



Watershed Study Program Overview

Flood Mitigation Program

by City of Madison Engineering Division
Board of Park Commissioners; January 12, 2022

Outline

- Engineering/Parks Teaming
- Watershed Study Overview
- First Study Results
- Built Environment Challenges
- Proposed Mitigation Measure Review Process
- Mitigation Measure Implementation
- Going Forward



E Johnson Street, Madison, WI



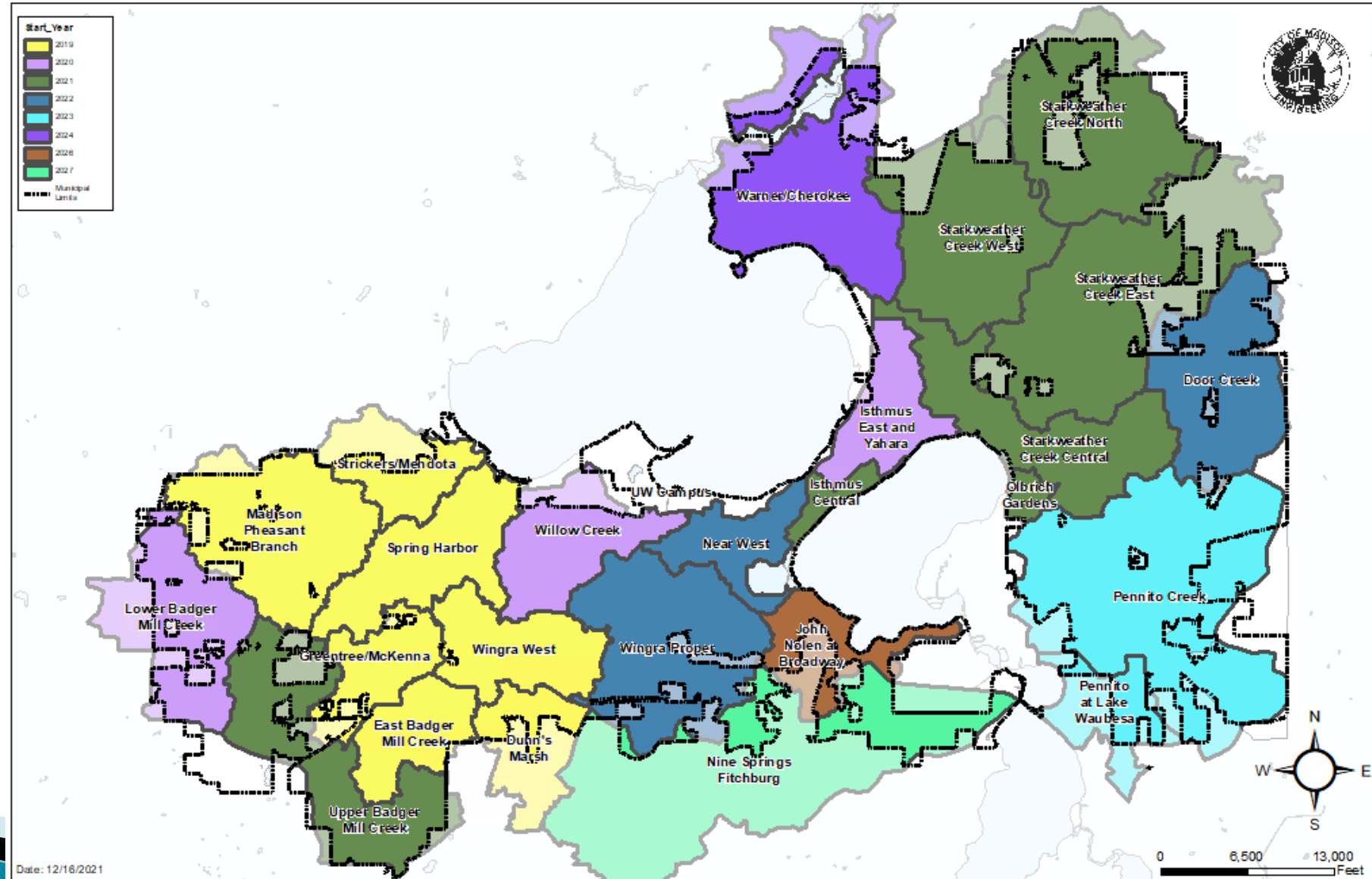
Deming Way, Madison, WI

Engineering/Parks Teaming

- ▶ Phase I – Overview to Board of Park Commissioners
 - Today
 - Informational Only
