Village of Howard City

Montcalm County, Michigan

DRAFT

Drinking Water State Revolving Fund (DWSRF) Project Planning Document

April 2025
870660

FLEIS&VANDENBRINK
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Introduction

This Project Planning Document was prepared for the Village of Howard City by Fleis & VandenBrink Engineering to evaluate and address the needs and deficiencies of the drinking water system.

The purpose of the Village of Howard City Drinking Water State Revolving Fund (DWSRF) Project Planning Document is to fulfill the project planning requirements under Michigan's Safe Drinking Water Act 399 and provide the basis for ranking of the Village's proposed drinking water improvements on the annual Project Priority List for obtaining a low-interest loan from the Drinking Water State Revolving Fund (DWSRF).

The format of this report follows the DWSRF Project Planning Document Guidance revised in January 2023, issued by the Michigan Department of Environment, Great Lakes & Energy (EGLE). Major elements of the Project Planning Document include a summary of the project study area and characteristics, a projection of the population served within the next 20 years, a summary of the existing water system, identification of the project needs, identifying and evaluating alternatives, and to evaluate the environmental impacts of the selected alternative.

Although the Village has been proactive in the maintenance and improvement of its water system, there are several concerns and needs of the system, including age, reliability, capacity, and quality. To continue to provide high-quality, dependable, and safe drinking water to its customers, the Village needs to continue maintaining and improving the system by making improvements that will result in energy and water savings while increasing system reliability, integrity, and quality. The costs of the needed water system improvements can be offset through financial assistance from the DWSRF. The Village has also submitted for the Clean Water State Revolving Fund. The project areas of these two programs overlap, giving the Village the opportunity to reduce costs and mitigate impact to users.

The Village's 2020 Water Reliability Study (WRS) recommended the replacement of undersized and aging water main within the Village. It also recommended the looping of dead ends at several locations within the system. Due to the number of areas still serviced by 4-inch or smaller diameter pipe, it is desired to replace and upsize these mains as one complete project versus multiple smaller projects completed over many years to address the reliability and quality issues of the system.

Based on the feasibility and evaluations presented in this Project Planning Document, the selected alternative includes the upsizing of 24,502 feet of water main 4-inch and smaller to a minimum 8-inch water main, replacement of 1,100 feet of undersized 6-inch watermain to 12-inch, replacement of 1,308 feet of aged 8-inch watermain with 8-inch, and the addition of 8-inch water main to loop nine sections and eliminate dead ends. Implementing the recommended improvements of this Project Planning Document will effectively address the water system reliability, quality, and safety concerns.

A copy of this draft Project Planning Document will be placed on public display at the Village of Howard City Village Hall for at least 10 days prior to the Village Council meeting on April 21, 2025, at 7:00 p.m. A summary of the public participation and comments solicited by the Village during the public hearing regarding the Project Planning Document and selected alternative will be included in the Public Participation section and documents will be attached in Appendix E.

1. Project Background

The Village of Howard City is approximately 2.45 square miles and is located in Montcalm County northeast of the City of Grand Rapids.

A. Study and Service Area

The study area for this project is defined by the service area for the Village of Howard City. The service area is defined by the village limits and no new service areas are anticipated. Approximately three customers are also located outside the Village along Lake Montcalm Road. The Village water system and Village boundary are shown in Figure A1 and Figure A2, respectively, of Appendix A.

Land Use and Development Trends

According to the 2022 Master Plan for the Village of Howard City, the primary land use is residential. Commercial development is primarily concentrated along Shaw Street and Ensley Street. Industrial development is located primarily on the South end of the Village. Residential development is disbursed throughout the Township alongside agricultural, vacant, and public land.

The Village of Howard City has some developable vacant land. Additional development is also anticipated to occur through the redevelopment of existing sites. The predicted land use in the study area over the 20-year planning period is anticipated to remain primarily as it currently exists, with the possible development of the few remaining vacant areas within the Village.

Any development, or redevelopment in the Village will not be detrimental to air and water quality, nor will they impact environmentally sensitive areas.

B. Population

The Village of Howard City provides water to the residents of the Village of Howard City. As of the 2020 Census, the study area, and service area, population was estimated to be 1,835 people. Census data and projections for the entire Village and the service area are discussed below.

Population Projections

Table 1 summarizes the current and projected populations for the Village of Howard City. Historical population data indicates a slight increase in population since 1960. The State of Michigan, Bureau of Labor Market Information and Strategic Initiatives projects a slight population increase for Montcalm County over the next 20 years. It is assumed that the population trend for the Village of Howard City will be similar to that of Montcalm County. For water system purposes, it is assumed that the 2045 population will grow at the same rate as Montcalm County.

Table 1. Population Information, Village of Howard City

	1960	1970	1980	1990	2000	2010	2020	2045
Village of Howard City	1,004	1,006	1,118	1,351	1,585	1,808	1,835	1,929
Annual % Change	-	0.5%	0.5%	1.9%	1.6%	1.3%	0.2%	0.2%
Montcalm County	35,795	39,660	47,555	53,059	61,226	63,342	64,457	70,778
Annual % Change	-	1.0%	1.8%	1.1%	1.4%	0.3%	0.5%	0.2%

C. Existing Environment Evaluation

Cultural and Historical Resources

A search of the Michigan State Housing Development Authority Historic Sites Online website indicated no State listed historic sites in the Village of Howard City. There are three Federal listings on the National Register of Historic Places and there are eight identified historic sites in the surrounding area.

- Greenville Downtown Historic District – Greenville, MI
- Winter Inn – Greenville, MI

- Giles Gilbert House – Stanton, MI
- Charles J. Church-Frank S. Gibson House – Greenville, MI
- Clifford Lake Hotel – Stanton, MI
- Cowden Lake Church of Christ – Coral, MI
- Ambrose J. Ecker House – Greenville, MI
- Charles H. Gibson House – Greenville, MI
- Greenville Informational Designation – Greenville, MI
- Littler Denmark Evangelical Lutheran Church – Gowen, MI
- Saint Paul's Episcopal Church – Greenville, MI

A letter requesting review with respect to impacts to known historical and archeological sites has not been sent to the State Historic Preservation Office (SHPO) because it is anticipated that this project will not be an equivalency project. However, it is not expected that the proposed improvements will impact these resources as construction will be confined within the Village's existing water system.

Air Quality

According to the EPA AirData from Grand Rapids-Wyoming, MI (the closest monitored location to the Village of Howard City), the Air Quality Index (AQI) was recorded for 365 days in 2023. The AQI was considered "good" or "moderate" for 352 of the measured days, indicating overall good air quality. The EPA website does indicate that air pollution levels measured at a particular monitoring site are not necessarily representative of the entire country or urban areas. However, given that no other records are available for Howard City and the close proximity of the City to Grand Rapids, it is reasonable to expect that Howard City has similar air quality. For any proposed project, air quality impacts due to construction dust and emissions in the area would be temporary.

Wetlands

A wetland map for the Village of Howard City was generated from the USFWS National Wetlands Inventory website. The map is included in Appendix A as Figure A3. The map indicates areas of freshwater forested/shrub wetland and freshwater emergent wetland, primarily located in the northern portion of the Village near Tamarack Creek.

It is not anticipated that this project will have any long-term impacts on area wetlands. The wetlands adjacent to the proposed project sites will not be affected during the construction of the improvements.

A request for review of any potential impacts to land-water interfaces has not been sent to EGLE because it is anticipated that this project is not an equivalency project.

The proper permits will be acquired prior to construction.

Great Lakes Shorelands, Coastal Zones, and Coastal Management Areas

The Village is not located along Great Lakes Shorelands or Coastal Management Areas, therefore impacts to these resources are not expected for the proposed project.

Floodplains

The Village of Howard City has areas located within the 100-year floodplain. The online FEMA Floodplain Map Viewer was used and the floodplain determination for this area has not yet been completed. The map is included in Figure A4 of Appendix A. Appropriate permits, if necessary, will be acquired prior to construction.

Natural or Wild and Scenic Rivers

The Wild and Scenic Rivers Act, as amended by the Michigan Scenic Rivers Act of 1991, prohibits federal assistance to a project which will have a direct and adverse effect on the values for which a river segment listed in the National Wild and Scenic Rivers System or designated for study on the National Rivers Inventory was established.

Rivers located within the Village of Howard City are not listed on the National Wild and Scenic Rivers System website, administered by the National Park System, or on the Michigan Natural Rivers System found on the

Michigan Department of Natural Resources website.

Major Surface Waters

The most noticeable natural feature in the Village of Howard City is the Tamarack Creek. The Tamarack Creek headwaters are near Lakeview, MI. The creek flows from east to west, flowing through the Village of Howard City, and then connecting to the Little Muskegon River in Newaygo County.

The proposed project is expected to take place throughout the Village. There may be some construction near the bank of the Tamarack Creek. In that case, proper erosion and sedimentation control measures will be put in place and inspected to ensure the protection of the surface water quality and natural habitats. Any permits required would be obtained prior to construction.

Topography and Geology

Figure A5 shows the existing topography from the USGS quadrangle map. The elevations around the Village vary around 900 feet.

The regional geology for the area is based on a review of the Quaternary Geology of Michigan Map (W.R. Farrand, 1982), see Figure A6; and the Bedrock Geology of Michigan Map (MDNR Geological Survey Division, 1987), see Figure A7.

The general geology of Montcalm County is characterized by end moraines of coarse-textured till and course-textured glacial till which overlie the red beds and the Grand River Formation.

Soil Types

Figure A8 is the USDA National Resources Conservation Service soil map for the Village of Howard City. Soil located within the Village mainly consists of Croswell and Melita loamy sands, Onekama loam, Saginaw Lobe, and Plainfield-Spinks sands.

Agricultural Resources

Figure A9 shows the Farmland Classification soil types within the Village of Howard City. Because the improvements are limited to the existing distribution system, the proposed project in the principal alternative is not anticipated to have impacts on agricultural resources.

Fauna and Flora

A USFWS Section 7 review was not completed for this project because it is anticipated that this project is not an equivalency project.

According to the USFWS Official Species List, there are two federally listed endangered species, one threatened species and one proposed threatened species. The endangered species in the area include the Indiana Bat and Karner Blue Butterfly. The threatened species in the area is the Eastern Massasauga Rattlesnake. The proposed threatened species in the area is the Monarch Butterfly.

Because the proposed work is limited to the existing distribution system, it was determined that no impacts on federally listed endangered, threatened, or proposed threatened species are anticipated.

D. Existing Facilities

The Village of Howard City owns and operates a Type 1 public water supply and distribution system with approximately 80,000 feet of distribution main. The following section provides an overview of the existing water system, including the size, capacity, and condition of the various components. In 2020, the Village had a Water Reliability Study (WRS) prepared by Fleis & VandenBrink Engineering and a Drinking Water Asset Management Report in 2025 prepared by Fleis & VandenBrink Engineering. The information in the following section was primarily obtained from these two sources. The reports are attached as appendices in the following order: the 2020 WRS as Appendix B and the 2025 Drinking Water Asset Management Report as Appendix C.

Supply

The Village of Howard City water system consists of two wells (Well No. 3 and 5). Well No. 3 is considered a standby well due to the higher concentrations of iron and hardness. Well No. 3 is exercised routinely and is located in the center of the Village south of Emory St. within the ballpark, as shown in Figure A1. Well No. 5 is located in the northern part of the Village on Orton Rd. 500 feet south of Legion St. Table 2 summarizes selected data of each well and pump. The firm well capacity of the wells (Well No. 5 out of service) is 450 gpm.

Table 2. Well Summary

Well Number	Year Drilled	Diameter (inch)	Depth (feet)	Rated Capacity @ TDH	Current Capacity @ TDH
3	1986	12	170	450 gpm / 240 ft	450 gpm / 240 ft
5	2001	12	170	625 gpm / 216 ft	550 gpm / 245 ft

Treatment

The Village regularly tests the water quality of its wells per EGLE requirements, federal and state laws, and sampling directives. Testing is performed monthly for bacteria, yearly for partial chemical, and every 3 years for metals analysis. The most recent series of water quality tests reported that all contaminant levels were below the EGLE action levels.

The yearly water quality tests report that there are no significant sources of contamination in the Village's water supply. All contaminant levels are below the state requirements.

Howard City currently disinfects the water supplied from the wells with 12.5% sodium hypochlorite injected in well houses. Well No. 3 is used for standby purposes only due to its high hardness level (last reported 258). Hardness above 250 mg/l is rated objectionable by EGLE.

The Village tests for lead and copper on a triennial basis. Lead/copper levels met the EGLE action levels in the most recent testing in 2024. The Village is in compliance, with the next round of testing due in the fall of 2027.

Water Storage

The Village of Howard City's water storage is provided by a 300,000-gallon single-pedestal elevated spheroid water tank located at 625 Cedar Street as shown in Figure A1. The water tank was constructed in 1998. The tank is 125 feet tall with a head range of 30 feet. The Village owns the tank and the property at the tank. The exterior and wet/dry interior of the tank were painted in 2015. The tank was last inspected in 2024 by Utility Service Group. Utility reported that the tank is in good structural condition and the coatings are in good condition.

Water Distribution

The majority of the system was originally installed in 1939, with service area expansion and upgrades over the years. The most recent improvements were in 2019. The distribution system consists of approximately 80,000 feet of water main ranging from 3/4-inch to 12-inch diameter. According to data from the 2025 Drinking Water Asset Management Report, the Village of Howard City's distribution system consists of cast iron (54%), ductile iron (43%), and PVC (3%). Table 3 provides a breakdown of the water distribution system's watermain inventory by size. The 2025 Drinking Water Asset Management Report, attached as Appendix C, includes a water asset inventory with a complete list of distribution pipe lengths, materials, and ages. An inventory of the distribution system showing the approximate percentages each water main size accounts for in the system is below in Table 3.

Table 3. Water Main Inventory	
Watermain Size (inches)	**Percent of Total (%)**
0.75	0.6
1	2.9
1.5	0.3
2	9.1
4	22.8
6	14.9
8	30
12	19.4

Within the system service lines, 46% is estimated to be composed of copper or plastic, and 54% is galvanized.

The 2025 Drinking Water Asset Management Report identified capital improvement projects to complete within the next 20 years. Replacement of the undersized water main dating is recommended. Water main looping and galvanized service line replacement are also recommended as part of the water main replacement project. The report is attached as Appendix C.

Water Meters

Water meter reading and billing is completed by Village employees. There are approximately 650 meters in use through the system.

Operation and Maintenance

A quarter of the mainline valves are exercised when flushing occurs, however, older valves are not turned due to concerns for breakage or leaking unless critical for flushing. The hydrants are flushed two to three times per year and exercised periodically. Hydrants are repaired as needed based on problems found during hydrant flushing.

The Village stocks spare parts for the major items in the system including ductile iron pipe and repair clamps for each size watermain.

Design Capacity

The firm capacity of a water system is defined as the capacity delivered with the largest supply (pumping) component out of service. Currently, the firm capacity of the Village's water supply is 450 gpm and the 2019 maximum day demand was 242 gpm. The Village's current firm capacity is sufficient for the current demands of the system.

As of the 2020 Water Reliability Study for the Village of Howard City, the Village's system, comprised of over 30% of 4 inches or smaller distribution main, has low residual pressure and low fire flow areas within the system. The pressures range from 30 psi to 55 psi, with some areas having available fire flows that are less than the suggested 1,000 gpm due to undersized distribution main or dead-end mains.

Climate Resiliency

Climate Change in Michigan will lead to more intense storm events and heat. Extreme heat can lead to increased water demands. The 2020 WRS indicated that the system has insufficient capacity to meet projected demands over the next 20 years. Increased intensity of storms could lead to power outages. The Village of Howard City's distribution system is operated from the elevated storage tank and does not have assets that require electrical power to operate.

E. Need for the Project

The needs of the existing water system presented in this project plan are summarized as follows:

- Distribution Mains – Replacement, upsizing, and looping to meet minimum capacity and reliability
- Lead Service Line replacement – Replace galvanized service lines connected to a lead gooseneck as needed to maintain compliance

Water Main Replacement

The 2020 WRS indicated that several locations throughout the Village had fire flows less than the suggested 1,000 gpm due to the undersized water mains. It was recommended that any 4-inch or smaller water main be replaced, as well as old and deteriorating water main. The Village should implement the recommendations and replace the undersized water main through the system, which accounts for about 33.7% of the system's water main. The existing undersized water main should be upsized to meet minimum capacity. The 8-inch water main that runs down Ensley Street from Walnut Street to Washburn Street was also recommended to be replaced due to its old age and criticality. The replacement of the water main will improve quality, capacity, reliability and overall system performance. Additional benefits will include reductions in operations and maintenance expenditures and potential health hazards associated with water main breaks.

The Village also has galvanized service lines that need to be replaced to maintain water quality and to comply with EGLE requirements.

Water Main Looping

The 2020 WRS also indicated that several hydrants in the Village did not receive the recommended fire flows due to restricted flow caused by dead end mains. The recommendations of the WRS were to implement looping at eight locations within the Village. The looping of currently dead-end water mains will bring reliability and integrity to the water distribution system.

Compliance with Drinking Water Standards

The Village of Howard City regularly tests the water quality in accordance with EGLE requirements. Bacteriological testing is performed monthly, partial chemical testing is performed annually, and metals testing is performed triennially. The water quality tests reviewed reported that the water met the State drinking water standards. The Village of Howard City 2023 Water Quality Report results are shown below in Table 4.

Table 4. Howard City Treatment Water Quality Data

	Maximum Contaminant Level	Maximum Contaminant Level Goal	Highest Level Detected	Violation (Yes / No)
Barium (ppm)	2	2	0.5	No
Fluoride (ppm)	4	4	0.42	No
Sodium (ppm)	n/a	n/a	25.2	No
Chlorine (ppm)	4	4	0.57	No
Total Coliform	TT	0	0	No
Lead (ppb)	15	0	0	No
Copper (ppm)	1.3	1.3	0.2	No

The Village of Howard City's water treatment and distribution system is currently meeting the requirements of Act 399. The Village of Howard City does not have any acute or non-acute Violations for MCL, nor have there been any waterborne disease outbreaks. The 2020 WRS did not identify any deficiencies within the system in need of correction to maintain compliance with Act 399.

Orders or Enforcements

The Village of Howard City has not received any court or enforcement orders, including written enforcement actions such as a Notice of Violation, Agreement, or Department Order to correct deficiencies and achieve compliance with Act 399.

Drinking Water Quality Problems

The latest 2023 Water Quality Reports indicate that the Village's drinking water met or exceeded all State and Federal drinking water standards. No significant sources of contamination were found in the water supply. The Village often receives complaints from water customers regarding discoloration of the water. Village staff are frequently flushing hydrants to remove stagnant, brow/rust-colored water. The proposed improvements to the water system will help ensure the continual supply and distribution of high-quality, safe, and reliable water.

F. Projected Future Needs

The Village of Howard City is committed to providing high-quality and reliable water to its residents, businesses, and other users. The Village has evaluated and prioritized its water capital improvement needs over the next 20 years and developed a Capital Improvement Plan as part of the 2025 Drinking Water Asset Management Report, in Appendix C. The identified needs of the system include the following improvements:

- Replace undersized water main
- Replace the aging water main
- Looping of dead-end water mains
- Replace galvanized service lines

2. Analysis of Alternatives

A. Identification of Alternatives

Alternatives to accomplish improvements to the Village's water system were developed and evaluated based on their ability to meet the scope of the project while remaining within financial, regulatory, and technical constraints.

Project objectives include:

- Provide high-quality, reliable water service to customers
- Improve water system integrity and reliability
- Replace undersized and unreliable water main
- Maintain system integrity and safety

Four alternatives were developed for the Village's water system improvement project:

- Alternative A - No Action
- Alternative B - Regional Alternative
- Alternative C - Optimize Existing Facilities
- Alternative D - New Construction or Replacement of Existing Facilities

The alternatives are described in detail in the following report subsections. Each alternative was initially screened based on effectiveness, feasibility, and financial requirements. Feasible alternatives were then subjected to a comprehensive evaluation with attention to detailed economic, technical, environmental, and public concerns.

Alternative A - No Action

This alternative includes no improvements to the water system. The existing system would remain in service in its current condition. There is a cost associated with this alternative although it is difficult to quantify.

Water Main Replacement

The undersized and aging water main would remain in place throughout the Village of Howard City. The water main will likely experience more frequent breaks, resulting in disruptions to customers and the potential for contamination of the distribution system. Financial resources will be required for the costly and often

challenging emergency repairs to keep the distribution system functioning. The undersized mains would continue to not meet minimum standards.

The existing galvanized lines connected to a lead gooseneck would still need to be replaced either as part of a different project or on their own. The Michigan Lead and Copper Rule requires all lead service leads to be replaced by 2041.

Water Main Looping
Dead-end water mains would remain in the system. Main breaks or other system disruptions will continue to impact more residents and businesses due to no redundancy.

Alternative B - Regional Alternative

Alternative B was developed to consider regional alternatives. This alternative would include abandoning the existing wells and pumping water from a regional distribution system. The nearest distribution system services the Village of Lakeview. The current flow within this distribution system is unknown but the construction of additional wells would be necessary, most certainly exceeding the forecasted cost of improvements required to update the Village's existing system, plus the cost of the transmission water main. Regional distribution from the Village of Lakeview is not a cost-effective option. There are no additional regional alternatives to be evaluated as a principal alternative.

Alternative C - Optimize Existing Facilities Alternative

This alternative evaluates if the existing waterworks facilities can function more efficiently with the addition of new equipment, operations changes, or the addition and training of operating personnel. This evaluation may determine that the existing facilities are already operating at their optimal efficiency. This investigation will determine what additions, expansions, or replacements must be made to achieve optimum performance and operation. The optimum performance level possible may be based on factors such as existing system design, the age and reliability of the existing equipment, and the operational characteristics of the system.

Water Main Replacement
The sections of the water main in need of replacement are undersized and reaching the end of their useful life. Optimum performance cannot be achieved by leaving these existing mains in the ground. The option of performing break repairs does not accomplish the objectives of the project.

Galvanized service lines previously connected to lead service lines cannot be optimized and must be replaced as part of the Michigan Lead and Copper Rule. Replacement of the galvanized service lines would still be required.

Water Main Looping
Water quality in dead-end water mains can be maintained by hydrant flushing to remove stagnant water. However, these operational changes do not address the Village's desire to increase reliability, redundancy, and flow in the system. Redundant looping connections provide multiple benefits that are only possible with the construction of new water mains.

Alternative D – System Improvements Alternative

This alternative addresses the improvement needs through the replacement of existing assets or the construction and implementation of new ones. These alternatives have been selected from the recommendations provided in the most recent asset management plan.

Water Main Replacement
Replacement of undersized water mains to meet current standards, will increase reliability, improve operational efficiency, and reduce the likelihood of water quality or health hazards. The water main replacements and upsizing will also restore the hydraulic capacity of the aging pipes whose inner diameters have been decreased due to corrosion, scaling, and tuberculation. Improved fire protection capabilities because of these replacements and upsizing is an additional benefit of this alternative and a recommendation of the 2020 WRS. None of the other alternatives evaluated accomplish the system needs as well as the replacement of these aging and undersized water mains. Galvanized service lines connected to lead now or previously or unknown if they were connected to lead along the proposed water main would be replaced as

part of the proposed project. This would improve water quality and ensure the Village meets EGLE requirements.

Water Main Looping
New water main to complete looping throughout the system will eliminate 18 dead ends, and, therefore, increase water quality, flow, reliability, and redundancy. As mentioned above, while operational changes to increase the frequency of hydrant flushing may help with water quality, the reliability and redundancy benefits can only be achieved with the construction of new water main infrastructure to complete the loop.

Based on the reasons detailed above, the new construction and replacement alternative is the preferred alternative and will be analyzed further. Further analysis will include an evaluation of principal alternatives for construction methods and materials.

B. Monetary Evaluation

The monetary evaluation includes a present worth analysis. This analysis does not identify the source of funds but compares costs uniformly for each alternative over the 20-year planning period. The present worth is the sum which, if invested now at a given interest rate, would provide the same funds required to pay all present and future costs. The total present worth is the sum of the initial capital cost, plus the present worth of OM&R costs, minus the present worth of the salvage value at the end of the 20-year planning period. The discount rate used in computing the present worth cost is established by the U.S. Office of Management and Budget (OMB) and has been set at 2.2% for 20-year, FY2026 DWSRF Projects.

The salvage value is calculated at the end of 20 years where portions of the project structures or equipment may have a salvage value, which is determined by using a straight-line depreciation. The present worth of the 20-year salvage value is then computed using the discount rate of 2.2%. The EGLE guidance document establishes the estimated life for the project structures and equipment to assess salvage values at 20-year planning period. In general, concrete structures, earthwork basins, and piping have a useful life of 30-50 years and equipment have a useful life of 10-20 years. For this project, a weighted useful life was determined by multiplying the principal cost for each component by its useful life and dividing by the total project cost. For this project, a weighted useful life of 45 years was used.

The cost of labor, equipment, and materials is not escalated over the 20-year life since it assumes any increase in these costs will apply equally to all alternatives. The interest charge during construction (capitalized interest) would not significantly influence the comparison of alternatives and was not included in the cost-effective analysis.

To ensure uniformity of the cost comparisons, the following cost comparison details were specifically addressed and were applied in the present worth analysis as per the EGLE guidance.

- Capital costs were included for all identified improvements.
- Sunk costs were excluded from the present worth cost. Sunk costs for the project include existing land, existing waterworks facilities, and outstanding bond indebtedness.
- Operation, Maintenance, and Replacement (OM&R) costs were included in the present worth cost.
- The economic comparison is based on a 20-year planning period and a discount rate of 2.2%.
- Salvage values were included in the present worth cost.
- Energy cost escalation was assumed equal between the alternatives and therefore not adjusted over the 20 years.
- Land purchase/acquisition costs did not apply to the principal alternatives.
- Mitigation costs are included in the Project Costs and considered in the present worth cost.
- Total existing and projected user costs for the project are presented.

A detailed breakdown of all identified project costs is included in Appendix D for the principal alternative. Table 5 provides a summary of the net present worth analysis.

Table 5. Summary of Net Present Worth Analysis	
Item	**Alternative D**
Project Cost	$18,932,000
Annual OM&R Cost	$20,000
Present Worth of OM&R Cost*	$384,000
Total Present Worth	**$19,316,000**
Salvage Value	$6,844,000
Net Present Worth	**$12,472,000**

**0.4% Discount Rate*

C. Environmental Evaluation

An environmental evaluation of each alternative was performed and summarized below. Several environmental impacts were considered when narrowing down the best alternative for the Village of Howard City. The matrix in Table 6 below shows the impact of all alternatives for each of the environmental features.

Table 6. Environmental Evaluation for Alternatives				
Environmental Feature	**Alternative A No Action**	**Alternative B Optimize**	**Alternative C Regional**	**Alternative D Improvements**
Agricultural and Open Space Lands	NSI	NSI	T	T
Air Quality	NSI	NSI	NSI	NSI
Drinking Water Supply Source	NSI	NSI	NSI	NSI
Endangered or Threatened Species	NSI	NSI	NSI	NSI
Fauna and Flora Communities/Habitat	NSI	NSI	NSI	NSI
Floodplains	NSI	NSI	T	T
Great Lakes Shoreline	NSI	NSI	NSI	NSI
Lakes and Streams	NSI	NSI	NSI	NSI
Parks and Recreational Facilities	NSI	NSI	NSI	NSI
Wetlands	NSI	NSI	T	T
Wild & Scenic Rivers	NSI	NSI	NSI	NSI

Explanation of Abbreviations:

NSI: No Significant Impact
L: Low, But Measurable Impact
SI: Significant Impact
T: Temporary Impact
B: Beneficial
NA: Not Applicable

Climate

The Climate in the Village of Howard City is typical of the Midwest. Climatological data for the area is based on information from the National Weather Service Forecast Office. 2024 Annual Data obtained from the nearby Grand Rapids Weather Station shows the following climate date for the surrounding area, likely inclusive of the Village of Howard City.

