



# East Isthmus and Yahara River Watershed Study Public Information Meeting

Public Information Meeting  
City of Madison Engineering Division  
October 6, 2022

*Thank you for attending. We will begin shortly...*



# Meeting Technical Housekeeping

- This meeting will be **recorded** and posted to the project page.
- All attendees should be **muted** to keep background noise to a minimum.
- Use the **“chat”** button for technical issues with meeting to troubleshoot with staff to assist.
- Use the **“Q and A”** button to type questions about presentation. Questions will be answered live after the presentation.
- Inappropriate questions may be dismissed.
- Use the **“raise your hand”** button to verbally ask your question. You will be prompted to unmute when it is your turn.



**This meeting is being recorded.**

**It is a public record subject to disclosure.**

By continuing to be in the meeting, you are consenting to being recorded and consenting to this record being released to public record requestors.

# How to Participate

The screenshot displays a Zoom webinar interface. At the top, a green banner reads "You are viewing City of Madison's screen" with a "View Options" dropdown. Below this is a Microsoft Excel spreadsheet with a grid showing months from May to August for the years 2019 and 2020. The name "Sally" is visible in cell A1. A "Recording" indicator is in the top left. A "City of Madison" logo is in the top right. In the center, there are two audio options: "Phone Call" and "Computer Audio". A blue button labeled "Join Audio by Computer" is positioned below these options, with a red arrow pointing to it. At the bottom left, there is a "Join Audio" button with a headset icon and a red arrow pointing to it. Other bottom icons include "Q&A", "Chat", and "Raise Hand". A "Leave Webinar" button is in the bottom right.



Make sure to join audio



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The screenshot displays a Zoom meeting interface. At the top, a green banner reads "You are viewing City of Madison's screen" with a "View Options" dropdown. Below this is a shared Excel spreadsheet with a ribbon menu and a grid of data. A "City of Madison" watermark is visible on the right side of the spreadsheet. In the center, a dark grey control panel contains two buttons: "Phone Call" and "Computer Audio". A blue button labeled "Join Audio by Computer" is positioned below these. At the bottom of the Zoom window, a toolbar includes icons for "Join Audio", "Q&A", "Chat", and "Raise Hand". A red arrow points to the "Raise Hand" icon. The text "Leave Webinar" is located in the bottom right corner of the Zoom window.

Raise your hand to be unmuted  
For comments or ask additional questions.



# How to Participate

The screenshot displays a Zoom meeting interface. At the top, a green banner reads "You are viewing City of Madison's screen" with a "View Options" dropdown. The main content is a shared Microsoft Excel spreadsheet. The spreadsheet has a header row with columns labeled A through Z. Row 1 contains the name "Sally" in column A, followed by a calendar for the year 2019 (columns B through Q) and a calendar for the year 2020 (columns R through Z). Below the spreadsheet, there are two audio options: "Phone Call" and "Computer Audio". A prominent blue button in the center says "Join Audio by Computer". At the bottom of the Zoom window, there is a toolbar with icons for "Join Audio", "Q&A", "Chat", and "Raise Hand". A "Leave Webinar" button is located in the bottom right corner.

Use chat if you have technical issues or a question for the panelists



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Use Q/A if you have questions.  
We will answer after the presentation



# How to Participate

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To leave the meeting  
click here

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# Presentation Overview

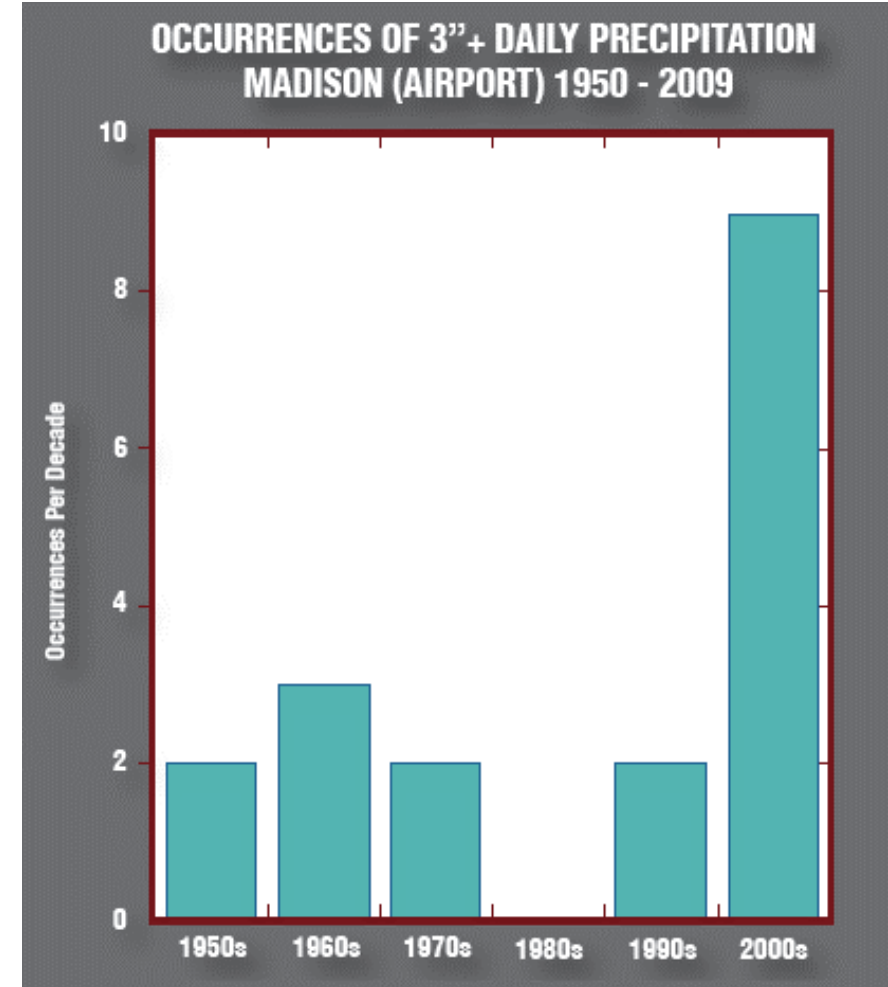
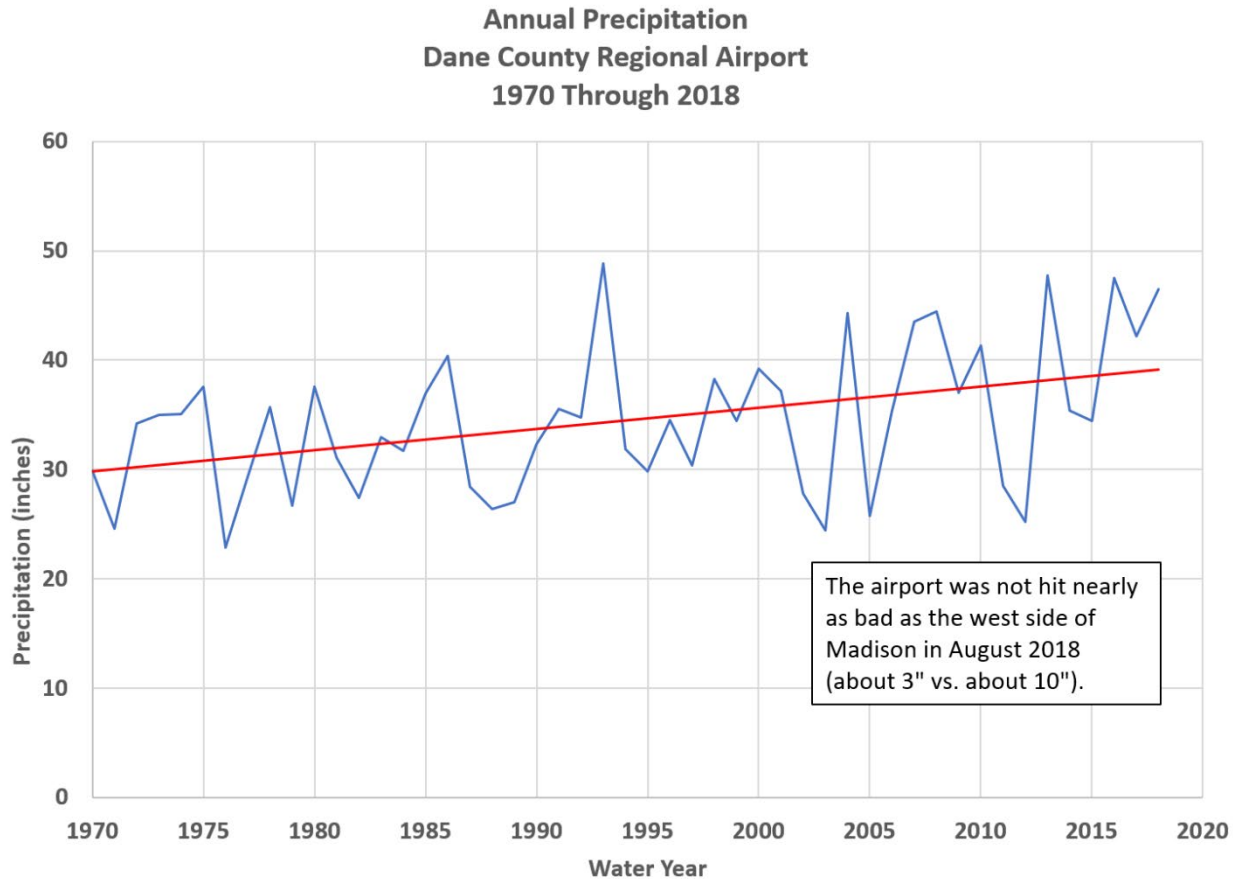
- Welcome – Jojo O’Brien, City of Madison
- Presentation – Tetra Tech
  - Definition of commonly used terms
  - Why are we here
  - Project location
  - Progress to date
  - Inundation mapping
  - Flood mitigation targets
  - Next steps
  - Watershed study limitations
- Q&A – facilitated by Tetra Tech
  - Submit questions through Zoom Q&A
- Flood map feedback—facilitated by Jojo O’Brien
- Wrap Up – Jojo O’Brien, City of Madison

