

Building Redundancy and Reliability into the City of Flint's Drinking Water System

ACEC/ASCE Michigan Infrastructure
Conference – May 11, 2023

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- Partnerships
- Key Factors & Challenges
- “Just in Time”

Project History

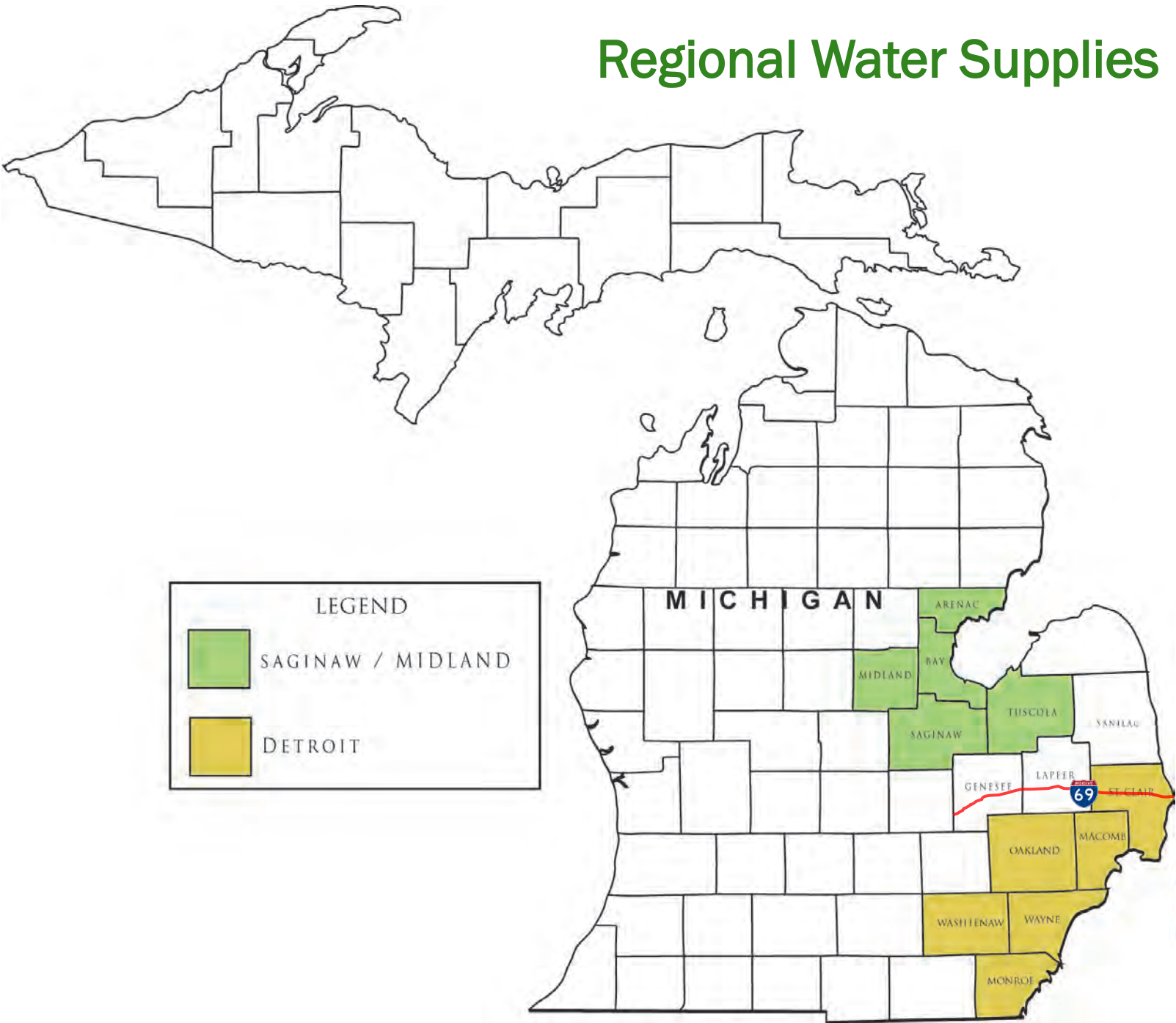


Project History

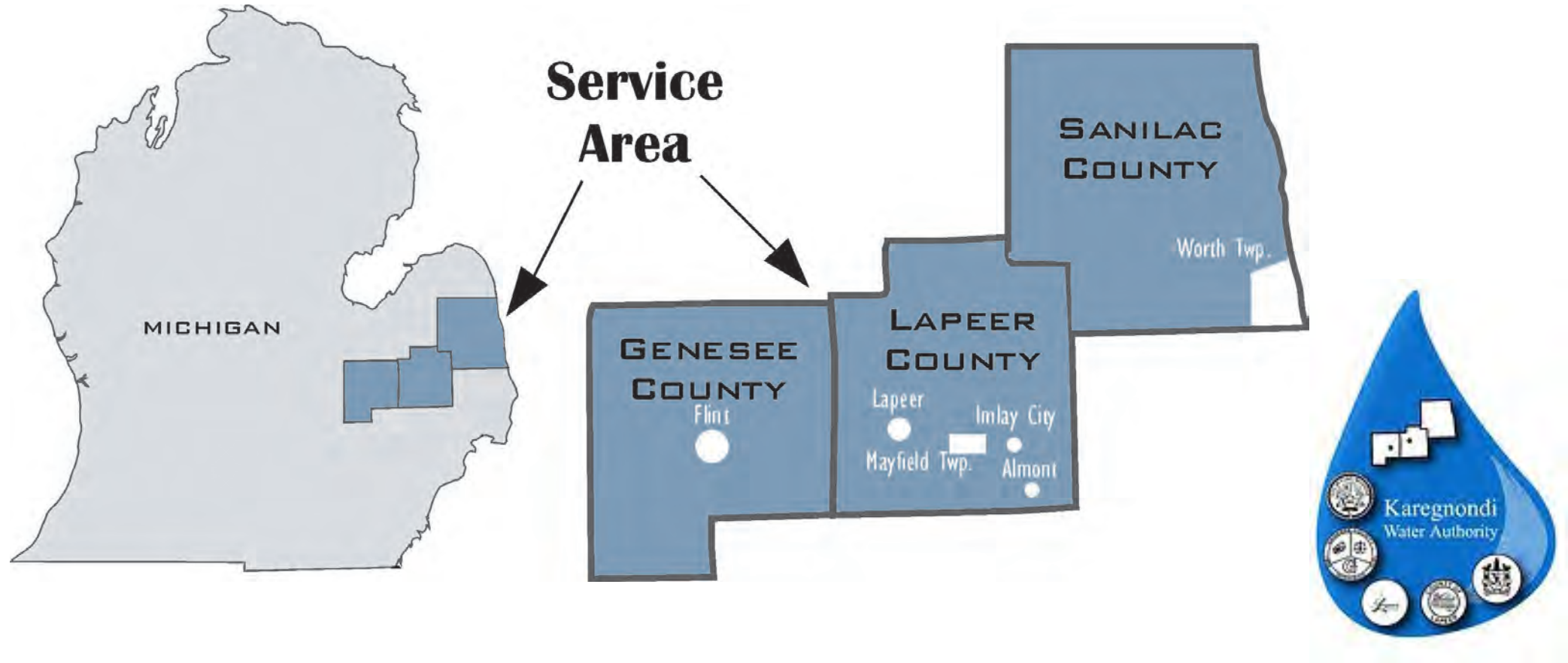
- City of Flint
- Detroit Water and Sewerage Dept (DWSD), now Great Lakes Water Authority (GLWA)
- Karegnondi Water Authority
- The Flint Water Crisis
- The “Master Agreement”
- Goal: System Redundancy and Reliability



