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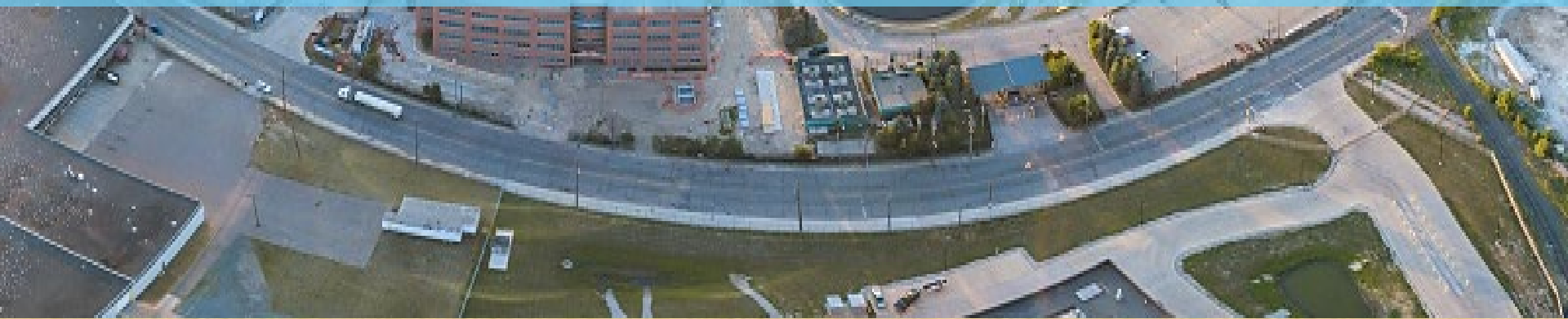
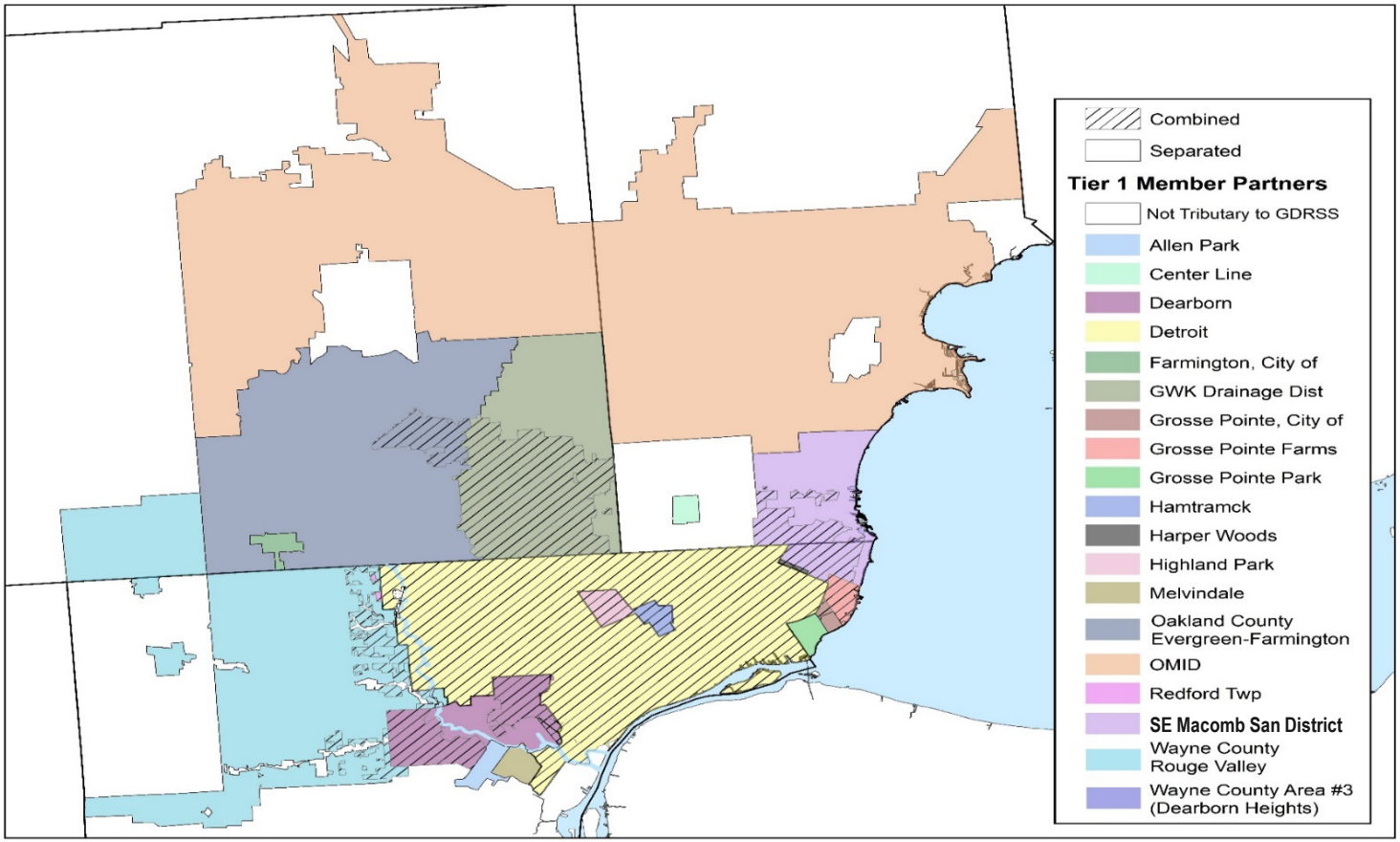
Resiliency Improvement Update

