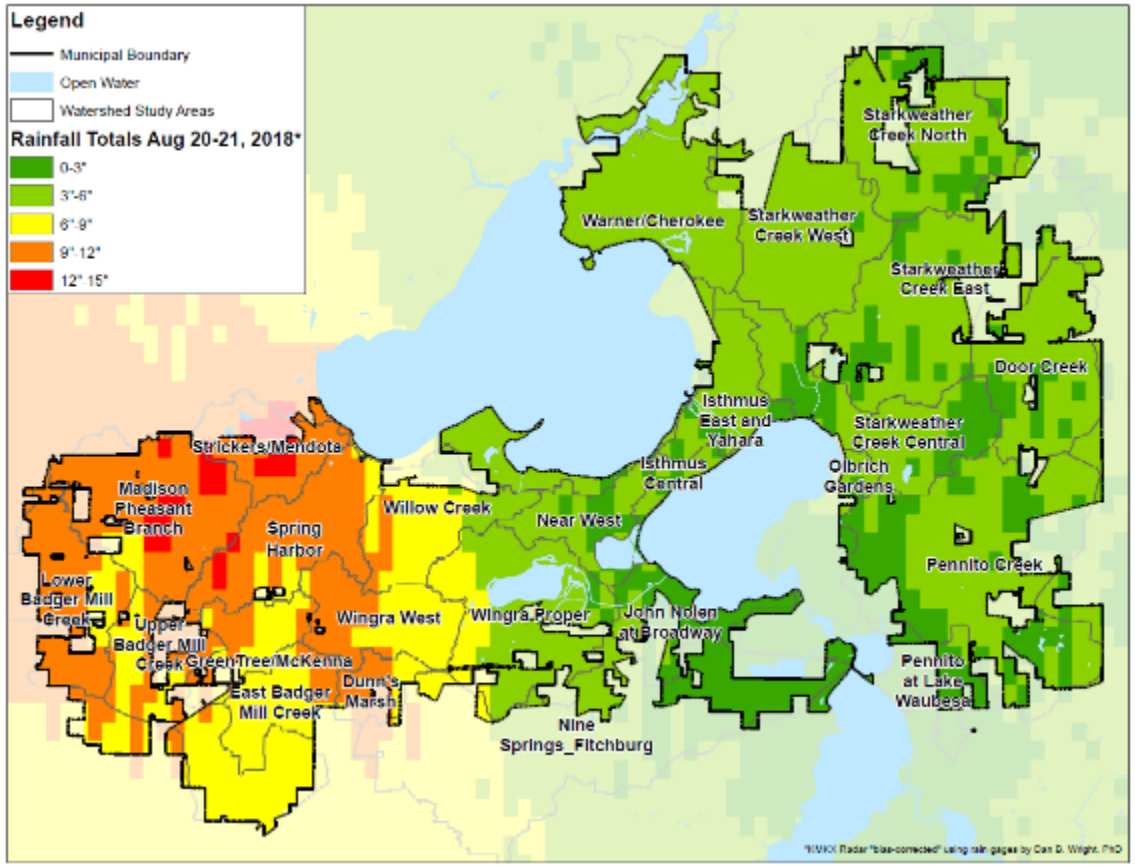
# Watershed Study Overview and Stricker's/Mendota Proposed Solutions

by City of Madison Engineering Division

April 20, 2022

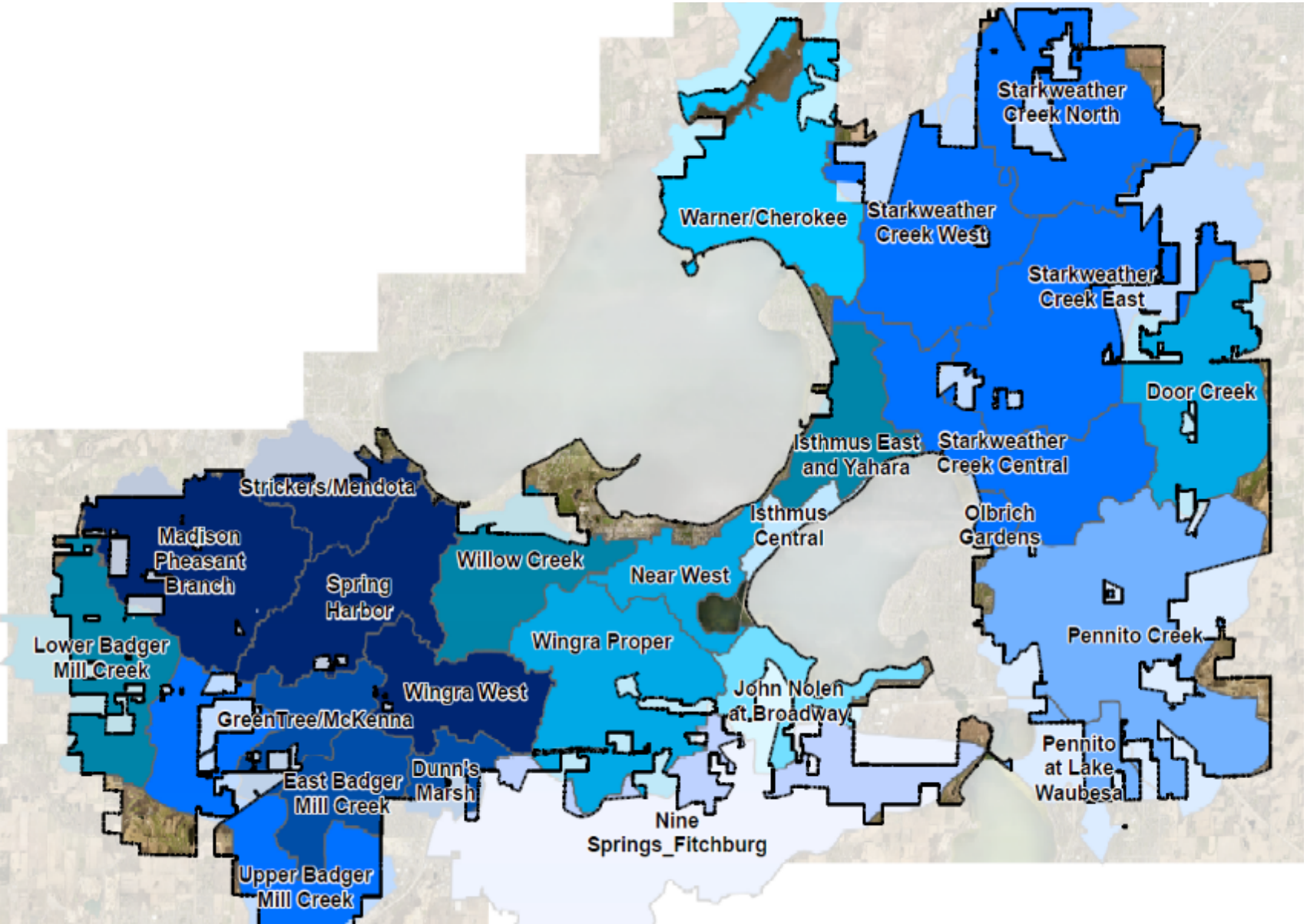
# Presentation Overview

- Phasing and Schedule
- Process (with anecdotal Lessons Learned)
- Proposed Solutions
  - Stricker's/Mendota
- Comments/Questions