# Definitions of commonly used terms

- **Stormwater:** rainwater produced from a rain event
- **Stormwater runoff:** the portion of the rainwater that does not soak into the ground
- **Stormwater inlets:** grates in the ground that take in stormwater runoff; connected to the stormwater conveyance system
- **Detention ponds:** ponds designed to hold stormwater runoff to improve water quality and/or help prevent flooding
- **Model:** computer software that is used to evaluate the stormwater conveyance system
- **Local Sewer Projects:** storm sewer that is reconstructed with another already-scheduled project – typically street reconstruction
- **Stand-alone Projects:** flood mitigation projects that will be constructed on their own – not tied to another already-scheduled project

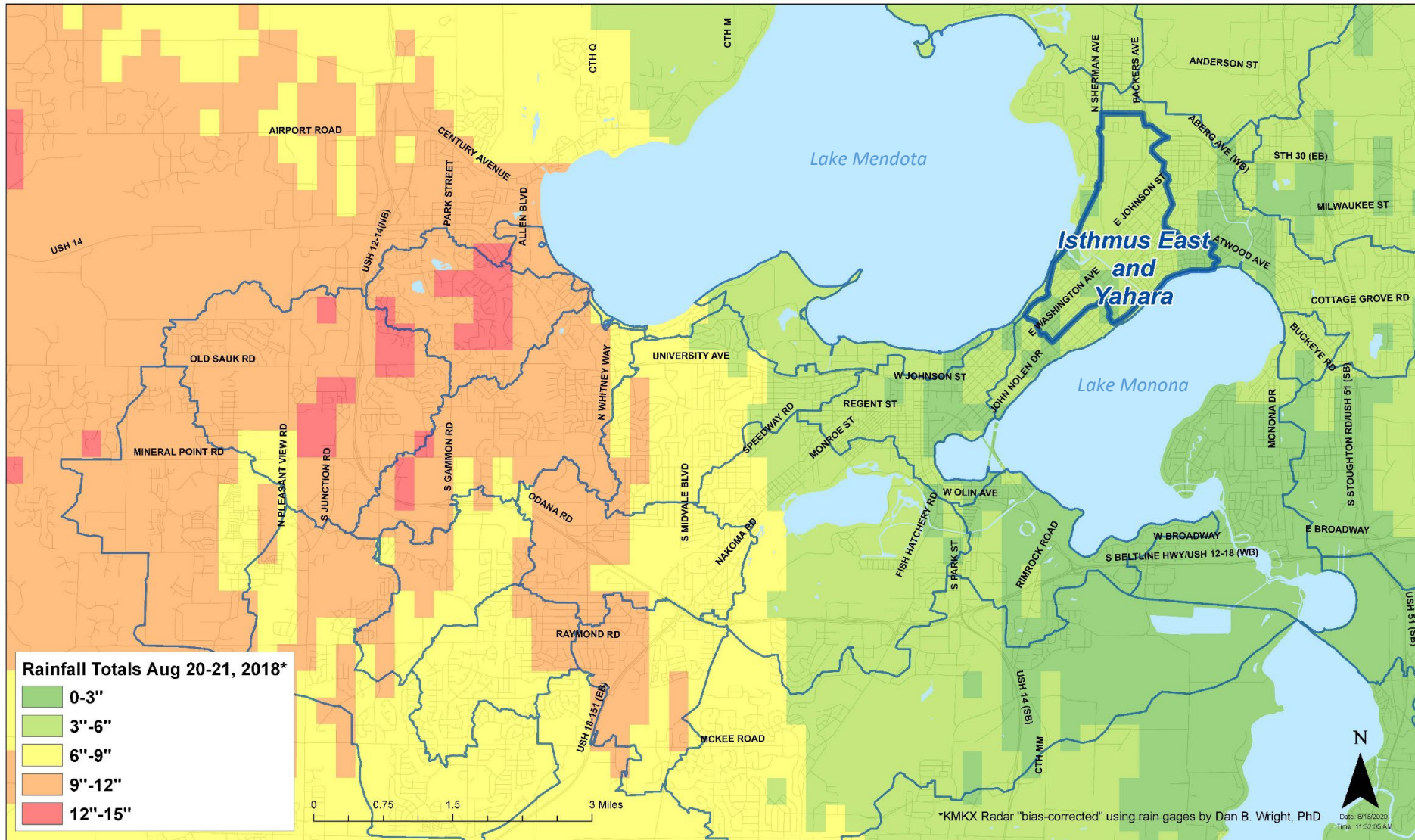
# Why We Are Here: Historic Events

- More rain
- More rain events greater than 3"



*Wisconsin's Changing Climate: Impacts and Adaptation. 2011. Wisconsin Initiative on Climate Change Impacts. Nelson Institute for Environmental Studies, University of Wisconsin-Madison and the Wisconsin Department of Natural Resources, Madison, Wisconsin.*

# Rainfall Totals August 20-21, 2018



KMKX Radar that was "bias corrected" using rain gauges by UW Professor Dan Wright

# Why We Are Here: Historic Rain Events

- Recent storms have
  - amplified known inadequacies
  - revealed new storm sewer deficiencies
- Result: flood damage

August 20, 2018, event: substantial damage

- Public infrastructure: \$4 million
  - Private property: reported \$17.5 million, estimated \$30 million
- City's plan
    - Complete watershed studies of impacted areas
    - Develop solutions from watershed studies