- Mean temperature of 52.2° F
- Average minimum temperature of 43.1° F
- Average maximum temperature of 61.3° F
- Daily average rainfall of 0.10 inches
- Greatest 24-hour total rainfall of 1.90 inches
- Average rainfall of 36.90 inches per year
- Average frost depth of 145

The following data was obtained from the USDA NRCS Web Soil Survey. Maps of the following soil features are displayed in Figure A8.

- Average frost-free days for the study area: 145 days (approx. 4.8 months)

Cultural and Historical Resources
It is not expected that any of the proposed alternatives would impact the historical sites. Any permits required will be obtained before construction begins if deemed necessary.

Air Quality
Construction for the water main replacement and looping may have temporary effects on air quality of the Village of Howard City. The exposed ground and excavation could lead to airborne dust, causing a temporary decrease in air quality. Additionally, the emissions from construction machinery could also cause temporary decreases to air quality. No long-term impacts to air quality are expected from this project.

Wetlands
Wetlands within the Village may be temporarily impacted during construction. Construction methods will be selected to reduce the impact to wetlands and restore wetlands to their original condition after construction. The appropriate permits will be obtained before construction begins.

Land/Water Resources
The project scope includes the construction of water system improvements within the existing, previously disturbed residential areas; therefore, it is anticipated that it will only have temporary impacts to the roadway, but no anticipated significant impacts are expected to any land or water resources.

Floodplains
Floodplains within the Village many be temporarily impacted during construction. Construction methods will be selected to reduce the impact to wetlands and restore wetlands to their original condition after construction. The appropriate permits will be obtained before construction begins.

Major Surface Waters
As discussed previously, Tamarack Creek runs along the northern portion of the Village of Howard City. The proposed project is expected to have portions of water main replacement that could potentially be within 500 feet of Tamarack Creek. Prior to construction, the distance from the proposed construction sites to the creek would be verified. If work is determined to be close to the creek, proper permits will be acquired, and proper erosion and sedimentation control measures will be put in place and inspected to ensure the protection of the surface water quality and natural habitats.

Agricultural Resources
The project study area is zoned and developed as business, residential, or commercial. As such, agricultural land or resources will not be impacted by any of the alternatives described above.

Flora and Fauna
As discussed in the existing environmental evaluation, there are two federally listed endangered species, one threatened species, and one proposed threatened species. The endangered species in the area include the Indiana Bat and Karner Blue Butterfly. The threatened species in the area is the Eastern Massasauga Rattlesnake. The proposed threatened species in the area is the Monarch Butterfly. Construction activities associated with the proposed project are not expected to impact these species. If there are effects proper precautions would need to be implemented and followed to prevent any negative impact on the species.

D. Technical Considerations

The proposed alternatives involve upsizing water main and eliminating dead ends, as recommended in the 2020 WRS and the 2025 Drinking Water Asset Management. The recommendations developed were based on modeling performed according to the *"Recommended Standards for Water Works" (10 State Standards),* as published by the Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (GLUMRB). The recommendations were made to follow the following specific standards:

8.2.2 Diameter – “The minimum size of water main which provides for fire protection and serving fire hydrants shall be six-inch diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in Section 8.2.1.”

8.2.4 Dead ends – “Dead ends shall be minimized by making appropriate tie-ins whenever practical, in order to provide increased reliability and reduce head loss.”

Segments of the proposed watermain replacement cover the same project area as the CWSRF Project Plan scope. The Village’s lift stations need improvements. Coordinating both of these projects will allow the Village to realize cost savings and mitigate impact to their users.

E. New/Increased Water Withdrawals

The Village of Howard City does not anticipate increased water usage because of system improvements.

3. Selected Alternative

The objectives of the improvements to the water supply system to be accomplished by the selected alternative are:

- Provide high-quality, reliable water service to customers
- Improve water system integrity and reliability
- Replace undersized and unreliable water main
- Maintain system integrity and safety

Each feasible alternative that met the project objectives was reviewed for effectiveness, reliability, implementation, environmental impacts, and cost-effectiveness.

Alternative D – System Improvements, via replacements and construction of various water system components, was the selected alternative, since it was the only viable alternative that was cost-effective, feasible, and met the principle objectives.

Alternative D entails replacement of roughly 26,910 feet of water main that is either undersized or reaching the end of its useful life. Approximately 8,210 feet of proposed water main will loop and eliminate 18 existing dead ends and replacement of 221 galvanized service lines.

The Project Map detailing the various improvements can be found in Figure A10.

A. Design Parameters

The proposed water main and associated appurtenances will be designed according to the “Ten State Standards” and EGLE recommended practices. Ten State Standards suggest that water mains should be at least 6 inches in diameter, but the benefits outweigh the cost increase to install 8-inch water main. This 8-inch pipes size is appropriate for Howard City given water tank capacity, population served, and volume and pressures needed to fight fires. Furthermore, 8-inch pipes were recommended in the 2020 Water Reliability Study. This selected alternative includes the replacement of all ¾-inch, 1-inch, 1.5- inch, 2-inch and 4-inch water main, with a limited amount of 6-inch and 8-inch water main. Approximately 2,280 feet of 1-inch, 310 feet of 1.5-inch, 7,022 feet of 2-inch, and 14,890 feet of 4-inch water main will be upsized to 8-inch water main. 1,308 feet of 8-inch water main will be replaced in kind with 8-inch water main. 1,100 feet of 6-inch water main near the water tower will be increased to 12-inch water main. Upsizing of the smaller diameter pipes to new 8-inch pipes will reduce head loss from old, non-smooth pipes and provide necessary additional fire flow to the system. The replacement of the 8-inch pipes will improve water quality and decrease service disruptions for existing customers. The replacement of the aging 6-inch water main near the water tower with 12-inch will increase reliability, system pressures, and fire flow to the system. In addition to water main replacement, approximately 221 galvanized service lines are to be replaced within the system.

Table 7 below outlines the location and length of each watermain replacement.

Table 7. Summary of Proposed Watermain Replacement				
Location	**From**	**To**	**Diameter (inch)**	**Length (feet)**
Hemlock	Shaw	North dead end	8	470
Alder	Chestnut	Shaw	8	1,020
Muencher	Edgerton	North dead end	8	750
Muencher	Chestnut	Shaw	8	1,100
Godfrey	Williams	North dead end	8	310
Cass	Edgerton	North dead end	8	860
Cass	Elm	Shaw	8	630
Lincoln	South dead end	Rathburn	8	880
Grant	Edgerton	Rathburn	8	720
Sherman	Emory	Williams	8	1,540
Cedar	Walnut	Joy	8	900
Cedar	Walnut	Water Tower	12	1,100
Ash	Cherry	Walnut	8	560
Spruce	Park	North dead end	8	280
Willow	Walnut	Emory	8	470
Locust	Cherry	Park	8	1,400
Poplar	Walnut	North dead end	8	400
Ensley	Washburn	Williams	8	3,270
Williams	Meuncher	West dead end	8	390
Williams	Sherman	Ensley	8	1,450
Rathburn	Grant	Lincoln	8	330
Edgerton	Cass	Muencher	8	450
Edgerton	Orton	Grant	8	800
Shaw	Sherman	White	8	1,250
Elm	Cass	Muencher	8	270
Park	Locust	Sherman	8	1,180
Chestnut	Cedar	Pine	8	380
Emory	East dead end	Orton	8	1,090
Walnut	East dead end	Poplar	8	260
Walnut	Joy	Ensley	8	2,400

The project also includes the looping of the system in nine locations to eliminate 18 dead-end mains. The proposed water main looping is to be completed with 8-inch water main.

Table 8 below outlines the location and length of each watermain loop.

Table 8. Summary of Proposed Watermain Looping				
Location	**From**	**To**	**Diameter (inch)**	**Length (feet)**
	Shaw to Sycamore	Chestnut	8	4,800
	Edgerton	Hemlock	8	500
	Ensley		8	350
	Williams	Edgerton	8	490
	Shaw	Spruce	8	580
	Emory	Poplar	8	150
	Legion	Orton	8	1,200
	Orton	Washburn East	8	80
	Cherry/Ash	Fire hydrant to West	8	60

Installation Methods

The construction of the 8-inch and 12-inch watermain will entail an open-cut installation method where feasible. To minimize impact to critical roadways, floodplains, and wetlands horizontal directional drilling will be evaluated. In areas where the proposed pipe will be below the grade of the road, the existing paved surface will need to be milled and hauled off-site. The contractor will need to maintain driveways and one travel lane along the streets during the construction process.

Pipe Materials

The ductile iron watermain to be installed shall be 8-inch or 12-inch ductile iron in compliance with AWWA C151/ANSI A21.50 and ANSI A21.51; Class 52. Joints shall be Ductile Iron of the following; Mechanical: AWWA C111/ANSI A21.11, Push-on: AWWA C111/ANSI A21.11, with respective electrical continuity. If horizontal directional drilling is utilized HDPE pipe, in compliance with AWWA Standard C-906 and ANSI/NSF Standards 14 and 61, will be installed. In addition, all materials must be listed and approved for use with potable water under ANSI/NSF Standards 14 and 61 (Standard 14 meets the requirements of Standard 61).

F. Useful Life

The Village of Howard City intends to secure a 20, 30, or 40-year DWSRF loan, for the construction of the recommended alternative. The weighted useful life for Alternative D has been calculated to be 50 years, which exceeds the 20, 30, or 40-year loan period. The weighted useful life is the total of all calculated life values (each asset's dollar value times its estimated useful life) divided by the total estimate of all project dollars spent on those assets. This analysis verifies that the components of the recommended alternative will cost-effectively address water system requirements for the term of the loan.

G. Water and Energy Efficiency

In addition to the ability of the selected alternative's ability to improve water quality and system capacity, it has the potential to improve water and energy efficiency. The upsizing of water main to follow standards will decrease the likelihood of water main breaks from capacity issues. The current undersized water main is susceptible to water main breaks, and thus water loss. Replacing the main with larger more reliable water main would prevent water loss. Replacing risky pipes will improve the distribution system and act as a loss prevention strategy according to the USEPA's Water Conservation Plan Guidelines and improve water efficiency.

In addition to water efficiency, there is an opportunity for energy efficiency to be realized with the implementation of the proposed project. The replacement of old pipes with new, larger, and smoother pipes will allow for decreased head loss and energy loss through the system. With decreased energy loss experienced through the system, the pumps will require less energy to push the water through the distribution system.

H. Schedule for Design and Construction

The anticipated schedule for implementation of the proposed water system improvements is presented below, which is based on an anticipated Fiscal Year 2026 Quarter 4 MFA Closing.

Table 9. Proposed Schedule for Design and Construction

Anticipated Date	Activity
April 2026	EAs Published No Later Than
May 2026	Part I and Part II Application Due
May 2026	FNSI Clearance
May 2026	Bid Ad Published No Later Than
July 2026	Part III of Application Due Bid Data Submittal (With Tentative Contract Award)
August 2026	EGLE Order of Approval Issued*
August 2026	Borrower's Pre-Closing with the MFA
August 2026	MFA Closing
October 2026	Notice to Proceed Issued No Later Than
November 2026	Begin Construction
November 2027	Complete Construction
December 2027	Final Restoration Acceptance and Record Drawings

Construction Delivery Method

EGLE published a State Revolving Funds Design Phase Guidance document in March 2015 which lists the following project delivery methods as acceptable for use in the DWSRF program: Design-Bid-Build (DBB), Construction Management At-Risk (CMAR), Fixed-Price Design-Build (FPDB), and Progressive Design-Build (PDB). These methods are summarized below.

Design-Bid-Build (DBB)

Many public infrastructure projects are delivered using the DBB method. In the DBB method, an engineer works closely with the Village and prepares the project bidding documents including the construction drawings and specifications.

General contractors submit bids based on the plans and specifications, and the lowest, responsible bidder is awarded the project. The general contractor pricing includes their subcontractors, or trade contractors, to perform specialized work such as electrical/controls, mechanical work, concrete work, etc. Typically, the engineering firm that developed the design provides construction observation and construction administration services during the construction phase. In this alternative, there are three parties – the owner, the engineer, and the general contractor.

The following advantages are offered by the DBB method:

- Well understood and accepted
- Independent oversight of builder
- Open to owner involvement during design

The following disadvantages are offered by the DBB method:

- Pricing is not known until the design process is complete
- Contractor selected based on low bid not on value, knowledge, and experience brought to the team

Construction Management At-Risk (CMAR)

CMAR is similar to DBB in that the engineering/design contract is separate from the construction contract. However, in the CMAR method, a construction management firm (CM) is hired independently by the Village

before or early in the design process. An engineer works closely with the Village and the CM during the entire design process. The CM provides input to the engineer and owner through the entire design process. The engineer prepares the construction drawings and specifications while the CM prepares the bidding documents and obtains pricing from their subcontractors and suppliers.

The CM develops a Guaranteed Maximum Price (GMP). In this alternative, there are three parties - the owner, the engineer, and the independently contracted CM firm.

The following advantages are offered by the CMAR method:

- Open to owner involvement during design
- Early integration of builder
- Provides early and continuous constructability review
- Provides early certainty of costs
- Pricing and design may be conducted in parallel
- Reduced likelihood of claims compared to the DBB alternative

The following disadvantages are offered by the CMAR method:

- Not a single source of responsibility
- No legal obligation linking designer to builder
- Potential for disputes, claims, and change orders

Fixed Price Design Build (FPDB)

Fixed Price Design Build (FPDB) is a delivery method where the owner designates one firm, a design-builder (DB), under one contract for the design and construction of the project. The DB provides a fixed price based on a defined scope, requirements, and schedule; but before complete and detailed design documents have been prepared.

Owner involvement during the design process is typically very limited after the fixed price is accepted. High level of project scope detail is required early in the design phase and pricing is typically unable to be adjusted after the 30% mark of the design process.

Progressive Design Build (PDB)

The PDB delivery method is similar to the CMAR method with one major distinction – the design-builder (DB) is under one contract for the design and construction of the project. Therefore, the Village has one single firm responsible for the design, schedule, construction, and warranty of the project. If there are issues that arise during construction or after construction, the Village has one firm to address the issues.

During the latter part of the design phase, the DB prepares the bidding documents and obtains pricing from their subcontractors and suppliers on an open-book basis.

If an agreement is reached on the pricing, the Village will move forward collaboratively to construction. With such flexibility, the PDB method allows the owner to improve the project outcome by participating directly in design decisions. In this alternative, there are two parties – the Owner and the DB firm.

The following advantages are offered by the PBD delivery method:

- The owner can transfer more risk to the DB since there is a single point of responsibility for the design, permitting, construction, and performance warranty of the project
- Owner is involved during the entire design and construction
- Early integration of builder
- Provides early and continuous constructability review
- Provides early certainty of costs
- Pricing and design may be conducted in parallel

Project Delivery Selection

The Village and engineering firm that developed the Project Plan had discussions regarding the available project delivery methods with advantages and disadvantages offered by each method to develop the preferred method for presentation at the Public Meeting.

I. Cost Summary

The costs associated with the design and construction of the selected alternative are presented below in Table 10. A detailed cost estimate is attached, for reference.

Table 10. Selected Alternative Cost Summary	
	Alternative D
Estimated Construction Costs	$14,563,000
Construction Contingencies (10%)	$1,456,000
Design & Construction Engineering (20%)	$2,913,000
Total Project Cost	**$18,932,000**

User Costs

The Village funds its water utility budget through user fees billed to its customers. Based on their projected budget, the Village has sufficient funds for current expenses but there are minimal funds for capital improvements.

EGLE has not yet provided interest rates for FY2026 State Revolving Fund projects. However, the FY2026 interest rates are expected to be similar to the FY2025 interest rates, which are as follows:

- 20-year loan – 2.50%
- 30-year loan – 2.75%
- 20-year loan Overburdened applicant – 2.00%
- 30-year loan Overburdened applicant – 2.00%
- 40-year loan Overburdened applicant – 2.00%
- 20-year loan Significantly Overburdened applicant – 1.00%
- 30-year loan Significantly Overburdened applicant – 1.00%
- 40-year loan Significantly Overburdened applicant – 1.00%

Since the calculated user costs for the proposed project exceed 1% of the MAHI, the Village is expected to be considered an Overburdened Community. Therefore, the rate of 2.00% was used to evaluate the anticipated user costs of the proposed project over the 20-year planning period.

The estimated cost for the Selected Alternative is $18,932,000, without considering any principal forgiveness or Village funding. The annual payment for the proposed project period would be $1,158,000. According to the 2020 Water Reliability Study, the Village has 650 customers that would be impacted by the loan repayment. Table 11 below shows this cost increases to users annually, quarterly, and monthly. Increases to user costs is based entirely on capital costs consisting of planning, engineering, administration, legal and construction since O&M is not expected to increase with the project.

Table 11. Approximate Cost Increases to Users		
Period	**Increase in Cost to User 100% Loan**	**Increase in Cost to User 20% Grant / 80% Loan**
Annually	$1,781.23	$1,425.08
Quarterly	$445.31	$356.27
Monthly	$148.44	$118.76

The Village's current rates are based on monthly readiness to serve charges and additional water usage charge per 1,000 gallons of water used. Water rates from the Village of Howard City 2024 Fee Schedule are noted in Table 12 below.

Table 12. 2024 Water Rates			
	Meter Size	**Readiness to Serve**	**Commodity Charge Per 1000 Gallons**
Residential	5/8" to ¾"	$13.05	$3.21
Other Classes of Users in the Village (Commercial)	5/8" to ¾"	$26.09	$3.21
	1"	$32.61	$3.21
	1 ½"	$52.17	$3.21
	2"	$104.33	$3.21
	3"	$143.47	$3.21
	4"	$182.58	$3.21
Outside Village Limits	5/8" to ¾"	$52.17	$6.24
	1"	$65.22	$6.24
	1 ½"	$104.33	$6.24
	2"	$208.67	$6.24
	3"	$286.92	$6.24
*Meter Check Fee			$50.00
Bulk Water Administration Fee			$50.00
Bulk Water Sales Fee		Per 1,000 Gallons	$6.24
Water Turn On/Off			$50.00

**When a meter is found to be not in working order because of natural causes, mechanical defects, or age, this fee shall be waived.*

This simple calculation is an estimate and does not consider residential equivalent units. The exact increase in a customer's water bill will be determined by a Municipal Financial Advisor to ensure that the utility is properly funded in the coming years. The recommendation of whether to raise Ready to Serve Fees, Commodity Fees, or a combination of both will be completed by the financial professional.

Any principal loan forgiveness or grants from EGLE would lessen the anticipated increase in user costs.

J. Implementability

The Village of Howard City owns and operates the water system within the Village and adjacent customers; therefore, it has legal authority and managerial capability to implement and operate the proposed improvements. The financial ability of Howard City to implement the selected alternative depends on the success of the Village's application to EGLE for DWSRF financial assistance. The Village will need to increase billing rates to its customers to make principal and interest payments on the loan. The Village intends to utilize consultants to assist with project coordination, design, financing, and construction administration.

4. Environmental and Public Health Impacts

The potential benefits and adverse effects of the selected alternative to the environment and/ or public health are evaluated in this section. The analyses of impacts are divided into direct, indirect, and cumulative impacts.

A. Direct Impacts

Direct impacts are the environmental impacts directly attributed to the construction and operation of the project. The Village must consider the impacts resulting from the construction and operation of the proposed project, as well as social impacts.

Construction Impacts

The areas to be impacted by the construction of the selected alternative are those areas highlighted for replacement of the water main or implementation of new water main for looping in Figure A10. The area of construction for these water main locations is intended to be primarily within the existing right of way. Within the right of way to be affected, the primary features are roads, driveway entrances, and sidewalks. All would be replaced to match existing conditions if affected by construction. Any areas of tree removal or excess vegetation would be identified and removed as required and according to applicable guidelines. For construction outside of the right of way for the water mains appropriate short- or long-term easements would be acquired.

As determined in the principal alternative analysis, the primary construction method to be used for the proposed project would be open-cut trenches for the locations of the proposed new water main. The construction work involves placing new water main for looping, replacing existing undersized water main pipes, and replacing galvanized service lines. Therefore, the trenches will be approximately 7 to 8 feet deep to accommodate the minimum coverage of 5 feet for the watermain. Some areas of proposed improvements may utilize horizontal directional drilling to minimize surface impacts. Groundwater is not expected to be impacted by the construction of new main, however, if groundwater is found during excavation, localized dewatering would be utilized at the required depth of the trench.

Traffic is expected to experience short-term negative impacts as a result of construction from the project. The majority of construction is expected to take place in existing right of ways and roadways. The portions of roads impacted by the proposed project can be seen in Figure A10. In addition to the traffic disturbances caused by road closures for construction, traffic will also be impacted by the construction vehicles.

The historical resources identified in the Village are not located in any proposed construction areas, therefore it would not be impacted by the construction. If additional historical sites were to be identified, the Village would apply for the required permits and take proper steps to mitigate any effect on the historical sites.

Operational Impacts

During the installation of new water mains, small portions of the water system will need to be isolated to connect the new mains to the existing mains. This will result in a temporary interruption of water service to the customers located in the isolated area. Installation of new service lines will also result in a temporary interruption of service.

Once the improvements are completed, both the Village and its water customers will realize operational benefits through the reduction of water main breaks and service interruptions.

Social Impacts

The proposed improvements will result in the Village of Howard City experiencing direct beneficial and negative social impacts. The proposed project providing more reliable, safe, secure, and high-quality drinking water to its customers and visitors is a great positive social impact that would be realized from the proposed improvements.

However, as discussed earlier, the negative social impacts include an increase in user costs. Part of the debt repayment plan would be to spread costs over the users for the 20-year loan repayment period, indicating this would have a long-term impact.

B. Indirect Impacts

Indirect impacts are those caused by the proposed project but removed in time and/or distance. Indirect impacts are often secondary in nature and are generally caused by residential and/or commercial development made possible by the project. However, the completion of this project is not expected to have any indirect impacts on development, land use, air or water quality, natural areas, community aesthetics, or resource consumption. This is because the improvements will be made in areas that are already developed.

C. Cumulative Impacts

Cumulative impacts are those impacts to the environment that increase in magnitude over time or that result from individually minor but collectively significant actions taking place over time. Cumulative impacts may

present themselves as multiple impacts affecting one environmental element. This section serves as an overview of potential cumulative impacts that could result from the proposed project.

It is possible that the upsizing and replacement of the water main could lead to unintended development of the Village of Howard City. It is possible that the current zoning within the Village could change to support new development on open land, or in vacant lots. The new development would utilize the additional capacity of the water system and would lead to an increase in wastewater. The increase in wastewater could potentially lead to the need for future projects to expand the capacity of the sanitary system.

Permits would need to be obtained for any development in the wetland areas identified in the Village, but it could be possible that future development may take place at those locations and fill wetlands. If the wetlands were filled and the land used for development, it would likely lead to an increase in surface water runoff carrying sediment and pollutants. The water would flow into Tamarack Creek, causing a decrease in the water quality of the Creek. Over time the Creek water quality could deteriorate from increased development and surface water runoff with contaminants. The potential increase in development could lead to deteriorating air quality as well from the addition of cars and traffic within the Village.

5. Mitigation

Structural and non-structural measures that avoid, eliminate, or mitigate adverse impacts on the environment need to be considered when implementing the selected alternative. The cost of mitigation was considered in the cost-effective analysis and included in the unit costs and lump sum prices developed during the capital cost evaluation for the principal alternatives.

The structural measures involve the specific design and construction of the improvements while the non-structural measures involve regulatory, institutional, governmental, or private plans, policies, or regulations of the Village. Mitigation of short-term, long-term, and indirect impacts were considered and are discussed below.

A. Mitigation of Direct Impacts

Construction Impacts

Traffic and Safety Hazard Control

Given that there will be road repair work required as part of the water main replacement and looping selected alternative, traffic control will be necessary.

Traffic control and maintaining access to homes and businesses will be the responsibility of the Contractor. Access to all homes and businesses will be maintained and emergency vehicle access will be ensured throughout construction. Residents will be notified when construction work is scheduled in their area. Contractors will be required to have trained persons performing all phases of the work. Traffic control regulators, warning signs, barricades, drums, and cones will be used for traffic control.

Construction site safety is the responsibility of the Contractor. The Contractor will be required to have only trained persons performing all phases of the work. The Contractor will also be required to comply with the Occupational Safety & Health Act (OSHA), including using backup alarms on all equipment, having employees trained in hazard control, and maintaining materials safety data sheets (SDS) for materials that may be used or handled by construction personnel.

Dust Control

The construction activities associated with the water main construction may result in increased dust in the vicinity of the construction site. Mitigation measures to minimize the negative effect of dust on residents and construction workers will be defined in the project specifications. It is anticipated that dust control will be provided by the application of water and/or dust palliative as needed during dry and dusty periods. The Contractor will be required to control dust in accordance with methods described in the project specifications. Disturbed turf will be seeded and mulched immediately following water main installation and testing.

Noise Control

Noise levels will temporarily increase during construction. Construction activities will only be allowed during the Village's approved hours to limit the adverse effect of noise to the residents/businesses near the construction areas.

Soil Erosion/Sedimentation Control
The Contractor will be required to obtain a soil erosion and sedimentation control permit or waiver from the local agency prior to the start of the work for the water main replacement, looping, and well construction. It is anticipated that mitigation measures to be utilized will include silt fence, geotextile filter fabric, and permanent seeding and mulch. Mitigation and abatement measures will be detailed in both the plans and specifications and will be reviewed and approved by the local permitting agency prior to construction. The other improvements proposed in this project are located within existing facilities and erosion control will not be needed.

Restoration of Roads and Vegetation Areas
Restoration of disturbed areas from the water distribution system improvements will be completed as soon as practical to minimize soil erosion. Restoring disturbed lawn areas, roadways, existing utilities, etc. will be completed in a timely fashion and in accordance with the project specifications.

Wetlands
Once verified and delineated, wetland permits will be obtained as needed for work within identified wetlands and near the river according to EGLE requirements. Additionally, the design of the water main looping and construction within suspected wetlands will be completed in a way to minimize impacts and the soil erosion and sedimentation plan will be developed and coordinated with EGLE during the development stage.

Operational Impacts
To mitigate the interruption of water service to customers due to the water main and service line installation, project specifications will require the contractor to work as efficiently as possible to install the new pipes in a timely manner and minimize the amount of time that customers are without water.

Social Impacts
Concerns related to the financial burden are expected to be remediated by funding the project through low-interest loans from DWSRF, which will allow for user cost increase to be spread across the 20-year planning period. Future user cost increases are expected to be unavoidable as the work needs to be completed to maintain the waterworks system and ensure access to safe and reliable water.

B. Mitigation of Indirect Impacts
Increased growth and development are not expected to occur in the Village with or without the completion of the proposed project. The Village can mitigate any unexpected growth through the implementation and enforcement of Village ordinances and zoning districts.

C. Mitigation of Cumulative Impacts
Cumulative impacts were evaluated and determined to have the potential to affect Tamarack Creek in the future. Mitigation efforts can minimize any effects felt by the creek in the future. Every effort will be made to avoid any long-term or irreversible adverse impacts to the creek including following best management practices for the installation of pipes and earth disturbance.

Wetland permits will be obtained as needed to ensure they are protected from filling or sedimentation. Permits for work near Tamarack Creek will also be obtained, as necessary, and proper sedimentation and erosion control measures will be followed, inspected, and maintained to limit any excess sediment entering the creek.