CITY OF MADISON

# Watershed Study Phasing




**Legend**

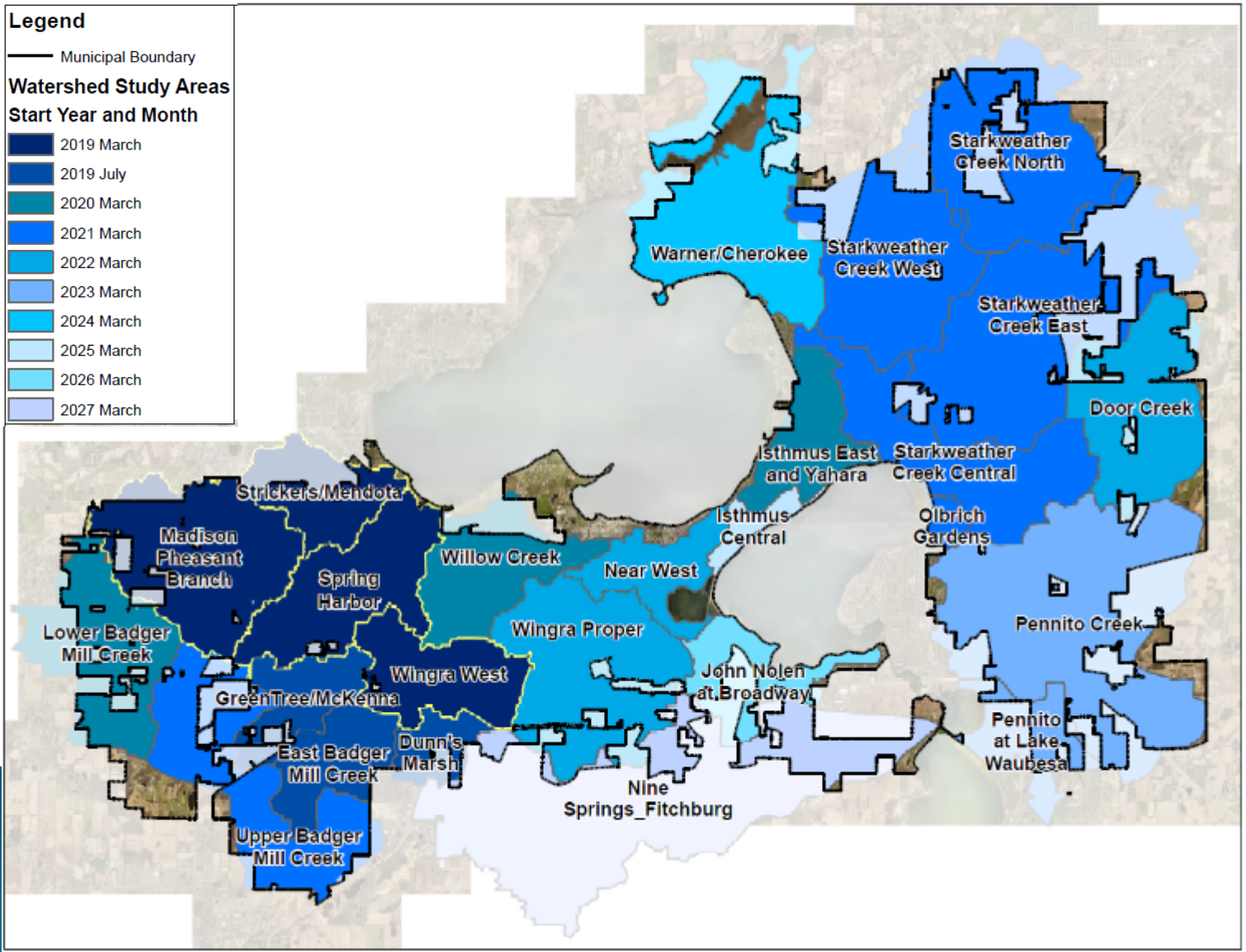
Municipal Boundary

**Watershed Study Areas**
**Start Year and Month**

- 2019 March
- 2019 July
- 2020 March
- 2021 March
- 2022 March
- 2023 March
- 2024 March
- 2025 March
- 2026 March
- 2027 March

CITY OF MADISON

# Round 1 Watershed Studies




- Madison Pheasant Branch
  - In-House
  - PM/Modeling Lead: Caroline Burger
- Spring Harbor
  - Outsourced
  - PM: Jojo O'Brien
- Stricker's/Mendota
  - Outsourced
  - PM: Lauren Striegl/Caroline Burger
- Wingra West
  - Outsourced
  - PM: Phil Gaebler

CITY OF MADISON

# Proposed and Actual Schedule

## Round 1 Watershed Studies

**Projected**: Spring-Summer 2019 **Actual**: Spring-Winter 2019

*Create and Calibrate Model*

**Projected**: Summer-Fall 2019 **Actual**: Fall-Winter 2019

*Identify Flood Impacts*

**Projected**: Fall-Winter 2019 **Actual**: Summer 2020

*2nd Public Meeting*

**Projected**: Winter-Spring 2020 **Actual**: Summer 2020 - Summer 2021

*Evaluate Solutions*

**Projected**: Spring-Summer 2020 **Actual**: Fall 2021 – Winter 2021/2022

*3rd Public Meeting*

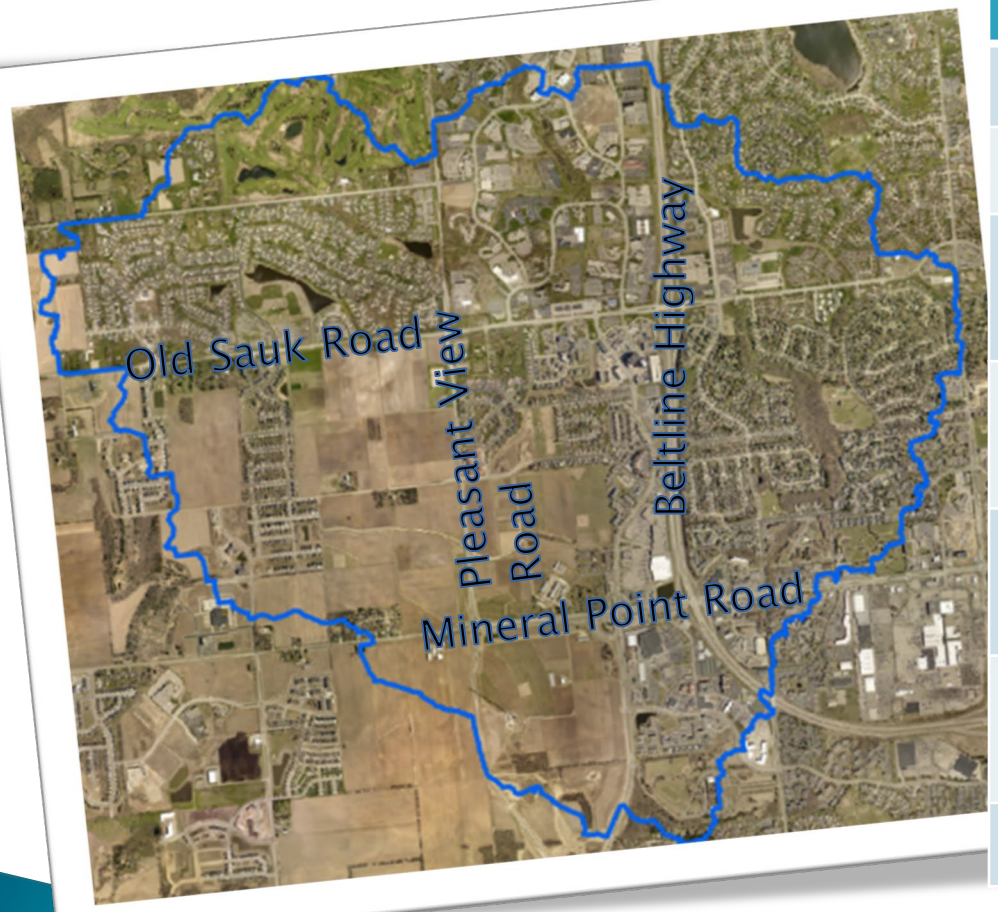
**Projected**: Summer-Fall 2020 **Actual**: Spring-Summer 2022