- ▶ Phase II – Individual Watershed Study Presentations
 - February 2022 – Spring Harbor, Stricker’s/Mendota, Wingra West
 - March 2022 – Pheasant Branch
 - April 2022 – Dunn’s Marsh, Greentree/McKenna
 - Provide Comments to be included in Reports
- ▶ Phase III – Project Implementation
 - As specific projects occur in the CIP
 - Provide input during design and construction

Watershed Study Program Overview

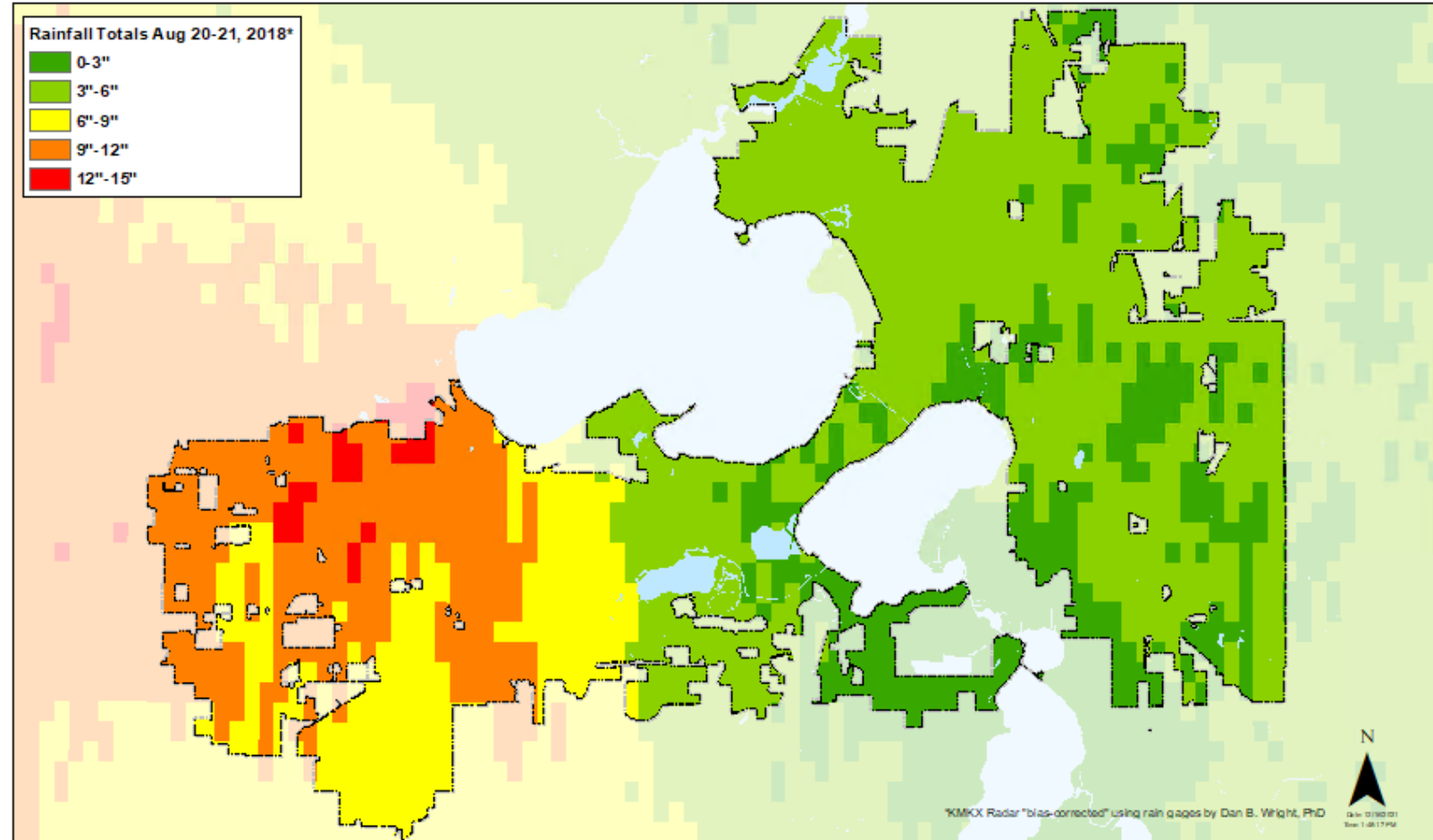
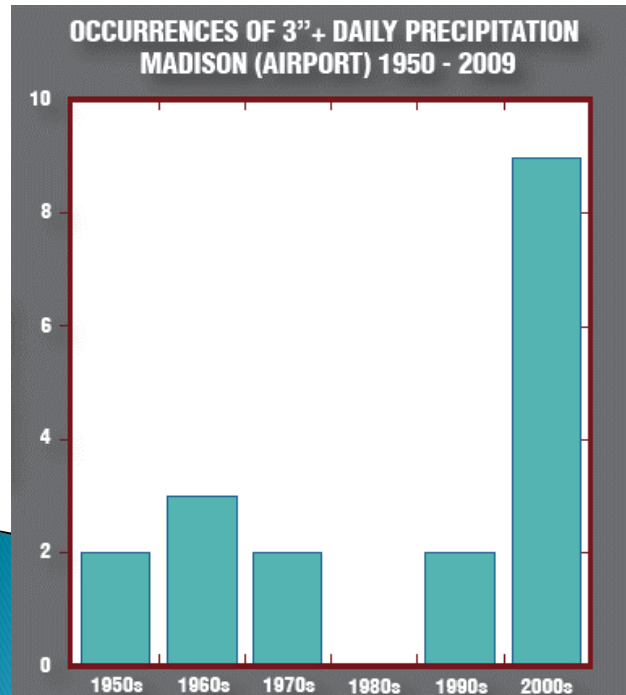
- ▶ 22 watersheds
- ▶ Began: 2019
- ▶ Estimated completion: 2025
- ▶ Includes significant public outreach