September 2022



GLWA Tributary Area



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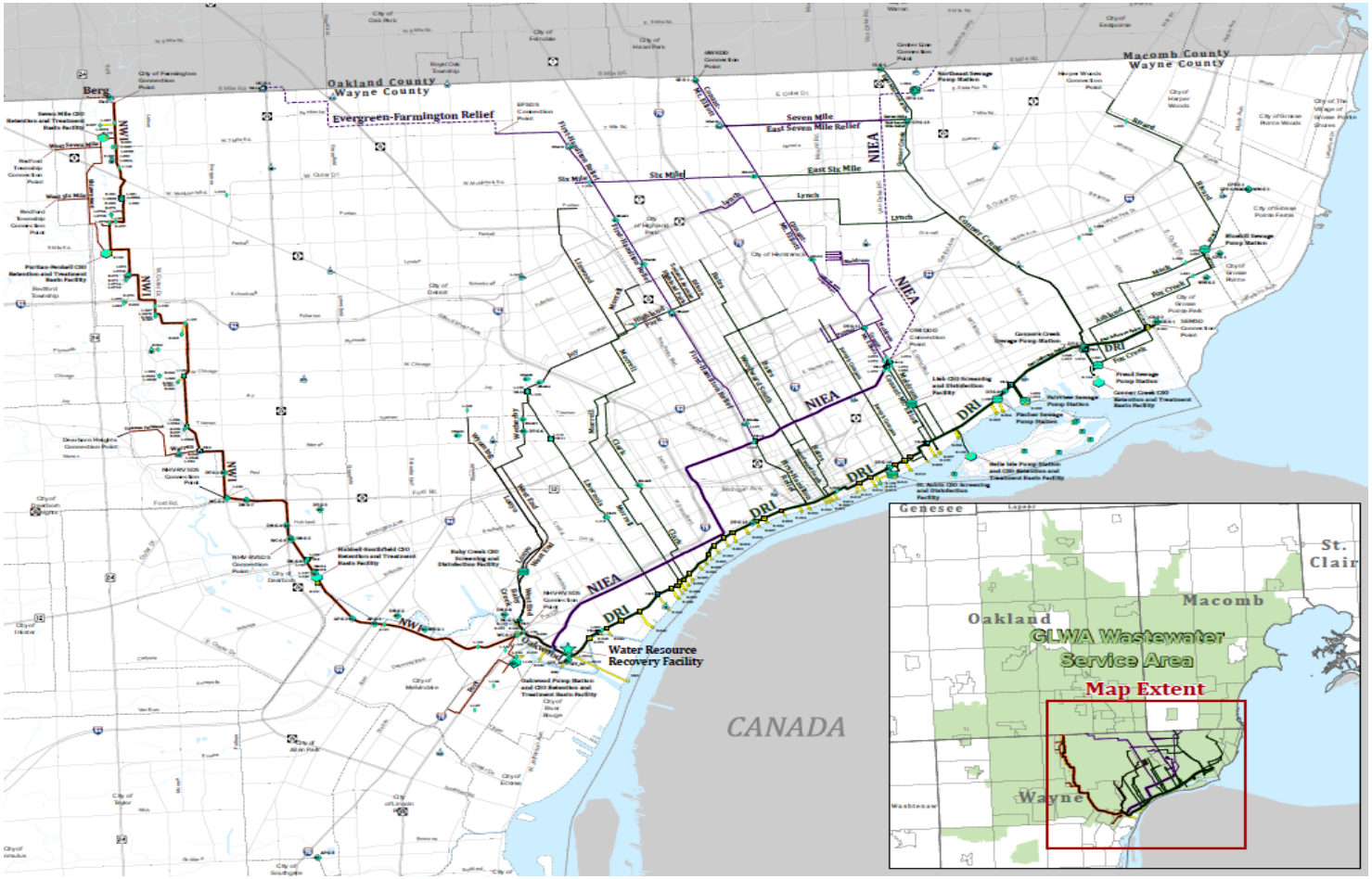
GLWA Collection System