*Finalize Study*

CITY OF MADISON

# Watershed Study Process

## Example: Madison Pheasant Branch

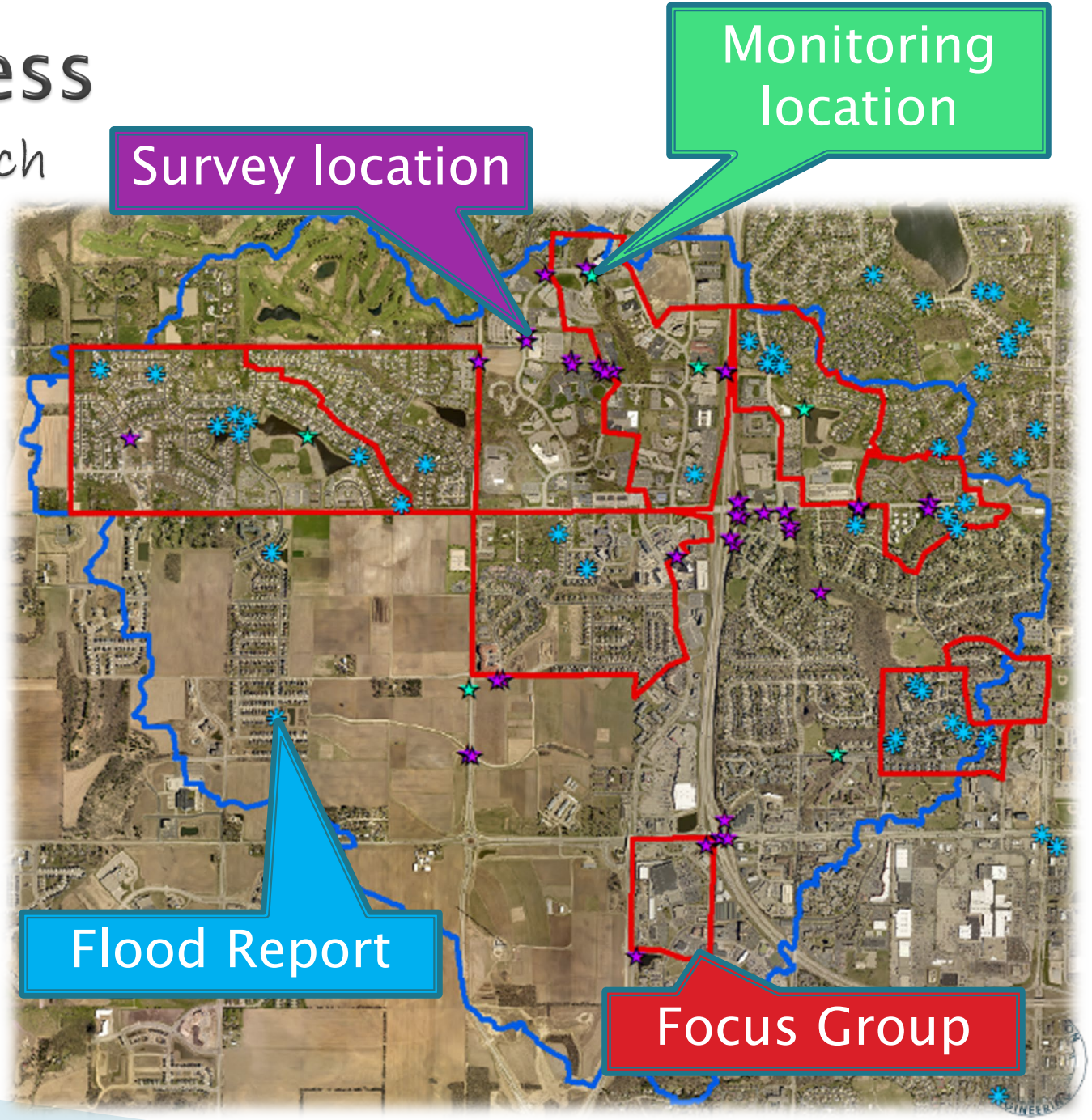



| Item | Quantity |
|---|---|
| Watershed Area (acres) | 3,300 |
| Number of Subcatchments (#) | 451 |
| Public Stormwater Inlets and Access Structures in Watershed (#) | 2,500 |
| Total storm sewer pipes in Watershed (#) | 2,200 segments; 31.4 miles |
| Storm sewer pipes in Model (#; length) | 1,452 segments; 27.4 miles |
| Open channels in Model (#; length) | 90 segments; 6.7 miles |
| Detention Ponds in Model (#) | 44 |

# Watershed Study Process

Example: Madison Pheasant Branch

- Data collection
  - Ground/storm sewer survey
  - Monitoring – rain depth, pond and storm sewer water levels, storm sewer flow
  - Flood reports
  - Focus groups – flooding experiences



# Watershed Study Process

## Example: Madison Pheasant Branch

- Public Information
  - Public Input Meeting #1 – May 4, 2019
  - Focus Groups – 9 Focus Groups in September 2019
  - Public Input Meeting #2 – June 18, 2020
  - Project website creation and updates – www.cityofmadison.com/PheasantBranchWatershed

CITY OF MADISON

# Watershed Study Process

## Example: Madison Pheasant Branch

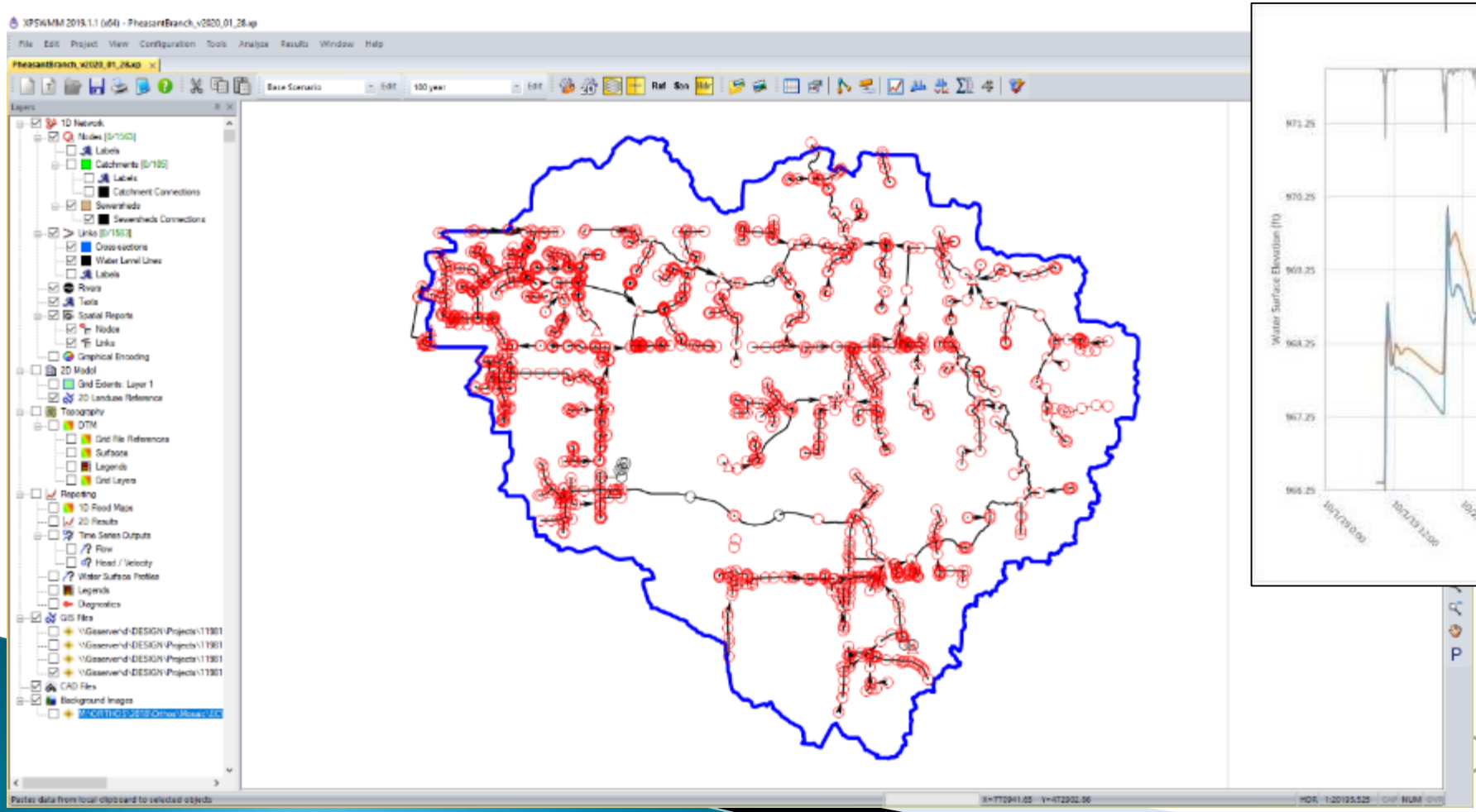
- Media – television, radio, Facebook, Twitter, Podcast
  - Coverage about Watershed studies as a whole on Channels 3, 27, 15, State Journal, Cap Times
  - Flooding awareness, education posts, photos and videos from focus groups on social media
  - Two podcast episodes on Everyday Engineering: Historic Flooding, Watershed studies