Watershed Study Program Overview

Began Initiative Because....

- ▶ Experiencing larger/more intense storm events
- ▶ June and August 2018 major storm events



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.

CITY OF MADISON



Watershed Study Program Overview

And In Support of Other City Plans...

➤ Parks and Open Space Plan

STRATEGY: IMPROVE THE PARK SYSTEM'S CAPACITY TO WITHSTAND FUTURE ENVIRONMENTAL CHANGES.



- Improve the Parks Division's capacity to analyze and plan for the impacts of climate change and other environmental pressures.
- Ensure best management practices for stormwater runoff and infiltration to reduce impacts of increasing storm severity.



- Ensure park design and amenities are flexible to accommodate dynamic climate patterns.
- Design and support opportunities for winter activities that are less impacted by climate change.

➤ Comprehensive Plan

GREEN AND RESILIENT

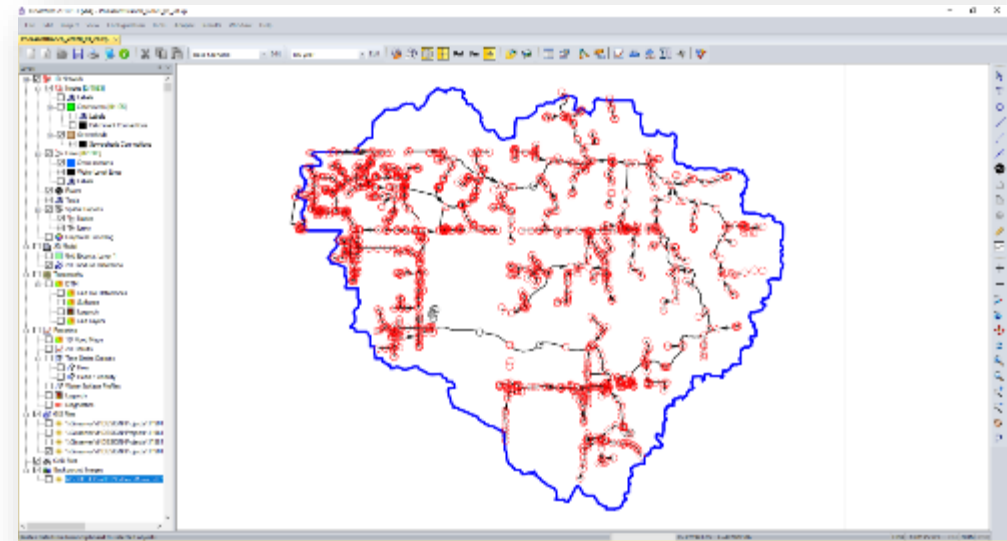
Goal: Madison will be a leader in stewardship of our land, air, and water resources.

