

Drinking Water State Revolving Fund **Project Planning Document**

Ellis & Harmonia Water Project

June 1, 2023

Submitted to:



Submitted by:

Bedford Charter Township
Calhoun County Michigan

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1. Introduction

This Project Planning Document (PPD) has been prepared to fulfill the requirements of the Drinking Water State Revolving Fund (DWSRF) program. Bedford Charter Township is applying for funding to build a new water main that will provide safe public drinking water to an area that has PFAS contamination in levels exceeding maximum allowable limits. This PPD is intended to meet the requirements of the following statutes, laws, and rules:

- The federal Safe Drinking Water Act (SDWA), Amendments of 1996, 42. United States Code (U.S.C.) §300f et seq.
- Part 54, Safe Drinking Water Assistance, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL §§324.5401-324.5418
- The Michigan Safe Drinking Water Act, 1976 PA 399, (Act 399), MCL §§325.1001-325.1023
- The Act 399 Administrative Rules, Michigan Administrative Code R325.10101-R325.12820

2. Project Background

2.1 Delineation of Study Area

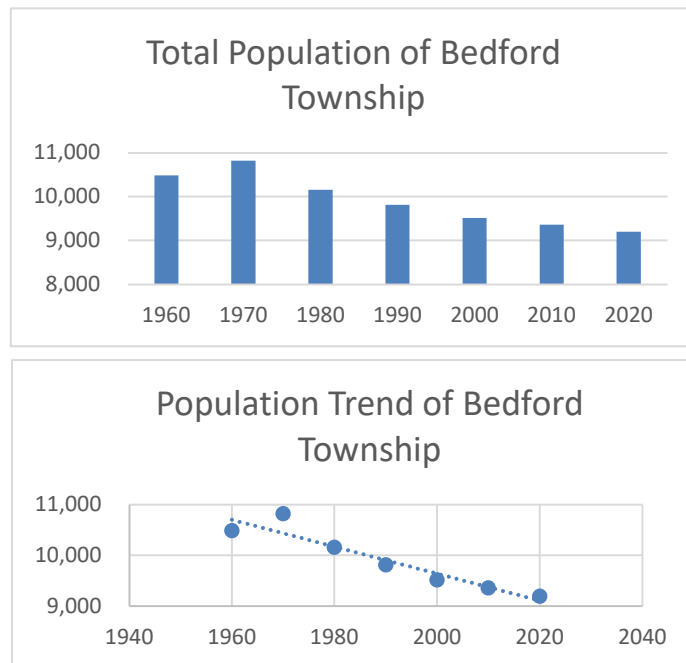
The Service Area is located in Sections 32 and 33 of Bedford Charter Township, and Section 04 of the City of Springfield, Calhoun County, Michigan. It lies between the Battle Creek ANG Base and the Kalamazoo River. This area has a number of private water wells that have tested positive for PFAS contamination. Some of these wells are in exceedance of allowable limits, some others had detectable levels. A map of the study area and appropriate natural features (lakes, rivers, etc.), and other key characteristics is attached in Appendix A.

2.2 Population

Bedford Charter Township had a population of 9,357 in 2010 and 9,198 in 2020.¹

Linear regression analysis of historical population trends from US Census data indicates an average 10-year growth to be -2.10%. Based on that analysis, the 5-, 10- and 20-year projections are shown below. There are no significant seasonal population fluctuations.

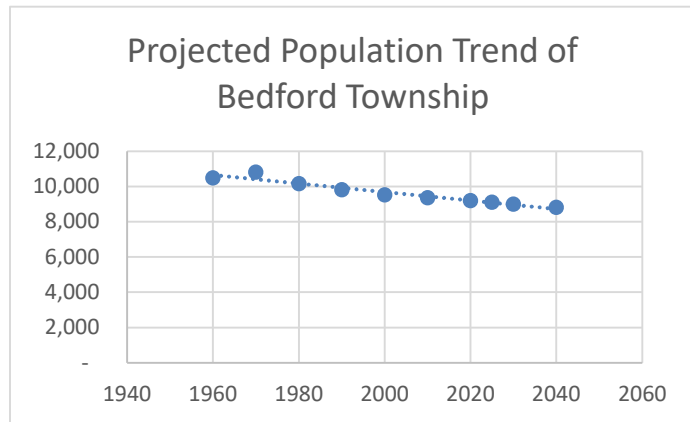
Year	Total Population	Delta %
1960	10,486	
1970	10,817	3.16%
1980	10,157	-6.10%
1990	9,810	-3.42%
2000	9,517	-2.99%
2010	9,357	-1.68%
2020	9,198	-1.70%
Average 10 Year Change		-2.12%



¹ <https://www.census.gov/quickfacts/fact/table/bedfordchartertowntshipcalhouncountymichigan#>

Bedford Charter Township DWSRF Project

Year	Projected Population
2025	9100
2030	9003
2040	8812



2.3 Existing Environment Evaluation

2.3.1 Cultural and historic resources

Cultural and historic resources are not anticipated to be in the project area. SHPO and THPO representatives will be contacted for verification.

2.3.2 Air Quality

Air Quality is not currently affected by the conditions requiring this project. Air quality will be impacted by the construction phase of this project as noted later in this document. Post construction, air quality will return to the pre-construction levels.

2.3.3 Wetlands

An area of the project along Harmonia Road will be adjacent to wetland soils. See maps in Appendix B.

2.3.4 Great Lakes Shorelands, Costal Zones, and Costal Management Areas

This project will not encroach on any shorelands, zones, or costal management areas of the Great Lakes.

2.3.5 Floodplains

The selected project alternative will cross under Helmer Creek which is in a flood plain.

2.3.6 Natural or Wild and Scenic Rivers

Helmer Creek lies in the path of the selected project alternative. There are no classified “Natural, Wild, or Scenic Rivers” in the project area.

2.3.7 Topography

Project area is relatively flat land with small knolls. The project route will primarily follow existing roadways which are graded to enhance water drainage, and which allows access by existing residential clients.

2.3.8 Geology

The aquifer in the Study Area is the Marshall Formation. The Marshall Aquifer is made up of sandstone, a type of rock that is formed from compressed sand. It is porous which makes it productive, however, because of its porosity it is also vulnerable to contamination and can be over used if too much is pumped with wells.

2.3.9 Soil Types

Soil types in the project excavation area as derived from GIS resources consist of:

Houghton Muck – undrained

Coloma Sandy Loam

Oshtemo Sandy Loam

See Map in Appendix B.

2.3.10 Agricultural Resources

There are no agricultural resources that will be impacted by the alternative.

2.3.11 Fauna and Flora

A rare species review will be initiated with Michigan Natural Features Inventory (MNFI) for the project area. Additionally, if required, a section 7 consultation will be conducted with USFWS.

2.4 Existing System

There are no existing facilities in the Service Area. Water treatment and supply is done by the City of Battle Creek. The EGLE map showing existing private water withdrawal well locations is in Appendix C.

2.4.1 Condition of source facilities

There are no existing facilities in the service area.

2.4.2 Method of water treatment

There are no existing facilities in the service area.

2.4.3 The condition, capacity, and reliability of storage tanks and pump stations

There are no existing tanks or pump stations in the service area.

2.4.4 The condition of service lines

There are no water distribution mains or service lines in the Service Area.

2.4.5 Existing Transmission/Distribution Mains

The new water main in this proposed project will connect to on the north end is a newly placed 8" watermain connected between the Battle Creek WWTP, and Jackson Street W. It will connect to an existing 12" main located approximately 1700 feet east of the intersection of Ellis and Harmonia Roads.

2.4.6 The Method of Residuals Handling and Disposal

Not Applicable.

2.4.7 The Condition of Water Meters

There are no water distribution mains or water meters in the Service Area.

2.4.8 Operation and Maintenance

There are no existing water distribution mains or service lines in the Service Area.

2.4.9 The Design Capacity of The Waterworks System and The Existing Uses of Available Capacity

There are no existing water distribution mains or service lines in the Service Area. The City of Battle Creek will be consulted to confirm capacity capability.

2.4.10 Evaluation of the System's Climate Resiliency

There are no water distribution mains or service lines in the Service Area. Southwestern Michigan has extreme climate during the winter. Water mains placed in the proposed project will be placed to a depth below the surface to protect them from freezing, flooding, wind storms, and vandalism.

2.5 Need for the project

2.5.1 Compliance with the Drinking Water Standards Defined in The Administrative Rules for Act 399.

The groundwater in the Service Area is contaminated with PFAS beyond safe levels and is not in compliance with the cited standards. MDHHS and EGLE well sampling maps and PFAS test results are in Appendix E. The contaminated wells are 8,000 to 9,000 feet from the Battle Creek ANG Base and the Battle Creek Executive Airport. These are believed to be the point sources of the PFAS contamination. Please refer to Appendix E for the locations of wells that have been tested.