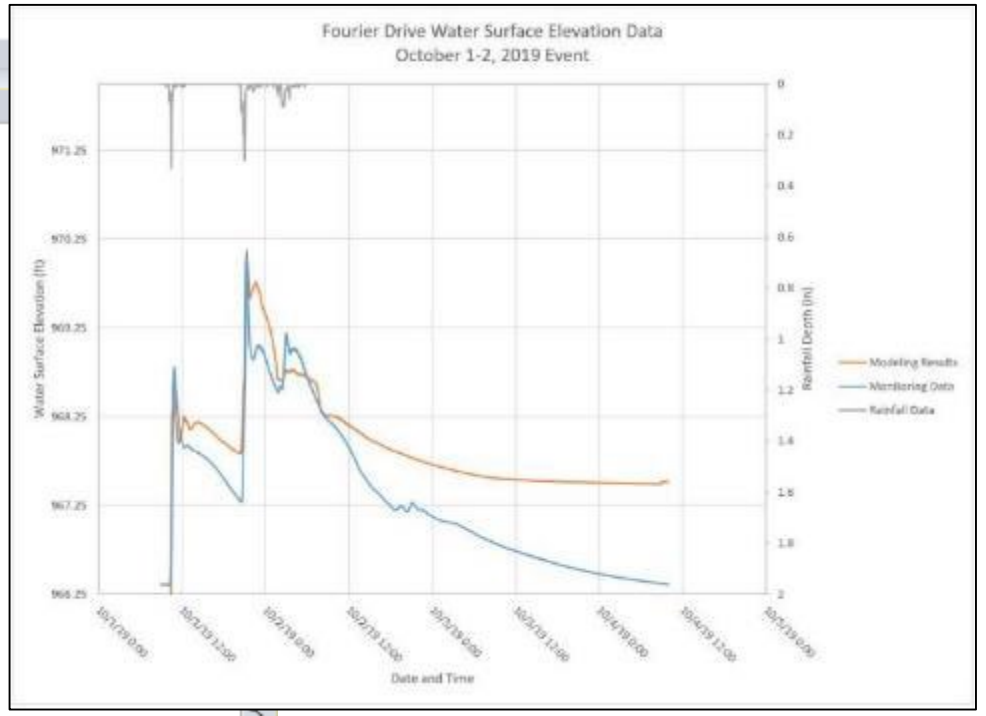
CITY OF MADISON

# Watershed Study Process

## Example: Madison Pheasant Branch

- Existing Conditions Model Construction and Calibration






CITY OF MADISON

# Watershed Study Progress

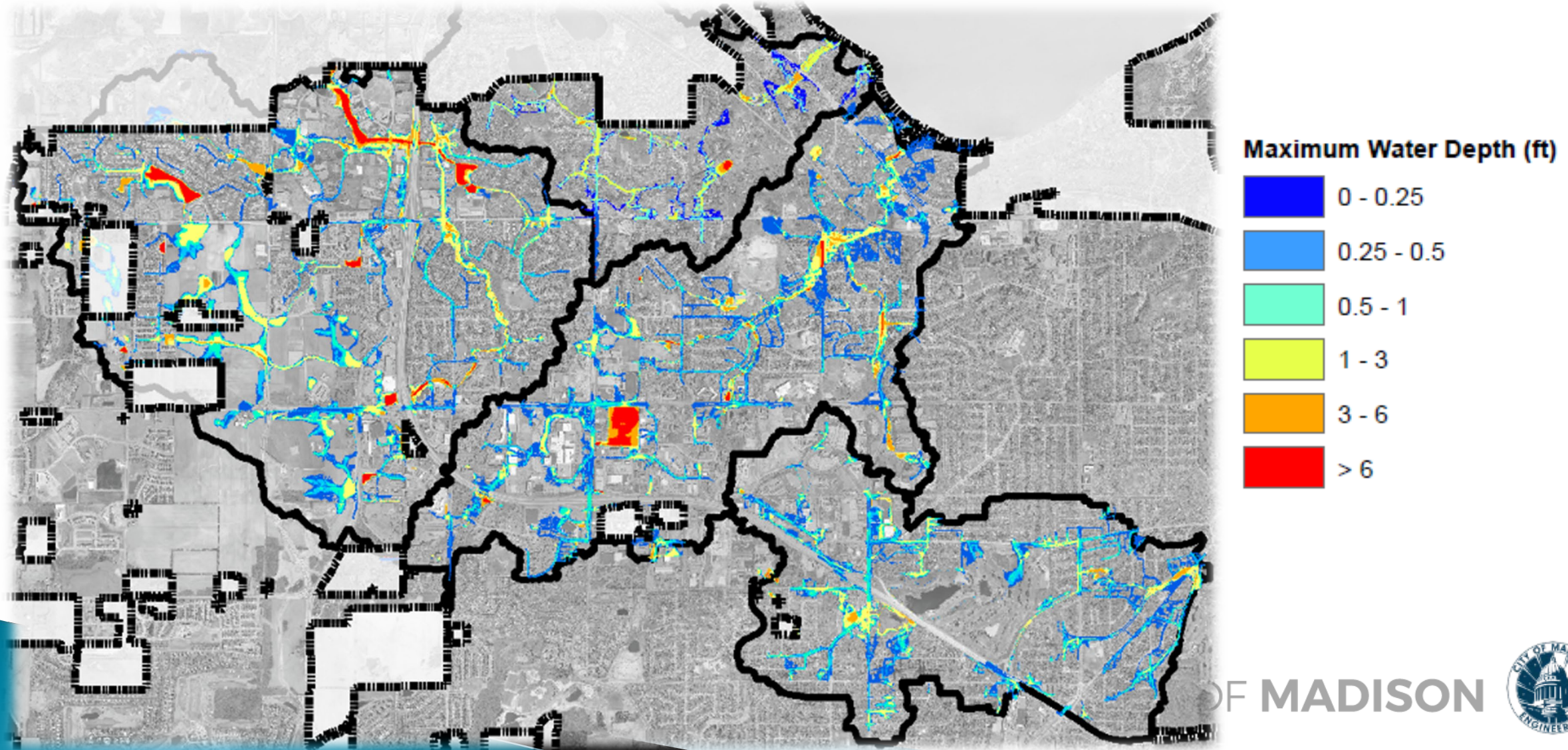
- Working with City Legal Department
  - Review Existing Condition Reports
  - Provide following disclaimer for inundation mapping

LEGAL DISCLAIMER

THE INTENT OF THE FLOOD ZONE MAPS ARE TO ASSIST INDIVIDUALS IN QUICKLY FINDING GENERAL FLOOD ZONE INFORMATION FOR THE INCORPORATED AND UNINCORPORATED AREAS OF THE CITY OF MADISON. FLOOD ZONE MAPS DO NOT NECESSARILY IDENTIFY ALL AREAS SUBJECT TO FLOODING. THE CITY OF MADISON PROVIDES THE MAPS AS AN ADVISORY TOOL FOR FLOOD HAZARD AWARENESS. INDIVIDUALS SHOULD NOT USE FLOOD ZONE MAPS AS THEIR PRIMARY RESOURCE FOR MAKING OFFICIAL FLOOD ZONE DETERMINATIONS FOR INSURANCE, LENDING, OR OTHER RELATED PURPOSES. THIS IS NOT AN OFFICIAL FLOOD MAP.

THE CITY OF MADISON ASSUMES NO LIABILITY FOR ANY ERRORS, OMISSIONS, INACCURACIES, COMPLETENESS OR USEFULNESS OF THE INFORMATION PROVIDED REGARDLESS OF THE CAUSE OR FOR ANY DECISION MADE, ACTION TAKEN, OR ACTION NOT TAKEN BY THE USER IN RELIANCE UPON ANY OF THE MAPS OR INFORMATION PROVIDED.