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2021 Rainfall Events

- June 25 and 26, 2021
  - Storm began at 3 A.M. on June 25th
  - Storm ended at approximately 3 A.M. on June 26th
  - Peak intensity of 15.5 inches per hour over a 5-minute duration
  - Maximum accumulated depth of 7.8 inches over 12 hours and 8.1 inches over 24 hours

- July 16, 2021
  - Storm began at 6 A.M. on July 16th
  - Storm ended at approximately 6 P.M. on July 16th
  - Peak intensity of 11.8 inches per hour over 5-min. duration
  - Maximum accumulation depth of 4.7 inches over 12 hours

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2022: Five 1,000-Year Rain Events

A 1,000-year rain event has a 0.1 percent chance of happening in any given year.

Series of Thunderstorms

- St. Louis, MO
- Morning of July 26
- 7.87 inches of rain fell in six hours
- 8.64 inches of rain logged for the day
- Wettest day on record

Eastern Rains

- Eastern Kentucky
- July 27
- 2 inches per hour
- Kentucky River rose 11 feet in five hours
- Water likely kept rising, but sensor washed away

Series of Thunderstorms

- Eastern Illinois
- Night of Aug. 1
- 8 to 13 inches of rain in about 12 hours
- Reports of flash flooding

Heavy Storms

- Death Valley, CA
- Aug. 5
- 1.46 inches of rain
- 0.01 inches shy of the all-time daily record
- Equivalent to nine months worth of rainfall

Series of Thunderstorms

- Dallas, TX
- Aug. 22
- 3.01 inches of rain in 1 hour
- Wettest day and wettest hour on record
- Reports of flash flooding

- All five events stemmed from stationary fronts and anomalously-humid air masses
- All areas experiencing abnormally dry conditions or in a severe drought beforehand
- 1,000-year floods may happen a lot more than once every 1,000 years, due to uptick in extremes and changing conditions

Source: Cappucci M. (2022 August 23). Five 1,000-year rain events have struck the U.S. in five weeks. Why? *Washington Post.* https://www.washingtonpost.com/climate-environment/2022/08/23/flood-united-states-climate-explainer/

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Internal and Independent Investigation

- Conducted a regional system-wide storm response investigation and event reconstruction
- Interviewed operations, maintenance and leadership personnel
- Collected, reviewed, analyzed and trended millions of data points
- Modeled, analyzed, and compared the as-operated and as-designed regional system responses
- Conducted Pump Station Power Vulnerability and Operations Assessments