2.5.2 Orders or Enforcement Actions

Not applicable.

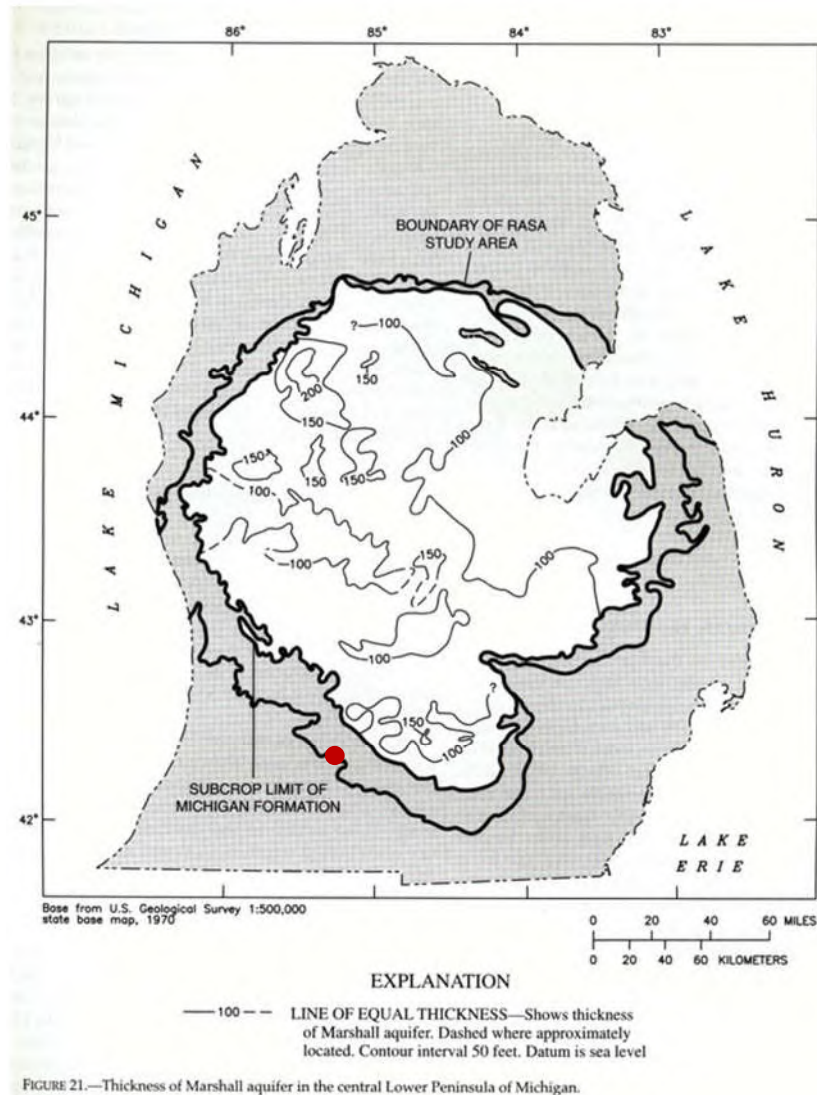
2.5.3 Drinking water quality problems

There are no issues currently with the water supply from the City of Battle Creek. The City's Water Quality Report in in Appendix D. MDHHS and EGLE Well Sampling Maps and PFAS test results are in Appendix E.

Groundwater PFAS contamination is the primary concern and the reason for this proposed project. The contaminated wells are from 8,000 to 9,000 feet horizontally from the Battle Creek ANG Base and the Battle Creek Executive Airport. These are believed to be the point sources of the PFAS contamination. Maps from MDHHS and EGLE indicating the locations of wells tested for PFAS contamination are in Appendix E.

The aquifer in the Study Area is the Marshall Formation. The Marshall Aquifer is made up of sandstone, a type of rock that is formed from compressed sand. It is porous which makes it productive, however, because of its porosity it is also fairly vulnerable to contamination and can be over used if too much is pumped with wells. See Fig 3-4 below.

Bedford Charter Township DWSRF Project



² <https://project.geo.msu.edu/geogmich/groundwater.html>

Figure 3.4 Michigan Aquifers 1

● PROJECT LOCATION

2.6 Projected Future Needs

This project will complete the immediate needs of the area served. Any new REUs in the area will tie into the new system.

² <https://project.geo.msu.edu/geogmich/groundwater.html>

3. New Water Supply Well Procedures

3.1 Well Design

No new wells are planned for this project.

4. Analysis of Alternatives.

Table 3: Analysis of Alternatives

The objective for all options is to provide safe drinking water to the service area.

The drinking water standard(s) related to all alternatives is PA 399 Safe Water Act of 1976

All alternatives tie in to existing water main at River Rd.

Alternative and Alignment	Construction Method	Technical Constraints	Rational for Rejection
Do Nothing (no action)			This alternative does not meet the objective
<u>Alternative – West</u> Route: Tie in at River Rd. and head south 3,200-ft cross-country and along Ellis Rd. to Harmonia Rd. then West 2,200-ft along Harmonia Rd to Evergreen Rd. and south 1150 ft. to existing Springfield 10” water main.	New water main and services placed using open cut excavation and horizontal auger bore (HAB) under the railroad ROW.	HAB could be difficult depending on soil types. Working within a railroad ROW will require an additional permit known for taking significant time to obtain. Easements from private property owners would be necessary.	This alternative would tie into a high-pressure zone requiring a pressure reducing valve, which is not desirable by the operating / maintaining authority. It incurs extensive cost due to the length of the run.

Bedford Charter Township DWSRF Project

<u>Alternative – East</u> Route: Tie in at River Road and head south 3200 ft. cross-country and along Ellis Rd. to Harmonia Rd. then East 1700 ft to existing Springfield 12” water main.	New water main and services placed using open cut excavation and horizontal auger bore (HAB) under the railroad ROW. A directional drill will be required to pass under Helmer Creek.	HAB could be difficult depending on soil types. Working within a railroad ROW will require an additional permit known for taking significant time to obtain. Easements from private property owners would be necessary.	This is the preferred project alternative.
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4.1 NARRATIVE OF ALTERNATIVES

The route of the water main from River Road south will cross private property. An easement will be required to complete the route south. Additionally, this alternative requires a HAB under a railroad ROW which will require special permitting from the ROW owner. Obtaining this permit may affect the actual start date for the project. The map in Appendix F indicates the service area and proposed routes.

4.1.1 No-Action/Do Nothing Alternative

The No-Action alternative is not a viable option for the community. The groundwater is contaminated by PFAS. The No-Action Alternative would not meet water quality requirements.

4.1.2 West Alternative

The West Alternative ties into a new water main that is being installed between the Battle Creek WWTP and Jackson Road. From the tie-point, it runs south for 3,200-ft south in private property then west 2,200-ft along Harmonia Rd., then south 1150 ft. along Evergreen Rd, to an existing 10” high pressure water main requiring a pressure reducing valve. Easements that would have to be acquired for this route. This route also requires a horizontal auger bore under the railroad track and permits from the railroad to enter upon railroad property and to place facilities underneath the railroad. This alternative would serve additional 16 potential customers.

4.1.3 East Alternative

The East Alternative ties into a new water main that is being installed between the Battle Creek WWTP and Jackson Road. From the tie-point, it runs south for 3,200-ft south in private property then east 1700 ft along Harmonia Rd to tie in on an existing 12” main. Easements that would have to be acquired for this route. This route also requires a horizontal auger bore under the railroad track and permits from the railroad to enter upon railroad property and to place facilities underneath the railroad. Additionally, a directional drill will be required to pass under Helmer Creek. This alternative would serve 16 potential customers.

Other alternatives were not reviewed due to length of pipe required to create a looped installation.

4.2 Optimum Performance of Existing System

There are no public facilities that can be optimized.

4.3 Regionalization

The proposed project is in fact a regional alternative. The City of Battle Creek treats and supplies water to Bedford Charter Township and to the townships of Emmett, Pennfield, and to the City of Springfield. This project will expand the regionalization and service area for the City of Battle Creek. An existing intergovernmental agreement for regional water is in place. Coordination with, and approvals from the cities of Battle Creek and Springfield will be required.

4.4 Monetary Evaluation

Since both Principal Alternatives would provide new public water mains to the service area, the monetary comparison is based on initial project costs only. The discount rate, salvage value, escalation and interest during construction will be similar. The following table compares the alternatives:

Bedford Charter Township DWSRF Project

Principal Alternative	Project Cost	Potential New Users	Expandability
West Alternative	\$4,208,000	16	
East Alternative	\$3,570,000	16	

4.4.1 Sunk Costs

There are no known sunk costs in respect to this project.