Deming Way, Madison, WI

# 100-Year Storm Definition

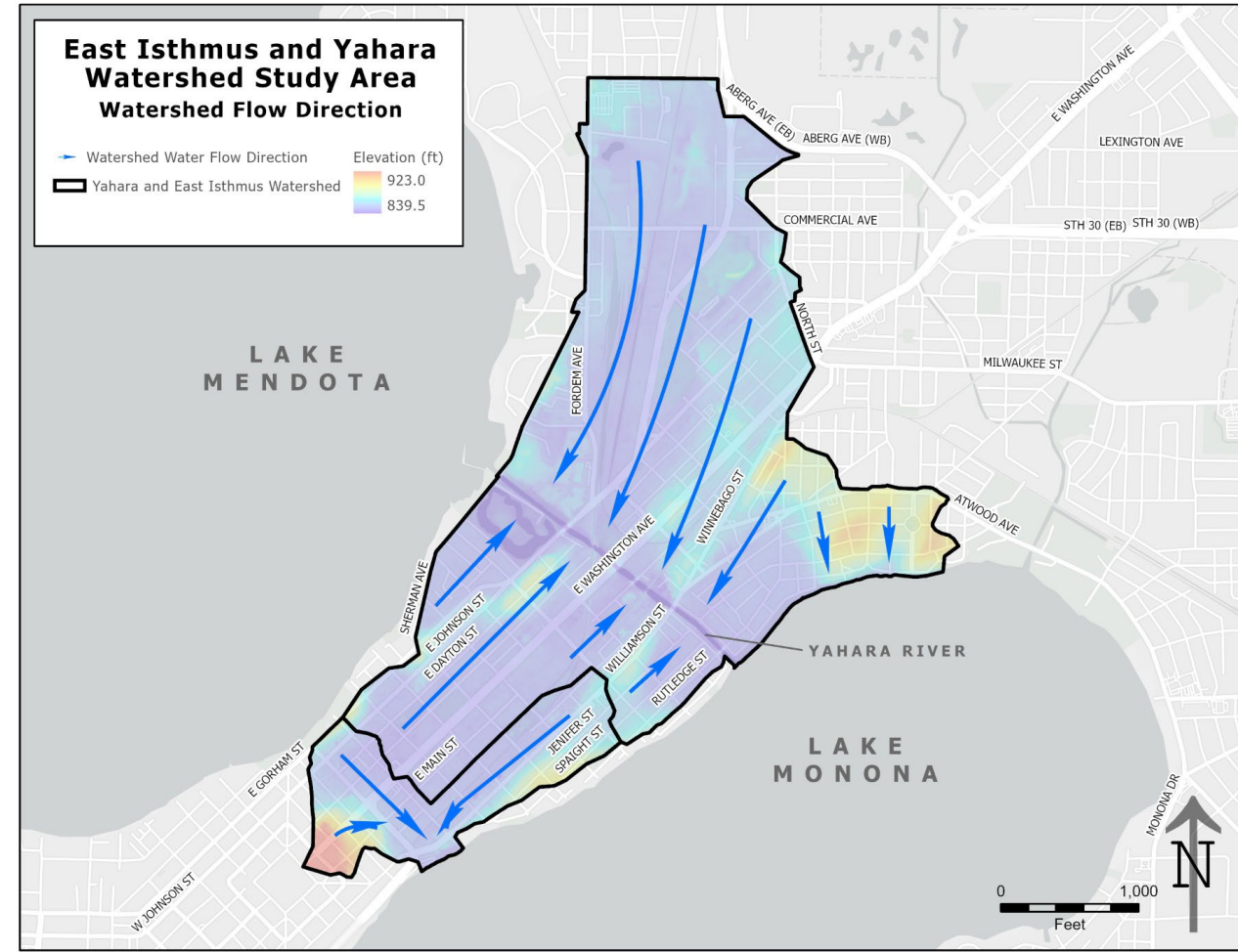
- The “100-Year” Storm
- Annual exceedance probability (AEP): chance that a rainfall event will occur in one year.
- 100-yr storm = 1/100 (1%) AEP
  - Does NOT mean that a storm will only occur once in 100 years.
  - During a 30-year mortgage, there’s a 26% chance of experiencing a 100-year (1%) event.

<b>Annual Exceedance Probability (AEP)</b>	<b>Chance of occurring in 1 Year</b>	<b>Return Period or Average Recurrence Interval (ARI)</b>
100%	1 in 1	1-year
50%	1 in 2	2-year
10%	1 in 10	10-year
4%	1 in 25	25-year
1%	1 in 100	100-year
0.10%	1 in 1000	1000-year

# Where the Water Goes

## What's a watershed?

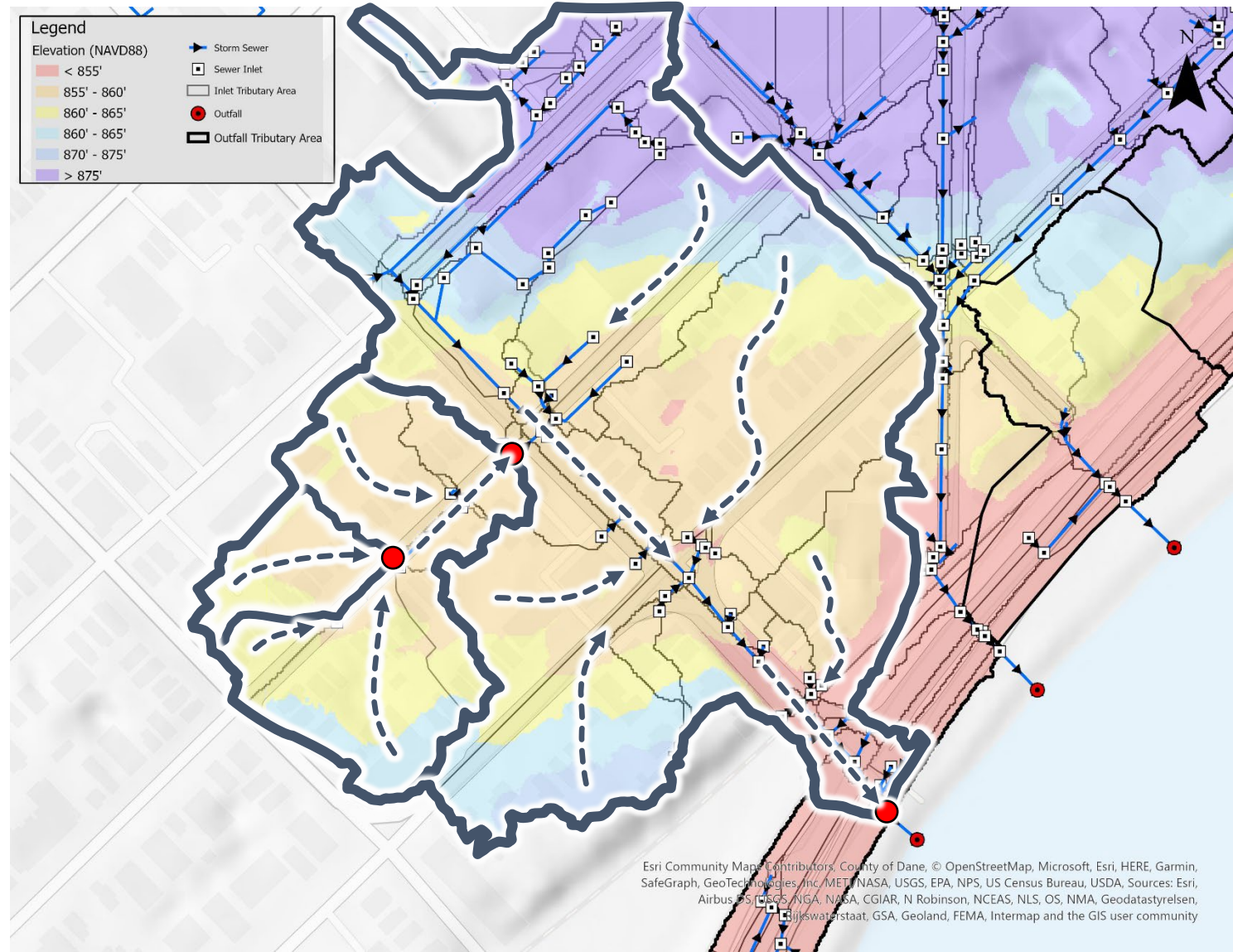
- A watershed is the area of land that drains precipitation (rain, snow, etc.) to a common low point, such as an inlet, stream, or lake.
- Determined by surface terrain and underground pipe system.



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# Where the Water Goes: Sewer Systems

- Madison has separate storm and sanitary sewers
- Storm sewer system is NOT the same as the sanitary sewer system

<https://www.azstorm.org/stormwater-101/storm-vs-sanitary-sewer>



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# Reasons for Flooding Issues