6. Public Participation
Public participation is an integral component of the final Project Planning Document for the proposed water system improvements. The purpose of public participation is to address any controversial aspects of the project and to generate a better understanding of the proposed project within the community. The following sections provide a summary of public participation.

A. Public Meeting

A formal public meeting on project alternatives and user costs will be held on April 21, 2025, at 7:00 p.m. at the Howard City Village Hall, 125 E. Shaw Street, Howard City, MI 49329. A summary of the meeting will be included in the final project plan.

B. Public Meeting Advertisement

C. Public Meeting Summary

D. Adoption of the Project Planning Document

APPENDIX A
MAPS AND FIGURES

PREPARED FOR:

VILLAGE OF HOWARD CITY

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 870660

N

0 200
SCALE IN FEET

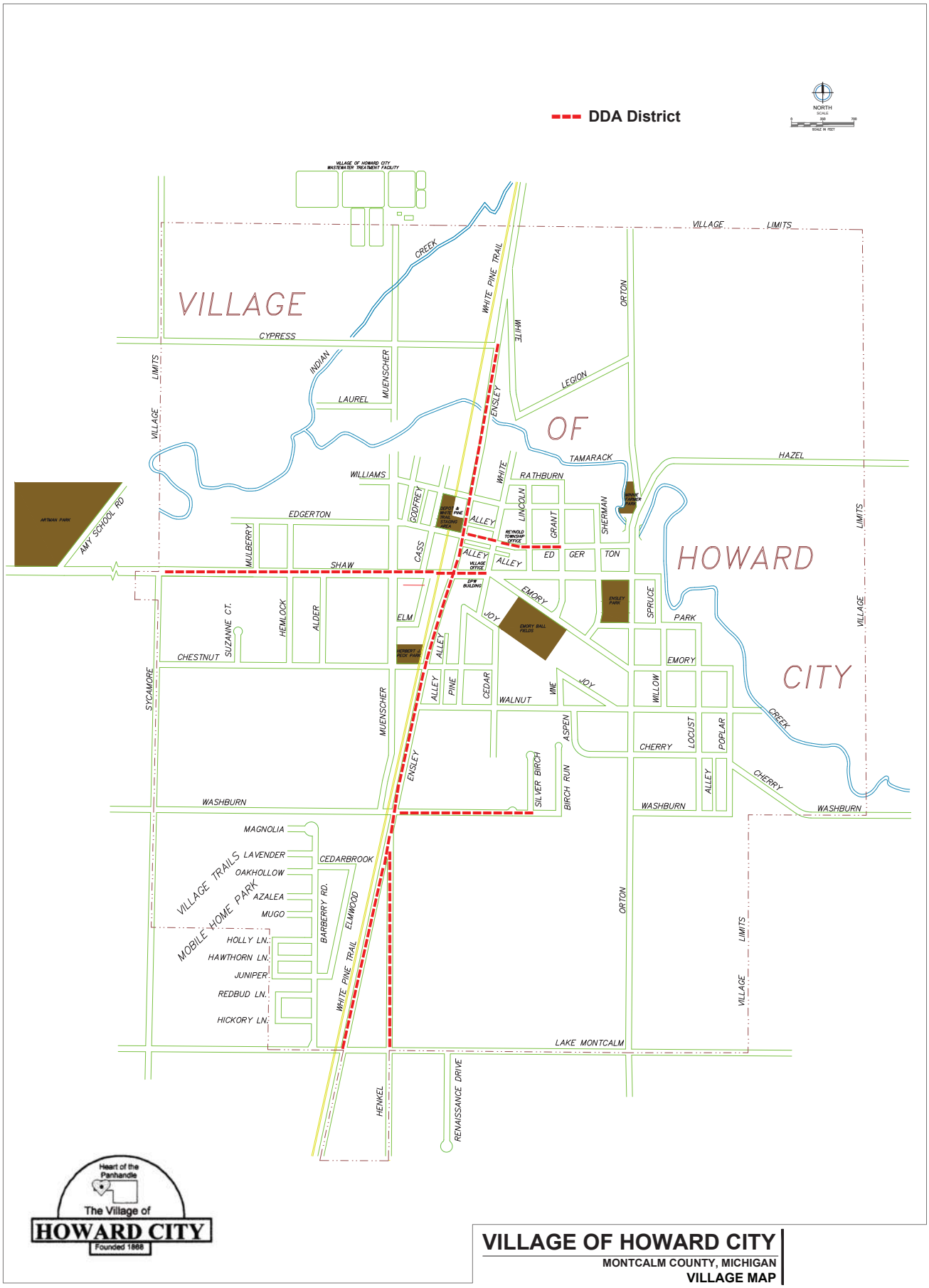
Water Tower
Well House
Fire Hydrant
System Valve
Watermain

Figure A1

WATER SYSTEM

VILLAGE OF HOWARD CITY
MONTCALM COUNTY, MICHIGAN

F&V



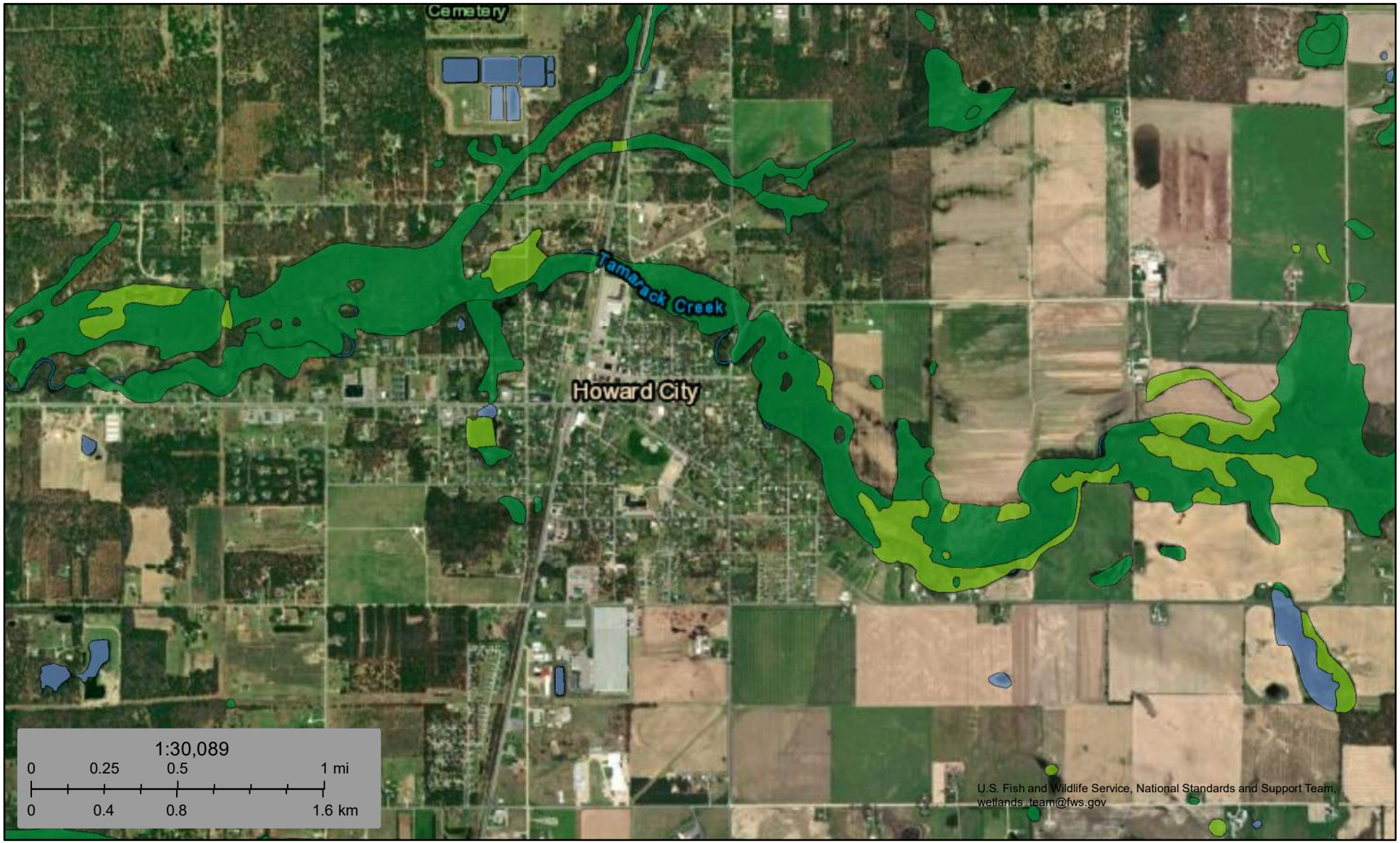
Heart of the Panhandle
The Village of
HOWARD CITY
Founded 1868

VILLAGE OF HOWARD CITY
MONTCALM COUNTY, MICHIGAN
VILLAGE MAP

Figure A2

U.S. Fish and Wildlife Service
National Wetlands Inventory

Village of Howard City - Wetland Map



January 29, 2025

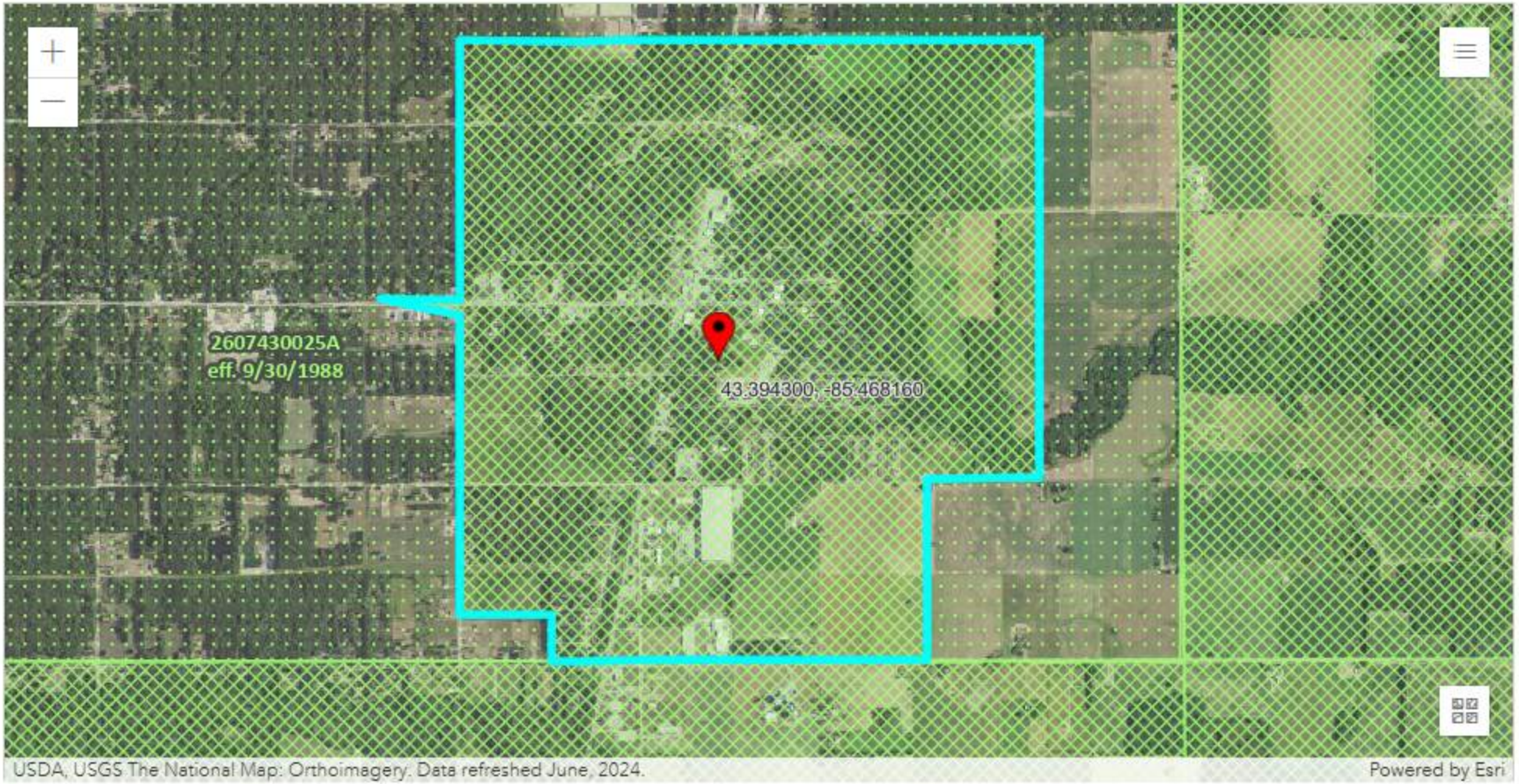
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Figure A3

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper



PIN
- Approximate location based on user input and does not represent an authoritative property location

MAP PANELS
- Selected FloodMap Boundary
- Digital Data Available
- No Digital Data Available
- Unmapped

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D
- Otherwise Protected Area
- Coastal Barrier Resource System Area

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth
- Regulatory Floodway Zone AE, AO, AH, VE, AR

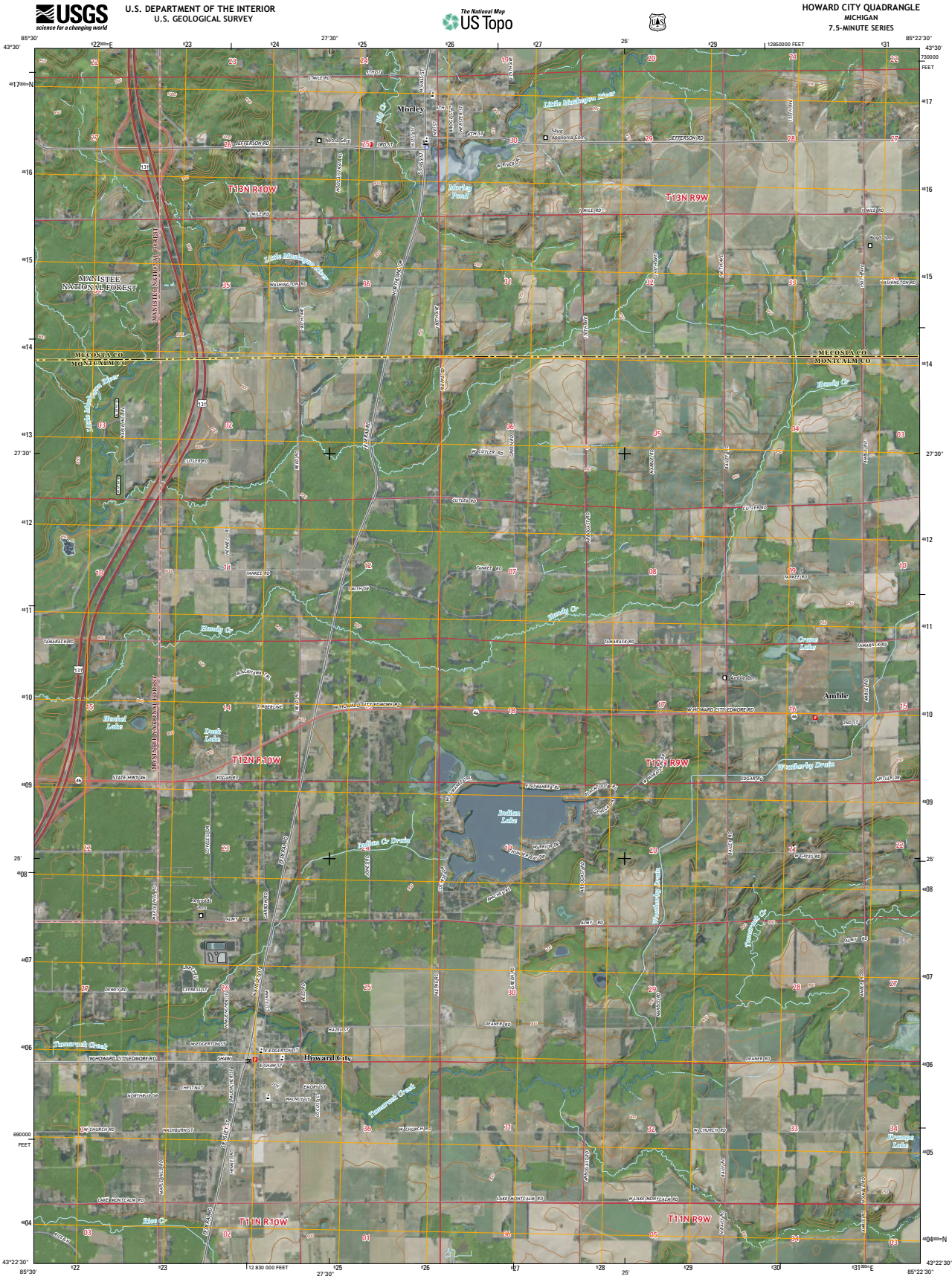
OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

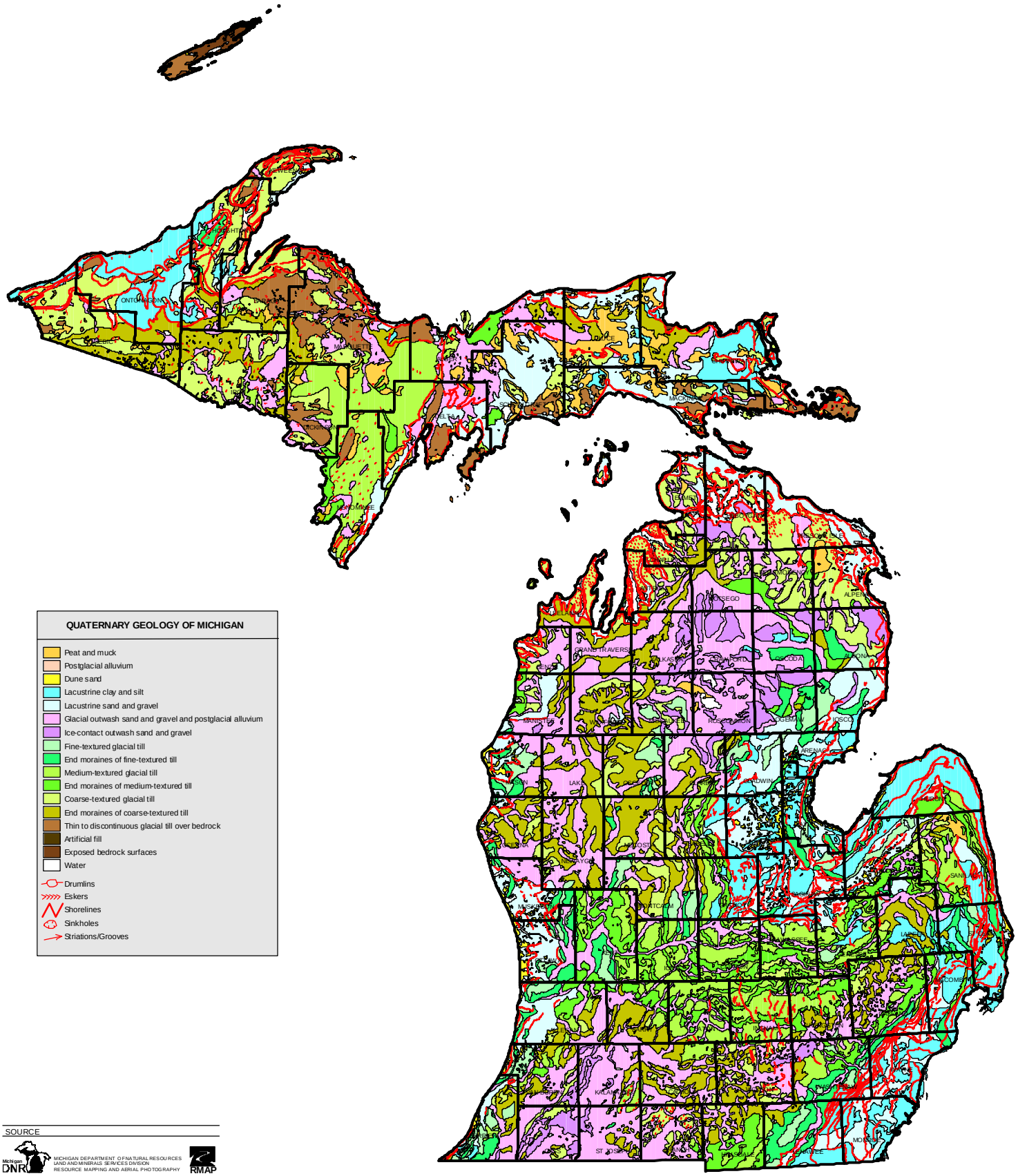
GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

Figure A4

Figure A5


USGS
science for a changing world
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map
US Topo
HOWARD CITY QUADRANGLE
MICHIGAN
7.5-MINUTE SERIES
T13N R10W
T13N R9W
T12N R10W
T12N R9W
T11N R10W
T11N R9W
MANISTEE NATIONAL FOREST
MECOSTA CO
MONTCALM CO
Howard City
Amble
Morley
Morley Pond
Little Muskegon River
Tamarack Creek
Indian Lake
Crane Lake
Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 16T
10 000-foot ticks: Michigan Coordinate System of 1983 (south zone)
This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.
Imagery.....NAIP, June 2012
Roads.....HERE, ©2013
Roads within US Forest Service Lands.....FSTopo Data with limited Forest Service updates, 2013
Names.....GNIS, 2013
Hydrography.....National Hydrography Dataset, 2012
Contours.....National Elevation Dataset, 2006
Boundaries.....Multiple sources; see metadata file 1972 - 2013
Public Land Survey System.....BLM, 2011
UTM GRID AND 2014 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
U.S. National Grid
100,000-m Square ID
FP
Grid Zone Designation
16T
SCALE 1:24 000
KILOMETERS
METERS
MILES
FEET
CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011. A metadata file associated with this product is draft version 0.6.16
MICHIGAN
QUADRANGLE LOCATION
ADJOINING QUADRANGLES
1 Big Bend
2 Stanwood
3 Altona
4 Tift Corner
5 Lakeview
6 Sand Lake
7 Coral
8 Trufant
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route
FS Primary Route
FS Passenger Route
FS High Clearance Route
Check with local Forest Service unit for current travel conditions and restrictions.
HOWARD CITY, MI
2014
NSN 7643016371159*
NGA REF NO. USGS X24K21259

1982 QUATERNARY GEOLOGY OF MICHIGAN



SOURCE

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
LAND AND MINERALS SERVICES DIVISION
RESOURCE MAPPING AND AERIAL PHOTOGRAPHY

Michigan Resource Information System
Part 609, Resource Inventory, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

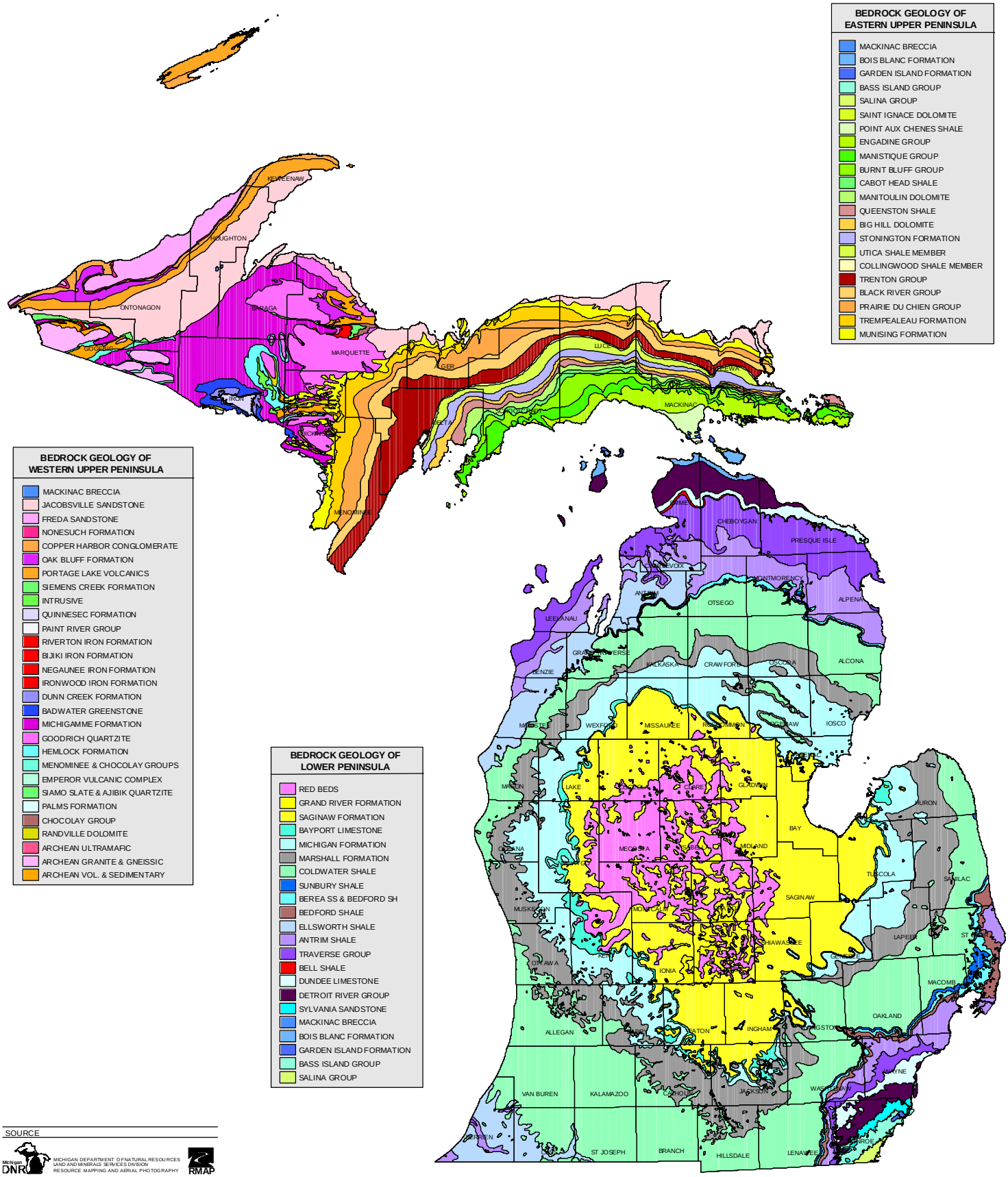
Automated from "Quaternary Geology of Michigan", 1982, 1:500,000 scale, which was compiled by W. R. Farrand, University of Michigan and the Michigan Department of Environmental Quality, Geological Survey Division.