4.4.2 Total Present Worth

West Alternative Total Present Worth = \$6,739,500.00 Estimated.

East Alternative Total Present Worth = \$5,037,500.00 Estimated.

4.4.3 Salvage Value

The useful life of the new water main is 50 years. The monetary evaluation is for 20 years. The salvage value is $(50-20)/50 \times \text{Initial Cost}$ or 60% of Initial Costs.

West Alternative = \$1,438,000.00.

East Alternative = \$1,340,000.00.

4.4.4 Escalation

There are no escalation costs for this project.

4.4.5 Interest During Construction

Interest during construction is not anticipated to be significant.

4.4.6 User Costs

User costs will include a one-time \$1000.00 fee for the meter and installation. There will be approximately \$30.00 per month per REU for water usage. These costs will be offset by eliminating the cost of purchasing filter units and/or potable water for consumption and the operation and maintenance of private wells.

4.4.7 Delivery Method

Design-Bid-Build Delivery Method will be used for this project.

4.5 Environmental Evaluation

4.5.1 Cultural Resources

The Township will hire a consultant to perform a section 106 review for this project. THPO representatives will be contacted in regards to their concerns in the project area. No archeological, historical, cultural, or tribal impacts are anticipated for the project.

4.5.2 The Natural Environment

Besides the temperature during winter months in Michigan, no adverse climate impacts are anticipated for either alternative. Air quality will be directly impacted during construction for both alternatives. This will be caused by dust from construction operations and exhaust from construction equipment and vehicles. Dust control mitigation will be included in the construction contract documents. This impact is temporary, limited to the time of construction operations.

No significant wetland impacts are anticipated for either alternative. There are no costal zones involved with any proposed work. EGLE does not list any areas of concern for environmental contamination. There are no agricultural resources that will be impacted by either alternative.

No known plant or animal community environmentally sensitive habitats will be impacted long-term. A threatened and endangered species review will likely be required by EGLE as part of the permitting process.

4.6 Technical Considerations

Both Principal Alternatives will comply with Act 399 and be designed to meet the standard recommended guidelines established in the “Recommended Standards for Waterworks” as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers. The scale of this project is not large enough to adversely impact the capacity of the existing system.

4.7 New / Increased Water Withdrawals

There are no new surface or groundwater withdrawals being proposed.

5. Selected Alternative

The East Alternative was selected for the following reasons:

- It provides safe drinking water to 16 REUs in an area known to be contaminated by PFAS.
- Battle Creek City forces will operate and maintain the proposed water mains.
- The West alternative is considerably longer resulting in increased costs.
- The West alternative would require a pressure reducing valve.

5.1 Design Parameters

The project plan design will be modeled to confirm system capacity. Determination of that responsibility is to be decided amongst the City of Battle Creek, the City of Springfield, and CEI.

5.2 Useful Life

Water mains have a life expectancy of 50 years.

5.3 Water and Energy Efficiency

As this projects ties into an existing system, no measurable gains or losses are expected.

5.4 Schedule for Design and Construction

Milestone (month/year)	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	2023	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024
Design											
Bidding											
Permitting											
Financing											
Construction Start											

Highlighted columns mean work on that task will be taking place.

5.5 Cost Summary (Estimate)

Item	Cost Opinion
Construction Costs	\$2,049,000
Soft Costs (Engineering, Financing, Legal and Administration)	\$960,000
Contingencies	\$410,000
Financial Costs	\$151,000
Total Project Cost Opinion	\$3.57 Million

5.6 Implementability

- Bedford Charter Township has the legal authority to implement the proposed project.
- Bedford Charter Township, with assistance from their Engineering Consultant, will have the managerial capability to implement the proposed project.
- Bedford Charter Township is a small community that lacks the capacity to incur debt sufficient to finance this project.
- Per an existing intergovernmental agreement, operation and maintenance on the water main in the proposed project will be done by the City of Battle Creek.

6. Environmental and Public Health Impacts

6.1 Construction impacts

- Air quality will be directly impacted during construction. This will be caused by dust from construction operations and exhaust from construction equipment and vehicles. Dust control mitigation will be included in the construction contract documents. This impact is temporary, limited to the time of construction operations.
- Post construction air quality will be indirectly impacted beneficially. Green areas will be re-seeded and roads will be re-surfaced reducing dust.
- Soil erosion and sedimentation mitigation controls will be included in the construction contract documents.
- After construction operations are completed and as customers connect to the municipal water supply, water quality will be directly improved as water from wells contaminated by PFAS will no longer go into on-site septic systems and leach into the ground water, stopping that cycle.

6.2 Operational impacts

River Road, Ellis Road, and Harmonia Road will be directly impacted by construction. The route would impact mostly front lawns of residential and commercial properties, including drive approaches. Tree removal will be minimized to the greatest extent possible.

There are no known hazardous or contaminated materials in the proposed construction area. PFAS is known to be in the groundwater. The pipe is anticipated to remain above the groundwater.

6.3 Social impacts

Construction will temporarily impact traffic movement for the residential and commercial users along the route of the new water main. Long-term negative social economic impacts are not anticipated. The project help maintain and encourage residential and commercial development in the area. It will likely mitigate socioeconomic degradation by keeping property values from decreasing as a result of PFAS in the drinking water.

6.4 Indirect impacts

The purpose of this project is to provide safe drinking water to properties that are already developed. Significant growth as a result of public water supply is not anticipated. Long narrow parcels are typical within the service area, and most of them are already developed. Most of the larger parcels within the service area have existing commercial operations.

6.4.1 Changes to land use

Changes to land use are not anticipated as stated above.

6.4.2 Changes in Air or Water Quality

Changes in air or water quality are not anticipated as stated above.

6.4.3 Changes to Natural Areas and Sensitive Species or Ecosystems

Changes to natural areas and sensitive species or ecosystems are not anticipated as stated above.

6.4.4 Changes to Aesthetic Aspects of The Community

Changes to aesthetic aspects of the community are not anticipated as stated above.

6.4.5 Changes to Resource Consumption

Changes to resource consumption is not anticipated as stated above.

6.5 Cumulative impacts

A threatened and endangered species review will likely be required by EGLE as part of the permitting process.

7. Mitigation Measures

The adverse impacts that cannot be avoided are, tree removal, and traffic control. The pipe alignment will be designed so that one way traffic can pass during construction. Half of the existing road pavement will be removed so the pipe can be located to minimize the need to remove trees. An EGLE permit to regulate environmental impacts will be part of the project.

8. Public Participation

8.1 Planning Meetings

The Township will hold and attend several meetings involving the City of Battle Creek, the City of Springfield, and the Calhoun County Environmental Health department.

8.2 Public Meeting

A formal public hearing will be held at the Bedford Township Hall to receive public input on the Project Planning Document at a date / time to be determined. The meeting will address at a minimum:

- A description of the water quality problems.
- A description of the recommended alternative including costs and a cost breakdown.
- A discussion of the project financing.
- A discussion of the impacts on social and environmental impacts associated with the project.

8.3 Public Hearing Advertisement

A copy of the public hearing advertisement and an affidavit confirming publication will be included in Appendix G.

8.4 Public Meeting Summary

A copy of the public meeting notes can be found in Appendix H.

8.4.1 Meeting Agenda

A formal public hearing will be held at the Bedford Township Hall to receive public input on the Project Planning Document at a date / time to be determined. The meeting will address at a minimum:

- A description of the water quality problems.
- A description of the recommended alternative including costs and a cost breakdown.
- A discussion of the project financing.
- A discussion of the impacts on social and environmental impacts associated with the project.

8.4.2 List of Attendees

A typed list of public hearing attendees will be included in Appendix I.

8.4.3 Public Concerns

A discussion of the project concerns and comments received during meeting and the public comment period will be included in Appendix J.

8.4.4 Social and Environmental Impacts

A description of the anticipated social and environmental impacts and the measures taken to mitigate will be included in public hearing presentation (see Appendix K).

8.5 Adoption of the Project Planning Document

The Bedford Charter Township Board of Trustees will approve a resolution adopting the final Project Plan. (see Appendix L.)