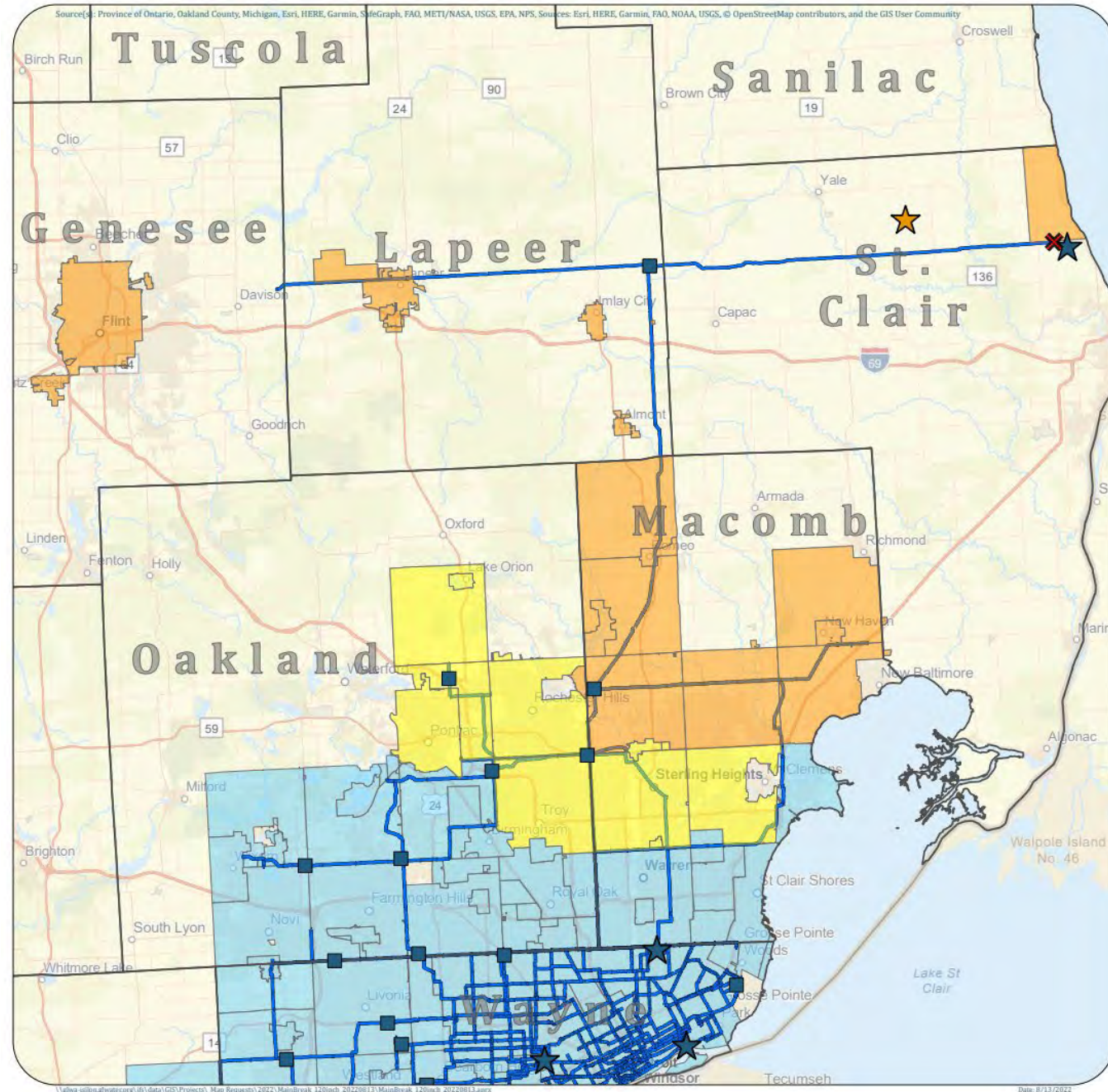
Regional Water Supplies



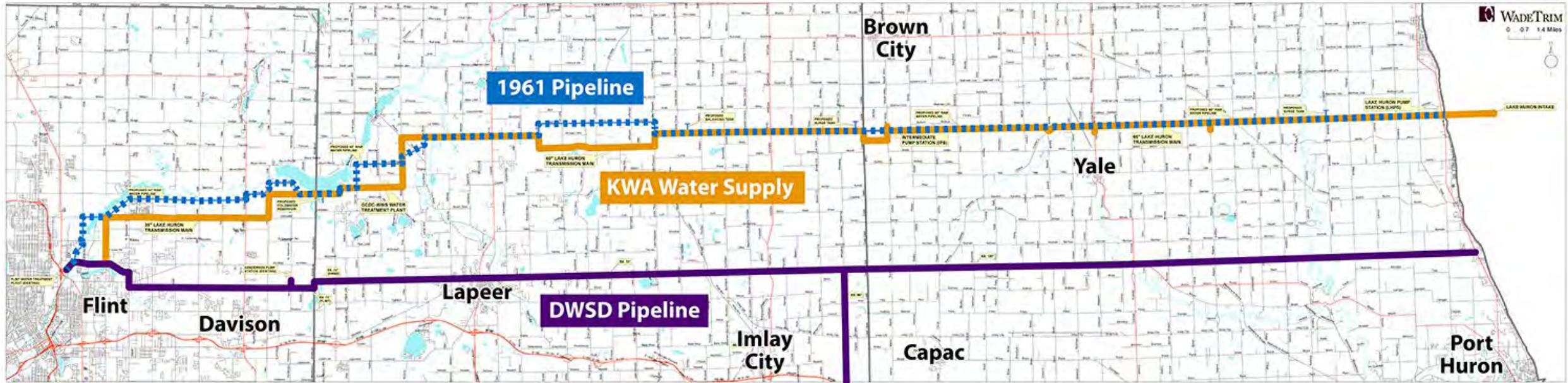
Karegnondi Water Authority (KWA) Service Area



DWSD/GLWA Service Area



DWSD and KWA Pipelines



City of Flint Timeline

- 1917 and 1952 – City construct water treatment plants
- 1961-1963 – City moves to construct own pipeline from Lake Huron but scandal derailed project
- 1964 – City signs 30-year contract with DWSD to provide treated water
- 2007-2009 – Karegnondi Water Authority (KWA) formed with members: cities of Flint and Lapeer, and the counties of Genesee, Lapeer and Sanilac
- 2011 – State takes over Flint's Budget



City of Flint Timeline

- 2013 – City approves purchase of KWA raw water
- 2014 – Water source temporarily switched from treated Lake Huron DWSD/GLWA water to Flint River water treated at City of Flint’s water treatment plant until KWA system was operating
- 2015 – High levels of lead discovered in water system, system switched back to DWSD/GLWA source
- 2017 – City signs new 30-year contract with GLWA
- 2017-2023 – City’s water system improvements, service lead replacement, in compliance six years in a row with Lead and Copper Rule water standards



Infrastructure Leadership and Partnerships

- 2017 “Master Agreement”
 - Working Relationship with Regional Cooperation

- Exhibit A - GLWA/Flint Water Contract
- Exhibit A-2 - Irrevocable License of Essential Water Mains and Raw Water Rights
- Exhibit B - GLWA/GCDC Finished and Backup Water Contract
- Exhibit C - Baseline Trust and All Receipts Trust Agreement
- Exhibit D - KWA/GLWA/Flint Three Party Agreement
- Exhibit E - DEQ/GCDC Grant Agreement (City not a party)
- Exhibit F - Contract for Deed, Quit Claim Deed for 72-inch pipe and Bill of Sale related to 72-inch pipe, License of 72 Inch Main by City of Flint to GLWA, and Sublicense of the 72 Inch Main by GLWA to the County of Genesee
- Exhibit G - KWA/Flint Raw Water Contract Amendments (Exhibits to Three Party Agreement)
- Exhibit H - Letter from the Governor’s legal counsel