Goal: Madison will have a model park and open space system that preserves our significant natural features and offers spaces for recreation and bringing residents together.

Strategy 2. Improve lake and stream water quality thru Partnerships, Leaf Collection, Green Infrastructure, and Stormwater Management and Erosion Control

Watershed Study Program Overview

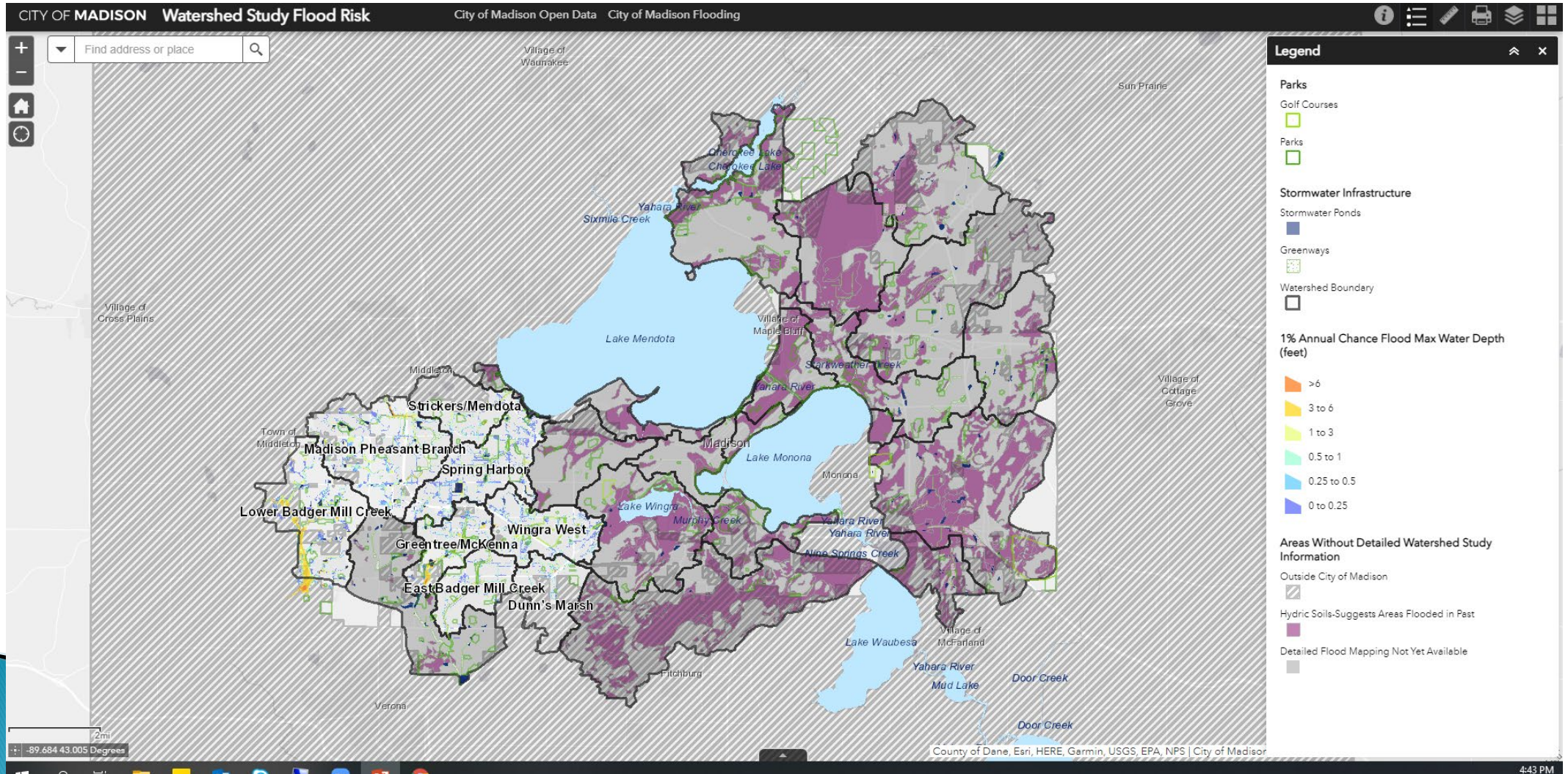
- ▶ Create:
 - Complex hydrologic and hydraulic computer models
 - 1D and 2D
- ▶ Evaluate:
 - Existing stormwater infrastructure
 - Existing overflow routes
 - Varying actual and design storm events
 - Distributed Green Infrastructure
- ▶ Major Outputs:
 - Flood risk mapping
 - Better guidance for new and re-developments
 - Causes of current flooding
 - Mitigation measures to reduce flood risk