Date 11/12/99

0 20 40 Miles

Figure A6

1987 BEDROCK GEOLOGY OF MICHIGAN



SOURCE

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
LAND AND MINERALS SERVICES DIVISION
RESOURCE MAPPING AND AERIAL PHOTOGRAPHY

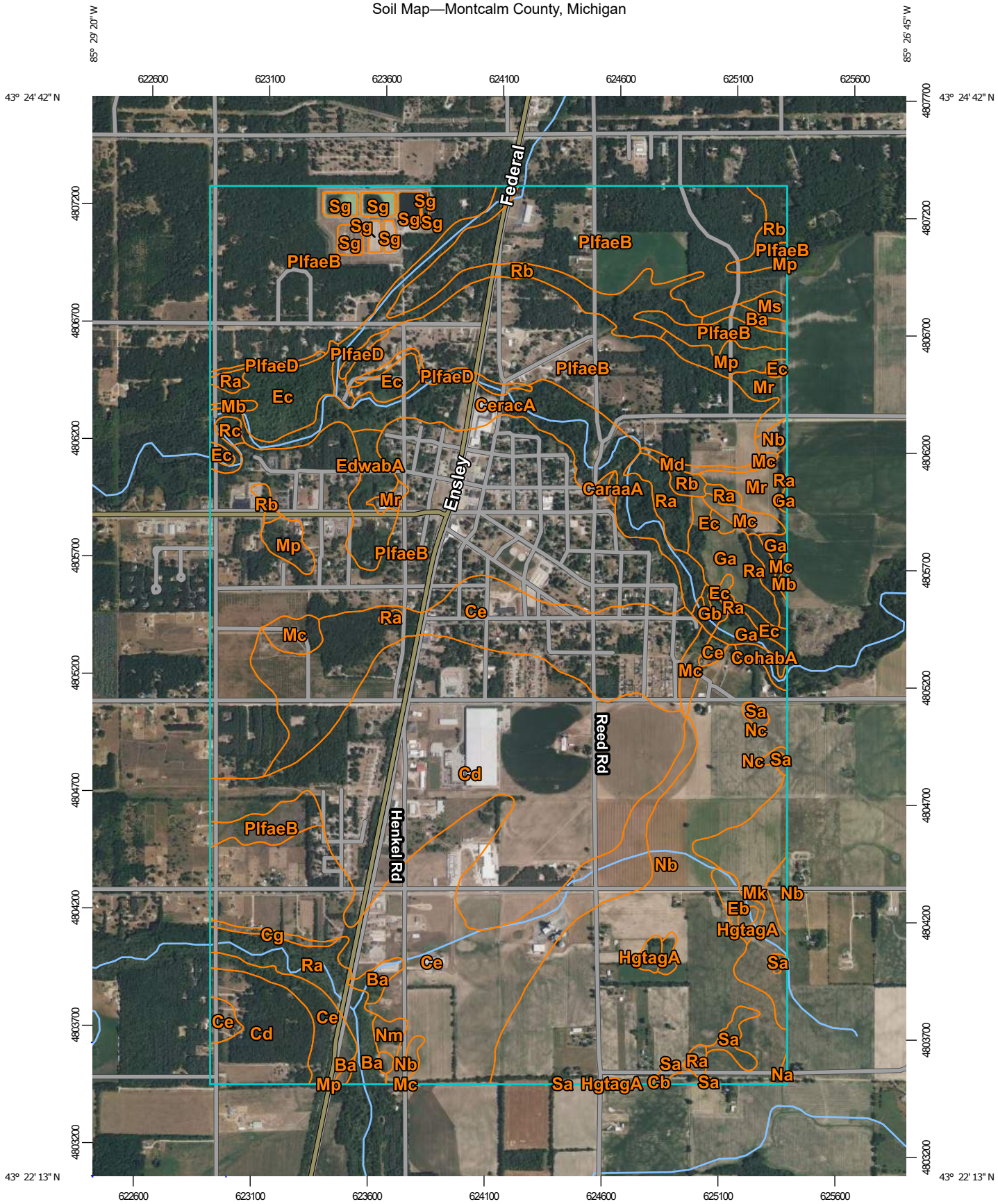
Michigan Resource Information System
Part 609, Resource Inventory, of the Natural Resources and Environmental Petection Act, 1994 PA 451, as amended.

Automated from "Bedrock Geology of Michigan," 1987, 1:500,000 scale, which was compiled from a variety of sources by the Michigan Department of Environmental Quality, Geological Survey Division.

Date 11/12/99

0 20 40 Miles

Figure A7



Map Scale: 1:22,400 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 300 600 1200 1800

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

Figure A8

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Montcalm County, Michigan
Survey Area Data: Version 20, Aug 27, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 2, 2020—Nov 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ba	Brevort loamy fine sand, 0 to 2 percent slopes	12.2	0.5%
CaraaA	Carlisle muck, lake moderated cool, 0 to 2 percent slopes	1.1	0.0%
Cb	Coral fine sandy loam, 0 to 2 percent slopes	0.3	0.0%
Cd	Croswell and Melita loamy sands, 0 to 2 percent slopes	370.8	15.8%
Ce	Croswell and Melita loamy sands, 2 to 6 percent slopes	393.5	16.8%
CeracA	Ceresco-Cohoctah complex, 0 to 2 percent slopes, frequently flooded	85.1	3.6%
Cg	Croswell and Melita loamy sands, 6 to 15 percent slopes	3.4	0.1%
CohabA	Cohoctah-Ceresco-Palms complex, 0 to 2 percent slopes, frequently flooded	4.1	0.2%
Eb	Ensley loam and Edmore loamy fine sand, 0 to 2 percent slopes	6.9	0.3%
Ec	Epoufette loamy sand and Ronald sandy loam, 0 to 2 percent slopes	45.7	2.0%
EdwabA	Edwards muck, lake moderated cool, 0 to 1 percent slopes	20.2	0.9%
Ga	Gladwin loamy sand and Palo sandy loam, 0 to 2 percent slopes	32.9	1.4%
Gb	Gladwin loamy sand and Palo sandy loam, 2 to 6 percent slopes	3.6	0.2%
HgtagA	Houghton-Adrian mucks, 0 to 1 percent slopes	5.1	0.2%
Mb	Mancelona loamy sand, 0 to 2 percent slopes	2.3	0.1%
Mc	Mancelona loamy sand, 2 to 6 percent slopes	22.1	0.9%
Md	Mancelona loamy sand, 6 to 10 percent slopes	3.3	0.1%
Mk	McBride and Isabella sandy loams, 2 to 6 percent slopes	39.5	1.7%
Mp	Melita loamy sand, 0 to 2 percent slopes	19.8	0.8%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Mr	Melita loamy sand, 2 to 6 percent slopes	23.4	1.0%
Ms	Melita-Iosco-Kawkawlin complex, 0 to 2 percent slopes	4.0	0.2%
Na	Nester loam, 0 to 2 percent slopes	1.0	0.0%
Nb	Onekama loam, Saginaw Lobe, 2 to 6 percent slopes	276.3	11.8%
Nc	Onekama loam, Saginaw Lobe, 6 to 12 percent slopes	2.9	0.1%
Nm	Newaygo sandy loam, 2 to 6 percent slopes	4.5	0.2%
PlfaeB	Plainfield-Spinks sands, 0 to 6 percent slopes	790.7	33.8%
PlfaeD	Plainfield-Spinks sands, 6 to 18 percent slopes	10.9	0.5%
Ra	Rifle and Tawas peats, 0 to 2 percent slopes	59.5	2.5%
Rb	Roscommon sand, 0 to 2 percent slopes	66.2	2.8%
Rc	Rousseau loamy fine sand, 0 to 2 percent slopes	2.7	0.1%
Sa	Sims loam, 0 to 2 percent slopes	11.2	0.5%
Sg	Sewage lagoons	17.1	0.7%
Totals for Area of Interest		**2,342.3**	**100.0%**

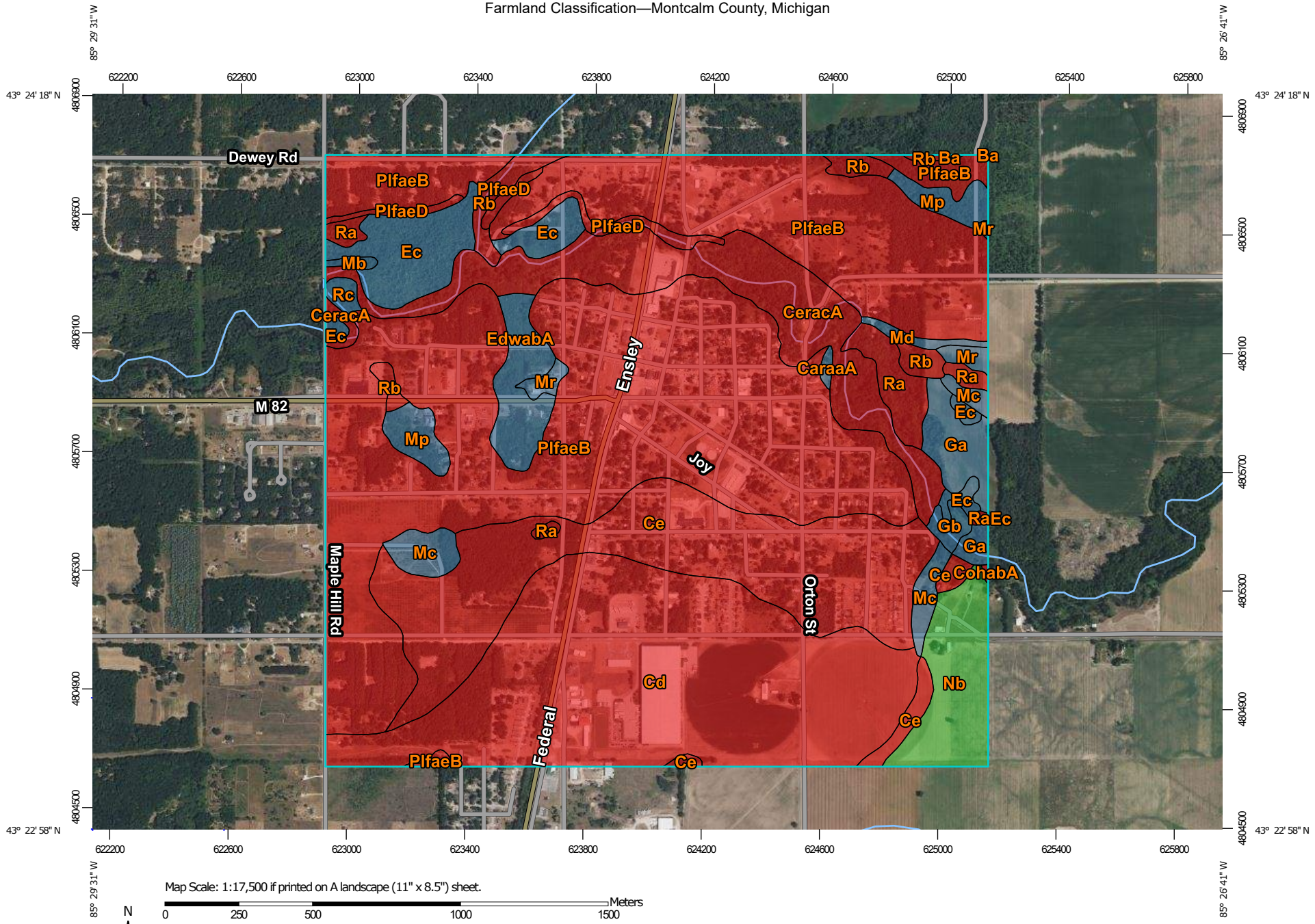

85° 29' 31" W
85° 26' 41" W
43° 24' 18" N
43° 22' 58" N
622200
622600
623000
623400
623800
624200
624600
625000
625400
625800
4806900
4806500
4806100
4805700
4805300
4804900
4804500
Dewey Rd
M 82
Maple Hill Rd
Ensley
Joy
Orton St
Federal
PlfaeB
PlfaeD
Rb
Ra
Ec
Mb
Rc
CeracA
EdwabA
Mr
Mp
Mc
Ce
Cd
Nb
Ba
Rb Ba
Md
CaraaA
Ga
Gb
RaEc
CohabA
Map Scale: 1:17,500 if printed on A landscape (11" x 8.5") sheet.
N
0 250 500 1000 1500 Meters
0 500 1000 2000 3000 Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

Figure A9

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

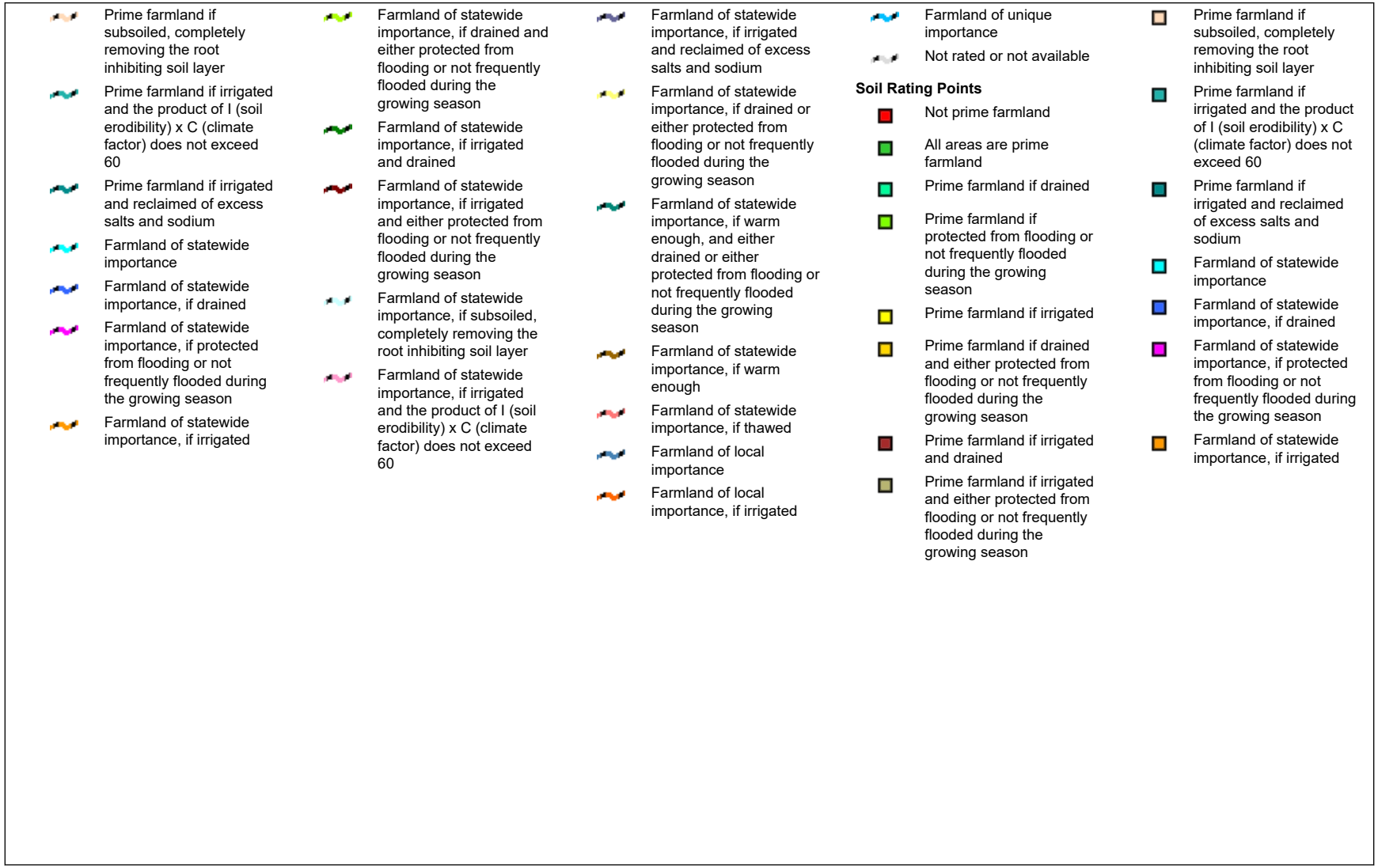
Soils

Soil Rating Polygons

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of statewide importance, if drained
- Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated
- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Soil Rating Lines

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season


Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated
Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated and drained
Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough
Farmland of statewide importance, if thawed
Farmland of local importance
Farmland of local importance, if irrigated
Farmland of unique importance
Not rated or not available
Soil Rating Points
Not prime farmland
All areas are prime farmland
Prime farmland if drained
Prime farmland if protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated and drained
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated

- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil Survey Area: Montcalm County, Michigan
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Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 2, 2020—Nov 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ba	Brevort loamy fine sand, 0 to 2 percent slopes	Farmland of local importance	0.3	0.0%
CaraaA	Carlisle muck, lake moderated cool, 0 to 2 percent slopes	Farmland of local importance	1.1	0.1%
Cd	Croswell and Melita loamy sands, 0 to 2 percent slopes	Not prime farmland	225.3	19.6%
Ce	Croswell and Melita loamy sands, 2 to 6 percent slopes	Not prime farmland	148.9	13.0%
CeracA	Ceresco-Cohoctah complex, 0 to 2 percent slopes, frequently flooded	Not prime farmland	84.0	7.3%
CohabA	Cohoctah-Ceresco-Palms complex, 0 to 2 percent slopes, frequently flooded	Not prime farmland	0.2	0.0%
Ec	Epoufette loamy sand and Ronald sandy loam, 0 to 2 percent slopes	Farmland of local importance	39.7	3.5%
EdwabA	Edwards muck, lake moderated cool, 0 to 1 percent slopes	Farmland of local importance	20.2	1.8%
Ga	Gladwin loamy sand and Palo sandy loam, 0 to 2 percent slopes	Farmland of local importance	17.4	1.5%
Gb	Gladwin loamy sand and Palo sandy loam, 2 to 6 percent slopes	Farmland of local importance	3.6	0.3%
Mb	Mancelona loamy sand, 0 to 2 percent slopes	Farmland of local importance	1.4	0.1%
Mc	Mancelona loamy sand, 2 to 6 percent slopes	Farmland of local importance	15.9	1.4%
Md	Mancelona loamy sand, 6 to 10 percent slopes	Farmland of local importance	3.0	0.3%
Mp	Melita loamy sand, 0 to 2 percent slopes	Farmland of local importance	15.4	1.3%
Mr	Melita loamy sand, 2 to 6 percent slopes	Farmland of local importance	5.7	0.5%
Nb	Onekama loam, Saginaw Lobe, 2 to 6 percent slopes	All areas are prime farmland	34.5	3.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
PlfaeB	Plainfield-Spinks sands, 0 to 6 percent slopes	Not prime farmland	481.1	42.0%
PlfaeD	Plainfield-Spinks sands, 6 to 18 percent slopes	Not prime farmland	10.8	0.9%
Ra	Rifle and Tawas peats, 0 to 2 percent slopes	Not prime farmland	18.5	1.6%
Rb	Roscommon sand, 0 to 2 percent slopes	Not prime farmland	16.9	1.5%
Rc	Rousseau loamy fine sand, 0 to 2 percent slopes	Farmland of local importance	2.7	0.2%
Totals for Area of Interest			**1,146.6**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Map Date: 11.07.2024
Data Sources: F&V, Village of Howard City, Montcalm County GIS, & Michigan Open Data

N

0 200
SCALE IN FEET

Maple Hill
Larch
Muencher
Federal
White
Cypress
Laurel
Ensley
Legion
Well #5
550 GPM
6" 1939
8" 2000
12" 2000
6" 1939
Hazel
Rathburn
4" 1939
Williams
Lincoln
Edgerton
Godfrey
Cass
2" 1939
1" 1939
1 1/2" 1939
6" 2019
8" 2019
8" 2016
8" 2011
3/4" 1939
Shaw
Grant
Sherman
Spruce
Park
Emory
Mulberry
6" 1990
2" 1984
8" 1996
8" 1960
Sycamore
Hemlock
8" 1984
Alder
Suzanne
Chestnut
Elm
Pine
Joy
Cedar
Vine
Well #3
448 GPM
6" 2001
Willow
Walnut
8" 1986
8" 1956
Ash
Locust
Poplar
Cherry
8" 2001
Water Tank
300,000 Gallon
12" 1998
Silver Birch
Birch
Washburn
8" 1994
Barberry
Elmwood
6" 1996
2" 1995
Orton
12" 1997
12" 1939
8" 1990
12" 1990
Henkel
Lake Montcalm
12" 2001
8" 2002
8" 2000
8" 2001

Watermain Replacement
Watermain Looping

Water Tower
Well House
Fire Hydrant
System Valve
Watermain

Figure A10

WATER SYSTEM

VILLAGE OF HOWARD CITY
MONTCALM COUNTY, MICHIGAN

F&V

APPENDIX B
2020 WATER RELIABILITY STUDY

PREPARED FOR:

VILLAGE OF HOWARD CITY

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 870660

VILLAGE OF HOWARD CITY

MONTCALM COUNTY, MICHIGAN

WATER RELIABILITY STUDY

October 2020
Project No. 842330

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

TABLE OF CONTENTS

TABLES:

FIGURES:

I. EXECUTIVE SUMMARY

This report is an evaluation of the Village of Howard City's water system facilities, capacities and needs through the year 2039. In addition, it provides a master plan for water system improvements to be implemented as feasible.

The system was evaluated in three categories: water supply, water distribution and water storage. In general, the system was found to meet the current daily demands but has some deficiencies with respect to fire flow demands.

A. WATER SUPPLY & TREATMENT

The Village is supplied by two wells, labeled No. 3 and 5. Well No. 5 is the primary producing well with well No. 3 on standby. In 2018 the Village abandoned well No. 4 leaving Well No. 3 as the only source of firm capacity. The firm capacity is defined as the capacity delivered with the largest well out of service. The current firm capacity for the Village is 450 gpm. The MDEQ/EGLE requires the firm capacity of any water supply system meet or exceed the maximum day demands placed on the system. The maximum day demand as measured in 2019 was 242 gallons per minute (gpm). The 2019 maximum day demand is approximately 54% of firm capacity. Therefore, the water supply is sufficient for the system.

The Village's water quality is considered good with the iron levels less than 0.1 mg/l and hardness at 202 mg/l at well No. 5. The last water quality test taken in 2019 reported the water met the State drinking water standards. Well No. 3 is used for standby purposes only due to the high hardness level (last reported 258 mg/l). Hardness above 250 mg/l is rated objectionable by MDEQ/EGLE. The Village could consider installing a water softening system at well No. 3 to provide a good quality water source.

B. WATER STORAGE

The 300,000 gallon elevated water storage tank was constructed in 1998 and last inspected in 2016 by Utility Service Group. Utility reported that the tank is in good structural condition and the coatings are in good condition.

C. WATER DISTRIBUTION

The water distribution system is comprised of watermains ranging in size from 2-inch to 12-inch. There are also ¾" serives and 1" services that have multiple service connections to them, which are unreliable. Approximately 30% of the distribution system is made up of watermains 4-inch and smaller. The presence of these smaller mains limits the amount of available fire flow. Since watermain smaller than 6-inch is no longer permitted by the MDEQ/EGLE, replacement of the 4-inch and smaller watermain should be budgeted.

D. RECOMMENDED IMPROVEMENTS

Several general, short and long term water distribution improvements are recommended with a total estimated cost of $4,882,000. The distribution projects are listed in order of priority; however, implementation of these projects should coincide with the Village's street improvements plan or master plan.

Each recommended improvement has an estimated cost associated with it. These costs are rough estimates to be used for budgeting purposes.

II. BACKGROUND AND PURPOSE

The Village of Howard City is located in Reynolds Township in the northwest corner of Montcalm County, Central Lower Michigan. Howard City has a type 1 (public) water supply and distribution system with two water production wells and one elevated storage tank.

The purpose of this report is to provide the Village with a comprehensive analysis of their water system in order to comply with MDEQ/EGLE and Act 399. The report evaluates the existing water supply, treatment, storage and distribution, and provides recommendations for improvements to serve the existing and future needs of the Village. This report is intended to be the master plan for guiding the community on the overall future water system capital improvement needs to meet future daily water and fire flow demands.

The study and service area includes the Village of Howard City. The Village water system was constructed in 1930, and the last water reliability study for the system was completed in 2014.

III. EXISTING WATER SYSTEM

A. WATER SUPPLY

1. Wells

The Village of Howard City water supply system currently consists of two wells. The wells are designated as wells No. 3 and 5. Well No. 3 is considered a standby well due to the higher concentrations of iron and hardness. Well No. 3 is exercised routinely and is located in the center of the Village south of Emory St. within the ballpark, as shown on Figure 1. Well No. 5 is located in the northern part of the Village on Orton Rd. 500 feet south of Legion St. Table 1 summarizes selected data of each well and pump. The firm well capacity of the wells (Well No. 5 out of service) is 450 gpm.

TABLE 1
WELL SUMMARY

Well Number	Year Drilled	Diameter (inch)	Depth (feet)	Rated Capacity @ TDH	Current Capacity @ TDH
3	1986	12	170	450 gpm / 240 ft.	450 gpm / 240 ft.
5	2001	12	170	625 gpm / 216 ft.	550 gpm / 245 ft.

Table 2 shows the amount of water that was pumped from Wells No. 3 and 5 for the year 2019.

TABLE 2
2019 WELL PRODUCTION LEVELS

Month	Well No. 3 (gallons)	Well No. 5 (gallons)
January	0	3,684,000
February	0	3,910,000
March	0	3,885,000
April	0	3,601,000
May	0	4,726,000
June	0	4,576,000
July	0	5,748,000
August	0	5,112,000
September	0	4,567,000
October	0	4,894,000
November	0	3,644,000
December	0	3,807,000
Totals	**0**	**52,154,000**

2. Well House

The well houses are constructed out of masonry block and Well house No. 5 is in great condition and very well maintained. However, well house No. 3 is in need of interior and exterior maintenance and upgrades.

3. Water Treatment & Quality

The Village regularly tests the water quality of its wells per MDEQ/EGLE requirements. Testing is performed monthly for bacteria, yearly for partial chemical, and every 3 years for metals analysis. The tests taken in September 2019 reported that the water quality met or exceeded the state requirements. The Village's water quality is considered good with the iron content less than 0.1 mg/l at well No. 5 and 0.2 mg/l at well No. 3.

Howard City currently disinfects the water supplied from the wells with 12.5% sodium hypochlorite injected in well houses. Well 3 is used for standby purposes only due to the high hardness level (last reported 258). Hardness above 250 mg/l is rated objectionable by MDEQ/EGLE. The Village could consider installing a water softening system at well No. 3 to provide a good quality water source.

The Village tests for lead and copper on an triennial basis. Lead/copper levels met the MDEQ/EGLE action levels in the most recent testing. The Village is in compliance, with the next round of testing due in the fall of 2021.

4. Wellhead Protection

The Village does not have a wellhead protection program in place, but they are reviewing whether they should develop one.

5. Auxiliary Power

The Village has two portable diesel generators capable of providing emergency power. The generators are 30 and 80 KW diesel powered, capable of running any well. The generators are started four times a year and run under load twice a year.

6. Emergency Response Plan

The Emergency Response Plan was updated and submitted to MDEQ/EGLE in 2017.

B. DISTRIBUTION SYSTEM

1. Pipe Condition

The Village of Howard City water distribution system is composed of 64% cast iron (CI), 31% ductile iron (DI), and 5% HDPE water main. Table 3 provides a breakdown of the water distribution system's watermain inventory by size. The majority of the system was installed around 1930. Since the last reliability study was completed in 2014, there has been 4,378 feet of watermain construction permitted in the Village.

TABLE 3
WATERMAIN INVENTORY

Watermain Size (inches)	Length (feet)	Percent of Total (%)
2	8,181	8.6%
4	21,767	23.0%
6	23,615	25.0%
8	23,681	25.0%
12	17,386	18.4%
Total:	**94,630**	**100.0**

2. Low Flow Areas

As shown in Table 3 over 30% of the distribution main has a diameter 4-inches or smaller. These small pipes create low residual pressure and low fire flow areas within the system. As stated in the previous reliability study, some hydrant testing was tried in the low flow areas, but the flow was insufficient to register on the pitot gauge or drop the residual hydrant pressure. Fortunately, improvements have been made since then and have increased the flow in a few of those areas, however with the large quantity of small diameter pipes still in the system, it is recommended to continue replacing these old and undersized mains. There are also approximately 146 feet of 3/4" serives and 2,804 feet of 1" services that serve more than one house. These should be replaced with larger mains as well.