Infrastructure Leadership and Partnerships

- 2017 “Master Agreement”
 - Working Relationship with Regional Cooperation

11. TBD - Backup Water Supply

| | |
|-----------------|---|
| Tasks | Complete 5.5-mile connector pipe to GCDC |
| Contract Owner | City of Flint |
| Amount | TBD |
| Effective Dates | TBD |
| Status | Proposed project constructing connection to GCDC will be included in City's WIIN/DWRF project plan- draft submittal target of Feb 2018. |

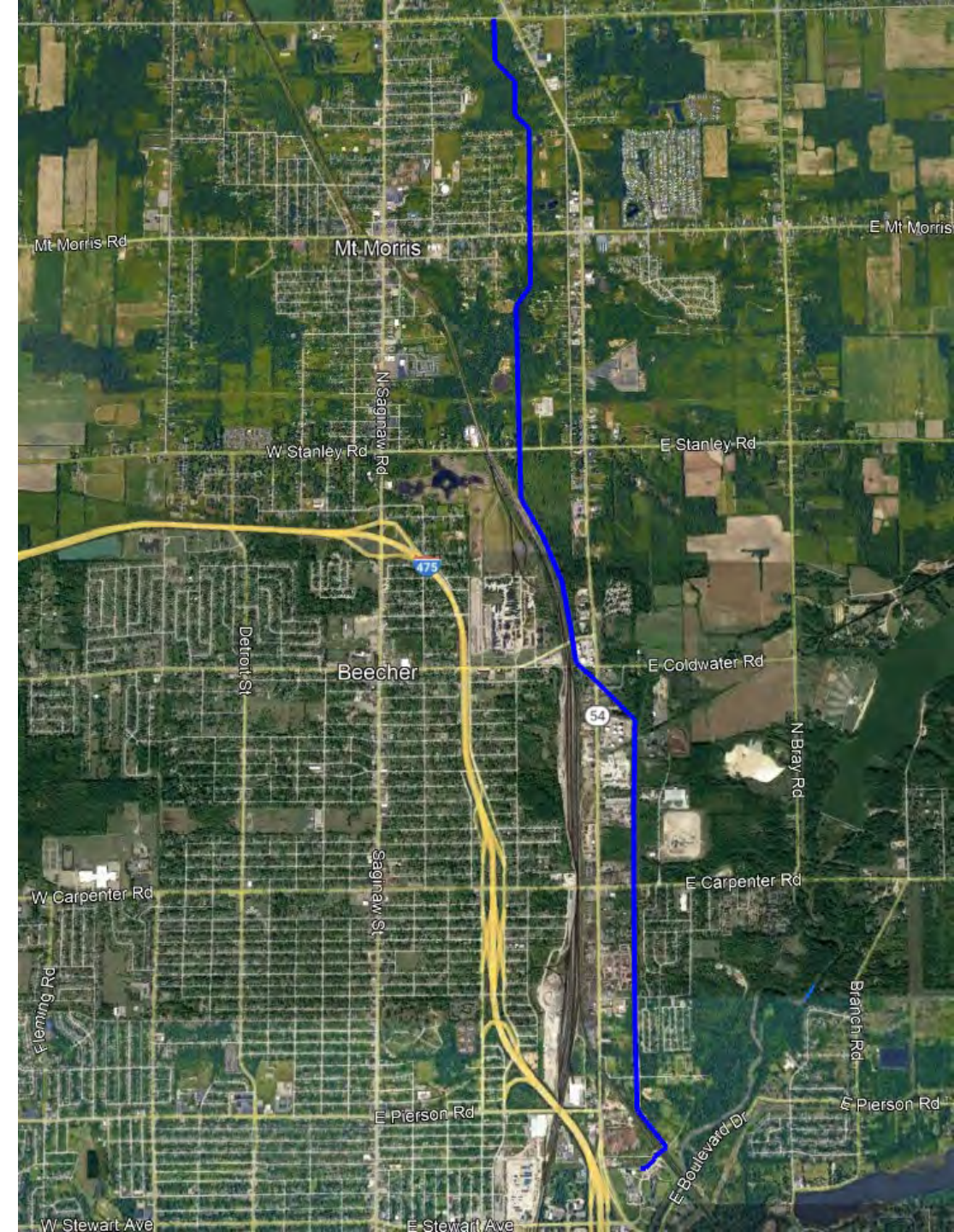


MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY



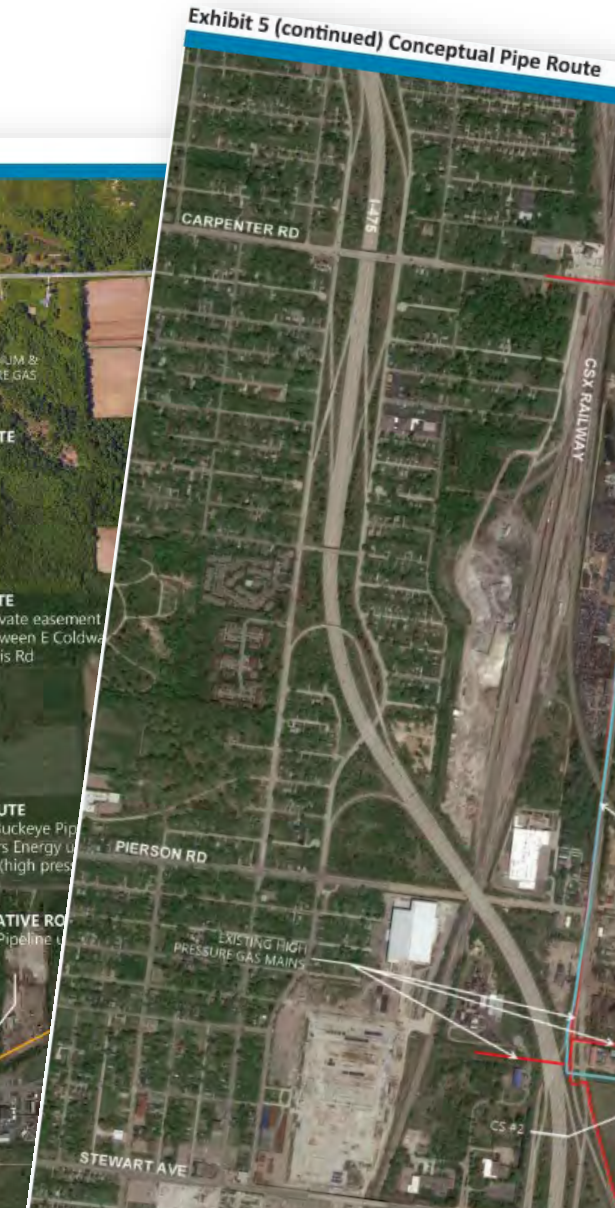
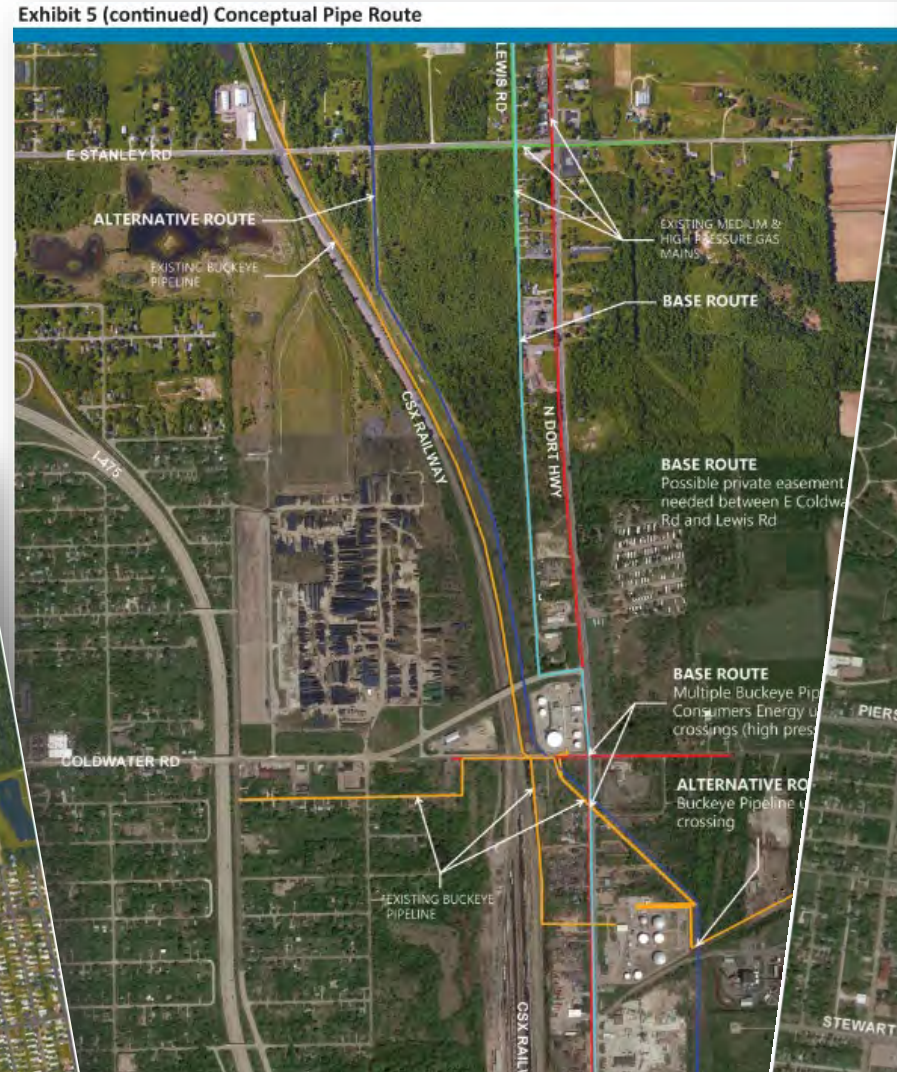
Project Key Factors

- Time Constraints
- **Route Selection & Environmental Concerns**
- Hydraulic Capacity
- **Water Blending**
- Material Procurement
- Permitting
- **Multi-Agency Coordination**
- New City Administrator, vacated DPW Director seat