Bedford Charter Township DWSRF Project

APPENDIX A

Map of the Study Area

APPENDIX B

Wetlands & Soils Maps

APPENDIX C

Map of Water Withdrawal Points

APPENDIX D

City of Battle Creek Water Quality Report

APPENDIX E

MDHHS and EGLE Well Sampling Maps and Test Results

APPENDIX F

Map of Alternatives

APPENDIX G

Public Hearing Advertisement and Affidavit of Publication

APPENDIX H

Public Hearing Notes and Copy of Presentation

APPENDIX I

Public Hearing Attendance Sheet

APPENDIX J

Written Comments Received During Public Comment Period and Responses

APPENDIX K

Social and Environmental Impacts

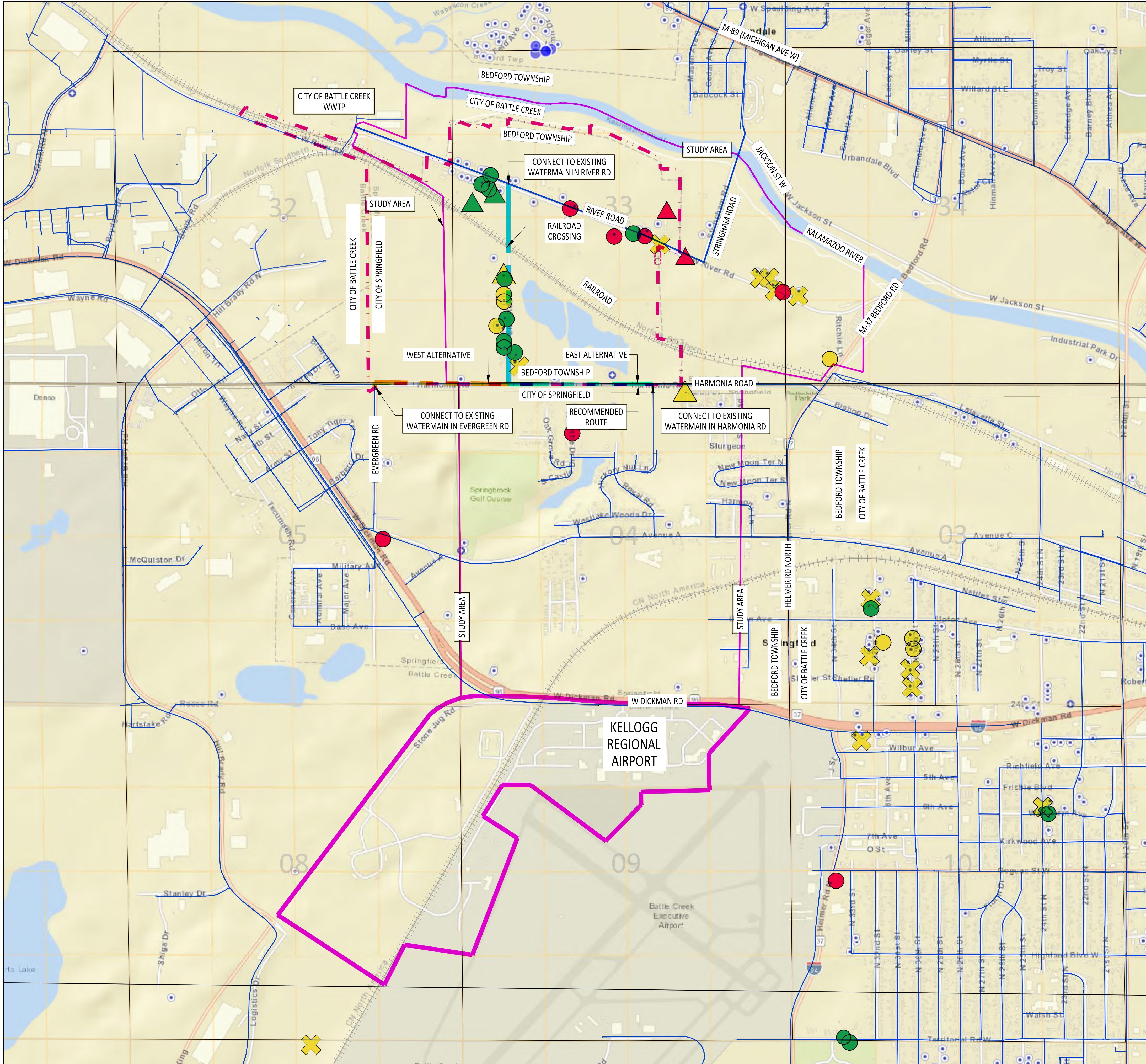
APPENDIX L

Township Resolution Adopting Project Planning Document

APPENDIX A

Map of the Study Area

Mar 07, 2023 9:04am P:\2022\221001_Ellis & Harmonia Water DESIGN\04-Drawings\221001_Concept.dwg



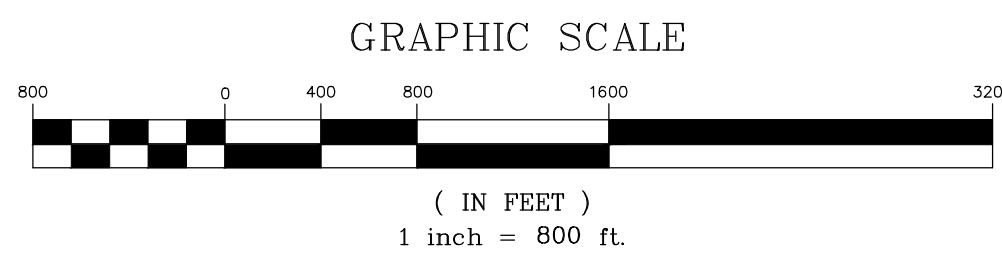
Battle Creek ANG Base
Drinking water well results for 2020
PFAS resampling.

— Draft — 1/21/2023

2020 Resampling Status

- Exceedence
- Exceedence First-time Sample
- Exceedence
- Detection
- Detection First-time Sample
- Detection No Filter Provides
- Not Detected
- Not Detected First-time Sample

- EXISTING WATER WELLS
- EXISTING WATER MAINS
- STUDY AREA
- PROPOSED WATERMAIN
- EAST ALTERNATIVE
- WEST ALTERNATIVE



Civil Engineers Inc.
14250 Beadle Lk Rd
Suite 150
Battle Creek, MI
49014-7202
www.cei-bc.com
269-962-5127

JOB NO: 221001

DATE: / /

DRAWN BY: KEH

REVIEWED BY: RAR

OWNER



ELLIS AND HARMONIA WATER CONCEPT

Know What's
Below, Call
MISS DIG.