C. WATER STORAGE

1. Specifications

The Village of Howard City currently has a 300,000 gallon single pedestal elevated tank that supplies water storage for the system. The tank is located off from Cedar St. south of Walnut St. as shown on Figure 1. The tank is 125 feet tall with a head range of 30 feet. The low and high water levels are at 21 and 29.7 feet, respectively. The lead pump starts at 25 feet and stops at 28.5 feet. There is a chart recorder at the municipal services building and a digital read out in the base of the tank. The tank area is fenced and has a locked gate.

2. Tank Maintenance

The tank was constructed in 1998 and was last inspected in 2016. The exterior and wet/dry interior of the tank were painted in 2015. Utility Service Group reported that the tank is in good structural condition and the coatings are in good condition.

D. CONTROLS

1. Telemetry

The wells communicate to the water tower through a dedicated phone line. The chart recorder is located at the municipal services building which communicates to the well houses and the tank to record the water level in the tank. The system uses a Sensaphone auto-dialer to notify staff of alarm conditions.

The Village uses SCADA with controls located in the base of the cone. The controls can be remotely operated.

The Village is considering switching to a radio telemetry system, which has an estimated cost of $35,000. The actual cost may vary depending on the options chosen by the Village to incorporate into the system.

E. SYSTEM OPERATIONS

1. Operators

The Village of Howard City's water system is classified as S-3. MDEQ/EGLE recommends that public water systems have a minimum of two certified people on staff to operate the system. There are 3 fulltime Village employees that operate the Howard City water system. These Village employees are certified with S-3, D-3 licenses for the water system and treatment as required by the state.

2. Meters

   The meter reading takes place on a monthly basis by the Village employees. All the meters were changed out in 2011. There are about 655 customers in the system and the meters for these customers are radio read.

3. Maintenance

   A quarter of the mainline valves are exercised when flushing occurs, however older valves are not turned due to concerns for breakage or leaking unless critical for flushing. The hydrants are flushed two to three times per year and exercised periodically. Hydrants are repaired as needed based on problems found during hydrant flushing. Formal records containing basic information and maintenance history is recommended for the valves and hydrants.

4. Parts

   The Village stocks spare parts for the major items in the system including ductile iron pipe and repair clamps for each size watermain.

IV. WATER USE AND FIRE PROTECTION

A. WATER USE

1. Customers

The Village of Howard City water system currently serves 655 customers, consisting of roughly 81% residential and 19% commercial users. Past water usage data is presented in Table 4 below. Peak hour demands are estimated based on a peaking factor of 5 times the average day demand.

TABLE 4
WATER USAGE

Year	Total Water Pumped (MGY)	Average Day Demand (MGD)	Maximum Day Demand* (MGD)	Average Day Demand (gpm)	Maximum Day Demand* (gpm)	Maximum Day Peaking Factor	Peak Hour Demand (gpm)
2015	67.482	0.189	0.236	131	164	1.2	656
2016	46.721	0.181	0.224	126	156	1.2	628
2017	46.967	0.209	0.209	145	145	1.0	726
2018	54.363	0.149	0.229	103	159	1.5	517
2019	52.154	0.143	0.348*	99	242	2.4	496

2. Historical Water Loss

Water losses were between 25% and 27% from 2018 - 2019 billing cycles as calculated by dividing the unbilled water by annual pumpage. Water meters were fully installed by 2011 allowing for the comparison. These losses far exceed the 10-15% target level that is typical of similar systems. The Village does monitor water loss on an annual basis and should continue to do so to limit lost revenue.

TABLE 5
WATER LOSS CALCULATIONS*

Year	Total Water Pumped (gal)	Total Water Billed (gal)	Total Unbilled Water (gal)	Unbilled Percentage
2018	54,363,000	39,793,973	14,569,027	27%
2019	52,154,000	39,103,246	13,050,754	25%

* Information based on monthly operating reports and Village billing records

3. Large Water Users

Table 6 shows the average monthly use for the system's largest water users. Using this data, the average daily use and average demand were derived. These water users represent approximately 23% of the Village's daily water use.

TABLE 6

LARGEST WATER USERS

Customer	Average Monthly Use (gal)	Average Daily Use (gal)	Average Demand (gpm)
Sietsema Farms	372,937	12,431	8.6
Donnelly John	143,696	4,790	3.3
Stratford Group LTD	70,800	2,360	1.6
Wolverine Worldwide	70,320	2,344	1.63
Leppink's Grocery	48,968	1,632	1.1
Shaw Lanes	41,137	1,371	1.0

As Table 6 shows, the Village has a small number of locations that have higher water demands than residential use. Therefore, the system demand for water can be related to population served. The customer type distribution and water usage data is listed below in Table 7 for planning purposes.

TABLE 7
CUSTOMER PLANNING DATA

Customer Type	Number of Connections	Approximate REUs	2019 Water Usage (Gallons)
Commercial	124	382	16,355,620
Residential	531	531	22,747,626
Totals	**655**	**913**	**39,103,246**

B. POPULATION PROJECTIONS

The 20 year water demands for the Village were projected using the past and present population numbers obtained from the U.S. Census Bureau. The average annual population growth for the Village over the last 27 years was approximately 1.0%. Based on this information a future annual growth rate of 1.2% was assumed. Table 8 shows the past, present and projected populations.

TABLE 8
POPULATION PROJECTIONS

Year	Population
1990	1,351
2000	1,585
2010	1,808
2017	1,824
2019	1,868 Est.
2024	1,983 Est.
2039	2,371 Est.

C. PROJECTED WATER DEMANDS

The projected water demands for the 20-year study period were calculated using projected population and the current average usage per capita. Table 9 shows the current per capita water usage. Estimated populations are from the U.S. Census Bureau and report projections.

TABLE 9
PER CAPITA WATER USAGE

Year	Average Day Demand (gpd)	Estimated Population	Average Day Demand (gpcd)
2015	189,000	1819	103.9
2016	181,000	1821	99.4
2017	209,000	1824	114.6
2018	149,000	1842	80.9
2019	143,000	1868	76.6

The amount of water used on a per capita basis has varied over the last 5 years by nearly 20% of water use. This study assumes the water usage will increase proportionally as population increases. A value of 80 gpcd will be used for analysis. The maximum peaking factor (maximum day demand divided by average day demand) has fluctuated between 1.0 and 2.5, excluding flushing days and other high demand days. Based on this, a maximum day peaking factor of 2.0 is used in this report to estimate future maximum day demands. Table 10 shows the projected water demands.

TABLE 10
PROJECTED WATER DEMANDS

	2024 (Estimate)	2039 (Estimate)
Population	1,983	2,371
Average Usage (gpcd)	90	90
Average Day Demand (gallons)	158,627	189,708
Average Day Demands (gpm)	110	132
Peaking Factor	2	2
Maximum Day Demand (gallons)	317,254	379,416
Maximum Day Demand (gpm)	220	263
Peak Hour Peaking Factor	5	5
Peak Hour Demand (gpm)	551	659

*Actual Maximum Day Demand for 2019 is 242 gpm (313 gpm is estimated from 80 gpcd average usage)

D. FIRE PROTECTION

1. ISO Rating System

The Insurance Services Office (ISO) establishes suggested fire flow protection standards based on various factors including building construction type, area, height, type of development and density. These factors and others such as fire fighting capabilities, when combined, result in an ISO rating of between 1 and 10, 1 being the best and 10 being the worst. This rating is used by insurance companies to determine appropriate insurance rates for its customers that live within the water supply system. The Village of Howard City currently has an ISO rating of 5/8B. Both numbers represent properties within 5 road miles of a recognized fire station, but the first number is for those properties within 1,000 feet of a fire hydrant while the second number is for those beyond 1,000 feet of a fire hydrant. 8B is a superior level of fire protection in otherwise Class 9 areas. The current rating is based on an evaluation received in April of 2013.

2. Recommended Fire Flows

The ISO establishes suggested fire flows at various locations throughout a community during a survey. It is not always cost-effective for a community to build a water system that meets all of the suggested ISO fire flows. In such a situation, the community can choose to adopt target fire flow values. Table 11 below presents the suggested ISO fire flows and recommended target fire flow values. These recommended target fire flows were obtained from tabular values presented in the *"Fire Protection Handbook'*, and the AWWA's Manual of Water Supply Practices –*"Distribution System Requirements for Fire Protection"*. It will be necessary for the Village to decide as to whether these recommended target fire flows provide the desired level of protection.

TABLE 11
ISO SUGGESTED AND RECOMMENDED TARGET FIRE FLOW VALUES AND DURATIONS

Classification	ISO Suggested Fire Flows at 20 psi	Recommended Target Fire Flows at 20 psi	Duration (hrs)
Residential	1,000-1,500	1,000	2
Commercial	2,000-2,500	2,000	2
Industrial	3,000	3,000	3
Institutional	3,500	3,500	3

3. Hydrant Flow Tests

Fleis & VandenBrink Engineering and City staff performed fire hydrant flow tests at select locations throughout the system (see Figure 1) on November 20, 2019 in order to obtain information used in calibration of the WaterCAD hydraulic computer model.

Table 12 provides the results of the fire hydrant tests. The available fire flow amount at the minimum residual pressure of 20 psi was calculated using the following formula:

$$\text{AVAILABLE FIRE FLOW @ 20 psi} = \frac{\text{Hydrant Flow} * (\text{Static Pressure} - 20)^{0.54}}{(\text{Static Pressure} - \text{Residual Pressure})^{0.54}}$$

TABLE 12
AVAILABLE FIRE FLOW @ 20 PSI FOR SELECT LOCATIONS

Test Number	Location	Actual Hydrant Flow (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Calculated Fire Flow @20psi (gpm)
1	Cass St., N of Shaw St.	1,006	55	39	1,535
2	Grant St. & Edgerton St.	977	55	41	1,602
3	Orton Ave., N of Hazel St.	1,099	50	41	2,105
4	Orton Ave., N of Walnut St.	1,124	50	46	3,337
5	Shaw St. 1st W of Sycamore St.	963	54	32	1,218
6	Pine St, S of Joy St.	1,086	52	30	1,330
7	Washburn, 2nd W of Ensley	1,124	49	40	2,114

The results of the fire hydrant flow tests indicate that the Village's system has adequate static pressure but low nominal fire flows. Figure 2 shows the static pressures, expressed as contours, for the Village's water system.

V. EVALUATION OF SYSTEM CAPACITY

A. HYDRAULIC MODEL ANALYSIS

1. Model Description

In order to evaluate the water distribution system, a computer model was developed to simulate the existing system. This study used WaterCAD version 8.0 developed by Bentley. The watermain sizes, configuration, friction factors, well pump curves, topographic information, flow demands and storage tank data were confirmed or updated within the model to simulate the existing and proposed water distribution systems. Watermain friction factors were estimated based on values required to achieve model calibration to within ±10% of the calculated available fire flow at 20 psi residual for the test locations. Table 13 presents the comparison of the calculated available fire flow at 20 psi to the values obtained in the calibrated WaterCAD model for the test locations listed.

TABLE 13
COMPARISON OF CALCULATED FIRE FLOWS FROM FIELD MEASUREMENTS TO WATERCAD FIRE FLOWS

Test Number	Location	Available Fire Flow @ 20 psi (Calculated) (gpm)	Available Fire Flow @ 20 psi (WaterCAD) (gpm)	Difference Between Measured & WaterCAD (%)
1	Cass St., N of Shaw St.	1,535	1,666	-8.5%
2	Grant St. & Edgerton St.	1,602	1,712	-6.8%
3	Orton Ave., N of Hazel St.	2,105	2,240	-6.4%
4	Orton Ave., N of Walnut St.	3,337	3,599	-7.9%
5	Shaw St. 1st W of Sycamore St.	1,218	1,126	7.6%
6	Pine St, S of Joy St.	1,330	1,203	9.5%
7	Washburn, 2nd W of Ensley	2,114	2,185	-3.3%

2. Test Results

As the results of Table 13 show, the difference between the calculated available fire flow at 20 psi from hydrant testing and that predicted by the calibrated WaterCAD model is within a +/- 10% tolerance. Therefore, the model is an accurate representation of the water system in the Village.

Most of the hydrant testing locations meet the recommended fire flow. Test 1 and 5 are located in a commercial area, therefore the recommended fire flow is 2,000 gpm and both of these tests do not meet that recommended flow.

3. Fire Flow Results

Fire flows were simulated throughout the existing system. The simulations were completed under existing firm capacity conditions. The elevated tank water levels were set at average operating depth. MDEQ/EGLE recommends a minimum of 20 psi residual pressure in the system at all times. This is to ensure the positive water pressure remains in the distribution system for customer use and to ensure safe water quality. All available fire flows reported are with a 20 psi residual pressure. Table 14 below presents available fire flow at 20 psi under max day conditions for the existing water distribution system. These values were obtained by running the WaterCAD model under firm capacity conditions and target fire

flow demands.

Figure 2 shows the existing static pressures and Figure 3 shows the existing fire flows throughout the Village for the 2019 maximum day demand. Figures 5 and 6 show the existing system fire flows under future 2024 and 2039 demands.

TABLE 14
COMPARISON OF TARGET FIRE FLOWS TO WATERCAD FIRE FLOWS

Test Number	Location	Recommended Target Fire Flow @ 20 psi (gpm)	Available Fire Flow @ 20 psi (WaterCAD) (gpm)	Difference Between Target & Available (%)
1	Cass St., N of Shaw St.	2,000	1,963	-1.9%
2	Grant St. & Edgerton St.	1,000	2,069	51.7%
3	Orton Ave., N of Hazel St.	1,000	3,164	68.4%
4	Orton Ave., N of Walnut St.	1,000	4,491	77.7%
5	Shaw St. 1st W of Sycamore St.	2,000	1,142	-75.1%
6	Pine St, S of Joy St.	1,000	1,797	44.4%
7	Washburn, 2nd W of Ensley	1,000	3,927	74.5%

As the results in Table 14 indicate, the recommended target fire flow at 20 psi residual is met in 5 of the 7 locations. Test number 1 is 1.9% off the target recommended fire flow. Test number 5 is deficient by 75.1% of the recommended value. Test number 5 is on a dead end run which is the main cause for the lower flows.

The available fire flows shown in Table 14 vary from the values shown in Table 13 for multiple reasons. In Table 13, the wells were turned off for calibration, and in Table 14, Wells No. 3 and 5 were operating to model total capacity conditions. Also, Table 14 shows the flows during the maximum day demands, while the calibration model portrays minimal flow conditions.

B. WATER SUPPLY

The MDEQ/EGLE recommends that the firm capacity of a community's water supply be greater than its maximum day demand. Currently, the firm capacity of the Village's water supply is 450 gpm and the 2019 maximum day demand was 242 gpm. Therefore, the existing firm capacity is sufficient for the current demands of the system. However, EGLE recommends that communities plan to increase supply when maximum day demand reaches 80% of firm capacity. The maximum day demand is currently 54% of the existing firm capacity. The projected maximum day demand of 263 gpm for 2039 is approximately 58% of the firm capacity. If population growth remains low, the Village should not require an additional supply source in the next twenty years.

C. WATER STORAGE

Table 15 compares the volume of available water using current firm well capacity and the existing storage volume for each of the classifications of recommended target fire flows and fire flow durations for the existing maximum day demand.

TABLE 15
REQUIRED STORAGE CAPACITY FOR FIRE FIGHTING
(EXISTING MAXIMUM DAY DEMAND)

Classification	Desired Fire Flow at 20 psi (gpm)	Duration (hr)	Existing Maximum Day Demand (gpm)	Total Flow Required (system outflow) (gpm)	Firm Well Flow (system inflow) (gpm)	Net (system outflow) (gpm)	Total Storage Required (gal)	Existing Storage (gal)	Addt'l Storage Required (gal)
Residential	1,000	2	242	1,242	450	792	95,000	300,000	0
Commercial	2,000	2	242	2,742	450	2,292	275,000	300,000	0
Industrial	3,000	3	242	3,242	450	2,792	502,500	300,000	202,500
Institutional	3,500	3	242	3,742	450	3,292	592,500	300,000	292,500

As the data in Table 15 shows, the Village does not have sufficient storage to meet the target fire flow requirements for fires classified above the commercial level. An industrial fire could be met for just less than two hours.

Although these tables show that the existing storage is low in terms of meeting fire flow requirements, the storage capacity of the tank exceeds existing and future maximum day demands of the system.

The Village is primarily a residential and commercial community; therefore, sizing the tank for industrial and institutional fire flows would be excessive. Additional storage capacity is not recommended at this time. However, an additional well to increase the firm well/pump capacity is recommended.

Table 16 shows the estimated storage needed for the future maximum day demand. The estimated change in storage needed over the next twenty years is minimal. As shown, the increase in the firm well/pump capacity (Firm Well Flow) is twice the capacity as the existing flow. This increase provides a sufficient firm well/pump capacity to meet the maximum day demand as well as additional firefighting flow.

TABLE 16
REQUIRED STORAGE CAPACITY FOR FIRE FIGHTING
(2039 PROJECTED MAXIMUM DAY DEMAND)

Classification	Desired Fire Flow at 20 psi (gpm)	Duration (hr)	Maximum Day Demand (gpm)	Total Flow Required (system outflow) (gpm)	Firm Well Flow (system inflow) (gpm)	Net (system outflow) (gpm)	Total Storage Required (gal)	Existing Storage (gal)	Addt'l Storage Required (gal)
Residential	1,000	2	263	1,263	900	363	43,618	300,000	0
Commercial	2,000	2	263	2,763	900	1,863	223,618	300,000	0
Industrial	3,000	3	263	3,263	900	2,363	425,427	300,000	125,427
Institutional	3,500	3	263	3,763	900	2,863	515,427	300,000	215,427

VI. RECOMMENDED IMPROVEMENTS

Recommended improvements have been separated into three groups. The first group consists of general improvements while the second and third groups are recommended short and long term improvements to the distribution system.

Figure 4 shows the recommended improvements. Figure 5 shows available future 2024 fire flows with recommended short term improvements and Figure 6 shows the fire flows under the 2039 maximum day demand with the long term recommended improvements.

Table 17 provides a comparison of the future available 2039 fire flows to the recommended target fire flows after completion of all of the recommended improvements.

TABLE 17
COMPARISON OF AVAILABLE FIRE FLOW TO TARGET FIRE FLOWS
AFTER COMPLETION OF RECOMMENDED IMPROVEMENTS

Test Number	Location	Recommended Target Fire Flow @ 20 psi (gpm)	2039 Available Fire Flow @ 20 psi (WaterCAD) (gpm)	Difference Between Target & Available (%)
1	Cass St., N of Shaw St.	2,000	2,064	3.1%
2	Grant St. & Edgerton St.	1,000	2,625	61.9%
3	Orton Ave., N of Hazel St.	1,000	5,000	80.0%
4	Orton Ave., N of Walnut St.	1,000	5,000	80.0%
5	Shaw St. 1st W of Sycamore St.	2,000	1,778	-12.4%
6	Pine St, S of Joy St.	1,000	3,285	69.6%
7	Washburn, 2nd W of Ensley	1,000	4,475	77.7%

As seen in Table 17, the recommended improvements increase the available fire flow above the target fire flows at all but one location. Test 5 is slightly less than the target flow, however no further improvements are recommended at this time.

Recommended Improvements – Estimated Cost

Distribution system improvements are recommended to improve available fire flows and overall system reliability. These improvements are shown in Figure 4. The recommended improvements should be considered and implemented by Village officials as funding allows and concurrent with any proposed road improvements, for cost savings. The Village should plan on replacing the remaining 4-inch or smaller watermains as road improvements are conducted in the Village.

Estimated costs are included with the recommended improvements. They are meant to be rough estimates for budgeting purposes only. They include appurtenances such as valves, hydrants, fittings, water services, restoration, engineering and contingencies. A unit price of $120 per foot was used for 8-inch watermain and $130 per foot for 12-inch watermain. It is assumed that the watermains could be placed outside of the paved roadway. The costs are estimated to increase by anywhere from $50 per foot to $100 per foot if watermain must be constructed within the paved roadway, depending on the amount and type of road construction.

Recommended Improvements

SHORT TERM (5-YEAR) DISTRIBUTION IMPROVEMENTS:

1.	Install radio telemetry system.	$35,000
2.	Install new pump at Well No. 3.	$30,000
3.	Upgrade interior and exterior of Well house No. 3.	$25,000
4.	Install new well and well house	$400,000
5.	Lead service line investigation & replacement.	Varies
6.	Loop 1,300 feet of 8-inch watermain from 6-inch watermain on Legion St. to Orton Ave. to Well No. 5.	$156,000
7.	Replace 2,400 feet of 4-inch watermain with 8-inch watermain on Ensley from Walnut to Williams St.	$288,000
8.	Replace 1,000 feet of 4-inch watermain with 8-inch watermain on Williams St. from Ensley to Grant St.	$120,000
9.	Replace 500 feet of 4-inch watermain with 8-inch watermain on Grant from Williams St. to Edgerton St.	$60,000
10.	Replace 800 feet of 4-inch watermain with 8-inch watermain on Edgerton St. from Grant to Orton Ave.	$96,000
11.	Replace 600 feet of 6-inch watermain with 12-inch watermain from the water tower to Walnut St. on Cedar St.	$78,000
12.	Replace 800 feet of 4-inch watermain with 8-inch watermain on Park from Orton Ave. to Locust St.	$96,000
13.	Replace 1,400 feet of 4-inch and smaller watermain with 8-inch watermain on Locust from Park to Cherry St.	$168,000
14.	Replace 300 feet of 2-inch watermain with 8-inch watermain and extend with 100 feet of 8-inch watermain from Locust & Emory to Poplar and south on Poplar St. to existing 4-inch watermain.	$48,000
15.	Loop 850 feet of 8-inch watermain on Washburn St. from Orton Ave. to the alley between Locust St. and Poplar St., attaching to the 6-inch watermains dead ends in the alleys between Cherry and Locust, and Locust and Poplar St.	$102,000
	SHORT TERM DISTRIBUTION IMPROVEMENTS TOTAL COST:	**$1,702,000**

LONG TERM (20-YEAR) DISTRIBUTION IMPROVEMENTS:

1.	Loop 1,000 feet of 8-inch watermain on Sycamore St. from Shaw Ln. to Chestnut St.	$120,000
2.	Loop 1,900 feet of 8-inch watermain on Chestnut from Sycamore to Hemlock St.	$228,000
3.	Loop 800 feet of 8-inch watermain on Lake Montcalm from Henkel to Barberry St.	$96,000
4.	Replace 500 feet of 1-inch watermain with 8-inch watermain on Cass from Williams to Edgerton St.	$60,000
5.	Replace 400 feet of 2-inch watermain with 8-inch watermain on Joy from Pine to Cedar St.	$48,000
6.	Replace 800 feet of 2-inch watermain with 8-inch watermain on Sherman from Shaw to Emory At.	$96,000
7.	Replace 500 feet of 1-inch watermain with 8-inch watermain on Ash from Walnut to Cherry St.	$60,000
8.	Loop 600 feet of 8-inch watermain from Shaw & Orton to Spruce and south to existing 2-inch watermain.	$72,000
9.	Replace 400 feet of 2-inch watermain with 8-inch watermain on Williams from Grant to Sherman St.	$48,000
10.	Replace 300 feet of 2-inch watermain with 8-inch watermain on Lincoln from Williams to Rathburn St.	$36,000
11.	Loop 300 feet of 8-inch watermain on Lincoln from Shaw to Edgerton St.	$36,000
12.	Loop 1000 feet of 8-inch watermain from Shaw and Hemlock north to Edgerton then west to the 6-inch watermain on Mulberry St.	$120,000
13.	Replace remaining 18,000 feet of 4-inch or smaller watermains with 8-inch watermain.	$2,160,000
	LONG TERM DISTRIBUTION IMPROVEMENTS TOTAL COST:	**$3,180,000**
	TOTAL COST OF RECOMMENDED IMPROVEMENTS:	**$4,882,000**

VII. FUNDING SOURCES

Five possible sources of funding have been identified for the Village of Howard City to complete the recommended improvement projects. A brief description of each follows:

Drinking Water Revolving Fund

This is a preferred alternative. It is a low interest loan program sponsored by the Michigan Department of Environmental Quality. Some communities may be eligible for principle forgiveness under the Green Project Reserve funding if the project reduces system energy use or provides water conservation.

The program is competitive and projects are scored on a point system that ranks them on a priority list. Not all projects submitted are funded so it is important to maximize points on the application. Requirements include a fairly extensive project plan, but most expenses, including the project plan, are eligible activities that can be rolled into the loan. In order for a community to be competitive, they should have a completed wellhead protection program. Applications are submitted by May 1st of every year.

USDA - Rural Utilities Service Grants or Loans (formerly FHA)

Rural Utility Service offers grants and loans for water improvements to communities with a low to moderate average household income. Since the Village's median average household income is not in the low to moderate range, it may be difficult to obtain grant dollars for a project. There are two types of loans available from RUS: direct loans and guaranteed loans.

Direct loans are only issued if the Village is unable to obtain funding from other sources at reasonable rates.

Guaranteed loans are made and serviced by lenders such as banks and savings and loan associations. Guarantees will not exceed 80 percent on any loss of interest and principal on the loan.

Special Assessment Bonds

Special assessments levied under PA 188 of 1954 are one of the most common ways to finance infrastructure improvements. The Village may levy special assessments against properties that receive special benefits from a public improvement. Property owners have petition rights that must be satisfied before the special assessment can go forward.

Special assessments typically can be repaid in installments with interest. The bonds may not exceed the amount of the special assessment roll, and may be secured secondarily by a pledge of the Village's full faith and credit.

Revenue Bonds

Revenue bonds are authorized by PA 94 of 1933. They authorize the Village to borrow money and issue bonds. They are paid from user fees generated by the operation of the improvements.

Revenue bonds are subject to the right of referendum. Petitions for a public vote can be filed by registered Village voters during a 45-day referendum period. Voter approval is not required if the referendum period expires without petitions being filed.

Contract Bonds

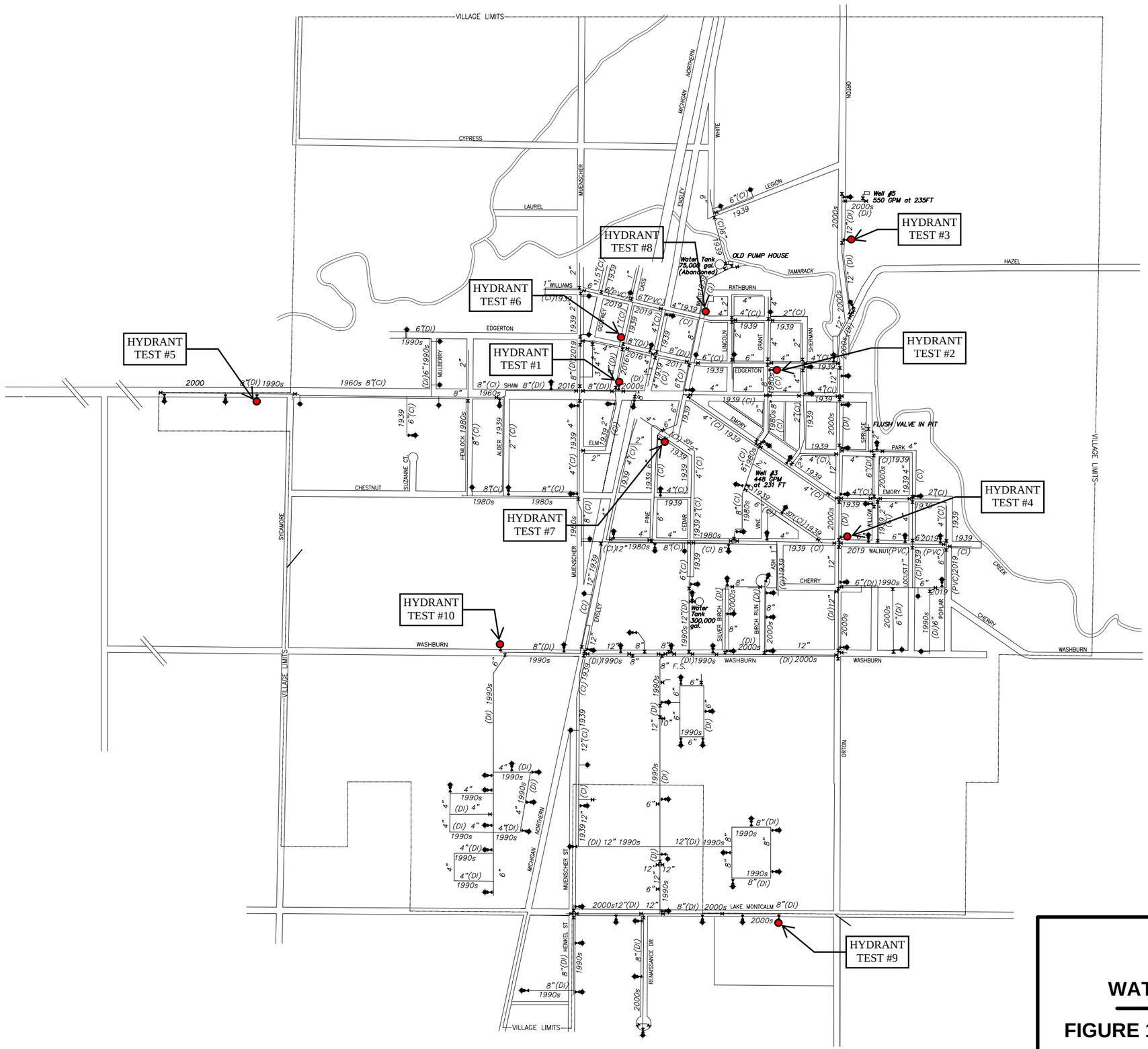
Contract bonds are authorized by several state laws. They authorize the Village to enter into an agreement with the County or a public authority in order to have the County or authority issue bonds on behalf of the Village.