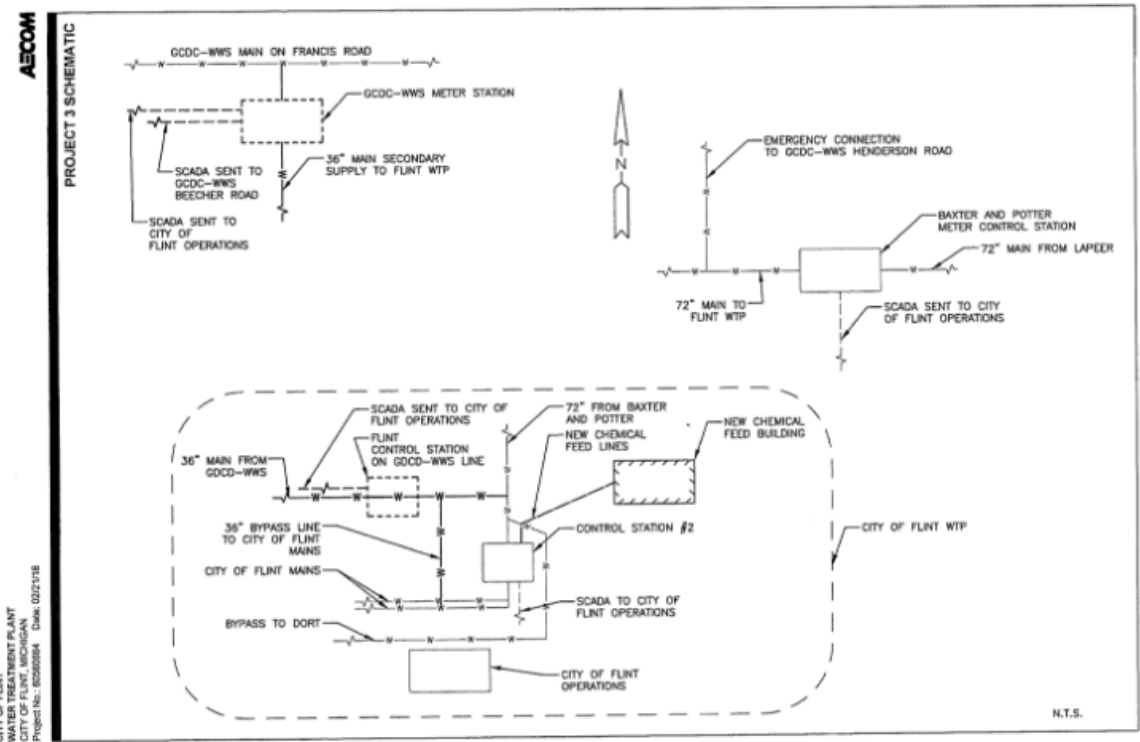
Route Alternatives

- Alternative Route Selection
 - 5.5 Mile Route
 - Environmental Concerns
 - Cost Savings (\$5M)
 - Consumers Energy Easements



Construction Challenges

- Schedule Impacts
 - Consumers Energy Agreements
 - Lengthy lead times on Materials
 - Substantial Completion October 2021
- Field Design Changes
 - Lack of Accurate Record Drawings at Water Plant
 - Lack of Remaining Institutional Knowledge
 - DPW Director left before Design Finalized / Construction Started
 - Utilized existing City materials (butterfly valves)



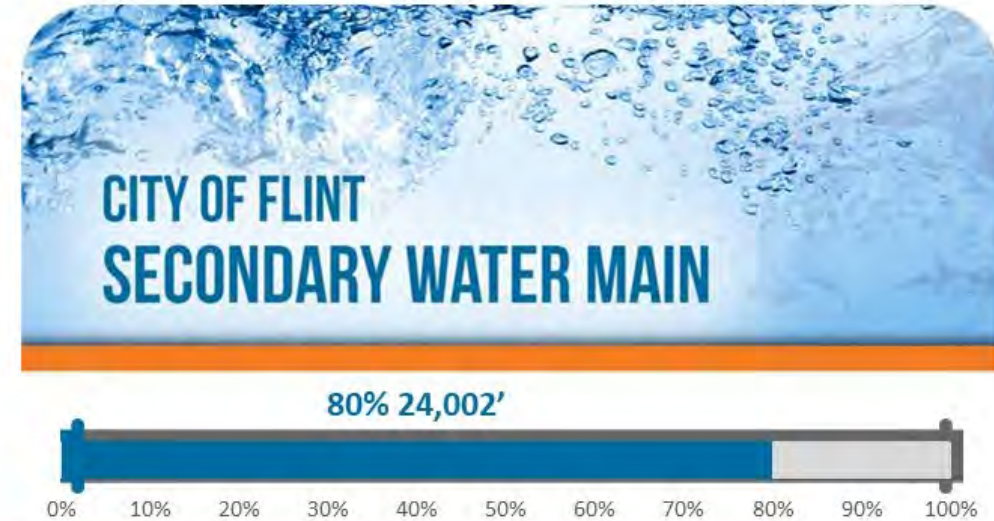
Construction Challenges

- Coordination & Sequencing between other work at WTP
 - Chemical Feed Building
- Utilities & Railroad
 - Consumers Energy Overhead High Voltage
 - Consumers & Buckeye (high pressure gas)
 - CSX Railroad
 - MDOT
 - Genesee County Road Commission