## Flash Flooding

Beltline, looking west from Park Street, WisDOT

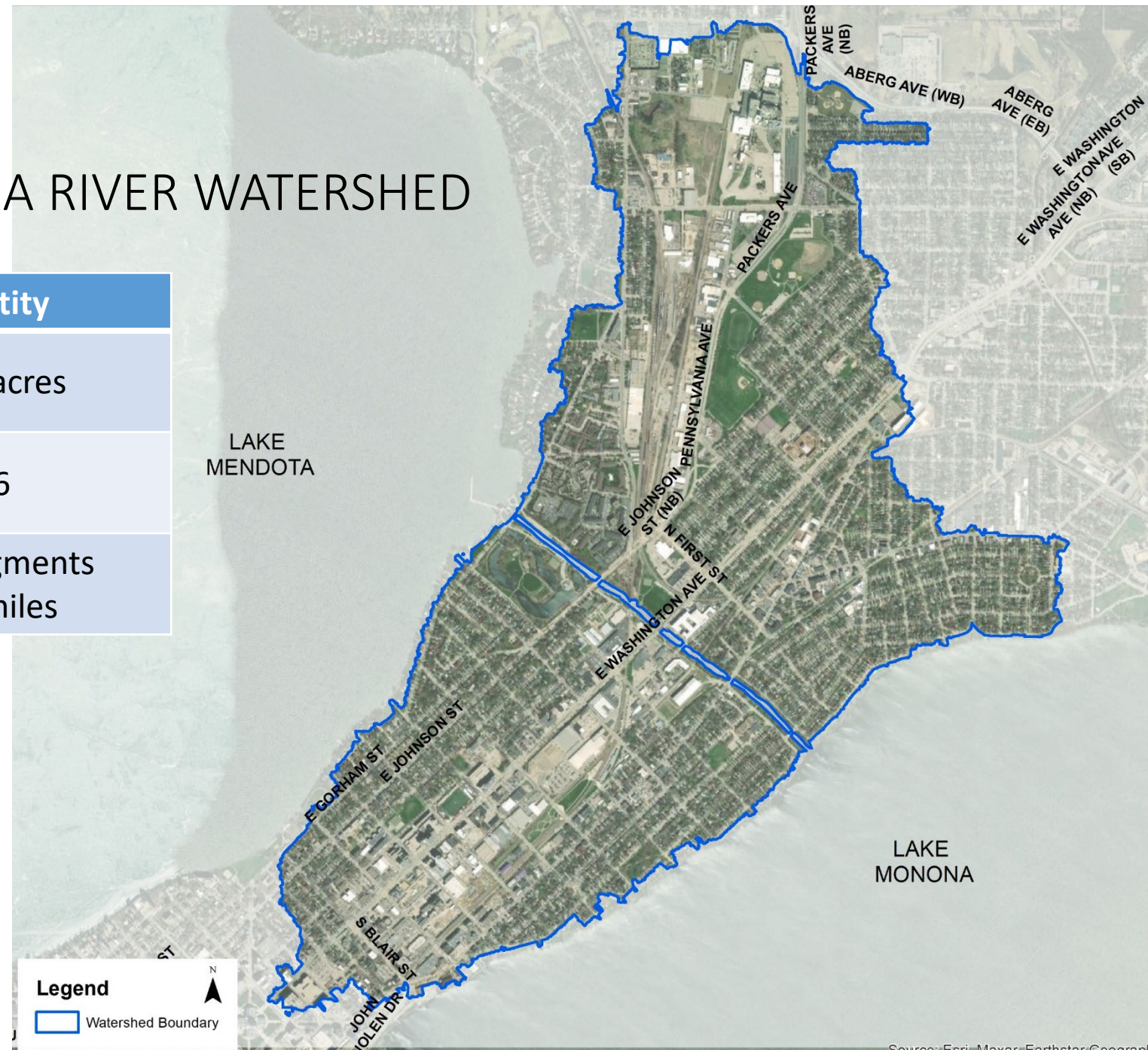
- Flash flooding: when storm sewer system cannot handle high amounts of rain
- Comparative example: a traffic jam
  - Too many cars of the Beltline during rush hour → backups happen
- During a storm, more water tries to move through the storm sewer system → backups happen



# Project Location

## EAST ISTHMUS AND YAHARA RIVER WATERSHED

Item	Quantity
Watershed Area	1,635 acres
Public Stormwater Inlets and Access Structures	816
Storm Sewer Pipes	3557 segments 46.1 miles



# Progress To Date

## DATA COLLECTION

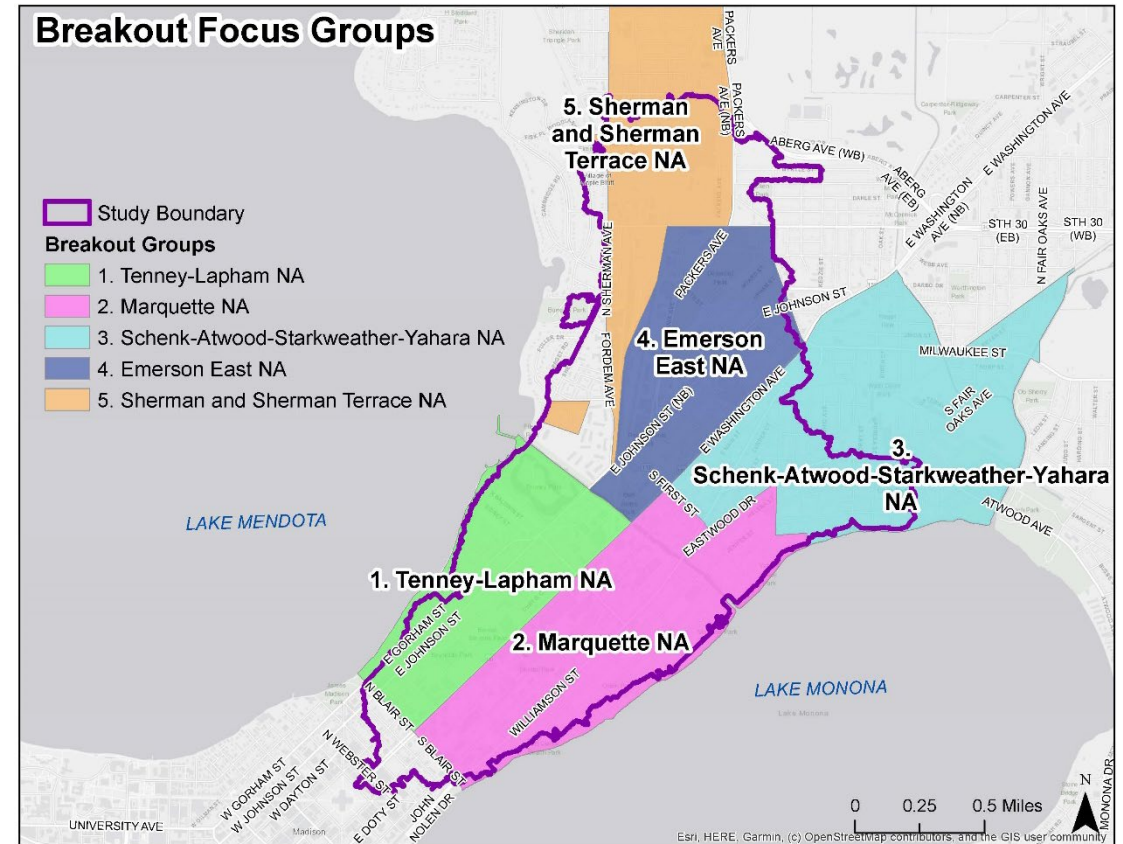
- Ground/storm sewer survey
- Monitoring
  - 2 years (2020-2021)
  - Rainfall
  - Storm Sewers (depth and flow)
- Lake levels
- River discharge
- Flood reports