The Village may want to consider a contract bond as the County may be able to borrow at a more favorable rate than the Village if they are willing to pledge its taxing power as secondary security for repayment of the bonds. Also contract bonds may be paid back by a number of sources including: specials assessments, connection fees, and user fees.

Economic Development Administration (EDA) and Michigan Economic Development Commission (MEDC)

EDA and MEDC fund infrastructure improvements when a business or industry is interested in locating in a community that will need to provide infrastructure improvements to support the incoming industry.

As an example, if an industry wanted to locate in the Village where there is not currently watermain, or the watermain is undersized to serve the business, these organizations could assist in funding the improvements. Also, water supply and/or storage improvements could be funded with grant dollars if the improvements are necessary to support the new business.



NORTH

LEGEND

8" / 1939 (CI) — WATERMAIN WITH PIPE SIZE YEAR BUILT & (TYPE)

028 — FIRE HYDRANT & NUMBER

HYDRANTS - 123

VILLAGE OF HOWARD CITY

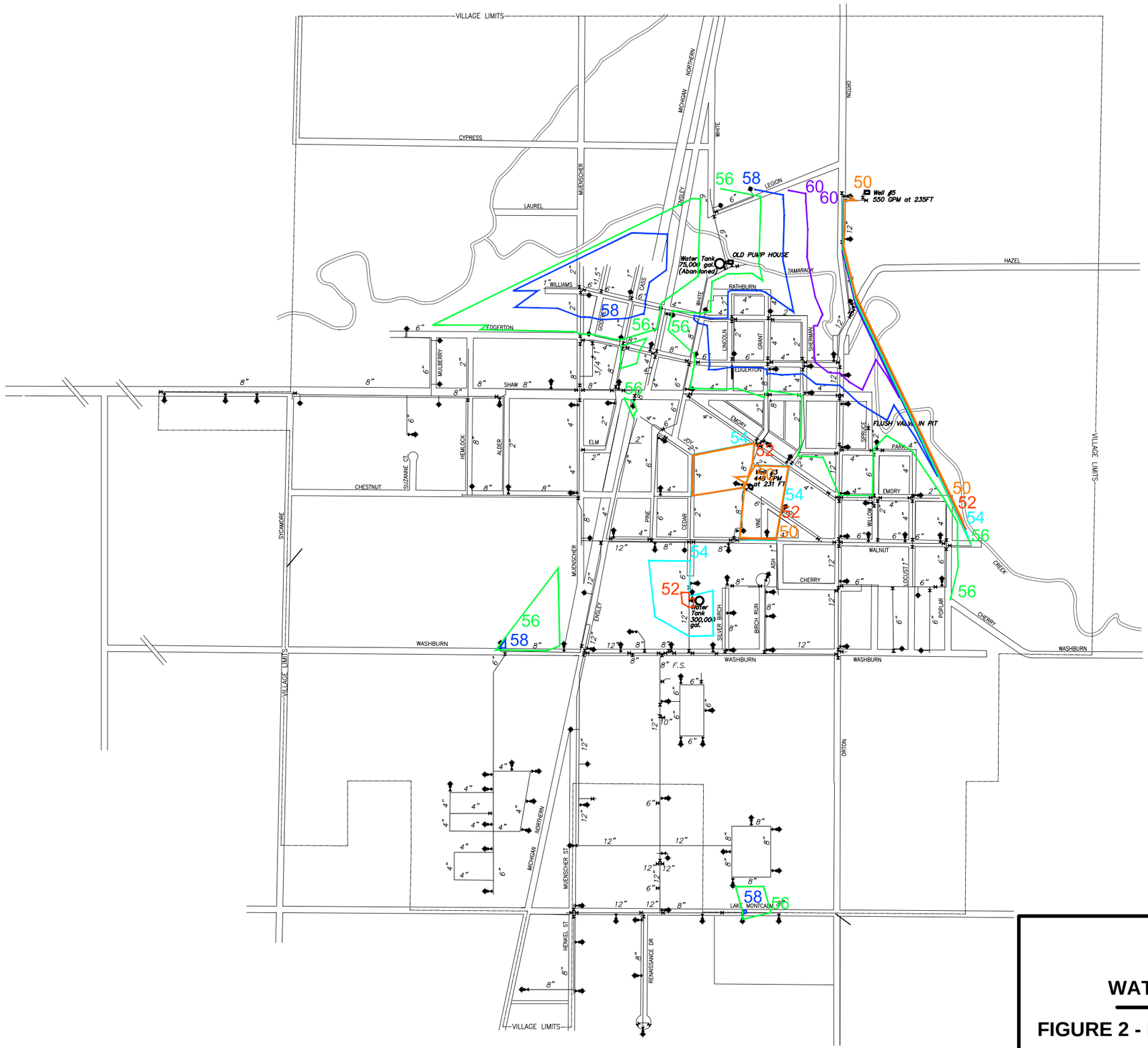
MONTCALM COUNTY, MICHIGAN

WATER RELIABILITY STUDY 2020

FIGURE 1 - EXISTING WATER SYSTEM

F&V PROJECT NO. 842330

F&V



NORTH

LEGEND

8" / 1939 (CI) — WATERMAIN WITH PIPE SIZE YEAR BUILT & (TYPE)

028 — FIRE HYDRANT & NUMBER

HYDRANTS - 123

XX PSI — STATIC PRESSURE CONTOURS

VILLAGE OF HOWARD CITY

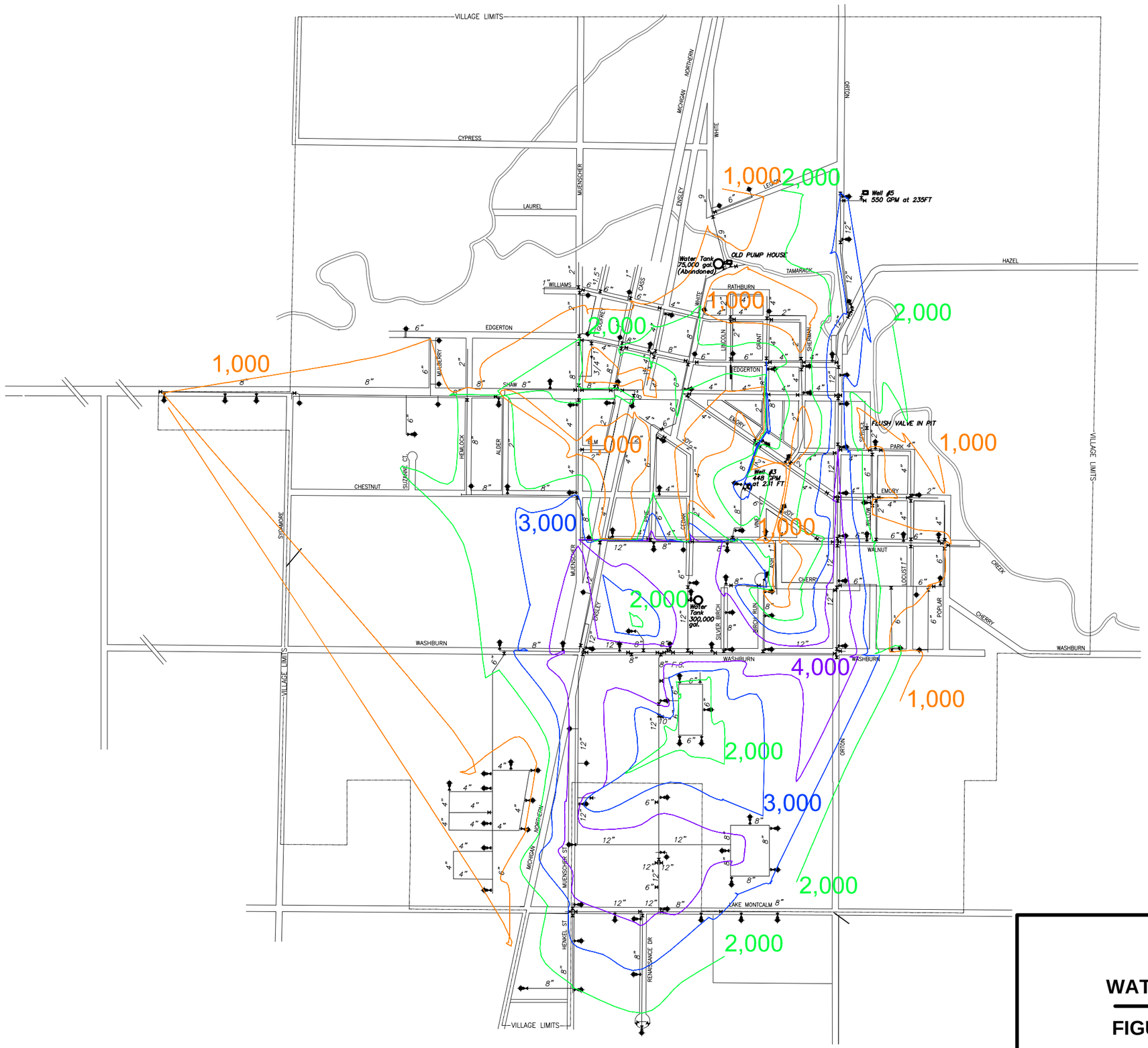
MONTCALM COUNTY, MICHIGAN

WATER RELIABILITY STUDY 2020

FIGURE 2 - EXISTING STATIC PRESSURE

F&V PROJECT NO. 842330

F&V



NORTH

LEGEND

8" / 1939 (CI) — WATERMAIN WITH PIPE SIZE YEAR BUILT & (TYPE)

028 — FIRE HYDRANT & NUMBER

HYDRANTS - 123

XX GPM — AVAILABLE FIRE FLOW CONTOURS

VILLAGE OF HOWARD CITY

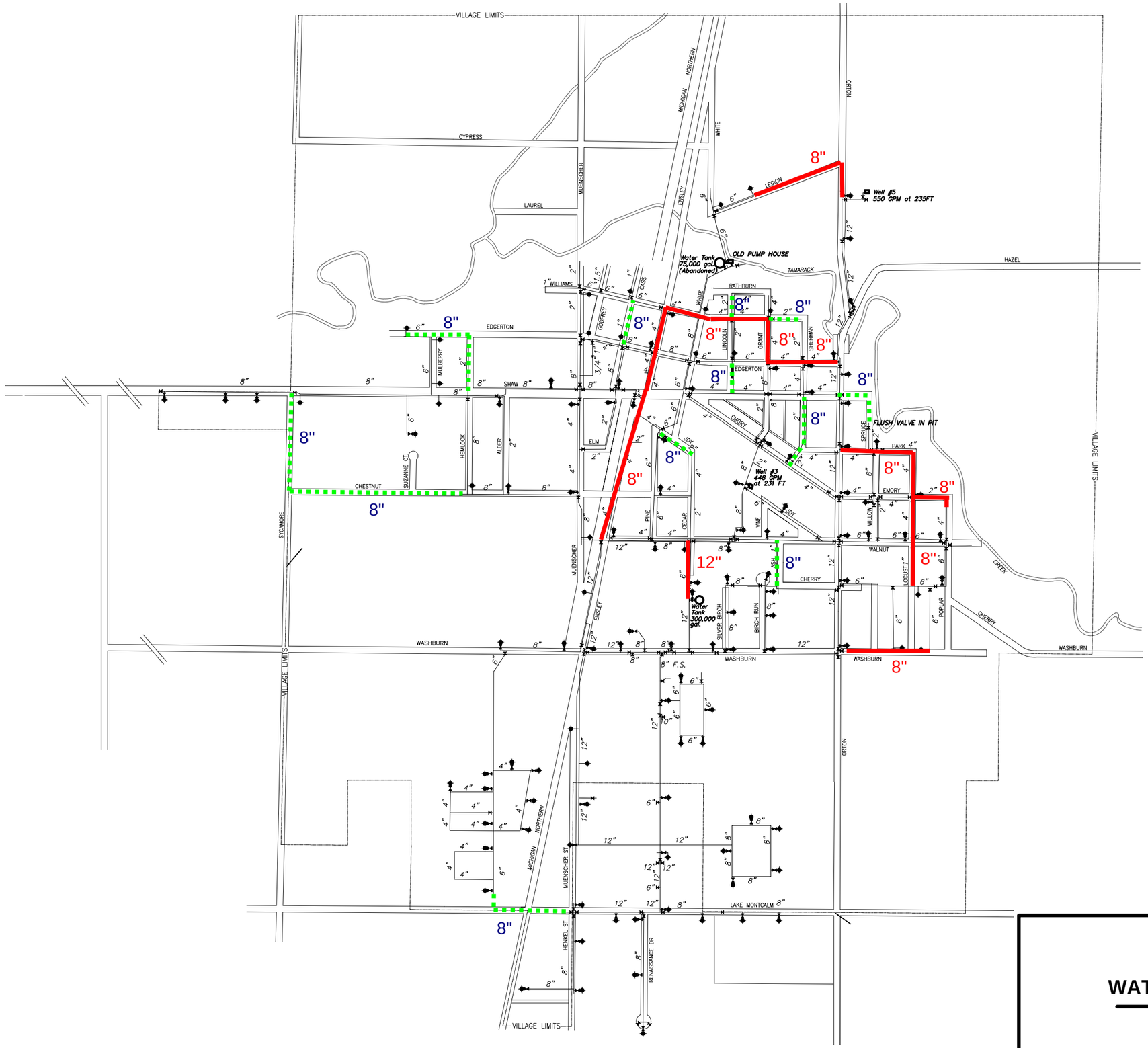
MONTCALM COUNTY, MICHIGAN

WATER RELIABILITY STUDY 2020

FIGURE 3 - EXISTING FIRE FLOW 2019 MAX DEMAND

F&V PROJECT NO. 842330

F&V



NORTH

LEGEND

8" / 1939 (CI) — WATERMAIN WITH PIPE SIZE YEAR BUILT & (TYPE)

028 — FIRE HYDRANT & NUMBER

HYDRANTS - 123

SHORT TERM IMPROVEMENTS

LONG TERM IMPROVEMENTS

GENERAL IMPROVEMENTS:
- INSTALL RADIO TELEMETRY SYSTEM
- INSTALL NEW PUMP AT WELL NO. 3
- UPGRADE INTERIOR AND EXTERIOR OF WELL HOUSE NO. 3
- LEAD SERVICE LINE INVESTIGATION & REPLACEMENT
- REPLACE REMAINING 18,000 FEET OF 4-INCH OR SMALLER WATERMAINS WITH 8-INCH WATERMAIN

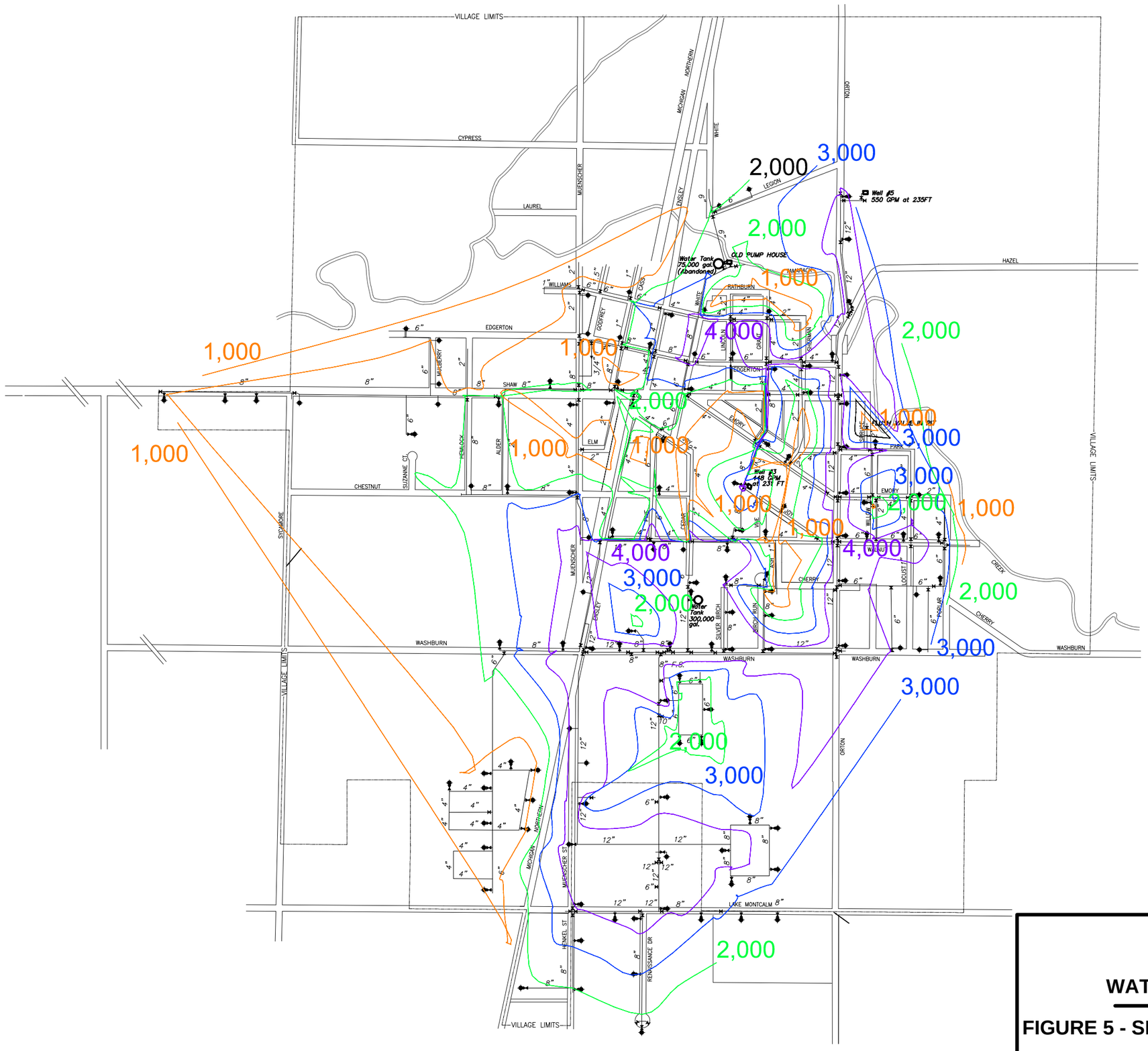
VILLAGE OF HOWARD CITY
MONTCALM COUNTY, MICHIGAN

WATER RELIABILITY STUDY 2020

FIGURE 4 - RECOMMENDED IMPROVEMENTS

F&V PROJECT NO. 842330

F&V



NORTH

LEGEND

8" / 1939 (CI) — WATERMAIN WITH PIPE SIZE YEAR BUILT & (TYPE)

028 — FIRE HYDRANT & NUMBER

HYDRANTS - 123

XX GPM — AVAILABLE FIRE FLOW CONTOURS

VILLAGE OF HOWARD CITY

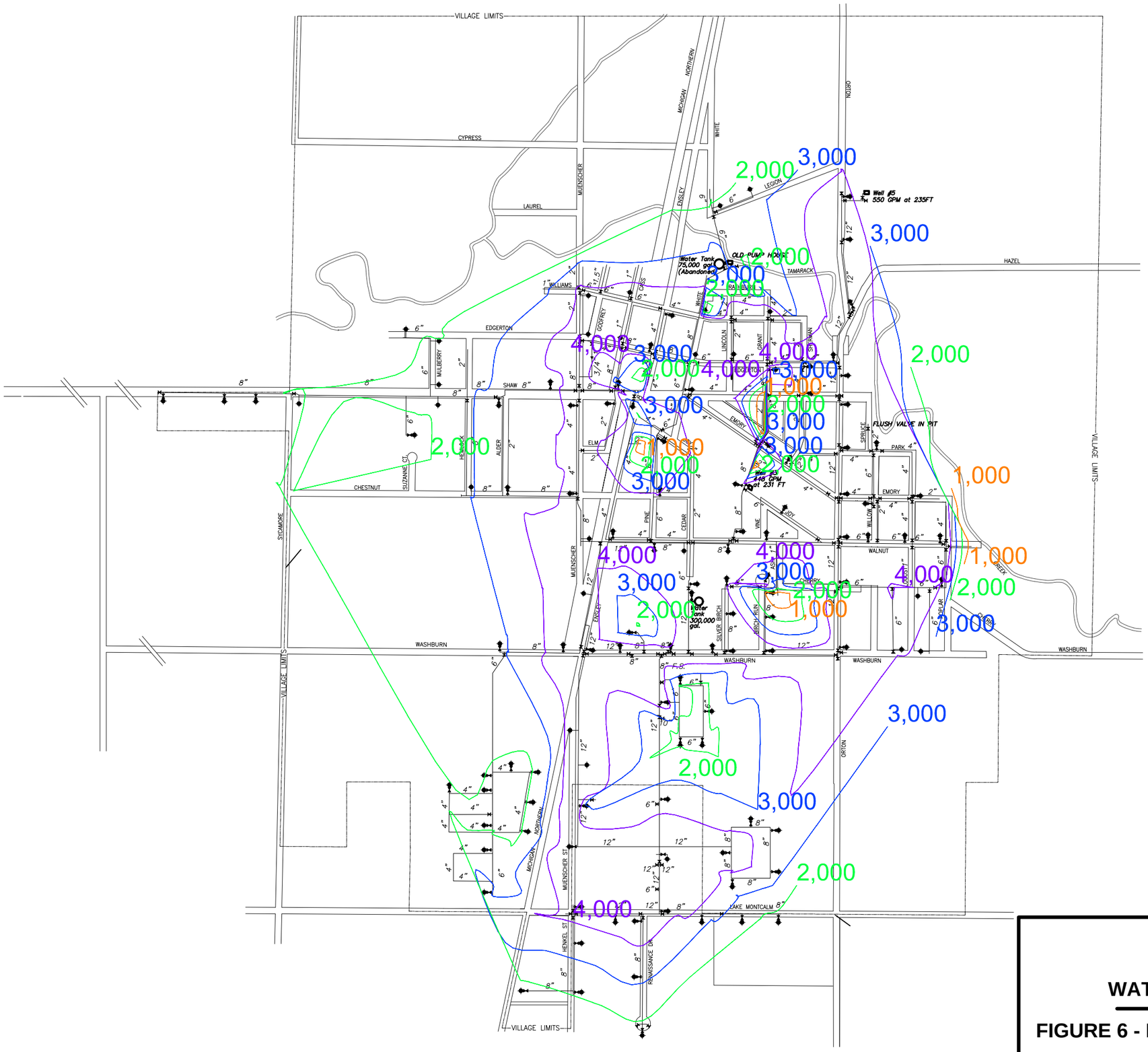
MONTCALM COUNTY, MICHIGAN

WATER RELIABILITY STUDY 2020

FIGURE 5 - SHORT TERM IMPROVEMENTS 2024 MAX DEMAND

F&V PROJECT NO. 842330

F&V



VILLAGE OF HOWARD CITY
MONTCALM COUNTY, MICHIGAN
WATER RELIABILITY STUDY 2020

FIGURE 6 - LONG TERM IMPROVEMENTS
2039 MAX DEMAND

F&V PROJECT NO. 842330

F&V

Junction Report

Label	Current Average Day Demand		Current Max Day Demand		2024 Max Day Demand		2039 Max Day Demand	
	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)
F-1	1,666	56	1,963	55	1,575	55	2,064	55
F-2	1,710	58	2,069	58	2,455	58	2,625	58
F-3	2,240	60	3,164	60	4,333	60	5,000	60
F-4	3,598	54	4,491	55	5,000	55	5,000	55
F-5	1,123	55	1,142	55	1,115	55	1,778	55
F-6	1,513	55	1,692	55	1,649	55	5,000	55
F-7	4,734	55	5,000	55	5,000	55	5,000	55
F-7 - OLD	1,202	55	1,797	55	1,899	55	3,285	55
F-8	1,087	55	947	55	1,290	55	1,332	55
F-9	1,464	55	2,164	55	2,193	55	1,822	55
F-10 OLD	2,184	58	2,386	58	2,442	58	2,759	58
F-10.1	3,520	55	3,927	55	4,186	55	4,475	55
J-1	617	55	622	55	609	55	2,804	55
J-2	275	59	895	59	1,822	59	4,053	59
J-4	1,199	59	817	59	1,656	59	5,000	59
J-5	75	59	74	59	74	59	3,048	59
J-6	22	55	22	55	(N/A)	(N/A)	(N/A)	(N/A)
J-7	2,048	55	2,305	55	3,627	55	4,828	55
J-8	2,933	55	3,315	55	4,026	55	5,000	55
J-9	296	55	296	55	296	55	405	55
J-10	(N/A)	(N/A)	(N/A)	(N/A)	3,343	60	3,707	60
J-11	(N/A)	(N/A)	(N/A)	(N/A)	2,676	55	4,035	55
J-19	(N/A)	(N/A)	(N/A)	(N/A)	2,859	55	4,382	55
J-21	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4,927	55
J-22	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2,037	55
J-24	3,517	55	3,787	55	4,865	55	5,000	55
J-25	784	55	797	55	811	55	5,000	55
J-26	4,934	55	5,000	55	5,000	55	5,000	55
J-27	2,086	55	2,313	55	1,921	55	4,397	55
J-28	2,460	58	3,030	58	4,670	58	5,000	58
J-30	1,969	55	2,174	55	3,926	55	5,000	55
J-32	2,200	55	2,529	55	1,889	55	5,000	55
J-33	1,634	58	1,434	58	4,203	58	5,000	58
J-35	2,081	55	2,307	55	1,929	55	4,439	55
J-39	2,542	55	2,650	55	2,651	55	3,681	55
J-40	1,303	55	1,334	55	1,294	55	2,120	55
J-42	956	55	924	55	4,042	55	5,000	55
J-43	2,058	55	2,281	55	2,018	55	3,719	55
J-45	88	58	88	58	89	58	2,681	58
J-46	456	58	455	58	588	58	3,425	58
J-47	75	58	79	58	79	58	3,096	58
J-48	67	58	71	58	71	58	3,122	58
J-49	1,492	55	1,201	55	2,388	55	2,645	55
J-50	1,295	55	1,087	54	1,788	54	1,895	54
J-51	1,337	55	1,372	55	1,426	55	5,000	55
J-52	108	55	108	55	108	55	109	55
J-53	60	55	60	55	60	55	60	55
J-55	3,329	55	4,002	55	5,000	55	5,000	55
J-56	2,294	55	1,985	55	4,332	55	5,000	55
J-57	1,053	55	1,055	55	1,580	55	5,000	55
J-58	10	55	9	54	8	54	2,687	55
J-58	713	55	713	55	835	55	4,378	55
J-59	3,667	55	3,811	55	3,985	55	4,161	55