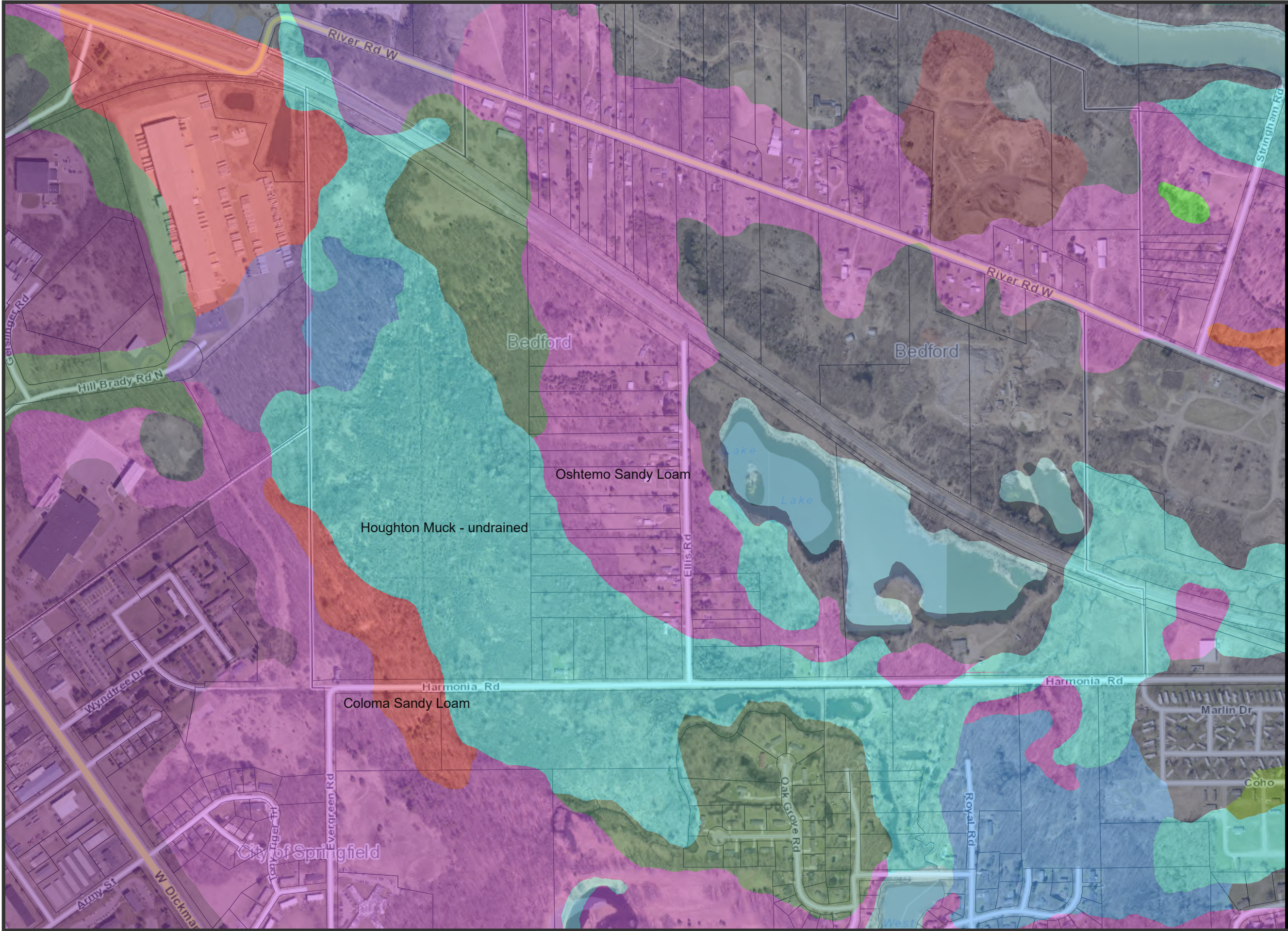
REVISIONS

Date	Comment

SHEET
Appendix A

APPENDIX B

Wetlands and Soils Maps



Calhoun GIS



Map Publication:
02/28/2023 9:03 AM



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FetchGIS

Disclaimer: This map does not represent a survey or legal document and is provided on an "as is" basis. Calhoun County expresses no warranty for the information displayed on this map document.

Map Legend

Change what items you see on the map by using the checkboxes

Wetland Data

- ☒ Wetland (Hydric) Soils
- ☒ National Wetlands Inventory 2005

Potential Wetland Restoration ☐

- ☐ Highest Potential - Hydric and Presettlement

Wetland Overlay

- ☐ High Potential - Hydric Soils Only
- ☐ Moderate Potential - Presettlement Wetlands Only

Part 303 Final Wetlands Inventory ☒

- ☒ Wetlands as identified on NWI and MIRIS maps
- ☐ Soil areas which include wetland soils
- ☐ Wetlands as identified on NWI and MIRIS maps and soil areas which include wetland soils

Stream Data

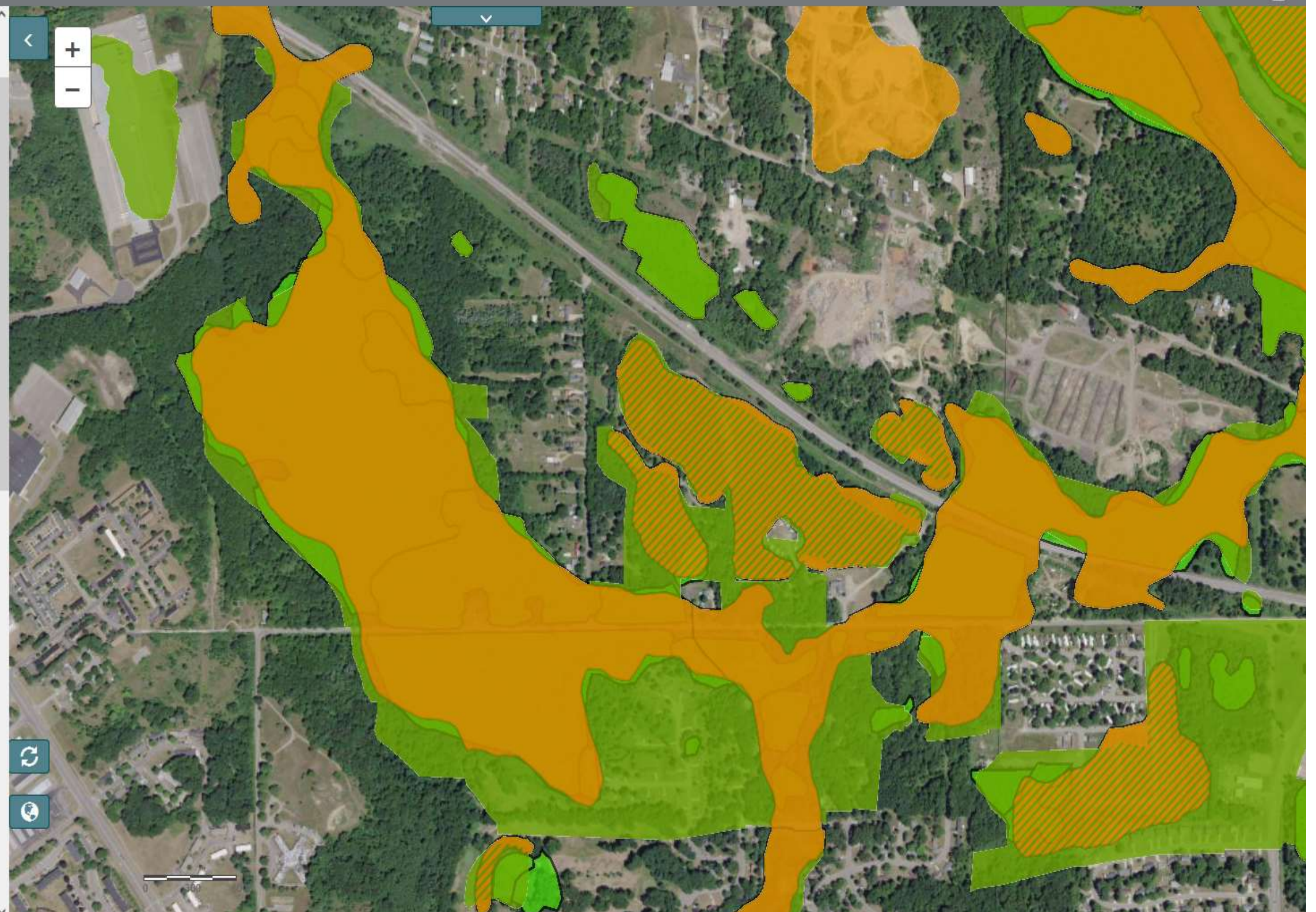
Live Stream Gauges ☒

- ☒ Major Flood
- ☐ Moderate Flood
- ☐ Minor Flood
- ☐ Action Stage
- ☐ Low Flow
- ☐ Unknown
- ☐ No Flooding