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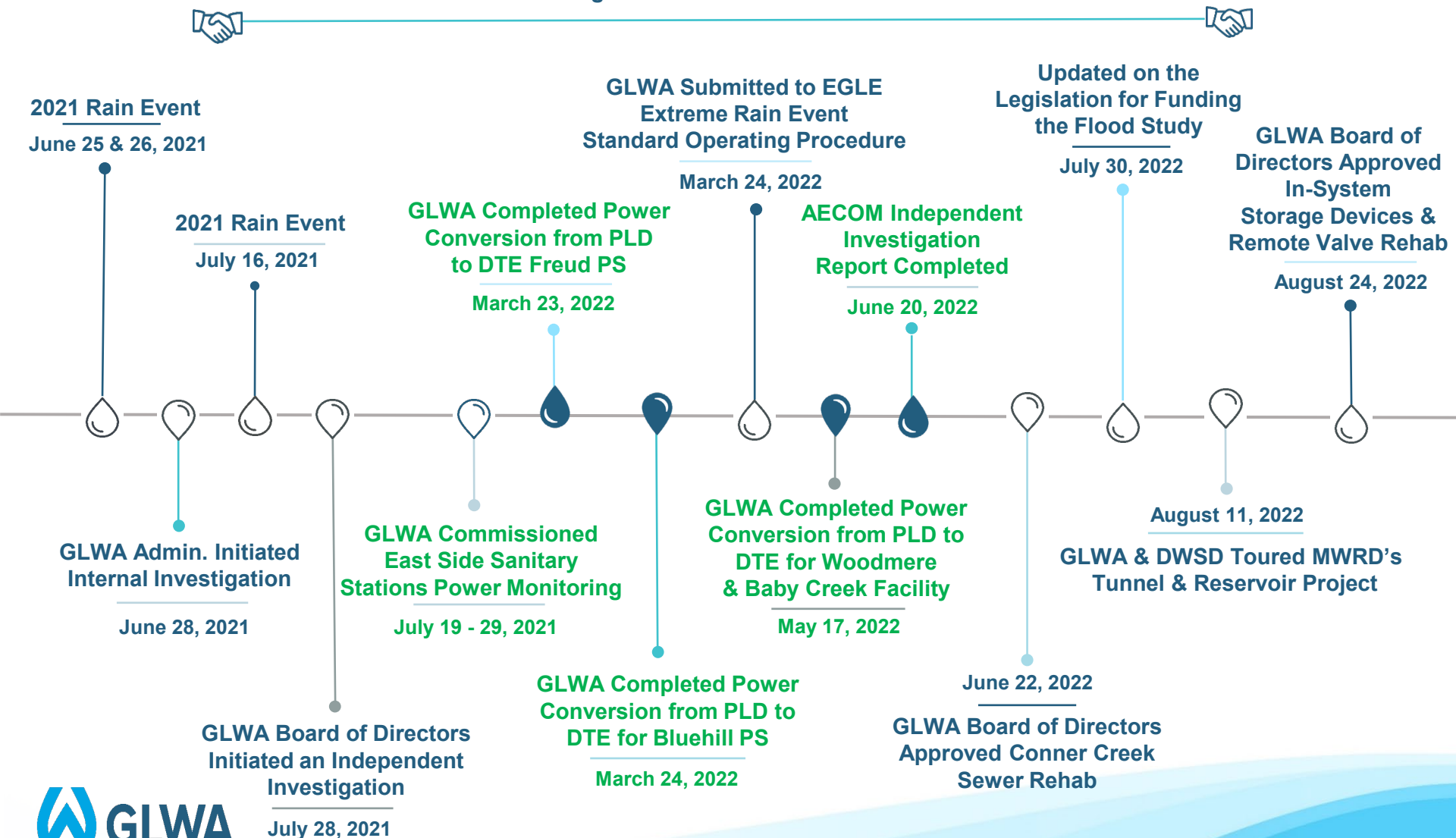
GLWA Resiliency Effort Timeline

9 meetings with East Side Member Partners
1 meeting with West Side Member Partners



2021 Rain Event
June 25 & 26, 2021

2021 Rain Event
July 16, 2021

GLWA Admin. Initiated Internal Investigation
June 28, 2021

GLWA Board of Directors Initiated an Independent Investigation
July 28, 2021

GLWA Commissioned East Side Sanitary Stations Power Monitoring
July 19 - 29, 2021

GLWA Completed Power Conversion from PLD to DTE Freud PS
March 23, 2022

GLWA Completed Power Conversion from PLD to DTE for Bluehill PS
March 24, 2022

GLWA Submitted to EGLE Extreme Rain Event Standard Operating Procedure
March 24, 2022

GLWA Completed Power Conversion from PLD to DTE for Woodmere & Baby Creek Facility
May 17, 2022

AECOM Independent Investigation Report Completed
June 20, 2022

GLWA Board of Directors Approved Conner Creek Sewer Rehab
June 22, 2022

Updated on the Legislation for Funding the Flood Study
July 30, 2022

GLWA & DWSD Toured MWRD's Tunnel & Reservoir Project
August 11, 2022

GLWA Board of Directors Approved In-System Storage Devices & Remote Valve Rehab
August 24, 2022