Communication and Coordination

- City of Flint & Public Communication
 - Construction Progress
 - Blending of two water sources
- Coordination of Equipment and SCADA at GCDC Connection
 - City of Flint, GCDC-WWS & GLWA
- Testing & Start-up Coordination
 - GLWA, GCDC-WWS, City, Genesee Twp



Water Main Construction

Contractor will be up to roughly sta. 96+24 with the watermain installation at the end of the day today which is North of Carpenter Road. The second & third crew continues working on miscellaneous items this week installing hydrants and ARV structures to the gate valves as well as a short bore under a buckeye gas line near Power Station Drive at sta. 107+75. The bore crew plans to move to Coldwater Road next week.



Construction



Construction



Construction



Construction



Construction



Construction



“Just in Time”

- GLWA 120” Line Break

MACOMB COUNTY

Gov. Whitmer activates emergency response to GLWA water main break



Hannah Mackay
The Detroit News

Published 11:12 a.m. ET Aug. 13, 2022 | Updated 11:07 p.m. ET Aug. 13, 2022

[View Comments](#)



Gov. Gretchen Whitmer activated the state's emergency operations center Saturday afternoon in response to a water main break at the Great Lakes Water Authority's Lake Huron Water Treatment Facility that's impacting more than a dozen communities under boil water advisories.

The state said the activation will ensure all resources are available to support those communities.

“Our top priority right now is protecting the public health and safety of Michigan residents until this water main is fixed as quickly as possible,” Whitmer said.

“I have activated the State Emergency Operations Center to ensure that every possible resource is available to GLWA and the impacted communities to accomplish that goal.”



NEWS

GLWA extends timeline to fix water main break in Metro Detroit

Published: August 16, 2022 at 5:10 PM

Tags: News

There are breaking developments in the massive water main break that is impacting over 100,000 Metro Detroiters, and it isn't good as the Great Lakes Water Authority now says it will take three weeks instead of two to fix it. New inspections found damage in the pipe, meaning more of that 120-inch main needs to be manufactured and trucked in. The Water Authority now says its goal is to have the line fully repaired by Sep. 3. On Tuesday (Aug. 16) at the site, crews began removing the broken pipe that was installed back in 1973. That means 130,000 people in the seven communities will need to boil their water for the next 18 days.



“Just in Time”

- Emergency Back-up Supply-first test



A screenshot of the City of Flint website. The header includes the City of Flint logo and navigation links: Home, Analysis, "Their swift action and smooth response ensured the safety and availability of Flint's drinking water was undisturbed" – EPA Region 5 Director Debra Shore, Home, About Flint, For Residents, For Businesses, Government, and Departments. The main content area features a dark blue background with a yellow and white graphic of a water tap and the year 1855. The headline reads: "No boil water advisory for City of Flint, thanks to secondary water source". Below the headline is the date "August 13, 2022" and a person icon. The text "Home / No boil water advisory for City of Flint, thanks to secondary water source" is visible above the headline.