Dams ☐

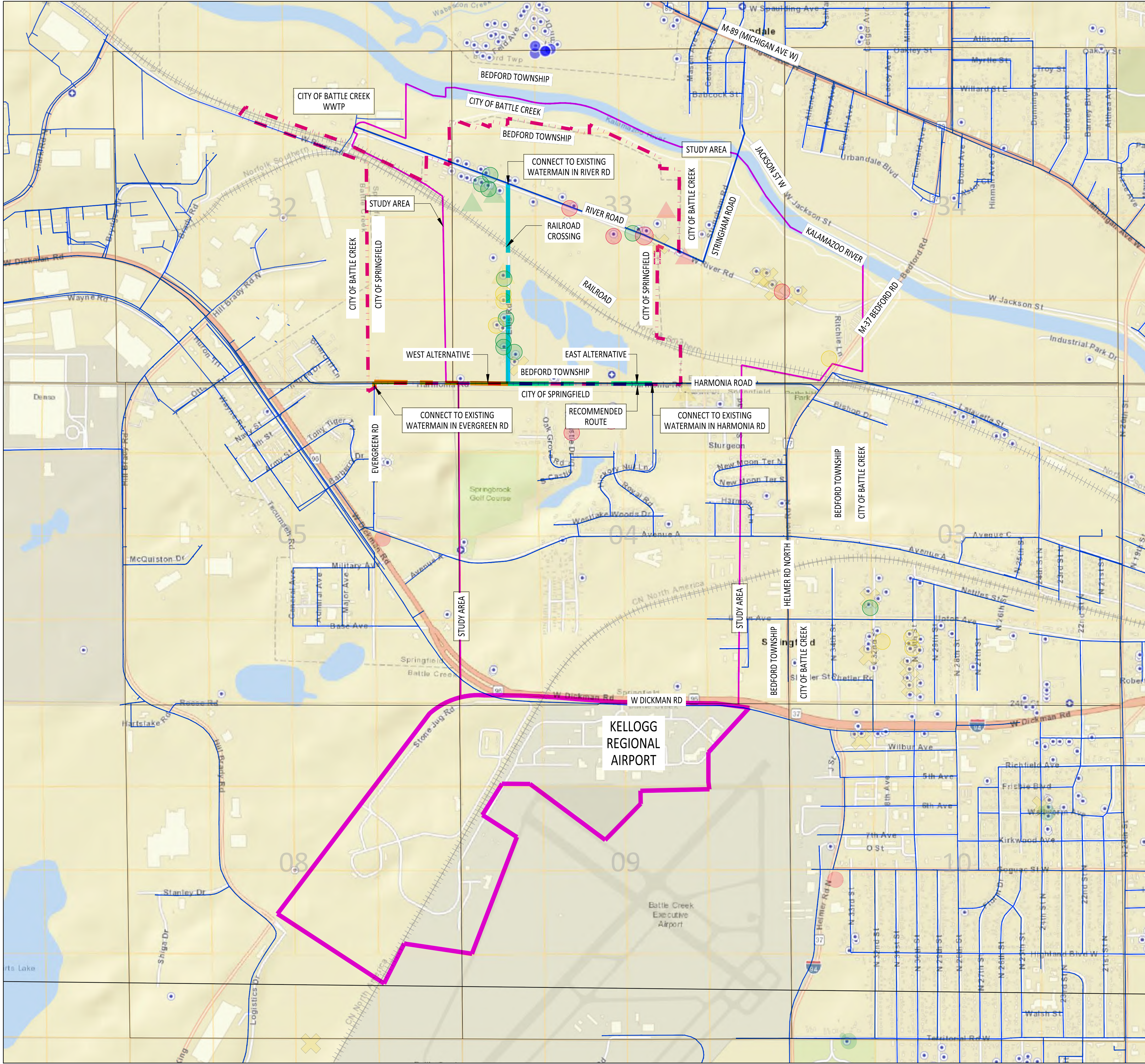
Recreational Prospecting ☐

2010 Trout Streams ☐

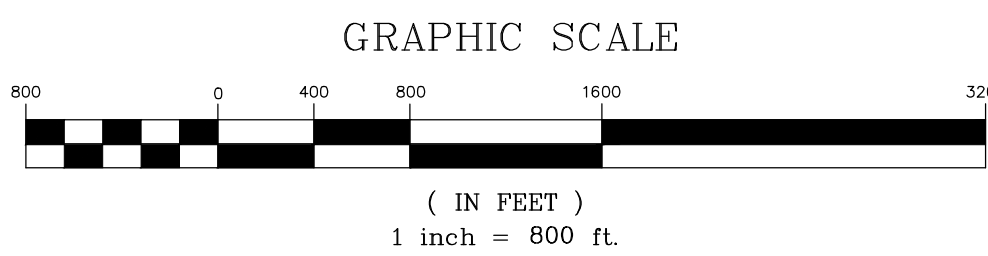


APPENDIX C

Map of Water Withdrawal Points



- EXISTING WATER WELLS
- EXISTING WATER MAINS
- STUDY AREA
- PROPOSED WATERMAIN
- EAST ALTERNATIVE
- WEST ALTERNATIVE



Civil Engineers Inc.
14250 Beadle Lk Rd
Suite 150
Battle Creek, MI
49014-7202
www.cei-bc.com
269-962-5127

JOB NO: 221001

DATE: / /

DRAWN BY: KEH

REVIEWED BY: RAR

OWNER



ELLIS AND HARMONIA WATER CONCEPT

WATER WITHDRAWAL POINTS

Know What's
Below, Call
MISS DIG.



REVISIONS

Date	Comment

SHEET
Appendix C

APPENDIX D

City of Battle Creek Water Quality Report

A tall, blue water tower with a black sunburst logo on top. The words "BATTLE CREEK" are written in black on the tower's upper section. The tower is set against a clear blue sky with some bare trees visible at the bottom.

BATTLE CREEK

Annual Water Quality Report

City of Battle Creek | Reporting year 2021

**PREPARED AND
PRESENTED BY**

City of Battle Creek
PWS ID# 0000450



City of Battle Creek water

Top service continues



For help in another language, please call the Department of Public Works at 269-966-3343. The city will provide interpretation at no cost to the caller.

Por consultas o asistencia en español, por favor comuníquese con el Departamento de Obras Públicas al (269) 966-3343. Se le conseguirá un intérprete de forma gratuita.

အကယ်၍ အခြားဘာသာစကားဖြင့် အကူအညီလိုပါက **Department of Public Works** ဖုန်း (၂၆၉) ၉၆၆ ၃၃၄၃ သို့ ခေါ်ဆိုနိုင်ပါသည်။ စကားပြန်ကို အခမဲ့စီစဉ်ပေးပါမည်။

The City of Battle Creek is pleased to present our annual water quality report, with testing completed between Jan. 1 and Dec. 31, 2021.

We continue to dedicate ourselves to producing drinking water that meets all state and federal standards. We always look for, and use, new methods to deliver the best quality drinking water to you, our customers.

In 2021 we worked on the following projects, helping us meet the needs of our water customers:

- We continued planning and preparation to install two 36-inch water meters at our Verona Pumping Station. They will more accurately measure the water we produce, improve data on water loss, and help us comply with regulations.
- We improved the two water tanks on Eldred Street to better protect the drinking water, give better access control, and improve safety features on the five million and 3.8 million gallon tanks. We also painted and updated corrosion control on the 3.8 million gallon tank.
- We replaced 227 lead water service lines, toward the goal of removing all of those in our system. We coordinate replacements with our street improvement projects.

For more information about this report, or for other questions about your drinking water, within Battle Creek city limits, call Utility Administrator Perry Hart, 269-966-3481.

If you live in the City of Springfield, call 269-965-2354.

If you live in Emmett Township, call 269-968-0241.

Sign up for Water Information System text and/or email notifications at battlecreekmi.gov/notifyme.

Have a water concern after hours, on weekends, or holidays? Call 269-966-3493.

The City Commission invites neighbors to give public comment during regular meetings, typically at 7 p.m. the first and third Tuesdays of each month at City Hall, 10 N. Division St. For agendas and more information, visit battlecreekmi.gov or call 269-966-3311.

Meetings stream live on the city's YouTube channel, on AccessVision cable, and under Live 17 at accessvision.tv.

Perry Hart
City Utility Administrator



IMPORTANT HEALTH INFORMATION



Some people may be more vulnerable to contaminants in drinking water than the general population.

Immunocompromised people, such as those with cancer undergoing chemotherapy, those who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. Environmental Protection Agency and Centers for Disease Control and Prevention guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium*, and other microbial contaminants, are available from the **Safe Drinking Water Hotline** at 800-426-4791 or water.epa.gov/drink/hotline.

Infants and children who drink water containing lead could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities.

Adults who drink this water over many years could develop kidney problems or high blood pressure.

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level, over a relatively short amount of time, could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level, over many years, could suffer liver or kidney damage.

People with Wilson's Disease should consult their personal doctor.

Treating our water

The treatment process of our drinking water has a series of steps at our Verona facility on Brigden Drive.

First, we draw water from the groundwater aquifer, and send it to our Radon, Iron, and Manganese removal plant (we call this the RIM Plant). Once there, we add air through an aeration process that removes radon and oxidizes iron and manganese. These two processes help remove iron and manganese later in the treatment process. Aeration (adding air to the water) also makes the iron and manganese form larger particles, which are easier to remove.

Next, we filter the water to remove the iron and manganese through dual-media, rapid sand filters. After filtration, we add a small amount of phosphate product, to keep the water from corroding our system's pipes and plumbing, which benefits lead and copper control.

Next, we send the water to an underground reservoir. Finally, we add low doses of fluoride (for dental health) and chlorine (to disinfect), and we pump the water to our water towers, and into your homes and businesses.

Meet the team

Meet Kim Walden and Tara Reniger! You are likely to speak to them when you call the water team at 269-966-3506 with your needs and questions. They can take your call 7:30 a.m.-4 p.m. Monday through Friday.



Where does my water come from?

The City of Battle Creek uses groundwater from the **Marshall Sandstone Aquifer**, drawn from the **Verona Well Field** in the northeast section of the city. This is our sole source of drinking water.

We constructed wells in the sandstone formation to collect the water stored there.



What is groundwater?

Groundwater is water beneath the surface of the earth that fills openings, known as pore spaces, in sand, gravel, or fractured rock. Groundwater begins as precipitation from snow or rain, which passes through the soil and accumulates in the pore spaces.

What is an aquifer?

When enough water accumulates to supply a well, it is considered an aquifer. The City of Battle Creek gets its water from a bedrock aquifer. We pump the water from 22 wells, with depths ranging from 100-150 feet.