# Progress To Date

## PUBLIC INFORMATION

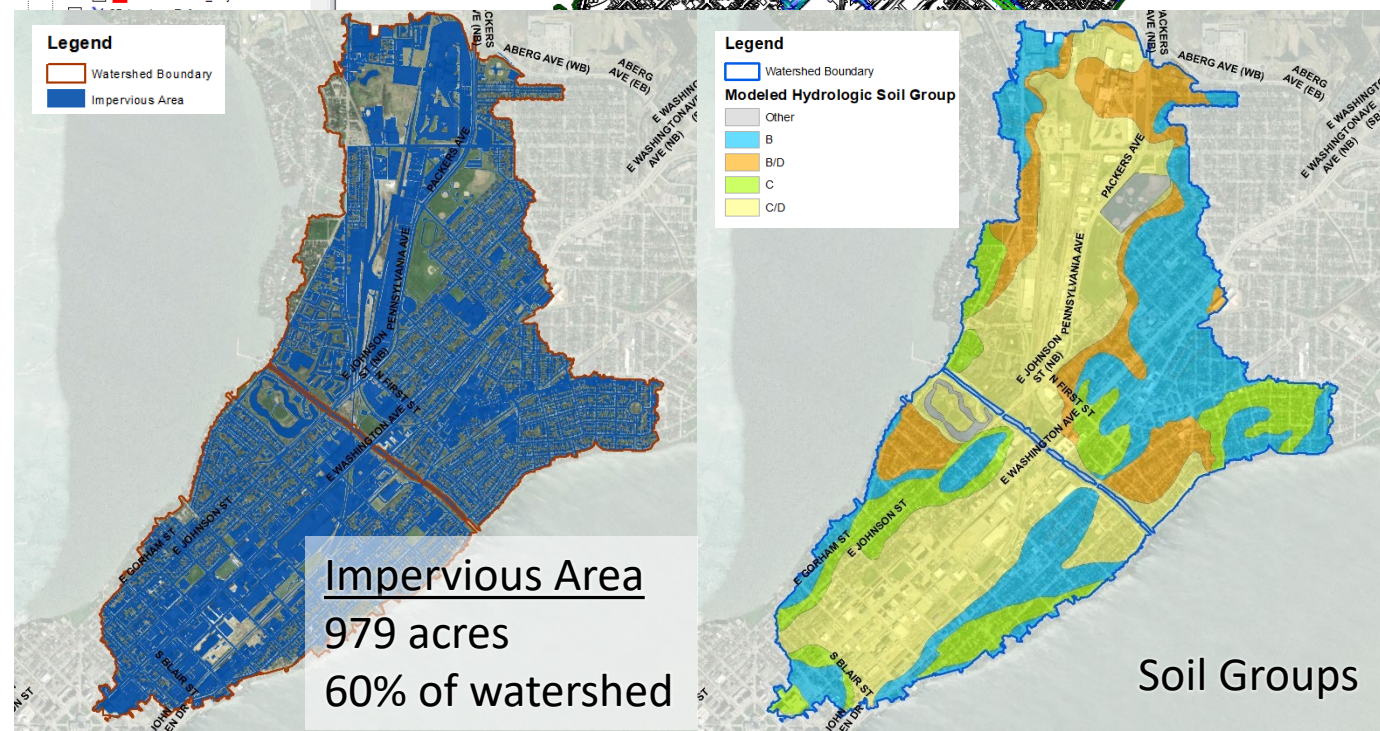
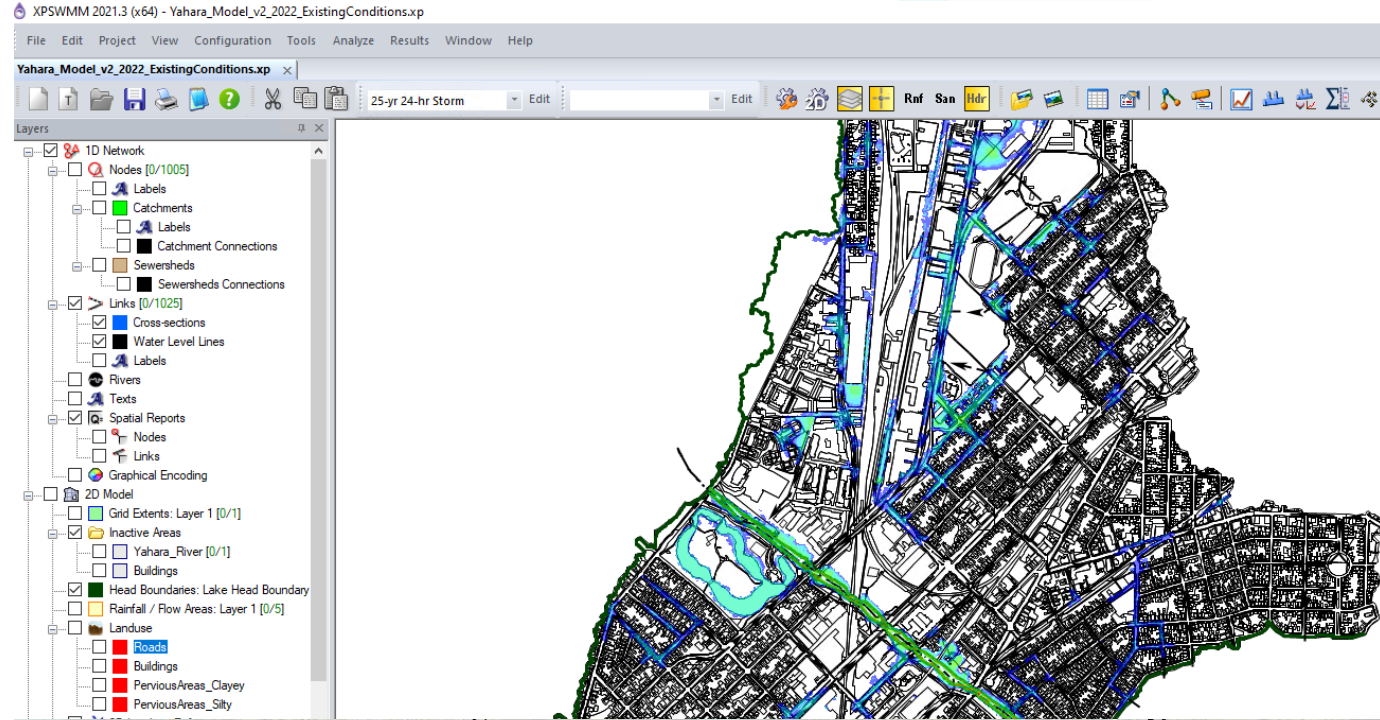
- Public Input Meeting #1 – August 26, 2020
- Public meeting included breakout groups



# Progress To Date

## MODEL DEVELOPMENT

- Hydrologic and Hydraulic Computer Model (XPSWMM)
- Model includes the Yahara River
- Existing Conditions Model Construction



Item	Quantity
Watershed Area (acres)	1,635
Number of Subcatchments (discrete drainage areas in the model)	773
Storm sewer pipes in model	24.2 miles (52% of the pipes)

# Progress To Date

## MODEL BOUNDARY CONDITIONS

- Drainage performance of the collection system is highly dependent on the lake and river levels
- Statistical analysis of lake levels and river discharge
- River discharge 100 to 700 cfs
- Lake Monona levels 846.0 to 848.5 ft

Recommended Boundary Conditions for Collection System Model

ID	Yahara River Discharge, cfs	Lake Monona Elevation, feet	WSE at Downstream Face of Tenney Dam, feet	WSE above Minimum Simulated Elevation, feet
1	250	846.00	846.50	0.00
4	700	846.00	848.12	1.62
16	700	847.50	848.67	2.17
24	700	848.50	849.25	2.75

Regulatory Lake Levels

	Lake Mendota	Lake Monona
Ordinary High Water Mark	850.50	845.62
Target Maximum	849.9	845.0
Target Summer Minimum	849.4	844.5
Target Winter Minimum	848.0	842.0

FEMA FIS 100-year Water Surface Elevation

Lake Mendota	Yahara River at Tenney Dam	Lake Monona
853.0	848.0	848.0

Lake Monona Water Surface Frequency Analysis

Frequency of Exceedance, %	Return Interval	Lower 95% Confidence Limit Lake Water Surface Elevation, feet	Median Lake Water Surface Elevation, feet	Upper 5% Confidence Limit Lake Water Surface Elevation, feet
0.2	500-year	846.80	848.29	849.85
0.5	200-year	846.67	847.84	849.04
1.0	100-year	846.56	847.49	848.38
2.0	50-year	846.41	847.13	847.81
5.0	20-year	846.13	846.65	847.21
10.0	10-year	845.90	846.27	846.75
20.0	5-year	845.61	845.87	846.20
50.0	2-year	845.08	845.25	845.45
80.0	15-month	844.62	844.79	844.96
90.0	13-month	844.38	844.59	844.75