First Study Results

City Flood Risk Mapping

Web Address: <https://cityofmadison.maps.arcgis.com/apps/webappviewer/index.html?id=939cd73b0b594a0aa2d926a6b0e41f40>



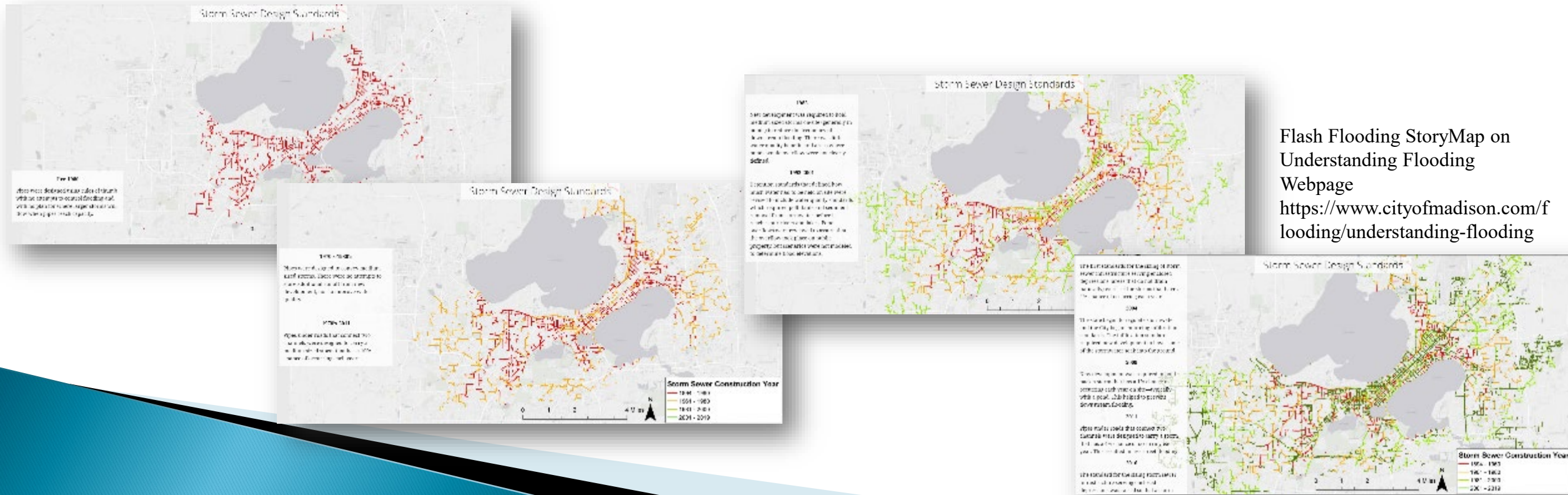
First Study Results

- ▶ First five study results (*10,000 acres of 65,000 acres of total study area*)
 - 10% Chance Target – no ponding on streets
 - 20–50% of streets not meeting target
 - 4% Chance Target – streets passable for emergency vehicles
 - 25% – 50% of streets not meeting target
 - 1% Chance Target – no structure flooding
 - 3% – 10% of structures not meeting target

Built Environment Challenges

Why targets are not currently met...