Flint water plant upgrades displayed during GLWA main break, EPA admin says

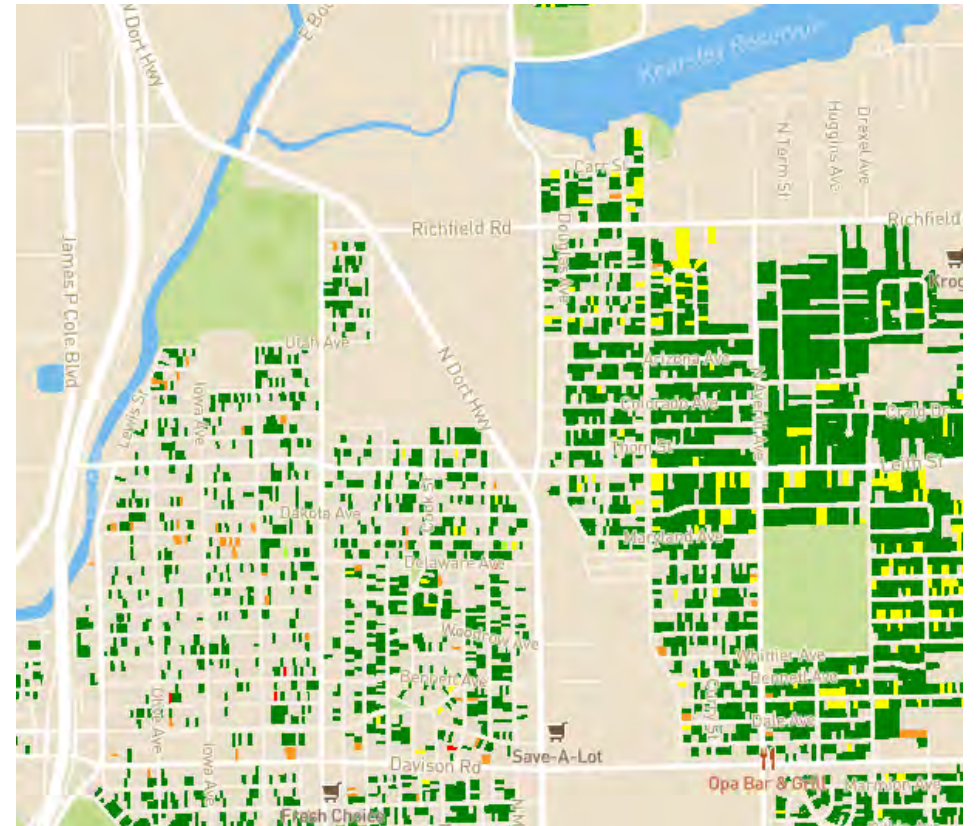
FLINT, Mich.— August 13, 2022

Following an early morning emergency alert from the City of Flint's primary water source, the city immediately connected to the Cedar Street Reservoir, and made the transition to the GCDC pipeline until further notice. The city is now receiving 100% of its water from the GCDC pipeline until further notice.

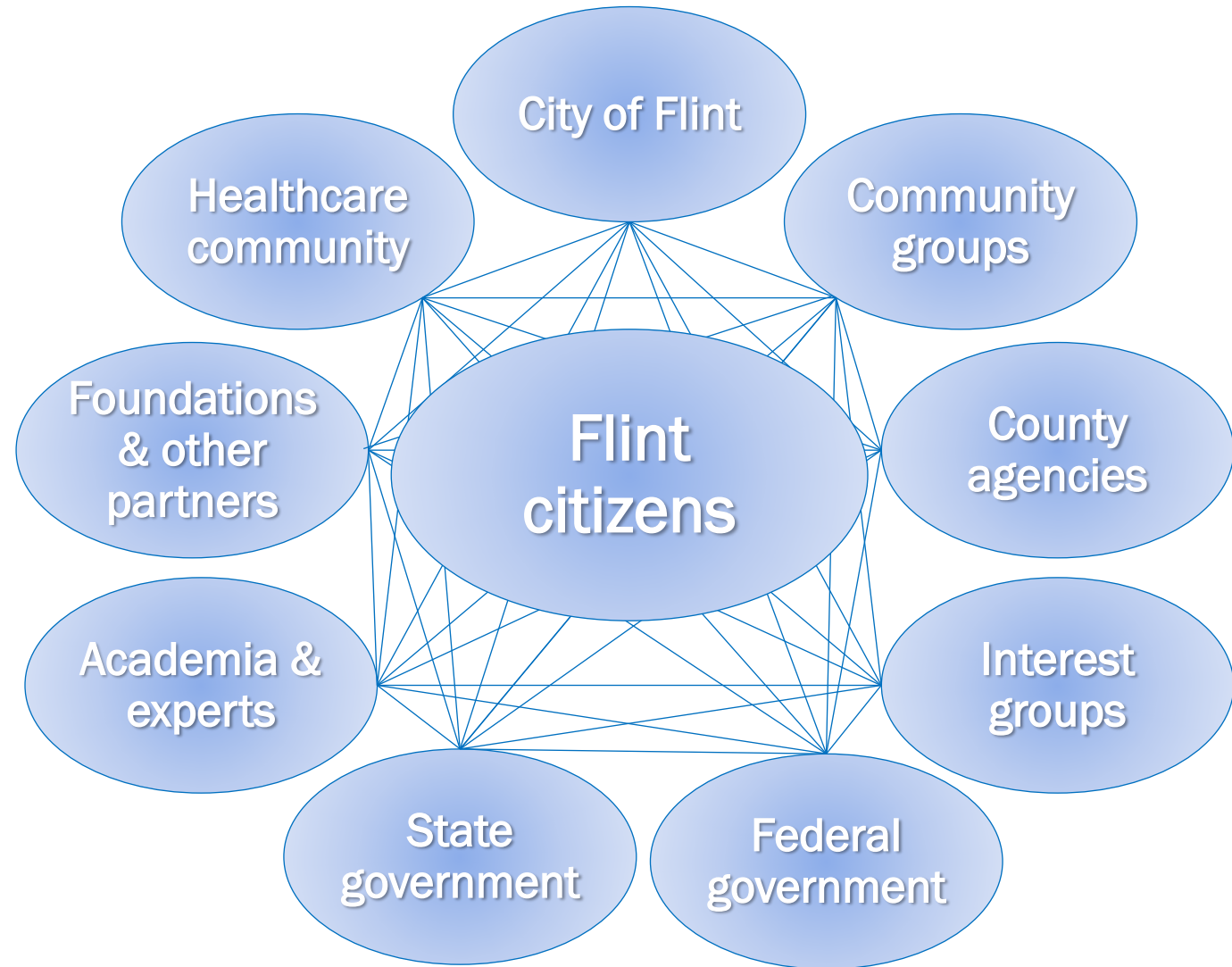
According to City of Flint Director of Public Works Mike Brown, staff were able to shut down the primary GLWA pipeline before pressure dropped below 20 psi. This means that residents do not need to boil water. "It's a long line from Imlay City to Flint," Brown said. "Our staff took action immediately to prevent our city's water quality from being affected."

City of Flint Water System Improvements

- Secondary Water Supply for redundancy and reliability
- Chemical Feed Building
- Water Transmission Main Replacements
- Water Meters
- Water Service Lead Replacements



Leadership and Partnerships



Questions?