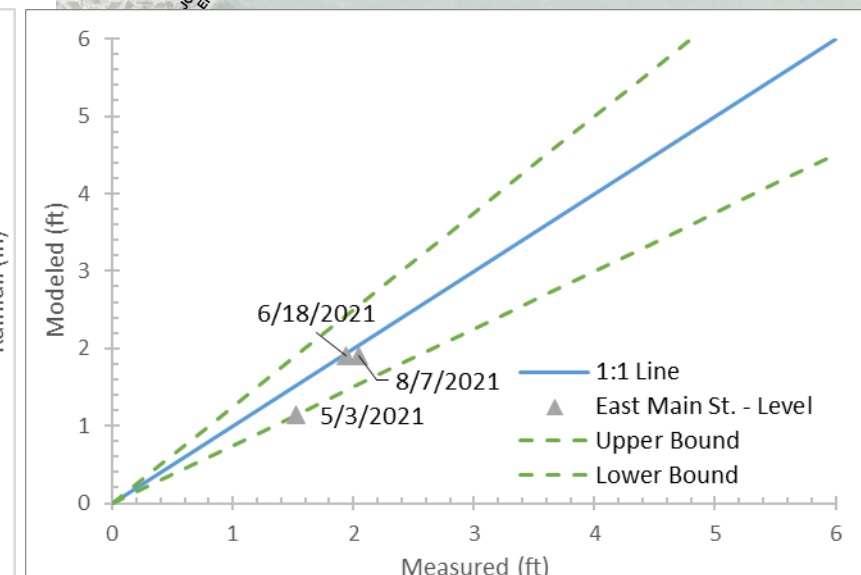
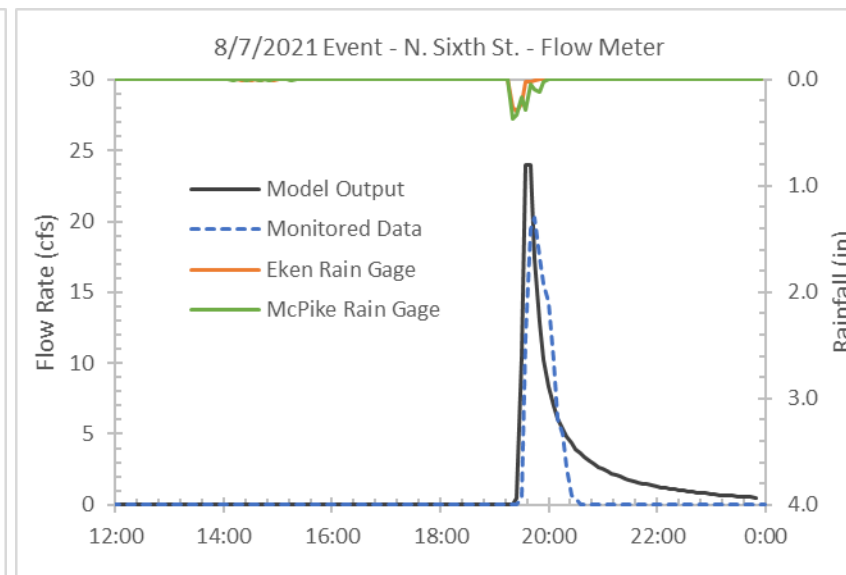
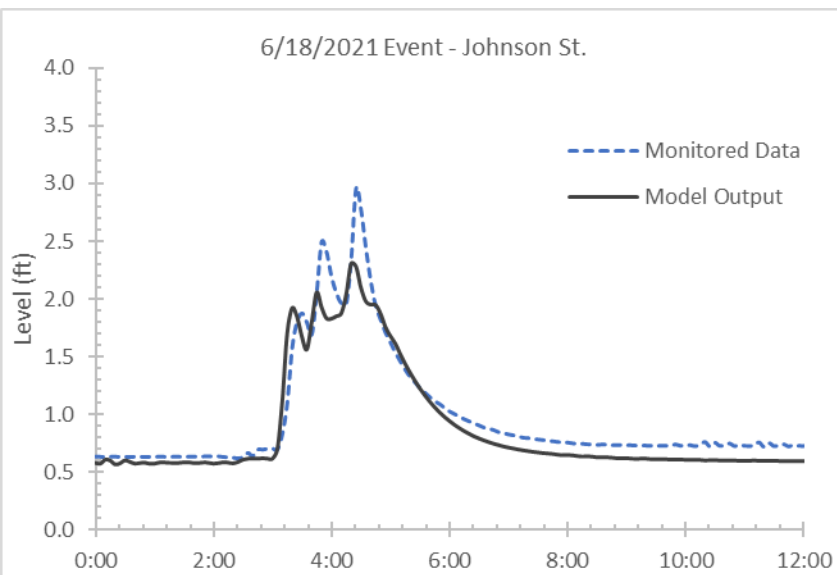
# Progress To Date

## MODEL CALIBRATION

- Existing Conditions Model Calibration

*Calibration is a process of comparing the model results to monitored results and making changes so the model matches more closely*

- Level loggers, flow meters, and rain gauges
- Reported flooding locations





# East Isthmus Yahara Watershed Study Flood Mapping

How Lake Level Flooding is Addressed in the East Isthmus Yahara River  
Watershed Study

City of Madison Engineering

October 4, 2022

[Historical Flooding Context](#)

[Threat of High Lake Levels on ...](#)

[Modeling the Yahara River](#)

[Flood Modeling Results](#)

[Sandbagging and Flash Flood Ri...](#)

[Additional Res](#)



To view storymap on your own device visit: <https://arcg.is/1jaPLa>

Or you can find a link to the Story Map on the project webpage:  
[www.cityofmadison.com/IsthmusYaharaWatershed](http://www.cityofmadison.com/IsthmusYaharaWatershed)

*\*you cannot view the story  
map in Internet Explorer*

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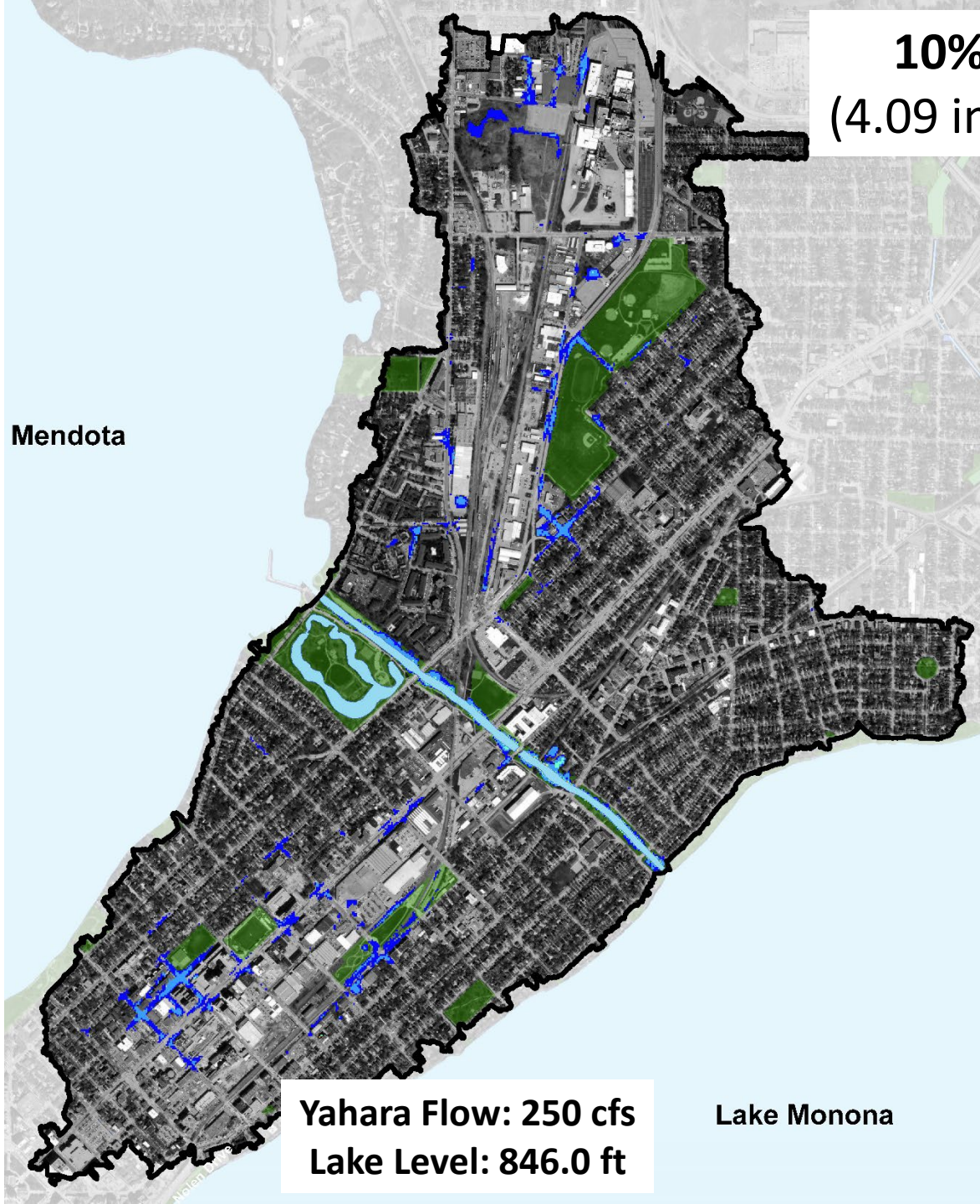
# Flood Mapping Disclaimer

This map exists to help you quickly get information about general flood risks. This map does not identify all areas that may flood or predict future flooding.