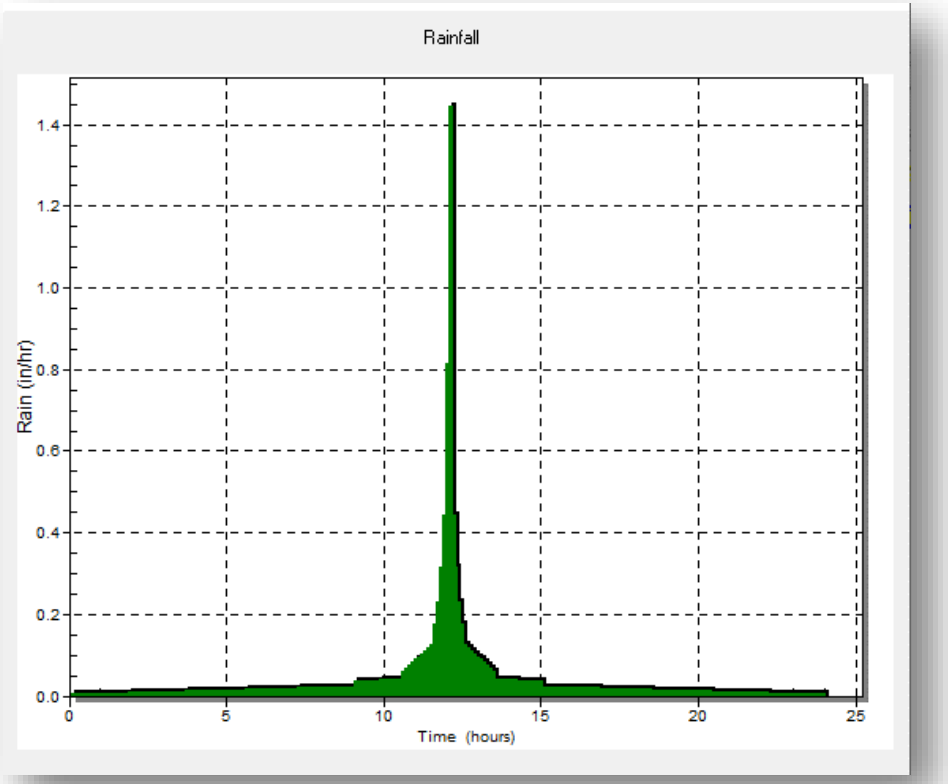
# Existing Conditions 1% Chance (100-yr) Event Inundation Mapping



# Watershed Study Process

## Storm Events Analyzed

- 100% chance (1-year)
- 50% chance (2-year)
- 20% chance (5-year)
- 10% chance (10-year)
- 4% chance (25-year)
- 1% chance (100-year)
- 0.2% chance (500-year)
- August 2018




- Each storm event takes 2-6 hours of simulation time

CITY OF MADISON

# Watershed Study Process

## Flood Reduction Targets

- 10% Chance Event
  - No surcharging of storm sewer onto roadway (storm sewer pipes are sized for event)
- 4% Chance Event
  - 0.2’ at Centerline of Road (roads passable for emergency vehicles)
- 1% Chance Event
  - No structure (home/building) flooding
  - No greenway crossing overflow (stormwater does not come out of greenway and flow over the road)
- 0.2% Chance Event
  - Safe conveyance of overflow

# Watershed Study Process

## Proposed Solutions – to get to Draft Solutions for Discussion

- Brainstorm ideas
  - Meet with Engineering Staff
- Conceptually size mitigation measures
  - Meeting with Engineering Staff
- Conduct initial analysis of mitigation measures
  - Some computer modeling
  - Some manual analysis
  - Meet with Engineering Staff
- Revise initial analysis based on feedback
  - Mostly computer modeling
  - Meet with Engineering Staff

# Watershed Study Process

## Proposed Solutions – to Finalize Solutions and Report

- Internal Agency Review
  - Engineering meets with Internal Agency staff to get feedback
  - Revise solutions based on feedback
- 3rd Public Information Meeting
  - Present solutions to public
  - Revise solutions based on feedback
- Finalize Draft Report
- 30-day Public Comment Period
  - Revise solutions based on feedback
- City Board and Commission Review and Approvals
- Finalize Report

# Stricker's/Mendota Watershed Proposed Solutions

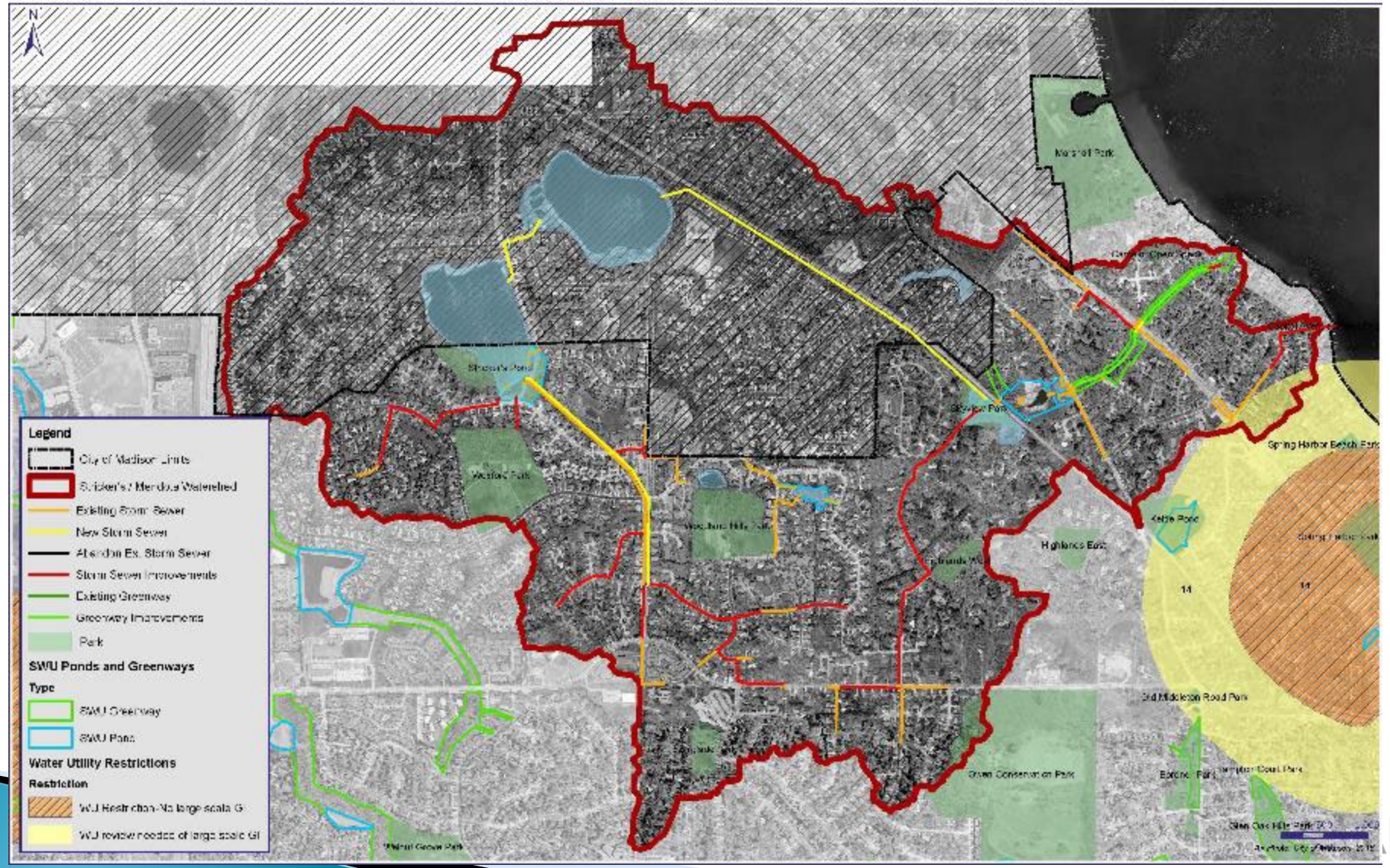
CITY OF MADISON

# Results

## Stricker's/Mendota Watershed

- 10% Chance Target – no ponding on streets
  - Existing Conditions: 3.5 miles out of 6.1 miles of storm sewer not meeting target (58%)
  - Proposed Conditions: 0.2 miles out of 6.1 miles of storm sewer not meeting target (4%) – reduced 3.3 miles
- 4% Chance Target – streets passable for emergency vehicles
  - Existing Conditions: 4.9 miles out of 17.7 miles of streets not meeting target (28%)
  - Proposed Conditions: 0.5 miles out of 17.7 miles of streets not meeting targets (1%) – reduced 4.4 miles
- 1% Chance Target – no structure flooding
  - Existing Conditions: 91 out of 1,470 structures not meeting target (6%)
  - Proposed Conditions: 15 out of 1,470 structures not meeting target (1%) – reduced 76 structures