A well house in the Verona Well Field, on the site of our Verona water production facility, on Brigden Drive in Battle Creek.

Substances that could be in the water

To make sure tap water is safe to drink, the U.S. Environmental Protection Agency prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. One can reasonably expect drinking water, including bottled water, to contain at least small amounts of contaminants. The presence of these contaminants does not necessarily indicate the water poses a health risk.

The sources of drinking water - both tap and bottled - include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land, or through the ground, it dissolves naturally occurring minerals - in some cases, radioactive material - and substances from animals, or human activity.

Substances that may be in source water include: **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment

plants, septic systems, agricultural livestock operations, or wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally occurring, or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides/herbicides, which may come from a variety of sources, such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic compounds, which are by-products of industrial processes and petroleum production, and may also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring, or may be the result of oil and gas production, and mining activities.

For more information about contaminants, and potential health effects, call the **U.S. EPA's Safe Drinking Water Hotline**: 800-426-4791.

Check out our historic display valves

Sometimes it is hard to imagine what our water infrastructure looks like, because the maze of pipes, valves, service lines, and fire hydrants exist mostly underground. But after a 2018 project to improve the water transmission mains at our Verona Pumping Station, we have two huge water valves on display for you to see and appreciate with us.

One sits at our Department of Public Works, 150 S. Kendall St. It is a 30-inch Eddy valve with a casting date of 1957. The Eddy Valve Co. was in Waterford, New York.

A smaller valve on the left side of the main valve casing is a bypass valve that allows pressure to equalize on both sides. Without this, the pressure on one side of the closed valve could be so great that it is difficult to open the valve, and can cause damage to it.

A large gear box on top of the valve made it possible to operate the valve by hand. Opening or closing this valve would take more than 150 turns of the operating nut.

The second valve sits at the Verona Pumping Station, 250 Brigden Drive. This one is a 30-inch Darling valve, also cast in 1957. The Darling Valve Co. was in Williamsport, Pennsylvania.

We could operate this valve mechanically with a horizontal or vertical valve wrench. It was installed in a vault, we used an electric actuator (a machine part that creates movement) to operate the valve.

The city installed both of these in the late 1950s, along with the original pumping station. Recently, the valves were no longer operable, and we installed new transmission lines in 2018, as part of a larger project improving operations and saving energy.

Special thanks to our Water and Waste Water teams, Andrew Matthews and Ben Blaniar for painting the city logo, Steve Skowron for fabrication work, J&H Engineering for design help, EJ for the manhole covers, and Davis Construction for helping sandblast and paint the valves.

Source water assessment

The state assessed our Columbia and Verona well field source water in 2003 to determine their relative potential for contamination. The susceptibility rating is on a seven-tier scale, from very low to very high, based primarily on geologic sensitivity, water chemistry, and contaminant sources.

The susceptibility rating for Verona is high, and the rating for Columbia is moderately high. It is important to understand these ratings do not imply poor water quality, only the systems' potential to become contaminated in the assessment areas.

There are remedies in place for known contamination sources for Verona, to prevent municipal well contamination. The City of Battle Creek has not used the Columbia Well Field since 2003.

To further protect our drinking water sources, we developed a wellhead protection plan for both well fields. For more information, see battlecreekmi.gov/publicworks and click Environmental Services, or call Utility Administrator Perry Hart at 269-966-3481.



Verona improvements win award

We were thrilled to celebrate in 2021, winning the American Public Works Association Project of the Year Award for an environmental project less than \$1 million: our Verona Pumping Station improvements.

One of our six pumps that send drinking water out into the community was not operating. All six were single-speed pumps, which was wasting energy during peak energy demand times of day. We decided to replace the inoperable sixth pump with a larger, variable-speed pump, and let the single-speed pumps work overnight, when energy costs are lower. We calculated a savings of up to \$60,000 with these improvements.

We also needed to fix the "Verona Triangle," a mess of inefficient and redundant piping and valves in the transmission mains leaving the Verona Pumping Station. The mess was caused over decades of system repairs and adjustments that connected old and new pipes, to lessen service interruptions. We decided to simplify and realign the pipes in the field, to make this system run smoother, and allow our team to operate it better. We were able to remove 275 feet of unnecessary piping!

We completed the project in July 2020, at a cost of \$866,237.



Winning the 2021 APWA Award, from left: APWA MI Chapter President Duane Poole; city Utility Administrator Perry Hart; city Engineering Administrator Kurt Tribbett; Bret Eckhart of contractor L.D. Docsa Associates; Aaron Davenport, Senior Vice President, Kalamazoo Office Director of Jones & Henry Engineering

Water testing results (table next page)

We monitor our water for many different substances, on a strict sampling schedule. The water we deliver also must meet specific health standards.

The table on the next page shows those substances we detected in our water. You can request a complete list of our analytical results by calling 269-966-3481.

Remember that detecting a substance does **not** mean the water is unsafe to drink; our goal is to keep all detects below their respective maximum allowed levels.

The state recommends monitoring for certain substances less often than once per year, because the concentrations of those substances do not change frequently. In these cases, we show the most recent sample data, along with the year we collected it.



Regulated substances															
				City of Battle Creek			Emmett Township			City of Springfield					
Substance (Unit of Measure)	Year sampled	MCL [MRDL]	MCGL [MRDLG]	Amount detected	Range: low-high	Violation	Amount detected	Range: low-high	Violation	Amount detected	Range: low-high	Violation	Typical source		
Chlorine (ppm)	2021	[4]	[4]	0.81	.20 - 1.38	No	0.78	.37 - 1.32	No	0.65	.20 - 1.21	No	Water additive used to control microbes		
Fluoride (ppm)	2021	4	4	0.73	.51 - .94	No	0.7	.54 - .86	No	0.69	.55 - .83	No	Erosion of natural deposits; water additive to promote strong teeth; discharge from fertilizer and aluminum factories		
TTHMs (ppb)	2021	80	0	Highest LRAA 41.6	28.3 - 67.0	No	61.8	NA	No	28.1	NA	No	By-product of drinking water chlorination		
HAA5 (ppb)	2021	60	0	Highest LRAA 9.8	7.0 - 15	No	12	NA	No	1	NA	No	By-product of drinking water chlorination		
Total Coliform Bacteria (% positive samples)	2021	5%	0	0	NA	No	0	NA	No	0	NA	No	Naturally present in the environment		
Tap water samples were collected for lead and copper analyses from sample sites throughout Battle Creek, Emmett, and Springfield															
Substance (Unit of Measure)	Year sampled	AL	MCGL [MRDLG]	90% Percentile Value	Range: low-high	Sites above AL/Total sites	Violation	90% Percentile Value	Range: low-high	Sites above AL/Total sites	Violation	90% Percentile Value	Range: low-high	Sites above AL/Total sites	Typical source
Lead (ppb)	2021	15	0	3	0-6	0/30	No	1	0-1	0/10	No	1	0-2	0/20	Corrosion of household plumbing systems; erosion of natural deposits
Copper (ppm)	2021	1.3	1.3	0.6	0.0-1.0	0/30	No	0.7	0.0-1.0	0/10	No	0.5	0.0-0.7	0/20	Corrosion of household plumbing systems; erosion of natural deposits
Secondary Substances (City of Battle Creek)									Additional secondary substances						
Substance (Unit of Measure)	Year sampled	AL	MCGL [MRDLG]	Amount detected	Range: low-high	Violation	Typical source	Substance (all ppt)	Date sampled	AL	Amount detected	MCGL [MRDLG]	Typical source		
Sodium (ppm)	2021	NA	NA	22	17-22	No	Naturally present in the environment; road salting; septic systems	HFPO-DA	2021	370	Non-detect <2.0	0	Per- and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that include perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). PFAS have been used globally during the last century in manufacturing, firefighting, and thousands of common household and other consumer products. These chemicals are persistent in the environment and in the human body – meaning they don't break down – and they can accumulate over time. In recent years, experts have become increasingly concerned by the potential effects of high concentrations of PFAS on human health.		
Sulfate (ppm)	2021	NA	NA	57	48-67	No	Runoff/leaching from natural deposits; industrial wastes	PFBS	2021	420	Non Detect <2.0	0			
Chloride (ppm)	2021	NA	NA	59	50-65	No	Runoff/leaching from natural deposits	PFHxA	2021	400000	Non-detect <2.0	0			
Gross Alpha (pCi/L)	2021	15	NA	1.2	.5-1.9	No	Erosion of natural deposits.	PFHxS	2021	51	Non Detect <2.0	0			
Gross Beta (pCi/L)	2015	50	NA	4.4	5.3 - 2.0	No	Decay of natural and man-made deposits	PFNA	2015	6	Non-detect <2.0	0			
Radium-226 (pCi/L)	2021	NA	NA	0.6	.4-.8	No	Erosion of natural deposits.	PFOA	2021	8	Non Detect <2.0	0	The Safe Drinking Water Act defines PFAS as per- and polyfluoroalkyl substances.		
Radium-228 (pCi/L)	2021	NA	NA	1.1	4-1.8	No	Erosion of natural deposits.	PFOS	2021	16	Non-detect <2.0	0			
Combined Radium (pCi/L)	2021	5	NA	1.7	1.0-2.4	No	Erosion of natural deposits.	Information on PFAS is available on the State of Michigan website at michigan.gov/pfasresponse/drinking-water/statewide-survey							

Combined Radium is a summary of Radium-226 and Radium-228.