- ▶ No stormwater management requirements before 1983 compared to 388 miles of storm sewer (36%) built before 1983
- ▶ Most restrictive stormwater requirements enacted by ordinance in 2020
 - Added 0.5% Chance Event to try to account for climate change



Flash Flooding StoryMap on Understanding Flooding Webpage
<https://www.cityofmadison.com/flooding/understanding-flooding>

Built Environment Challenges

Why targets are not currently met

- ▶ Natural storage areas replaced with development
 - Examples include: Bordner Park, Blackhawk Park, Odana Golf Course, Isthmus
- ▶ Low-lying areas have been developed
- ▶ Older development did not leave adequate room for stormwater management infrastructure meeting today's needs



City of Madison 1892



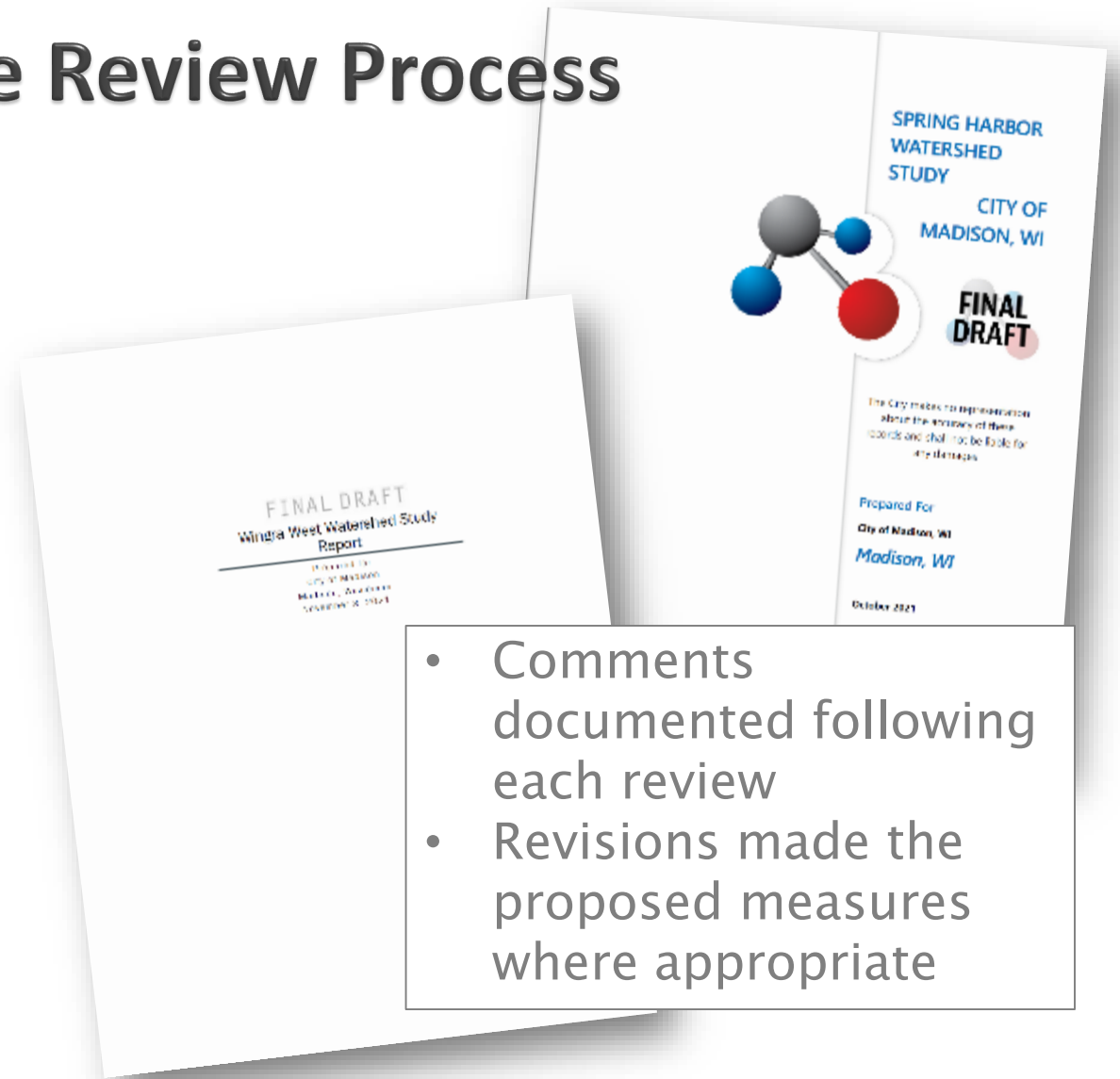
City of Madison 1906



City of Madison - Current Hydric Soils + Low Lying Areas

Proposed Mitigation Measure Review Process

- Pre-Draft Final Report
 - History Landmark, Natural Resources, Deed Restrictions, etc
 - Engineering Staff Review
 - Engineering Management Review
 - Public Works Initiative Presentation
 - Individual Agency Meetings
- Post-Draft Final Report
 - City Legal Review
 - Public Comment Period
 - Board of Public Works
 - Board of Park Commissioners



Mitigation Measure Implementation

- First five studies:
 - 50 mitigation measures
 - Totaling \$145 million
 - Additional local sewer upgrades
 - 3 Parks impacted
- Engineering created Prioritization Matrix incorporating:
 - Structures removed from flood risk during 1% chance storm
 - Flood risk reduction during other storm events
 - Emergency services access
 - Racial Equity and Social Justice
- Implementation expected to occur over the next 50–100 years

Mitigation Measure Implementation

- ▶ Some solutions will require teaming with other agencies
 - Parks
 - Lands jointly dedicated as parks and drainage
 - Park lands adjacent to stormwater utility land
 - Planning
 - Fire & Police
 - Water Utility
 - Adjacent Municipalities
- ▶ Initial comments requested on Draft Final Reports
- ▶ Engineering will reach out during conceptual design to begin coordination
- ▶ Will coordinate during design and construction