# Stricker's/Mendota Watershed Proposed Mitigation Measures



# Stricker's/Mendota Watershed Proposed Mitigation Measures

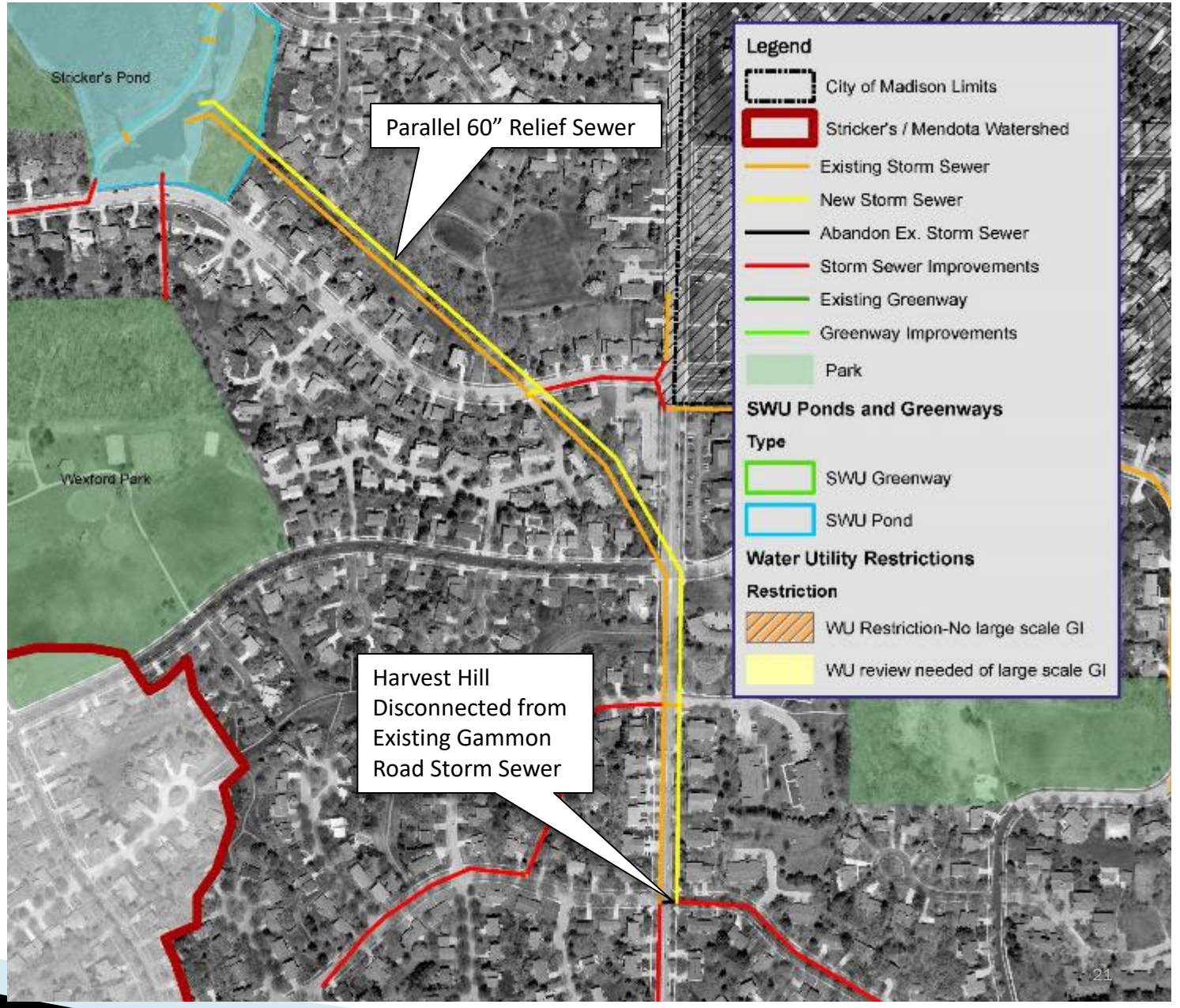
- Storm Sewer Pipe Size Increases
- Significant increase to conveyance capacity
  - Longmeadow Drive Relief Sewer
    - Parallel 60" relief sewer from existing Harvest Hill connection to Stricker's Forebay
    - Improvements to Stricker's Pond/Tiedemann's Pond outlets
  - Mendota-Grassman Greenway Improvements
    - Improve greenway conditions between University Avenue to Old Middleton Drive and University Ave to Camelot Drive
    - Parallel 72" pipe beneath University Avenue at the crossing
    - Replace and upsize culverts beneath Lake Mendota Drive

# Longmeadow Relief Storm Sewer

## Stricker's/Mendota Watershed

- Install parallel 60" relief sewer from existing Harvest Hill connection along Gammon Road and Longmeadow Drive to Stricker's Forebay

Target: Prevent roadway flooding in 10% event



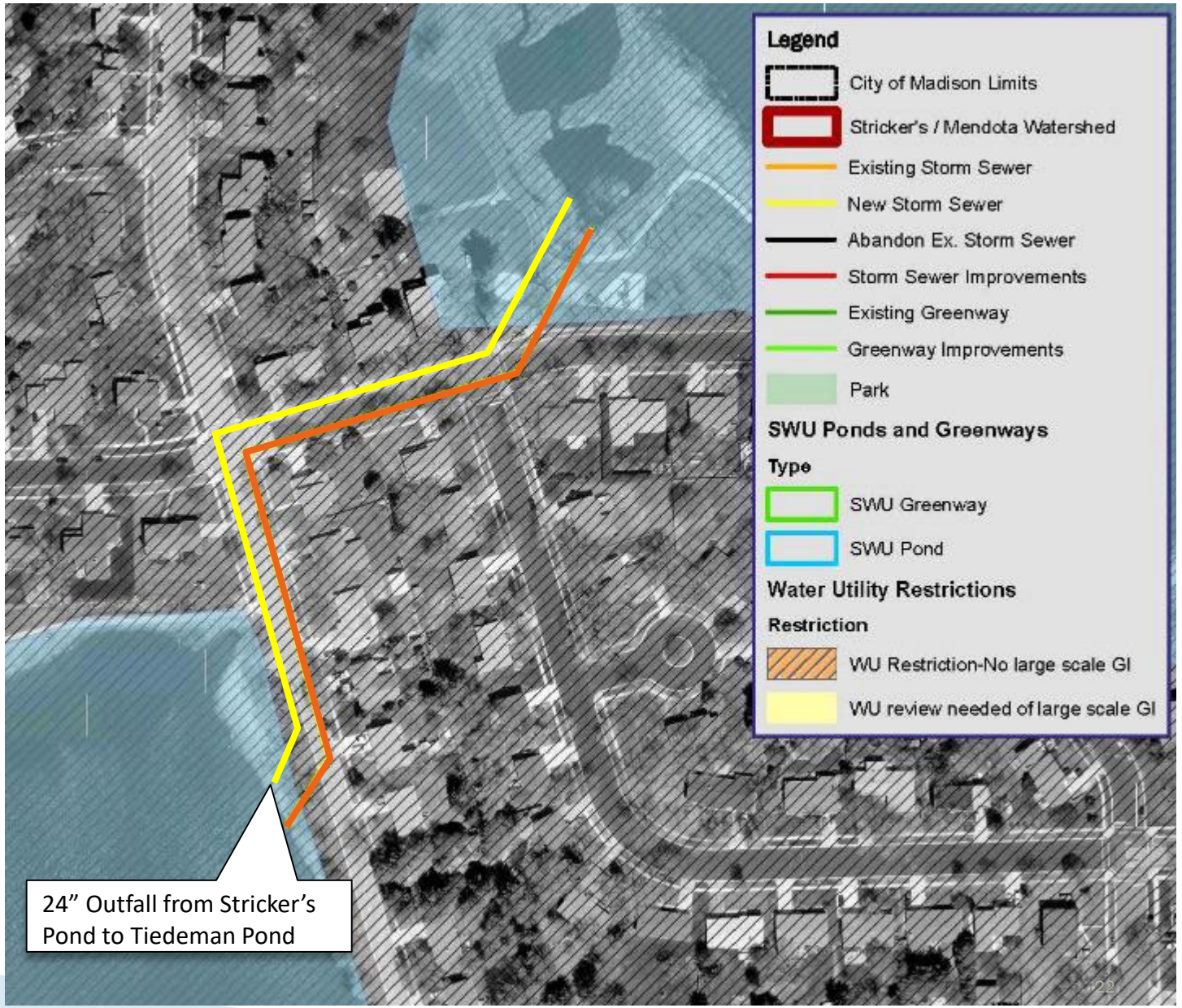
# Stricker's Pond Outfall

## Stricker's/Mendota Watershed

- Install additional 24" outfall from Stricker's Pond to Tiedeman Pond

Target: Prevent increase in WSE in Stricker's Pond due to improvements in Madison