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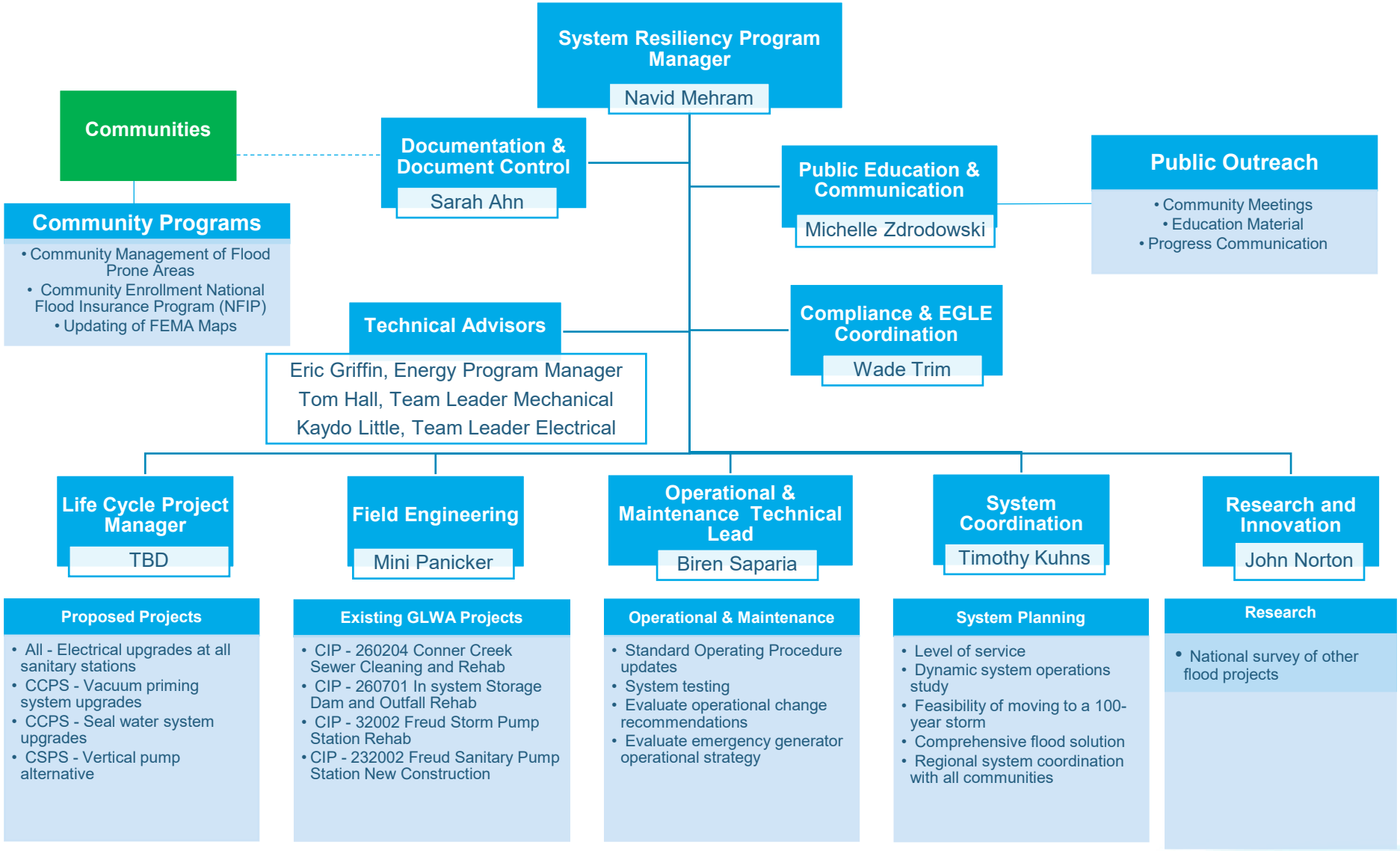
Resiliency Delivery Team



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Schedule

Proposed Projects	2023	2024	2025	2026	2027	2028+
All - Electrical Upgrades at all Sanitary Stations						
CCPS - Vacuum Priming System Upgrades						
CCPS - Seal Water System Upgrades						
CCPS - Vertical Pump Alternative						

Existing CIP GLWA Projects	2023	2024	2025	2026	2027	2028+
CIP - 260204 Conner Creek Sewer Cleaning and Rehab						
CIP - 260701 In System Storage Dam and Outfall Rehab						
CIP - 32002 Freud Storm Pump Station Rehab						
CIP - 232002 Freud Sanitary Pump Station New Construction						