Label	Current Average Day Demand		Current Max Day Demand		2024 Max Day Demand		2039 Max Day Demand	
	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)
J-59	1,809	55	398	55	3,572	55	4,676	55
J-60	85	55	85	55	85	55	4,855	55
J-60	498	55	310	55	516	55	519	55
J-61	3,061	55	3,700	55	5,000	55	5,000	55
J-61	5,000	55	5,000	55	5,000	55	5,000	55
J-62	1,817	55	1,226	55	3,602	55	4,769	55
J-62	2,780	55	2,931	55	3,002	55	3,004	55
J-63	2,041	55	1,568	55	4,445	55	5,000	55
J-63	2,280	55	2,523	55	(N/A)	(N/A)	4,173	55
J-64	353	55	353	55	352	55	3,229	55
J-65	1,269	55	1,828	55	1,944	55	3,800	55
J-66	1,253	55	1,821	55	1,933	55	3,999	55
J-66	474	55	1,895	437	1,905	437	1,966	437
J-67	1,032	55	2,033	55	2,150	55	4,492	55
J-68	2,335	55	2,046	55	4,362	55	5,000	55
J-70	700	55	624	55	623	55	2,162	55
J-71	664	55	590	55	589	55	2,268	55
J-75	4,530	55	5,000	55	5,000	55	5,000	55
J-76	3,691	55	4,449	55	4,706	55	4,716	55
J-77	3,474	55	4,498	55	4,764	55	5,000	55
J-78	3,062	55	3,710	55	3,859	55	4,226	55
J-79	203	55	208	55	2,197	55	3,776	55
J-80	106	55	107	55	128	55	149	55
J-81	2,161	60	2,995	60	4,083	60	4,742	60
J-82	2,290	60	3,213	60	4,410	60	5,000	60
J-83	3,155	55	3,602	55	3,738	55	3,786	55
J-84	2,849	55	3,169	55	3,262	55	3,324	55
J-85	1,361	55	965	55	2,435	55	2,745	55
J-86	1,436	55	993	55	2,540	55	2,865	55
J-87	118	55	109	55	108	55	3,883	55
J-88	2,076	55	2,310	55	1,935	55	4,486	55
J-89	2,261	58	2,669	58	3,480	58	5,000	58
J-90	2,450	58	3,006	58	4,883	58	5,000	58
J-92	4,389	55	4,988	55	5,000	55	5,000	55
J-93	13	59	88	59	13	59	3,023	59
J-95	912	55	907	55	3,871	55	5,000	55
J-96	119	55	119	55	118	55	2,679	55
J-97	55	55	55	55	54	55	2,333	55
J-98	3,537	55	3,801	55	4,912	55	5,000	55
J-100	2,857	55	2,979	55	3,052	55	4,586	55
J-101	3,737	55	3,937	55	4,406	55	5,000	55
J-102	1,213	58	1,300	58	4,613	58	5,000	58
J-104	252	55	263	55	1,920	55	4,133	55
J-105	5,000	55	5,000	55	5,000	55	5,000	55
J-106	1,079	55	1,081	55	4,265	55	5,000	55
J-107	1,714	55	931	55	3,252	55	3,841	55
J-108	3,511	55	4,275	55	5,000	55	5,000	55
J-109	3,750	55	4,543	55	5,000	55	5,000	55
J-111	767	55	778	55	3,132	55	4,540	55
J-113	2,205	57	2,430	55	1,871	55	5,000	55
J-114	1,500	55	1,524	55	1,534	55	1,721	55
J-115	1,416	55	1,436	55	1,444	55	1,622	55
J-117	2,512	55	3,056	55	4,195	55	5,000	55
J-118	954	55	777	55	1,406	55	1,585	55
J-119	1,016	55	810	55	1,615	55	1,818	55
J-121	526	55	553	55	555	55	5,000	55

Label	Current Average Day Demand		Current Max Day Demand		2024 Max Day Demand		2039 Max Day Demand	
	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)
J-122	379	55	373	55	374	55	4,037	55
J-123	1,812	55	1,976	55	1,999	55	2,108	55
J-124	2,163	55	2,266	55	2,200	55	2,922	55
J-125	5,000	55	5,000	55	5,000	55	5,000	55
J-126	2,616	60	3,500	60	4,894	60	5,000	60
J-127	3,166	55	3,617	55	3,755	55	3,808	55
J-128	2,850	55	3,170	55	3,264	55	3,327	55
J-129	969	58	845	58	3,883	58	5,000	58
J-130	543	55	546	55	2,885	55	4,246	55
J-132	1,673	55	1,693	55	1,708	55	1,918	55
J-135	2,318	58	2,742	58	3,741	58	5,000	58
J-136	3,142	55	3,232	55	3,343	55	3,489	55
J-137	5,000	55	5,000	55	5,000	55	5,000	55
J-138	2,769	60	3,626	60	5,000	60	5,000	60
J-139	1,664	55	1,754	55	1,771	55	1,848	55
J-140	3,384	55	4,314	55	4,547	55	4,852	55
J-141	927	55	4,425	55	5,000	55	5,000	55
J-142	1,475	55	1,499	55	1,508	55	1,692	55
J-145	5,000	55	5,000	55	5,000	55	5,000	55
J-146	5,000	55	5,000	55	5,000	55	5,000	55
J-147	1,532	55	1,629	55	1,642	55	1,723	55
J-148	671	55	570	55	569	55	1,890	55
J-149	760	55	682	55	681	55	1,882	55
J-150	90	58	90	58	90	58	3,592	58
J-151	1,196	55	1,270	55	3,681	55	5,000	55
J-152	1,229	59	1,218	59	2,971	59	5,000	59
J-153	1,588	55	1,253	55	2,796	55	3,218	55
J-154	2,117	55	2,354	55	2,033	55	4,665	55
J-155	3,121	55	3,465	55	4,186	55	5,000	55
J-157	791	55	793	55	799	55	4,843	55
J-158	1,406	55	1,423	55	1,468	55	5,000	55
J-159	83	55	82	55	2,992	55	4,470	55
J-160	2,036	55	2,175	55	2,031	55	2,928	55
J-161	2,036	55	2,200	55	2,018	55	3,265	55
J-162	2,868	55	3,281	55	4,062	55	5,000	55
J-163	3,317	55	3,984	55	5,000	55	5,000	55
J-164	1,811	55	2,021	55	1,859	55	4,570	55
J-165	741	55	738	55	735	55	4,303	55
J-168	4,905	55	5,000	55	5,000	55	5,000	55
J-169	2,107	55	2,294	55	2,344	55	2,632	55
J-171	5,000	55	5,000	55	5,000	55	5,000	55
J-172	455	55	456	55	456	55	5,000	55
J-173	175	55	175	55	175	55	5,000	55
J-175	1,715	55	1,753	55	1,767	55	1,979	55
J-176	478	55	568	55	1,079	55	(N/A)	(N/A)
J-177	1,176	55	1,287	55	1,359	55	5,000	55
J-178	627	55	633	55	1,083	55	1,289	55
J-179	193	55	198	55	2,315	55	3,793	55
J-180	187	55	191	55	2,411	55	3,836	55
J-181	1,407	55	1,905	55	2,054	55	3,411	55
J-182	2,303	55	2,736	55	4,116	55	5,000	55
J-184	779	55	883	55	894	55	5,000	55
J-185	5,000	55	5,000	55	5,000	55	5,000	55
J-186	1,982	55	2,041	55	2,064	55	2,305	55
J-187	1,073	55	1,256	55	1,281	55	4,478	55
J-188	1,345	58	1,109	58	4,089	58	5,000	58

Label	Current Average Day Demand		Current Max Day Demand		2024 Max Day Demand		2039 Max Day Demand	
	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)
J-189	786	55	709	55	708	55	1,873	55
J-190	743	55	664	55	662	55	1,978	55
J-191	842	55	869	55	873	55	5,000	55
J-192	1,173	55	1,176	55	2,044	55	5,000	55
J-193	1,150	55	1,147	55	4,188	55	5,000	55
J-196	4,389	55	4,618	55	5,000	55	5,000	55
J-197	5,000	55	5,000	55	5,000	55	5,000	55
J-198	2,219	55	2,314	55	2,356	55	2,605	55
J-199	4,642	55	5,000	55	5,000	55	5,000	55
J-200	617	55	548	55	547	55	3,769	55
J-201	2,201	55	2,408	55	2,466	55	2,891	55
J-202	2,159	60	2,992	60	4,075	60	4,732	60
J-204	765	58	751	58	3,893	58	4,918	58
J-205	2,280	55	2,381	55	2,340	55	3,284	55
J-207	1,995	55	2,236	55	1,971	55	4,405	55
J-208	1,185	59	827	59	1,733	59	4,273	59
J-209	13	59	41	59	13	59	3,070	59
J-210	667	55	667	55	3,699	55	4,584	55
J-211	972	55	983	55	965	55	1,347	55
J-212	414	55	399	55	2,746	55	4,333	55
J-214	4,534	55	4,898	55	5,000	55	5,000	55
J-216	1,590	55	1,651	55	1,580	55	2,412	55
J-217	1,068	55	1,084	55	1,061	55	1,359	55
J-218	914	55	844	55	832	55	1,457	55
J-219	1,048	55	982	55	964	55	2,202	55
J-221	5,000	55	5,000	55	5,000	55	5,000	55
J-222	233	55	241	55	1,994	55	3,933	55
J-224	1,716	55	1,316	55	3,067	55	3,629	55
J-226	1,134	55	869	55	2,207	55	2,478	55
J-227	864	55	724	55	2,397	55	2,607	55
J-228	1,705	55	993	55	3,456	55	4,064	55
J-229	925	55	728	55	3,182	55	3,462	55
J-230	5,000	51	5,000	51	5,000	51	5,000	51
J-234	621	55	514	55	512	55	1,893	55
J-235	579	55	580	55	583	55	5,000	55
J-236	1,156	59	834	59	1,793	59	4,153	59
J-237	768	55	771	55	776	55	4,786	55
J-239	1,243	55	918	55	2,297	55	2,586	55
J-240	11	59	11	59	11	59	2,788	59
J-241	5,000	55	5,000	55	5,000	55	5,000	55
J-242	4,828	55	5,000	55	5,000	55	5,000	55
J-243	3,496	55	4,252	55	5,000	55	5,000	55
J-244	1,731	55	1,812	55	1,722	55	2,613	55
J-246	1,725	55	1,099	55	3,941	55	4,678	55
J-247	614	55	503	55	501	55	1,868	55
J-248	5,000	55	5,000	55	5,000	55	5,000	55
J-250	941	55	826	55	3,972	55	4,405	55
J-251	1,654	55	1,892	55	2,074	55	5,000	55
J-252	4,963	55	5,000	55	5,000	55	5,000	55
J-253	4,827	55	5,000	55	5,000	55	5,000	55
J-254	2,111	55	2,393	55	3,442	55	4,975	55
J-256	834	55	756	55	755	55	1,936	55
J-257	3,011	60	3,802	60	5,000	60	5,000	60
J-454	3,649	55	3,792	55	3,970	55	4,151	55
J-455	1,804	55	1,274	55	3,373	55	3,916	55
J-456	2,175	60	3,025	60	4,126	60	4,800	60

Label	Current Average Day Demand		Current Max Day Demand		2024 Max Day Demand		2039 Max Day Demand	
	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)
J-458	3,081	55	3,428	55	4,137	55	5,000	55
J-459	5,000	55	5,000	55	5,000	55	5,000	55
J-460	3,014	55	3,378	55	4,078	55	5,000	55
J-461	1,623	55	2,370	55	2,409	55	2,177	55
J-463	2,184	55	2,385	55	2,442	55	2,759	55
J-473	4,983	55	5,000	55	5,000	55	5,000	55
J-475	1,043	55	1,972	55	2,081	55	3,788	55
J-476	275	59	897	59	1,838	59	4,180	59
J-477	4,491	55	5,000	55	5,000	55	5,000	55
J-478	9	55	8	54	7	54	24	55
J-480	3,620	55	4,330	55	4,567	55	4,567	55
J-493	1,675	55	1,745	55	1,789	55	5,000	55
J-495	2,246	55	2,666	55	3,795	55	5,000	55
J-496	2,010	58	2,228	58	4,122	58	5,000	58
R-1	1,667	55	2,017	55	2,492	55	3,501	55
R-2	2,682	55	3,162	55	3,985	55	5,000	55
R-3	2,572	60	3,463	60	4,799	60	5,000	60
R-4	4,072	55	4,803	55	5,000	55	5,000	55
R-5	1,193	55	1,216	55	1,183	55	2,050	55
R-6	2,226	55	2,564	55	3,824	55	5,000	55
R-7	354	55	387	55	1,746	55	5,000	55
R-8	1,874	55	2,319	55	2,695	55	5,000	55
R-9	1,677	58	2,447	58	2,486	58	2,254	58
R-10	4,565	55	5,000	55	5,000	55	5,000	55
Sietsema F	1,621	55	2,363	55	2,401	55	2,172	55

APPENDIX C
2025 DRINKING WATER ASSET MANAGEMENT REPORT

PREPARED FOR:

VILLAGE OF HOWARD CITY

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 870660

VILLAGE OF HOWARD CITY
MONTCALM COUNTY, MI

DRINKING WATER
ASSET MANAGEMENT PLAN

January 2025
853450

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

TABLE OF CONTENTS

I. BACKGROUND

A. Service Area

The Village of Howard City is located in northwestern Montcalm County, approximately 35 miles north of the City of Grand Rapids. Howard City has a Type I (public) water supply and distribution system that provides water service to the entire developed land area within the Village limits (2.45 sq mi). As of the 2020 U.S. Census, Howard City has a population of 1,835.

B. Purpose

The purpose of this report is to provide the Village of Howard City with an Asset Management Plan (AMP) and associated Capital Improvements Plan (CIP) for its water system assets, to comply with EGLE and the Michigan Safe Drinking Water Act (Act 399 of 1976). Rule 1606 of Act 399 (R 325.11606) states that a community water supply that serves more than 1,000 people shall implement an asset management program (as defined in R 325.10102).

The intent of asset management is to ensure the long-term sustainability of the water utility by helping the utility manager make informed decisions on when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy. This report is intended to be the master plan for guiding the Village on the overall water system improvements needed to ensure its ability to perpetually deliver the required level of service.

II. ASSET INVENTORY

Howard City's publicly owned water system assets consist of two wells, approximately 18 miles of water main, and an elevated storage tank. A map of the existing system is provided as in Appendix A.

Well #3 is rated for a capacity of 450 gpm and is designated as a standby well due to its higher concentrations of iron and hardness. Well #5 is rated for 625 gpm and produces between 46.7 and 67.5 million gallons of water annually. Water treatment at the wells consists of injection of chlorine for disinfection. The wells are housed in two separate buildings.

Water mains range from 3/4" to 12" in diameter and are composed of cast iron, ductile iron, PVC, and copper. The oldest water mains in the system were constructed around 1930 as part of the original distribution system.

The storage tank has a capacity of 300,000 gallons and is the only storage available for Howard City.

The water asset inventory is presented in Appendix B and provides asset descriptions, year installed, and location. Source, treatment, and storage assets also include manufacturer (where applicable), replacement cost, useful life, and criticality assessment. All information in the asset inventory is based on construction record drawings and other data received from the Village. There is currently a Geographic Information System (GIS) in place for refining the inventory as assets are replaced and further documented.

III. CRITICALITY ASSESSMENT

The criticality of each water system asset is based on a combination of its Likelihood of Failure and its Consequence of Failure. Determining each asset's criticality allows the Village to manage its risk and aids in determining where to spend operation and maintenance dollars and plan capital expenditures.

When determining an asset's Likelihood of Failure, the following factors are considered: asset age, asset material, and asset size. The table below details the Likelihood of Failure rating system. These ratings have been applied to each asset listed in the asset inventory in Appendix B.

Likelihood of Failure		
Rating	**Probability**	**Description**
5	Imminent	Will occur several times in the life of an item
4	Probable	Likely to occur several times in the life of an item
3	Occasional	Likely to occur sometime in the life of an item
2	Remote	Unlikely, but possible to occur in the life of an item
1	Improbable	So unlikely, it can be assumed occurrence may not be experienced

When determining an asset's Consequence of Failure, the following factors are considered: cost of repair, social / environmental impacts, redundancy in the system, and impact to providing quality water. The Consequence of Failure can be high if any one of these considerations is significant or the accumulation of several consideration occur with a failure.

The table below details the Consequence of Failure rating system. These ratings have been applied to each asset listed in the asset inventory in Appendix B.

Consequence of Failure		
Rating	**Consequence**	**Description**
5	Catastrophic disruption	Massive system failure, severe health effects and death, persistent and extensive damage
4	Major disruption	Major effect, major loss of system capacity, major health effects, major costs, important LOS compromised
3	Moderate disruption	Moderate effect, moderate loss of system capacity, moderate health effects, moderate costs, important LOS still achieved
2	Minor disruption	Minor effect, minor loss of system capacity, minor health effects, minor costs
1	Insignificant disruption	Slight effect, slight loss of system capacity, slight health effects

Assessing an asset's criticality requires an examination of its Likelihood of Failure and its Consequence of Failure as discussed above. An analysis reveals which assets have the highest criticality factors and, therefore, which assets require the most attention either for repair or replacement. The following formula is used to determine an asset's criticality:

Criticality Factor = Likelihood of Failure × Consequence of Failure

The criticality factor is converted to a risk rating as shown in Appendix C. The watermain distribution assets were assessed for their corresponding risk rating and a Business Risk Matrix was produced to display the summation of both the total length of pipes and number of pipes that fall into each of the five risk categories. A map showing the location of each segment of pipe and the equivalent risk score is included in Appendix C.

IV. LEVEL OF SERVICE GOALS

The Village of Howard City's mission is to provide the community with continuous, safe drinking water and adequate fire protection that meets or exceeds Federal and State requirements.

The following Level of Service (LOS) goals were developed with the Village administrative staff:

LOS Determinant	Define the Goal	How the Goal is Achieved
Safe Drinking Water	Meet all Federal and State water quality regulations	Monitor water quality: monthly for bacteria, annually for partial chemical, and triennially for metals.
Health & Safety	Provide a safe and injury-free workplace	Conduct regular safety meetings. Incur no MIOSHA safety violations.
Security	Secure all water installations from tampering	Maintain well-lit, fenced and/or locked facilities with proper signage.
Operator Certification	Retain certified personnel to operate and maintain the system	Employ at least 1 operator in charge and 1 backup operator. Operators must maintain a minimum of D-3 and S-3 licenses.
Customer Complaints	Provide excellent customer service	Investigate all customer complaints within 2 business days of report. Report results of the complaint to customer verbally, via the phone, in person, or in writing. Follow up on all complaints to ensure customer satisfaction.
Regulatory Changes	Be aware of regulatory changes and comply with changes as they occur	Attend industry conferences and training sessions to stay informed of changes and requirements. Request annual meeting with local EGLE representative to ensure compliance.
Response Time	Provide excellent customer service	Respond to customer emergencies within 2 hours. Provide customers with written notice 24 hours in advance of any planned interruption in service.
Financial	Maintain funds to address unexpected breakdowns and major expenses	Evaluate water rates every 5 years and adjust the rates/budget accordingly. Seek external funding for major projects as they present themselves. Maintain an operating reserve of 10%.
Water Supply	Maintain all well-related equipment	Have wells and pumps professionally inspected annually, then complete recommended maintenance items. Regularly test and perform maintenance on backup power generators. Maintain well houses in adequate condition.
Water Quality	Provide high-quality, good-tasting drinking water	Maintain water treatment equipment. Flush water mains at least once annually.
Water Storage	Maintain storage tank for longer lifespan	Have the storage tank professionally inspected every 5 years, then complete recommended maintenance items.
Water Distribution	Maintain water mains, hydrants, and valves to ensure good working order	Flush all hydrants at least once annually. Exercise all primary valves on a 4-year rotation. Maintain system pressure above 35 psi but strive for 60-80 psi under normal conditions. Monitor water losses annually and maintain below 10%.
Administrative	Ensure accurate billing	Review discrepancies and correct in a timely fashion.

V. CAPITAL IMPROVEMENTS PLAN

A twenty-year Capital Improvements Plan (CIP) was developed for the Village of Howard City based on the criticality assessment within this report and the latest Water System Reliability Study (WSRS) completed for the Village in October 2020 by Fleis & VandenBrink. The CIP is presented in Appendix D, including anticipated costs and dates of completion. A map of the proposed improvements is provided as Figure 1 in Appendix D.

VI. WATER FINANCIAL PROJECTION STUDY

Utility Financial Solutions, a municipal financial advisor, incorporated the CIP into the Village's water system budget and determined the adjustments to the billing rate structure that will be required to generate sufficient revenue for implementing the CIP. An analysis of the budget over a five-year period is included in Appendix E.

APPENDIX A:
FIGURES

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0 200
SCALE IN FEET

Water Tower
Well House
Fire Hydrant
System Valve
Watermain

WATER SYSTEM

VILLAGE OF HOWARD CITY
MONTCALM COUNTY, MICHIGAN

F&V

APPENDIX B:
ASSET INVENTORY

Source Assets										
Source Assets	Year Installed	Location	Latitude	Longitude	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
Well #3 (12" diameter, 170' deep)	1987	South of Emory St	N43 23.595	W085 27.962		$ 250,000.00	52	2	3	6
Well #5 (12" diameter, 170' deep)	2000	East of Orton Rd	N43 24.092	W085 27.695		$ 250,000.00	65	2	3	6
Well Pump #3 (450 gpm at 240')	1987/ohaul 2005	South of Emory St	N43 23.595	W085 27.962		$ 100,000.00	0	3	3	9
Well Pump #5 (550 gpm at 216')	2000/ohaul 2014	East of Orton Rd	N43 24.092	W085 27.695		$ 100,000.00	9	1	3	3
Well house #3	1987	South of Emory St	N43 23.595	W085 27.962		$ 450,000.00	52	2	3	6
Well house #5	2000	East of Orton Rd	N43 24.092	W085 27.695		$ 450,000.00	65	2	3	6
80 kW generator	1995	Portable			Kohler	$ 100,000.00	10	2	2	4
30 kW generator	1984	Portable			Westinghouse	$ 80,000.00	-1	3	2	6

Treatment Assets										
Treatment Assets	Year Installed	Location	Latitude	Longitude	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
Water Treatment Equipment - Useful life 15 years										
chlorinator (24 gpd)	2000	well #3	N43.100889	W85.239389	LMI A151-91S	$ 2,000.00	0	3	2	6
chlorinator (38.4 gpd)	2015	well #5	N43.095755	W85.238848	Stenner	$ 2,000.00	5	1	2	2
Phosphate (24 gpd)	2000	well #3	N43.100889	W85.239389	LMI A151-91S	$ 2,000.00	0	3	2	6
Phosphate (38.4 gpd)	2015	well #5	N43.095755	W85.238848	Stenner	$ 2,000.00	5	1	2	2

Storage Assets										
Storage Assets	Year Installed	Material	Location / Label	Capacity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
Water Storage - Useful life: 90 years										
Single Pedestal Spheroid Elevated Tank	1998	Steel	625 Cedar St	300,000 gal	Caldwell	$ 2,400,000.00	63	2	4	8

Distribution Assets				
Distribution Assets	Year Installed	Diameter (in)	Material	Total Length (ft)
Watermain - Useful Life Based on Material				
	1930	0.75	CI	451
	1930	1	CI	2280
	1930	1.5	CI	235
	1930	2	CI	6789
	1930	4	CI	17795
	1930	6	CI	3646
	1930	8	CI	1085
	1930	12	CI	2130
	1950	8	CI	3959
	1960	8	CI	1770
	1980	2	CI	478
	1980	4	CI	348
	1980	8	CI	2129
	1980	8	DI	1303
	1990	6	DI	4258
	1990	8	DI	3717
	1990	12	DI	6493
	2000	4	DI	26
	2000	6	DI	1317
	2000	8	DI	6087
	2000	12	DI	6812
	2010	8	DI	3776
	2010	6	PVC	2622
	2010	8	PVC	60

APPENDIX C:
RISK ASSESSMENT

Strategies for Asset Rehabilitation or Replacement	
Risk Rating	**Strategies for Asset Rehabilitation or Replacement**
Very High (5)	Inspect immediately and replace in 1-5 years
High (4)	Inspect immediately and develop short to medium term rehabilitation plan
Medium (3)	Inspect immediately and develop long term rehabilitation plan
Low (2)	Develop short term inspection strategy and develop long term rehabilitation plan
Very Low (1)	Develop medium to long term inspection strategy and long term rehabilitation plan

Likelihood of Failure	*Very Low*	*Low*	*Medium*	*High*	*Very High*
Very High	Medium Risk (3)	High Risk (4)	Very High Risk (5)	Very High Risk (5)	Very High Risk (5)
High	Low Risk (2)	Medium Risk (3)	High Risk (4)	Very High Risk (5)	Very High Risk (5)
Medium	Very Low Risk (1)	Low Risk (2)	Medium Risk (3)	High Risk (4)	Very High Risk (5)
Low	Very Low Risk (1)	Very Low Risk (1)	Low Risk (2)	Medium Risk (3)	High Risk (4)
Very Low	Very Low Risk (1)	Very Low Risk (1)	Low Risk (2)	Low Risk (2)	Low Risk (2)

Consequences of Failure

Likelihood of Failure	Very Low	Low	Medium	High	Very High
Very High	2.24	2.25	0.81	0.36	0.00
High	0.07	0.25	0.00	0.00	0.07
Medium	0.74	0.07	1.08	0.40	0.21
Low	0.13	0.12	0.40	0.00	0.00
Very Low	0.00	4.40	0.15	0.94	0.35