- Project is located in Middleton



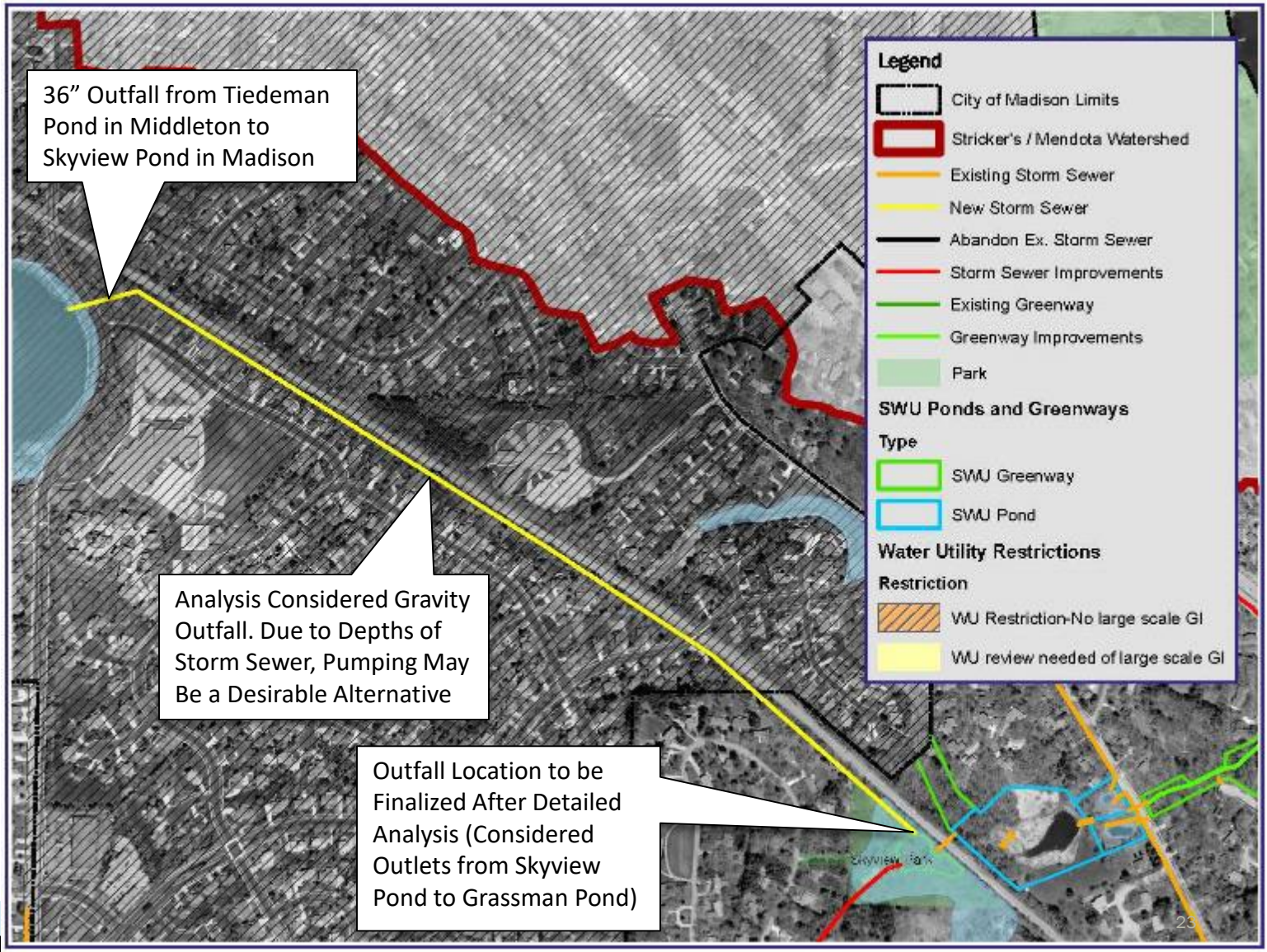
# Tiedeman Pond Outfall

## Stricker's/Mendota Watershed

- Installed parallel 36" outfall from Tiedeman Pond to Skyview Pond

Target: Prevent increase in WSE in Tiedeman Pond due to improvements in Madison

- Project is partially in Middleton



# Lake Mendota Greenway (Upstream)

## Stricker's/Mendota Watershed

- Improve greenway flow conditions from Old Middleton Road to University Avenue

Target: Prevent structure flooding in 1% event

- Project requires downstream improvements to be effective

- In Design

# University Avenue Culvert

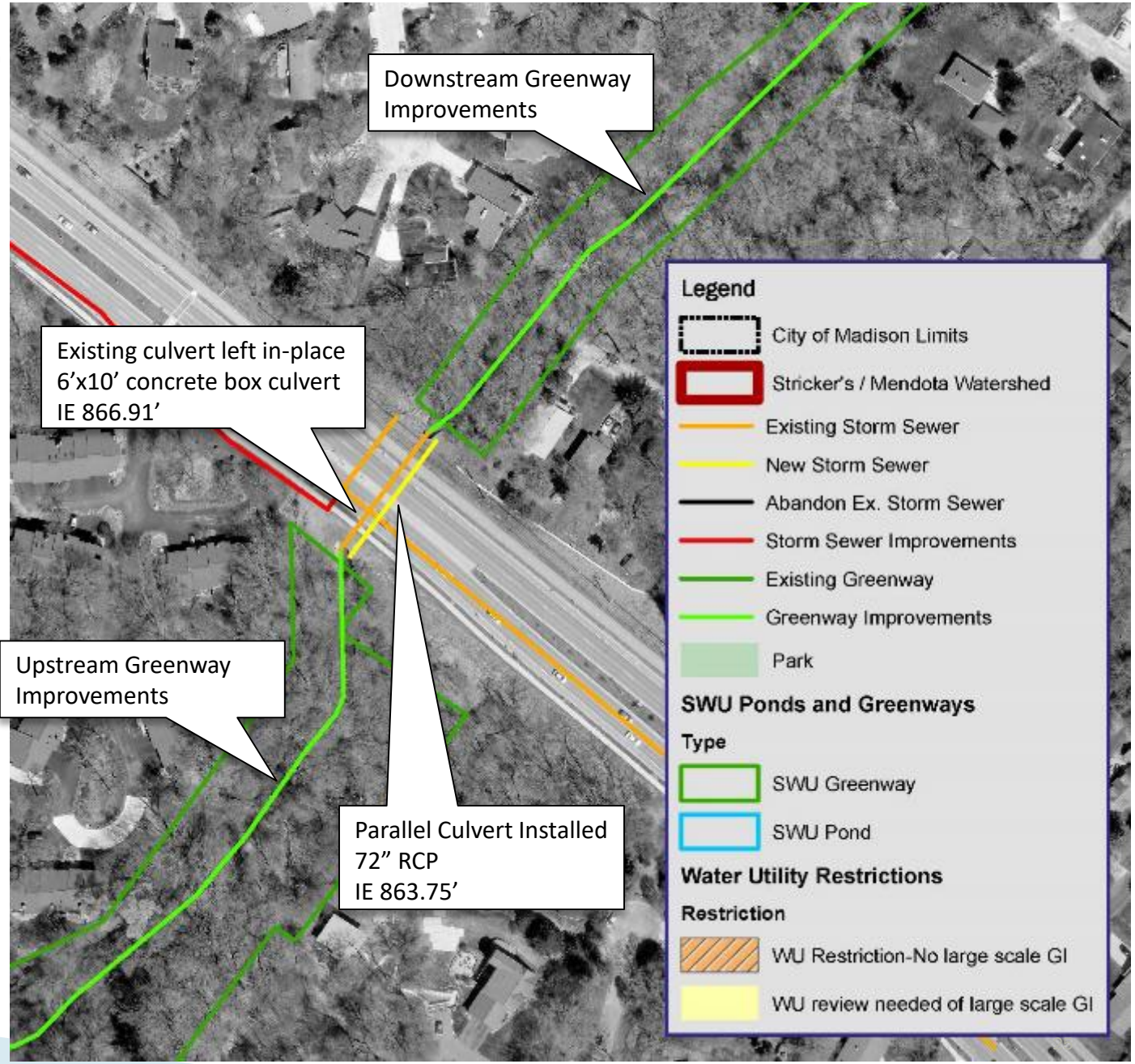
## Stricker's/Mendota Watershed

- Install parallel 72" RCP culvert next to existing 6'x10' box culvert