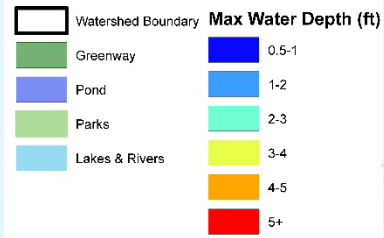
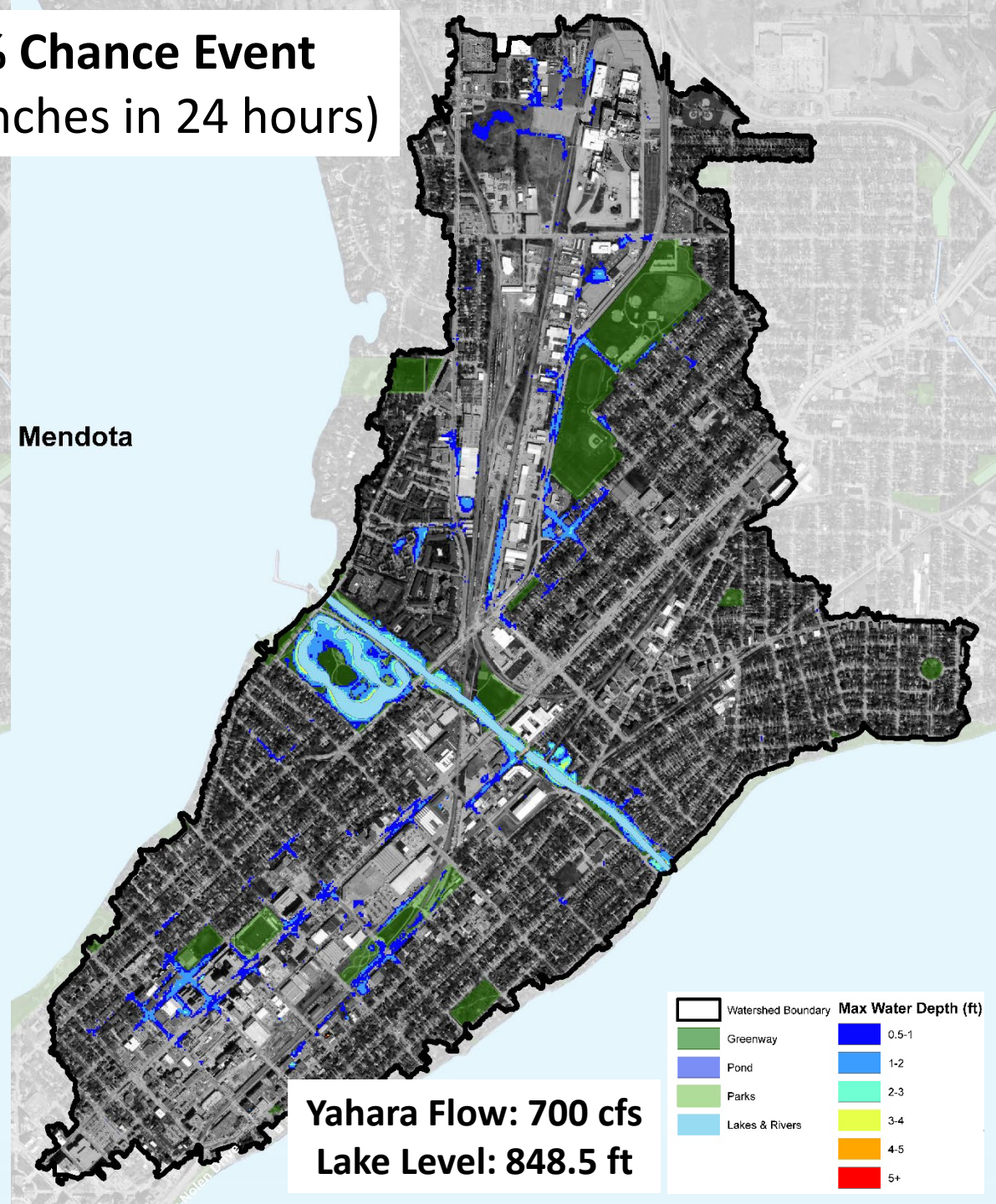
Do not use this map to make official flood risk determinations for insurance, lending, or other purposes. This is not an official FEMA federal Flood Insurance Rate Map or the state or local equivalent.

The City of Madison assumes no liability for any errors, omissions, or inaccuracies. The City also assumes no liability for any decisions or actions a user might take based on this map.

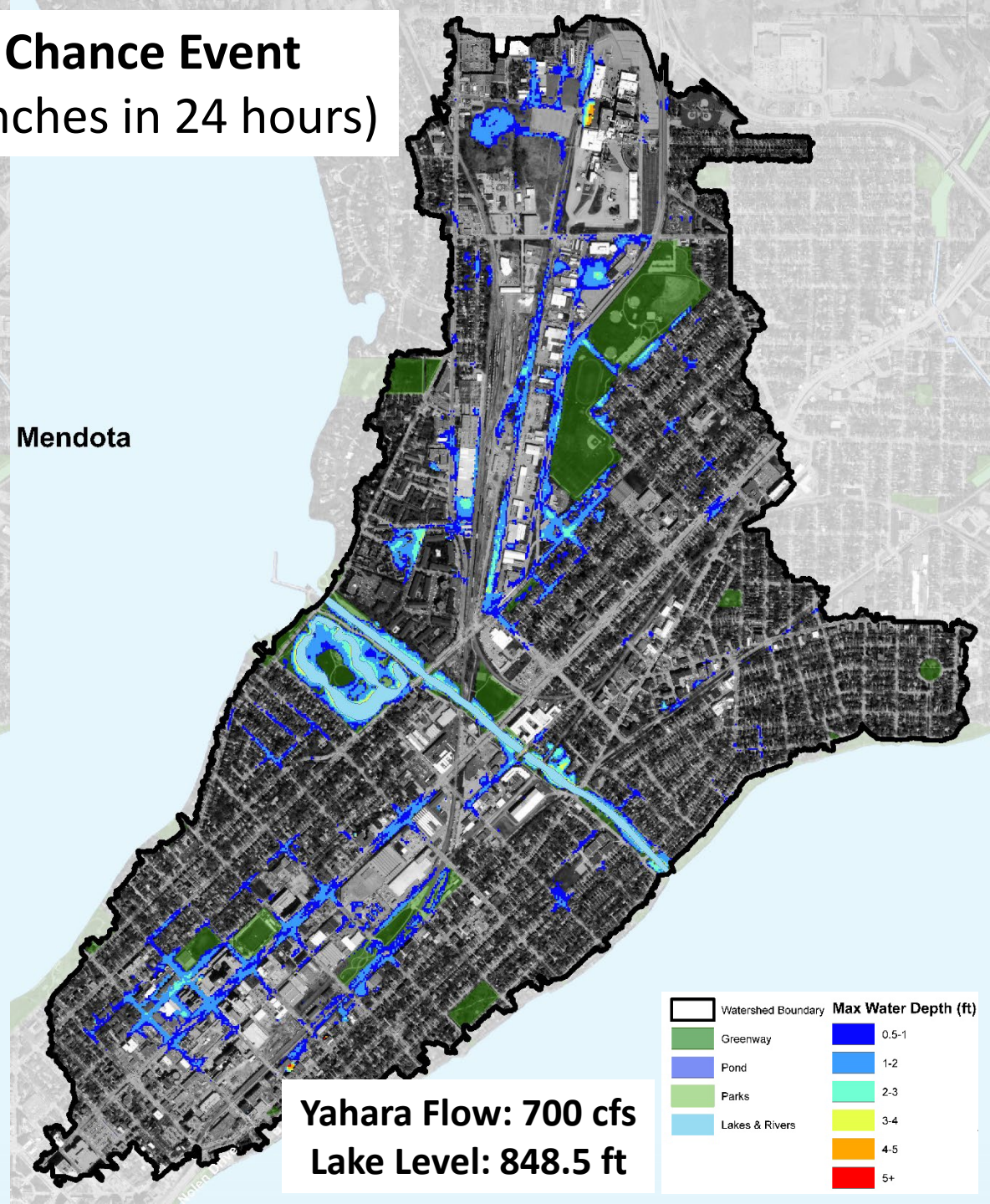
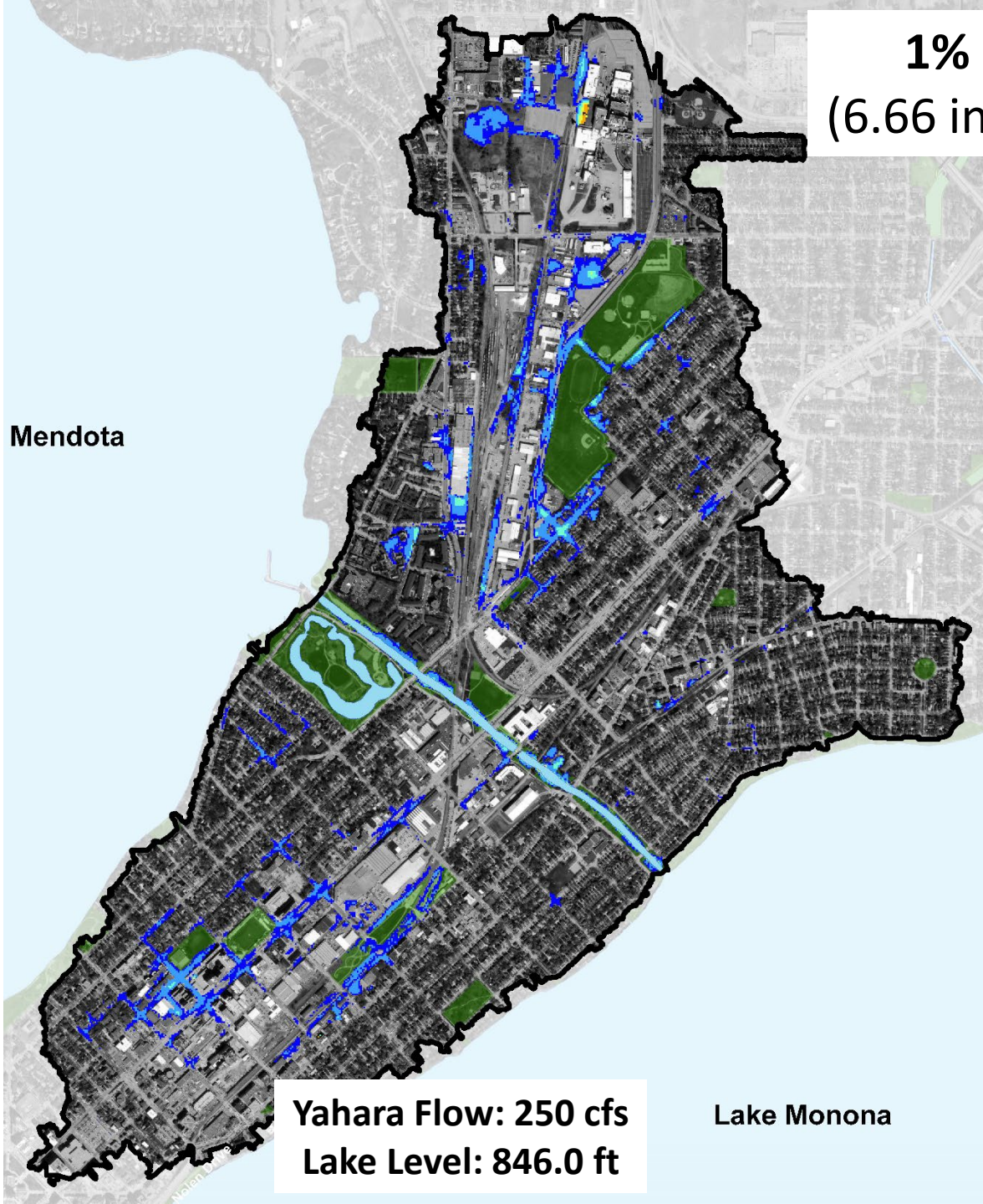
# Existing Conditions Inundation Mapping