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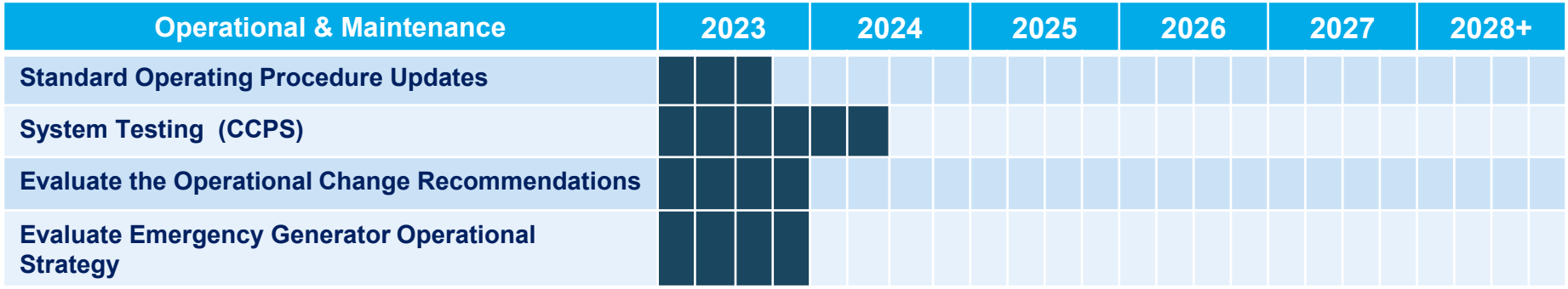
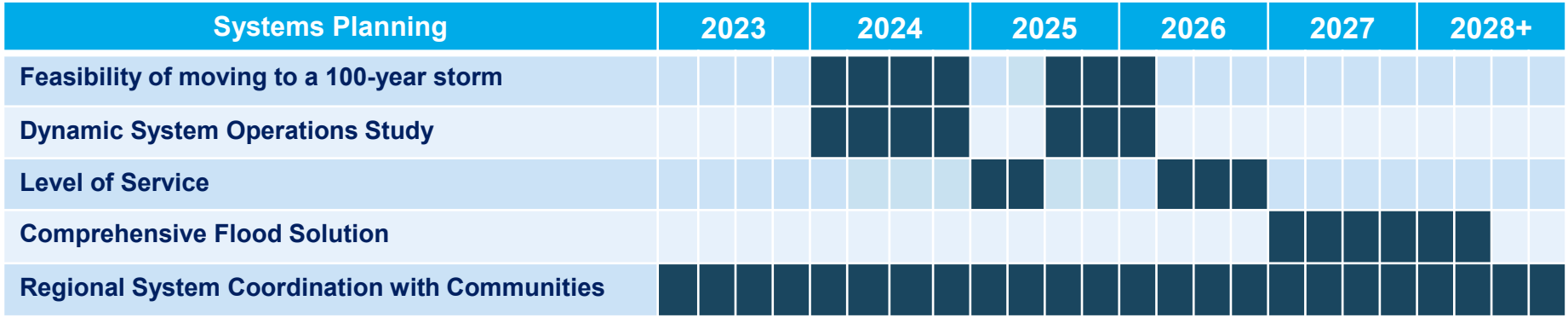
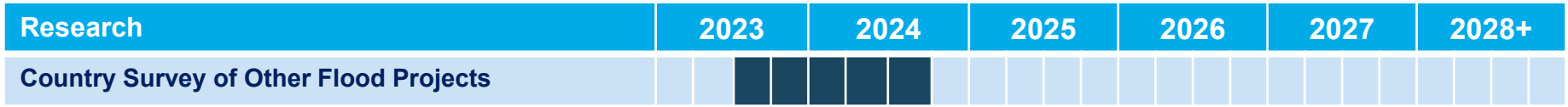
Schedule







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Success Factors

- Implement the short term (2 - 4 year) recommendations to provide operational reliability
- Maintain reliable operations of the sanitary pump stations during storm events
- Maintain power reliability while ensuring feasible flexibility
- Maintain operational readiness for large, high-intensity storms
- Establish an ideal road map for the CCPS
- Evaluate system awareness and condition assessments for system assets
- Complete and accurately document the progress of the resiliency improvements
- Maintain consistent communication to communities and operators

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ONE WATER  **ONE TEAM**

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