Target: Prevent structure flooding in 1% chance event

- Requires upstream and downstream greenway improvements to be effective

- In Design



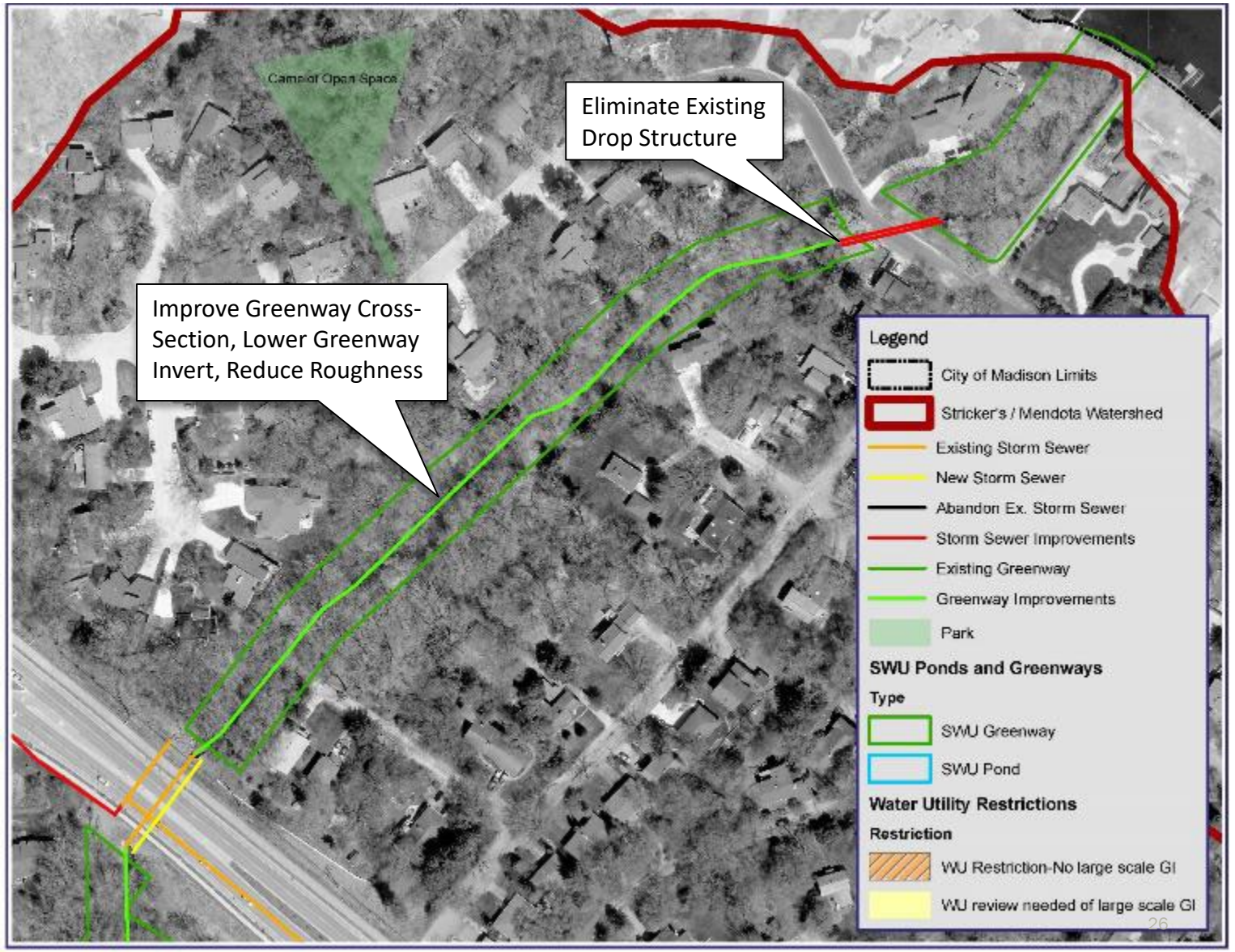
# Lake Mendota Greenway (Downstream)

## Stricker's/Mendota Watershed

- Improve greenway flow conditions from University Avenue to Camelot Drive

Target: Prevent structure flooding in 1% event

- Project requires upstream and downstream culvert improvements
- In Design



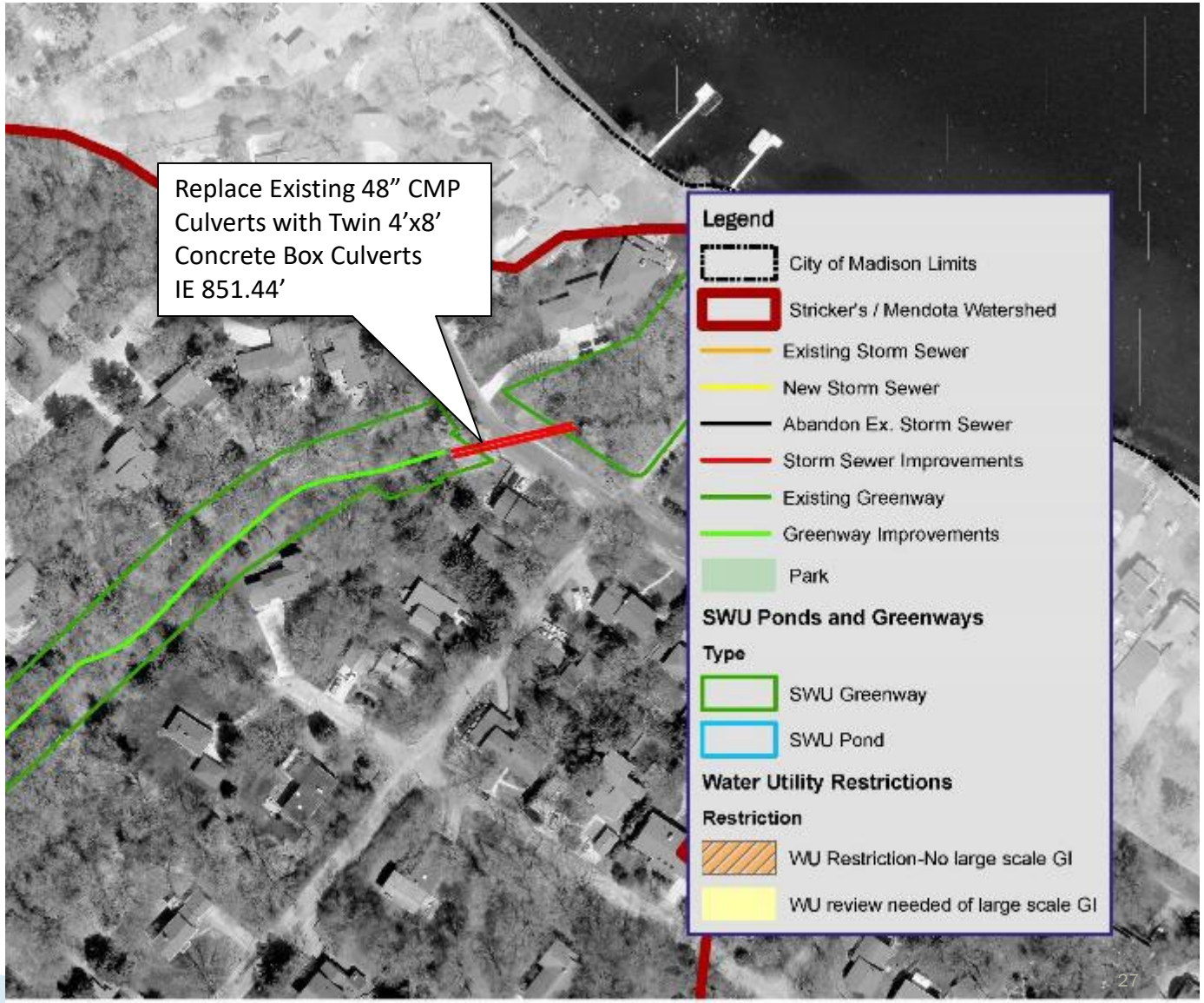
# Lake Mendota Drive Culvert

## Stricker's/Mendota Watershed

- Replace existing culverts with 2 – 4'x8' Box Culverts

Target: Prevent structure flooding in 1% chance event

- Requires upstream greenway and culvert improvements to be effective
- In Design



# Comments/Questions/Open Discussion