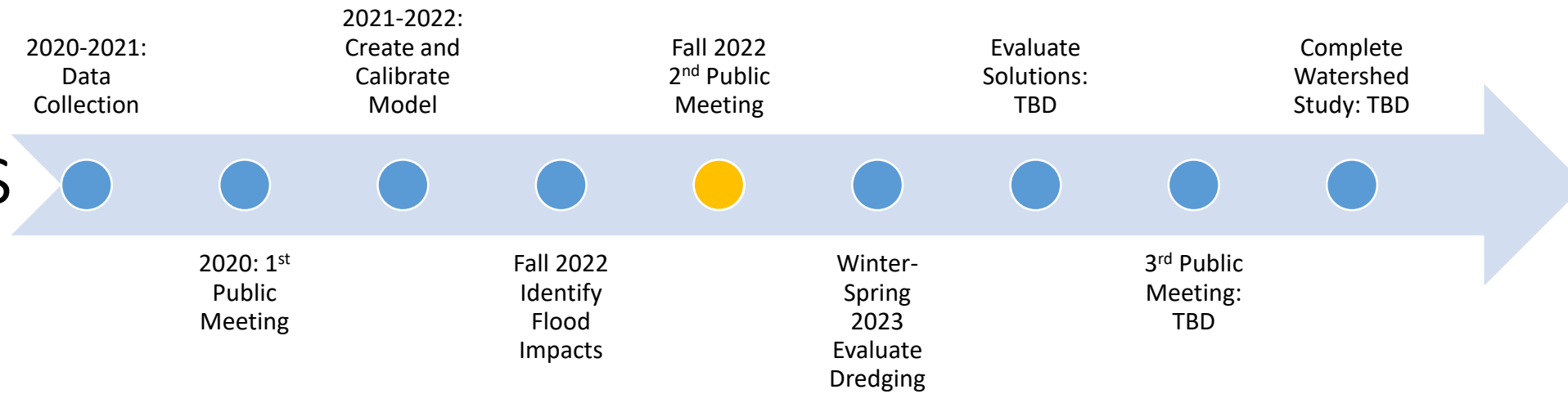
**10% Chance Event**  
(4.09 inches in 24 hours)



Existing Conditions Inundation Mapping



# Next Steps



- Evaluate impact dredging the river between Lake Mendota and Lake Monona has on the flooding scenarios in model
- If dredging has large impact, complete dredging feasibility study. *Challenges with bridges, type of dredging, utility conflicts.*
- Identify Flooding Problem Areas
- Evaluate Solutions (decide whether or not dredging is included in base scenario)
- Public Meeting #3 to present solutions
- Final Report
- Begin Implementing Solutions



# Next Steps

## FLOOD MITIGATION TARGETS

- 10% Chance Event (4.09 inches in 24 hours)
  - No surcharging of storm sewer onto roadway
  - Storm sewer pipes are sized to carry storm
- 4% Chance Event (5.01 inches in 24 hours)
  - 0.2 feet at Centerline of Roads
  - Roads passable for emergency vehicles
- 1% Chance Event (6.66 inches in 24 hours)
  - No structure (home/building) flooding
  - No greenway crossing overflow (stormwater does not come out of greenway and flow over the road)
- 0.5% Chance Event (8.81 inches in 24 hours)
  - Safe conveyance of overflow



# Watershed Study Limitations

- Utilizing computer models for analysis (computer models have inherent limitations, require assumptions, and are for one specific set of circumstances)
- Retrofitting infrastructure takes a lot of time and money
- Not all problems can be solved
- Repairs are not always easy, popular, or inexpensive
- Best engineering solution may not be the one chosen
- Property owners will need to create solutions too
- Solutions will need broad community cooperation
- Groundwater problems not easily addressed by infrastructure



# Contact Information & Resources

- Engineering
  - Project Manager, Jojo O'Brien, [jobrien@cityofmadison.com](mailto:jobrien@cityofmadison.com)
- Project Website: [www.cityofmadison.com/IsthmusYaharaWatershed](http://www.cityofmadison.com/IsthmusYaharaWatershed)
- Sign-up for project email updates on the website
  - Updates on study status will be posted to the project website
  - Recording for this meeting will be posted on project webpage
- Facebook – City of Madison Engineering 
- Twitter – @MadisonEngr 
- Engineering Podcast: Everyday Engineering on iTunes, GooglePlay





# First: General Q&A

- Please type general questions in Q&A box or “raise hand”

# Next: Specific feedback on flood maps

- Please save specific comments on flood maps for the end of the presentation. We will stay on and gather your feedback, but we’d like to address general questions with the whole group first.
  - To view storymap on your own device visit: <https://arcg.is/1jaPLa>
  - Or you can find a link to the Story Map on the project webpage: [www.cityofmadison.com/IsthmusYaharaWatershed](http://www.cityofmadison.com/IsthmusYaharaWatershed)