DEFINITIONS

- **90th %ile:** The levels reported for lead and copper represent the 90th percentile of the total number of sites tested. It is equal to or greater than 90% of our lead and copper detections.
- **AL: Action Level.** The concentration of a contaminant that, if exceeded, triggers treatment, or other requirements a water system must follow.
- **HAA5:** Haloacetic Acids
- **LRAA:** Locational Running Annual Average
- **MCL: Maximum Contaminant Level.** The highest level of a contaminant allowed in drinking water. They are set as close as possible to MCLGs, using the best available treatment technology.
- **MCLG: Maximum Contaminant Level Goal.** The level of a contaminant in drinking water below which there is no known or expected health risk. They allow for a margin of safety.
- **MRDL: Maximum Residual Disinfectant Level.** The highest level of a disinfectant allowed in drinking water. Convincing evidence shows adding a disinfectant is necessary to control microbial contaminants.
- **MRDLG: Maximum Residual Disinfectant Level Goal.** The level of a drinking water disinfectant below which there is no known or expected health risk. MRDLGs do not reflect the benefits of using disinfectants to control microbial contaminants.
- **NA:** Not applicable
- **pCi/L: Picocuries per liter.** A measure of radioactivity.
- **ppb: Parts per billion.** One part substance per billion parts water (or micrograms per liter).
- **ppm: Parts per million.** One part substance per million parts water (or milligrams per liter).
- **SMCL: Secondary Maximum Contaminant Level.** Standards developed to protect aesthetic qualities of drinking water, which are not health-based.
- **TTHMs:** Total trihalomethanes

Lead in home plumbing

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

We are responsible for providing high quality drinking water, but we cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to two minutes before using water for drinking or cooking.

If you have a service line that is lead, galvanized, previously connected to lead, or unknown but likely to be lead, we recommend that you run your water for at least five minutes to flush water from both your home plumbing and the lead service line.

If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the **Safe Drinking Water Hotline** at 800-426-4791, or on the **U.S. EPA's website**, water.epa.gov/drink/info/lead.

Water system by the numbers

City of Battle Creek

19,531 total water services
4,305 known lead services
14,765 services of unknown material - unlikely to contain lead
461 services of unknown material

City of Springfield

1,734 total water services
2 known lead services
7 services of known material - no lead
73 services of unknown material - unlikely to contain lead
1,652 services of unknown material

Emmett Township

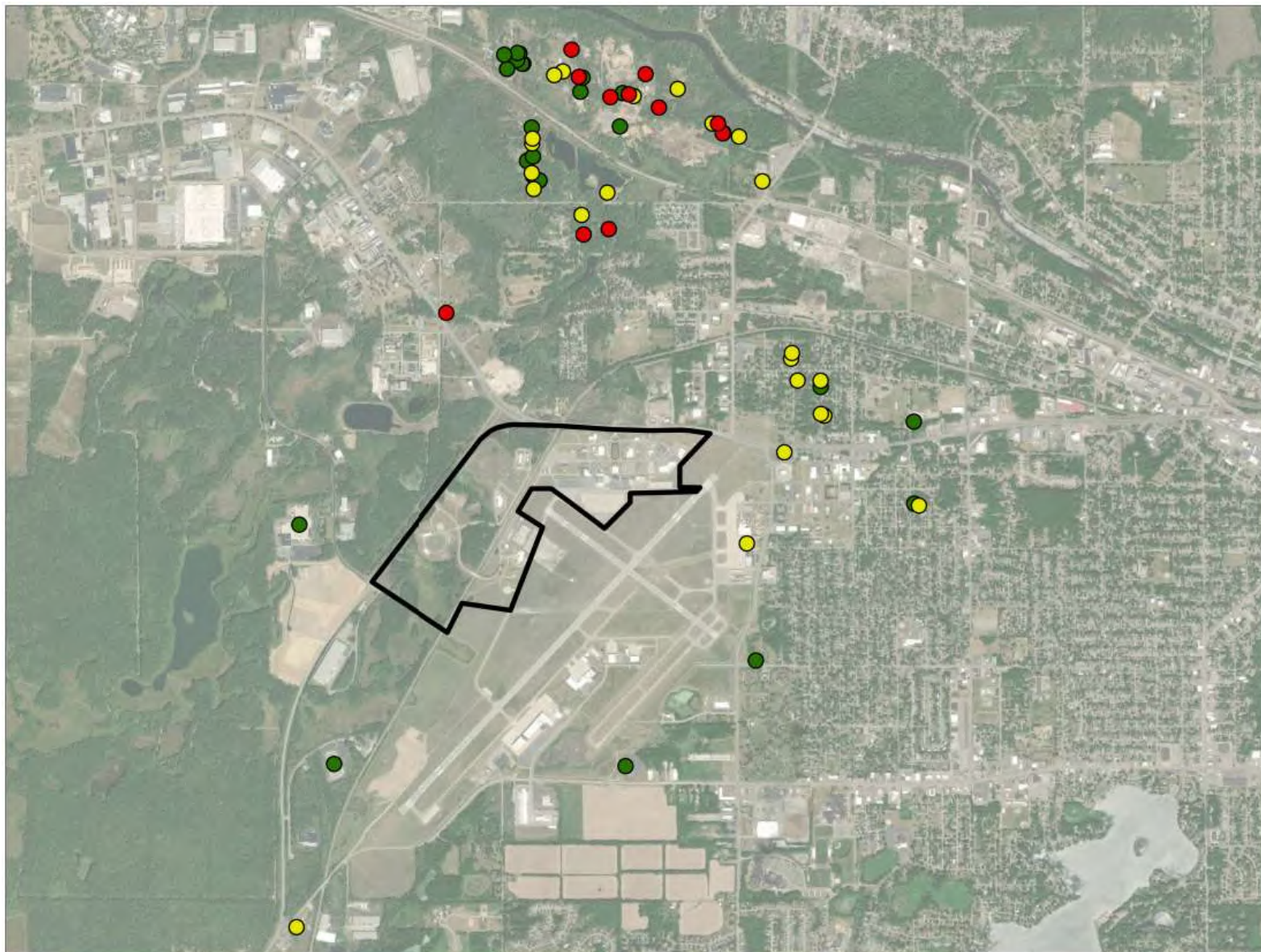
929 total water services
2 known lead services
322 services of known material - no lead
605 services of unknown material - unlikely to contain lead



City of Battle Creek
Department of Public Works - Water
150 S. Kendall St.
Battle Creek, MI 49037

APPENDIX E

MDHHS and EGLE Well Sampling Maps and Test Results



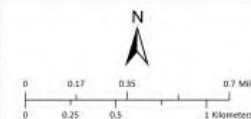
Battle Creek ANG Base
Drinking water well results for 2022
MDHHS PFAS sampling.

— Draft — 9/9/2022

2022 Sampling Status

- Exceedance
- Detection
- Not Detected

▭ Battle Creek ANG Base



Current_Past_Status	(All)		
Current_ResultCategory	(All)	ND = Not Detected	Last Updated: 10/17/2022
DatedAdded_SiteSummary	(All)	D = Detections Below Comparison Values	
Current_Past_Round	(All)	E = Detections Above Comparison Values	

Blank Cell = Analyte not tested for this sample

[illegible]

[illegible]

APPENDIX F

Map of Alternatives



Calhoun GIS
Ellis & Harmonia Water



Map Publication:
03/02/2023 10:53 AM



powered by
FetchGIS

Disclaimer: This map does not represent a survey or legal document and is provided on an "as is" basis. Calhoun County expresses no warranty for the information displayed on this map document.

APPENDIX G

Public Hearing Advertisement and Affidavit of Publication

APPENDIX H

Public Hearing Notes and Copy of Presentation

APPENDIX I

Public Hearing Attendance Sheet

APPENDIX J

Written Comments Received During Public Comment Period and
Responses

APPENDIX K

Social and Environmental Impacts

APPENDIX L

Township Resolution Adopting Project Plan