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STRICKER PARK TRAIL SEGMENT



Mitigation Measure Implementation

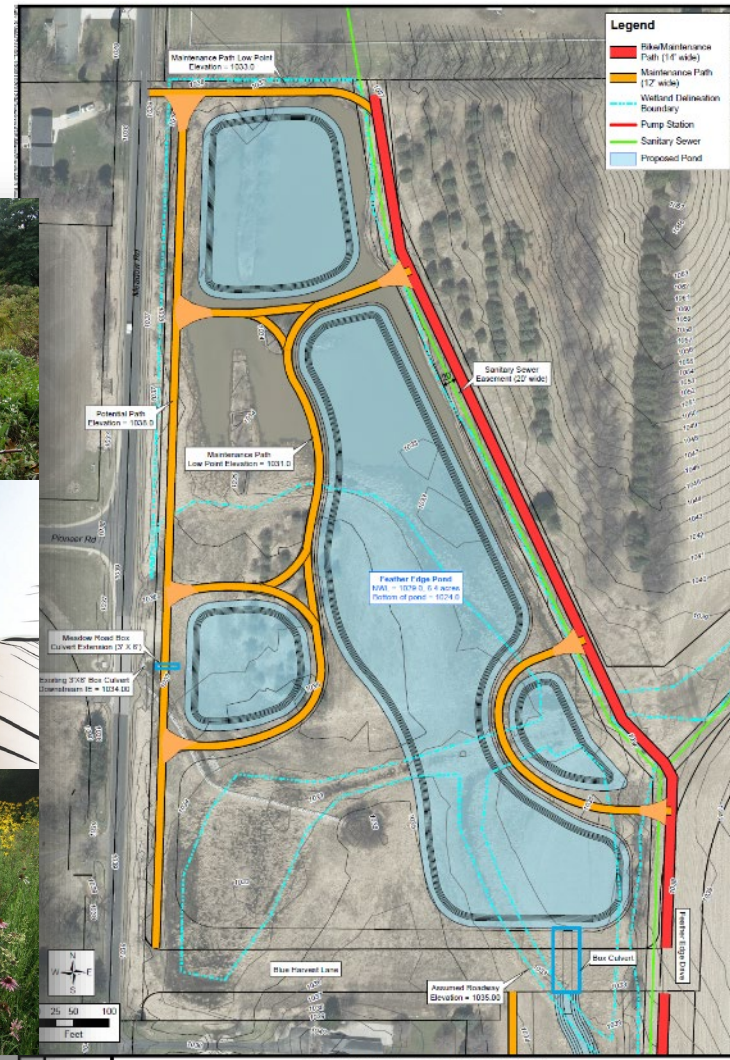
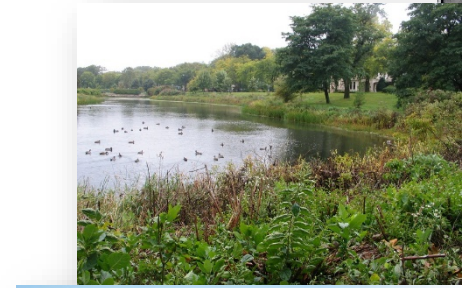
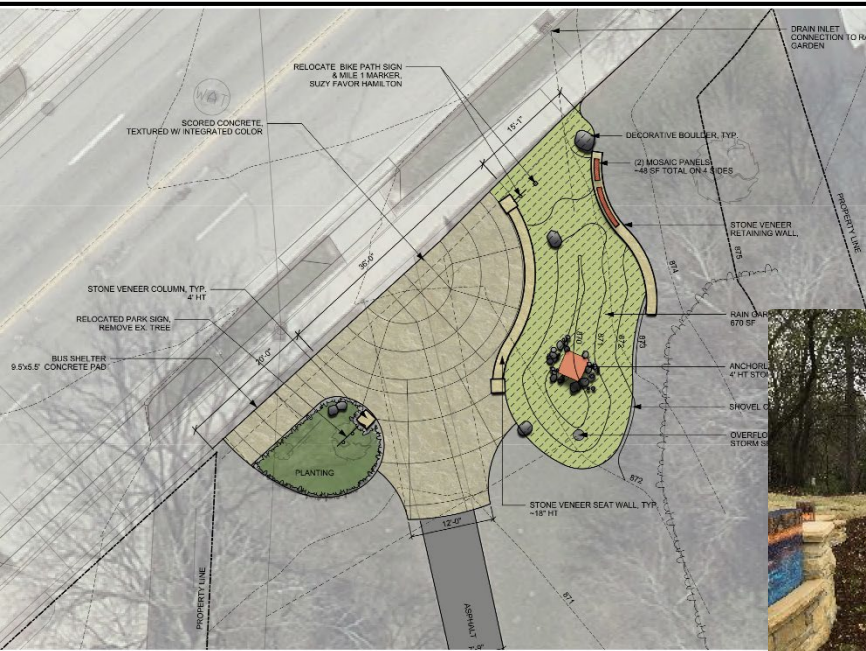
- ▶ MGO Chapter 37 Modifications
 - New Development
 - Added 0.2% chance detention requirement
 - Increased sizing standards for greenway crossings
 - Low building openings for critical areas
 - Re-Development
 - Reduce 10% chance peak flow by 15%
 - Reduce 10% chance runoff volume by 5%
 - Green Infrastructure required
 - Low building openings for critical areas
 - Utilize models created for watershed studies
- ▶ Ordinance Review for Green Infrastructure Implementation



Going Forward

- ▶ Collaborate to meet Park and Stormwater goals
 - Reduce flood risk
 - Integrate Improvements to Enhance/add park amenities
 - Meet City resident needs

Lower Badger Mill Creek Regional Ponds



Wingra Park Entrance
Madison, WI | October 10, 2017

ALTERNATIVE #3 - FEATHER EDGE POND
LOWER BADGER MILL CREEK WATERSHED
CITY OF MADISON
DANE COUNTY, WISCONSIN

Additional Information: Project Webpages

- ▶ Watershed Study Program –
<https://www.cityofmadison.com/flooding/city-initiatives/watershed-studies>
- ▶ Understanding Flooding –
<https://www.cityofmadison.com/flooding/understanding-flooding>
- ▶ First Watershed Studies
 - Spring Harbor Watershed Study –
<https://www.cityofmadison.com/engineering/projects/spring-harbor-watershed-study>
 - Stricker's/Mendota Watershed Study –
<https://www.cityofmadison.com/engineering/projects/strickers-mendota-watershed-study>
 - Wingra West Watershed Study –
<https://www.cityofmadison.com/engineering/projects/wingra-west-watershed-study>
 - Pheasant Branch Watershed Study –
<https://www.cityofmadison.com/engineering/projects/madison-pheasant-branch-watershed-study>
 - Dunn's Marsh Watershed Study –
<https://www.cityofmadison.com/engineering/projects/dunns-marsh-watershed-study>



Questions?