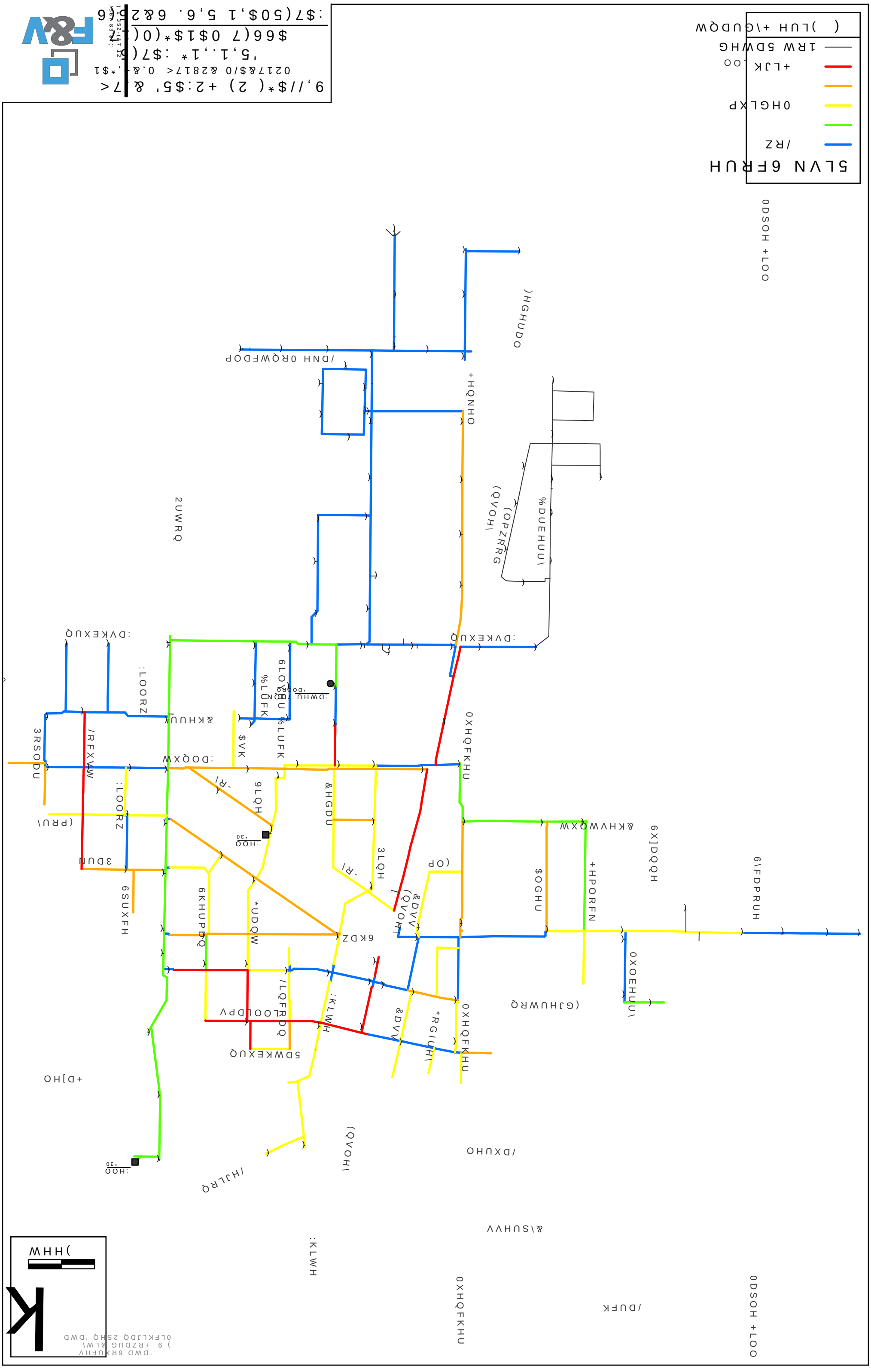
Consequence of Failure

Business Risk Matrix (Risk Rating) by Length of Pipes in Miles

Likelihood of Failure	Very Low	Low	Medium	High	Very High
Very High	30	25	11	3	0
High	1	3	0	0	1
Medium	7	1	12	1	1
Low	3	8	3	0	0
Very Low	0	48	2	11	2

Consequences of Failure

Business Risk Matrix (Risk Rating) by Number of Pipes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APPENDIX D:
CAPITAL IMPROVEMENTS PLAN

Source, Treatment, and Storage Assets: 1-5 Year Capital Improvements				
Asset	**Replacement Cost**	**Year Constructed**	**Rehab Actions**	**Year**
SCADA	$45,000	N/A	Install a new radio telemetry system.	1
Well No. 3	$40,000	1987	Install a new pump at Well No. 3	2
Well No. 3	$35,000	1987	Upgrade the interior and exterior of Well House No. 3	2
Proposed Well	$515,000	N/A	Install a new well per recommendations from 2019 Water Reliability Study	5
Service Lines	Varies	Varies	Replace service lines in accordance with EGLE's Lead and Copper Rule (LCR)	Varies

Distribution Assets: 1-5 Year Capital Improvements											
Asset	**Group ID**	**From**	**To**	**Risk (By Grading)**	**Replacement Cost***	**Material**	**Size (in)**	**Year Constructed**	**Length (ft)**	**Rehab Actions**	**Year**
Water Main	Cedar St [3]	Walnut St	330ft South of Walnut St	5-Very High	$74,000	Cast Iron	6	1939	370	Replacement	1
Water Main	E Edgerton St [5]	Grant St	N Sherman St	5-Very High	$76,000	Cast Iron	4	1939	380	Replacement	1
Water Main	E Edgerton St [6]	N Sherman St	300ft East of N Sherman St	5-Very High	$59,000	Cast Iron	4	1939	291	Replacement	1
Water Main	E Williams St [1]	N Ensley St	White Rd	5-Very High	$87,000	Cast Iron	4	1939	432	Replacement	1
Water Main	E Williams St [2]	White Rd	Lincoln St	5-Very High	$58,000	Cast Iron	4	1939	285	Replacement	1
Water Main	E Williams St [3]	Lincoln St	Grant St	5-Very High	$81,000	Cast Iron	4	1939	401	Replacement	1
Water Main	E Williams St [4]	Grant St	N Sherman St	5-Very High	$74,000	Cast Iron	2	1939	366	Replacement	1
Water Main	Ensley St [1]	Williams St	Edgerton St	5-Very High	$86,000	Cast Iron	4	1939	426	Replacement	2
Water Main	Ensley St [3]	70ft South of Edgerton St	230ft South of Edgerton St	5-Very High	$35,000	Cast Iron	4	1939	172	Replacement	2
Water Main	Ensley St [4]	200ft South of W Shaw St	Walnut St	5-Very High	$265,000	Cast Iron	4	1939	1321	Replacement	2
Water Main	Ensley St [5]	Walnut St	Washburn St	5-Very High	$221,000	Cast Iron	8	1956	1100	Replacement	3
Water Main	Grant St [1]	Rathburn	E Williams St	5-Very High	$51,000	Cast Iron	4	1939	253	Replacement	3
Water Main	Grant St [2]	E Williams St	E Edgerton St	5-Very High	$93,000	Cast Iron	4	1939	462	Replacement	3
Water Main	Locust St [1]	Park St	Emory St	5-Very High	$100,000	Cast Iron	4	1939	498	Replacement	3
Water Main	Locust St [2]	Emory St	Walnut St	5-Very High	$86,000	Cast Iron	4	1939	429	Replacement	3
Water Main	Locust St [3]	Walnut St	500ft South of Walnut St	5-Very High	$101,000	Cast Iron	1	1939	500	Replacement	4
Water Main	Legion St [2]	Legion St	Orton Ave.	N/A[1]	$260,000	N/A[1]	N/A[1]	N/A[1]	1300	N/A[1]	4
Water Main	Washburn St [7]	Orton St	Poplar St	N/A[1]	$190,000	N/A[1]	N/A[1]	N/A[1]	950	N/A[1]	4

* Water Main replacement costs values include appurtenances such as valves, hydrants, fittings, water services, excavation, restoration, engineering and contingencies. It is assumed that the water mains could be placed outside of the paved roadway. Detailed cost estimates are required to adequately determine project costs. Additionally, it is assumed all watermain less than 8" in diameter will be replaced with 8" watermain.

[1] Per 2019 Water Reliabilty Study, Loop 8" of Proposed DI Water Main.

Source, Treatment, and Storage Assets: 6-10 Year Capital Improvements				
Asset	**Replacement Cost**	**Year Constructed**	**Rehab Actions**	**Year**
N/A	N/A	N/A	N/A	N/A

Distribution Assets: 6-10 Year Capital Improvements											
Asset	**Group ID**	**From**	**To**	**Risk (By Grading)**	**Replacement Cost***	**Material**	**Size (in)**	**Year Constructed**	**Length (ft)**	**Rehab Actions**	**Year**
Water Main	Alder St [1]	W Shaw St	Chestnut St	4-High	$200,000	Cast Iron	2	1939	997	Replacement	6
Water Main	Chestnut St [3]	Pine St	Cedar St	4-High	$75,000	Cast Iron	4	1939	371	Replacement	6
Water Main	E Shaw St [1]	White Road	Grant St	4-High	$167,000	Cast Iron	4	1939	833	Replacement	6
Water Main	E Shaw St [2]	Grant St	S Sherman St	4-High	$76,000	Cast Iron	4	1939	377	Replacement	6
Water Main	E Shaw St [3]	S Sherman St	330ft East of S Sherman St	4-High	$67,000	Cast Iron	4	1939	330	Replacement	6
Water Main	Emory St [1]	E Shaw St	Grant St	4-High	$183,000	Cast Iron	4	1939	911	Replacement	7
Water Main	Emory St [2]	Grant St	S Sherman St	4-High	$78,000	Cast Iron	4	1939	386	Replacement	7
Water Main	Emory St [3]	S Sherman St	530ft East of S Sherman St	4-High	$112,000	Cast Iron	4	1939	559	Replacement	7
Water Main	Henkel Rd [1]	Washburn St	530ft North of Lake Montcalm Rd	4-High	$554,000	Cast Iron	12	1939	2130	Replacement	8
Water Main	Joy St [2]	Maple St	Walnut St	4-High	$185,000	Cast Iron	4	1939	924	Replacement	8
Water Main	Lincoln St [1]	Rathburn	E Williams St	4-High	$51,000	Cast Iron	4	1939	253	Replacement	8
Water Main	Park St [6]	40ft East of Orton St	50ft East of Spruce St	4-High	$65,000	Cast Iron	4	1939	324	Replacement	8
Water Main	Park St [8]	70ft East of Spruce St	Locust St	4-High	$81,000	Cast Iron	4	1939	402	Replacement	8
Water Main	Poplar St [1]	Emory St	Walnut St	4-High	$69,000	Cast Iron	4	1939	340	Replacement	8
Water Main	S Muencher St [2]	70ft South of W Shaw St	Elm St	4-High	$125,000	Cast Iron	4	1939	620	Replacement	9
Water Main	S Muencher St [3]	Elm St	Chestnut St	4-High	$92,000	Cast Iron	4	1939	457	Replacement	9
Water Main	Spruce St [1]	Park St	400ft North of Park St	4-High	$78,000	Cast Iron	4	1939	387	Replacement	9
Water Main	W Edgerton St [2]	S Muencher St	Cass St	4-High	$93,000	Cast Iron	4	1939	463	Replacement	9
Water Main	W Williams St [1]	330ft West of N Muencher St	70ft West of N Muencher St	4-High	$54,000	Cast Iron	1	1939	269	Replacement	9
Water Main	Walnut St [1] North	S Ensley St	Pine St	4-High	$94,000	Cast Iron	4	1939	467	Replacement	9
Water Main	Walnut St [2] North	Pine St	Cedar St	4-High	$77,000	Cast Iron	4	1939	382	Replacement	9
Water Main	Walnut St [3] North	Cedar St	Walnut St Easement	4-High	$91,000	Cast Iron	4	1939	453	Replacement	9
Water Main	Walnut St [10]	Poplar St	330ft East of Poplar St	4-High	$67,000	Cast Iron	4	1939	334	Replacement	10
Water Main	Walnut St [4]	Walnut St Easement	Ash St	4-High	$94,000	Cast Iron	4	1939	466	Replacement	10
Water Main	Walnut St [5]	Ash St	Joy St	4-High	$81,000	Cast Iron	4	1939	404	Replacement	10
Water Main	Walnut St [6]	Joy St	Orton St	4-High	$38,000	Cast Iron	4	1939	187	Replacement	10

* Water Main replacement costs values include appurtenances such as valves, hydrants, fittings, water services, excavation, restoration, engineering and contingencies. It is assumed that the water mains could be placed outside of the paved roadway. Detailed cost estimates are required to adequately determine project costs. Additionally, it is assumed all watermain less than 8" in diameter will be replaced with 8" watermain.

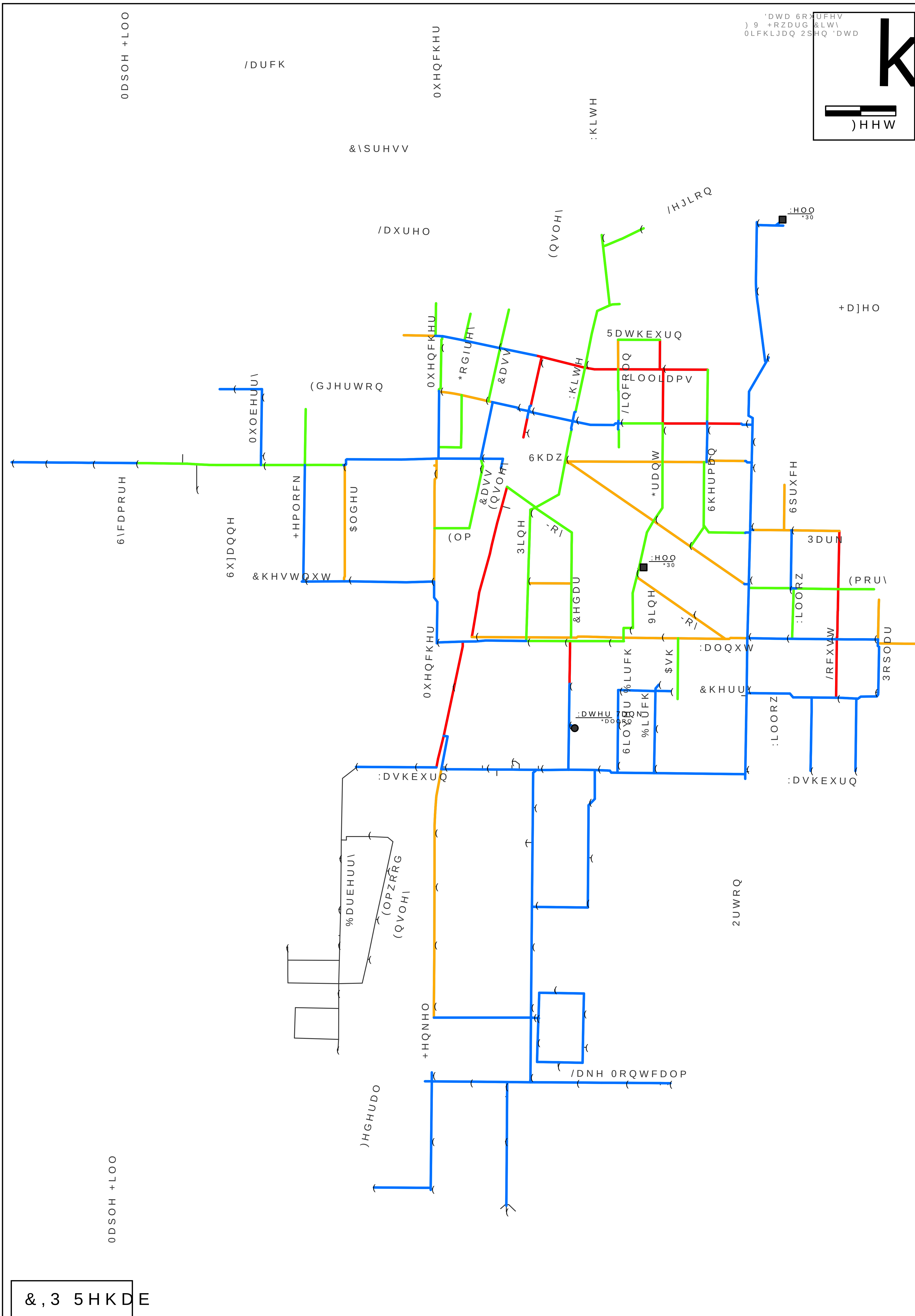
Source, Treatment, and Storage Assets: 11-20 Year Capital Improvements				
Asset	Replacement Cost	Year Constructed	Rehab Actions	Year
N/A	N/A	N/A	N/A	N/A

Distribution Assets: 11-20 Year Capital Improvements

Asset	Group ID	From	To	Risk (By Grading)	Replacement Cost*	Material	Size (in)	Year Constructed	Length (ft)	Rehab Actions	Year
Water Main	Ash St [1]	Walnut St	Cherry St	3-Medium	$104,000	Cast Iron	1	1939	519	Replacement	11
Water Main	Cass St [1]	330ft North of W Williams St	W Williams St	3-Medium	$68,000	Cast Iron	1	1939	338	Replacement	11
Water Main	Cass St [2]	W Williams St	W Edgerton St	3-Medium	$93,000	Cast Iron	1	1939	465	Replacement	11
Water Main	Cass St [4]	W Shaw St	Elm St	3-Medium	$122,000	Cast Iron	2	1939	610	Replacement	11
Water Main	Cedar St [1]	Joy St	Chestnut St	3-Medium	$88,000	Cast Iron	4	1939	436	Replacement	12
Water Main	Cedar St [2]	Chestnut St	Walnut St	3-Medium	$93,000	Cast Iron	2	1939	463	Replacement	12
Water Main	E Edgerton St [4]	50ft East of Lincoln St	Grant St	3-Medium	$71,000	Cast Iron	6	1939	353	Replacement	12
Water Main	Elm St [1]	S Muencher St	Cass St	3-Medium	$60,000	Cast Iron	2	1939	298	Replacement	12
Water Main	Emory St [6]	Orton St	20ft West of Willow St	3-Medium	$73,000	Cast Iron	4	1939	360	Replacement	12
Water Main	Emory St [8]	10ft East of Willow St	Locust St	3-Medium	$72,000	Cast Iron	4	1939	359	Replacement	12
Water Main	Emory St [9]	Locust St	Poplar St	3-Medium	$62,000	Cast Iron	2	1939	306	Replacement	12
Water Main	Godfrey St [1]	W Williams St	230ft North of W Williams St	3-Medium	$47,000	Cast Iron	1.5	1939	235	Replacement	13
Water Main	Grant St [3]	E Edgerton St	E Shaw St	3-Medium	$66,000	Cast Iron	8	1956	329	Replacement	13
Water Main	Grant St [4]	E Shaw St	Emory St	3-Medium	$106,000	Cast Iron	8	1956	529	Replacement	13
Water Main	Grant St [4] Easement	Emory St	Joy St	3-Medium	$101,000	Cast Iron	8	1956	504	Replacement	13
Water Main	Hemlock St [1]	140ft South of W Edgerton St	W Shaw St	3-Medium	$96,000	Cast Iron	2	1984	478	Replacement	14
Water Main	Joy St [1]	Pine St	Cedar St	3-Medium	$76,000	Cast Iron	2	1939	378	Replacement	14
Water Main	Joy St [1] Easement	Pine St	S Ensley St	3-Medium	$61,000	Cast Iron	4	1939	302	Replacement	14
Water Main	Legion St [1]	White St	400ft nothEast of White St	3-Medium	$77,000	Cast Iron	6	1939	381	Replacement	14
Water Main	Lincoln St [2]	E Williams St	20ft North of E Edgerton St	3-Medium	$89,000	Cast Iron	2	1939	445	Replacement	14
Water Main	Lincoln St [4]	50ft South of E Edgerton St	200ft South of E Edgerton St	3-Medium	$32,000	Cast Iron	2	1939	157	Replacement	14
Water Main	N Muencher St [1]	Shaw St	W Edgerton St	3-Medium	$56,000	Cast Iron	2	1939	277	Replacement	15
Water Main	N Muencher St [2]	W Edgerton St	W Williams St	3-Medium	$95,000	Cast Iron	2	1939	473	Replacement	15
Water Main	N Sherman St [1]	E Williams St	E Edgerton St	3-Medium	$89,000	Cast Iron	2	1939	440	Replacement	15
Water Main	Park St [1]	S Sherman St	40ft West of Orton St	3-Medium	$78,000	Cast Iron	2	1939	386	Replacement	16
Water Main	Pine St [1]	Joy St	Chestnut St	3-Medium	$126,000	Cast Iron	6	1939	629	Replacement	16
Water Main	Pine St [2]	Chestnut St	Walnut St	3-Medium	$94,000	Cast Iron	6	1939	467	Replacement	16
Water Main	Rathburn [1]	Lincoln St	Grant St	3-Medium	$72,000	Cast Iron	4	1939	358	Replacement	16
Water Main	S Muencher St [1] Easement	S Muencher St	W Edgerton St Easement	3-Medium	$91,000	Cast Iron	0.75	1939	451	Replacement	16
Water Main	S Sherman St [2]	E Shaw St	Park St	3-Medium	$109,000	Cast Iron	2	1939	541	Replacement	17
Water Main	S Sherman St [3]	Park St	Emory St	3-Medium	$44,000	Cast Iron	2	1939	218	Replacement	17
Water Main	Tamarack Creek [1]	White Rd	100ft North of Legion St	3-Medium	$122,000	Cast Iron	6	1939	605	Replacement	17
Water Main	W Edgerton St [2] Easement	W Edgerton St	S Muencher St Easement	3-Medium	$38,000	Cast Iron	1	1939	189	Replacement	17
Water Main	W Shaw St [2]	Maple Hill Rd	Mulberry St	3-Medium	$213,000	Cast Iron	8	1960	1064	Replacement	18
Water Main	W Shaw St [3]	Mulberry St	Hemlock St	3-Medium	$76,000	Cast Iron	8	1960	376	Replacement	18
Water Main	W Shaw St [4]	Hemlock St	Alder St	3-Medium	$66,000	Cast Iron	8	1960	330	Replacement	18
Water Main	Walnut St [1] Easement	Walnut St	Joy St	3-Medium	$127,000	Cast Iron	8	1956	634	Replacement	18
Water Main	Walnut St [2] South	Pine St	Cedar St	3-Medium	$81,000	Cast Iron	8	1956	404	Replacement	18
Water Main	Walnut St [3] South	Cedar St	Walnut St Easement	3-Medium	$92,000	Cast Iron	8	1956	460	Replacement	18
Water Main	White Rd [1]	200ft East of White Rd, 330ft North of Rathburn	White Rd, 270ft North of Rathburn	3-Medium	$41,000	Cast Iron	8	1939	203	Replacement	19
Water Main	White Rd [2]	White Rd, 330ft North of Rathburn	E Williams St	3-Medium	$100,000	Cast Iron	8	1939	496	Replacement	19
Water Main	White Rd [3]	E Williams St	90ft North of E Edgerton St	3-Medium	$78,000	Cast Iron	8	1939	387	Replacement	19
Water Main	White Rd [5]	90ft South of E Edgerton St	Emory St	3-Medium	$57,000	Cast Iron	6	1939	285	Replacement	19
Water Main	White Rd [6]	Emory St	Joy St	3-Medium	$112,000	Cast Iron	6	1939	556	Replacement	19
Water Main	Willow St [2]	Emory St	Walnut St	3-Medium	$87,000	Cast Iron	2	1939	432	Replacement	19
Water Main	Sycamore St [1]	W Shaw St	Chestnut St	N/A[1]	$200,000	N/A[1]	N/A[1]	N/A[1]	1000	N/A[1]	20
Water Main	Chestnut [4]	Sycamore St	Hemlock St	N/A[1]	$380,000	N/A[1]	N/A[1]	N/A[1]	1900	N/A[1]	20
Water Main	Lake Montcalm [3]	Henkel St	Barberry St	N/A[1]	$160,000	N/A[1]	N/A[1]	N/A[1]	800	N/A[1]	20
Water Main	E Shaw St [6]	Orton St	Spruce St	N/A[1]	$120,000	N/A[1]	N/A[1]	N/A[1]	600	N/A[1]	20
Water Main	W Edgerton [6]	Mulberry St	Hemlock St	N/A[1]	$200,000	N/A[1]	N/A[1]	N/A[1]	1000	N/A[1]	20

* Water Main replacement costs values include appurtenances such as valves, hydrants, fittings, water services, excavation, restoration, engineering and contingencies. It is assumed that the water mains could be placed outside of the paved roadway. Detailed cost estimates are required to adequately determine project costs. Additionally, it is assumed all watermain less than 8" in diameter will be replaced with 8" watermain.

[1] Per 2019 Water Reliabilty Study, Loop 8" of Proposed DI Water Main.



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APPENDIX E:
WATER FINANCIAL PROJECTION STUDY

Village of Howard City, MI

Water Financial Projection Study

December 20, 2024

UTILITY FINANCIAL SOLUTIONS, LLC

Submitted Respectfully by:

Dawn Lund, Vice President
Utility Financial Solutions, LLC
dlund@ufsweb.com
(231) 218-9664

UTILITY FINANCIAL SOLUTIONS, LLC

December 20, 2024

Mr. Michael Falcon
Village Manager
PO Box 510
Howard City, MI 49329

Dear Mr. Falcon,

We are pleased to present this executive summary report for a long-term financial projection completed for the Village of Howard City Water Department. This report was prepared to provide the Village with a comprehensive examination of its existing financials by an outside party.

The specific purposes of this long-term financial projection study are:

1) Determine the utility's revenue requirements for fiscal year 2026
2) Project rate adjustments needed to work toward targeted revenue requirements

This report includes results of the financial projection and identifies the projected rate track of the Water Department. Specific findings included in this report are:

1) Rate adjustments are based on the utilities ability to work toward three factors listed below:
    a. Debt Coverage Ratio
    b. Minimum Cash Reserves
    c. Optimal Net Income

This report is intended for information and use by management and the governing body for purposes stated above and is not intended to be used by anyone except the specified parties.

Sincerely,

Dawn Lund

Utility Financial Solutions, LLC
Dawn Lund
Vice-President

UTILITY FINANCIAL SOLUTIONS, LLC

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Introduction

This report was prepared to provide the Village of Howard City Water Department with a long-term financial projection and rate track. The specific purposes of the financial plan are identified below:

1) ***Determine the utility's revenue requirements for fiscal year 2026***. The Utility's revenue requirements were projected for the period from 2026 – 2030 and included adjustments for the following:
    a. Anticipated O&M costs.
    b. Capital improvements currently underway and scheduled over next five years. The Village provided capital improvement information.

2) ***Projected rate adjustments needed to work toward targeted revenue requirements.*** The primary purpose of this study is to identify appropriate revenue requirements and the rate adjustments needed to work toward targeted revenue requirements. The report includes a long-term rate track for the Water Department to help ensure the financial stability of the utility in future years.

The Village of Howard City retained Utility Financial Solutions, LLC to review the above items and identifies the appropriate course of action. This report includes results of the long-term financial projection.

Utility Revenue Requirements

Revenue requirements for the Water Department were projected for 2026 based on 2024 actual expenses and budget 2025. Revenues and expenses were analyzed with adjustments made to actual expenses to reflect projected operating characteristics and inflation. The table below summarizes the significant assumptions used in the projection:

	Projected 2026	Projected 2027	Projected 2028	Projected 2029	Projected 2030
Inflation Rate	2.9%	2.9%	2.9%	2.9%	2.9%
Growth	0.0%	0.0%	0.0%	0.0%	0.0%
Investment Income	0.5%	0.5%	0.5%	0.5%	0.5%

Table Two below is a summary of the financial projection. This projection includes a $1.721 million bond issue in 2026 and $650,000 bond issue in 2029 for projected capital improvements. The Water Department has a projected adjusted operating income of $15,788 in 2026. The income is projected to decrease each year to an operating loss of ($57,398) in 2030. Adjusted operating income is projected to be below targeted minimums throughout the projection period. Cash Balance decline throughout the projection period and debt coverage ratios do not meet the minimum targets starting in 2027.

Table Two – Financial Summary (Without Rate Adjustments; With Bond Issues)

Fiscal Year	Projected Rate Adjustments	Projected Revenues	Projected Expenses	Adjusted Operating Income	Projected Cash Balances	Capital Improvements	Bond Issues	Debt Coverage Ratio
2026	0.0%	310,086	294,298	15,788	1,759,758	709,000	1,721,000	1.89
2027	0.0%	310,086	313,104	(3,018)	1,263,406	461,000	-	0.65
2028	0.0%	310,086	330,537	(20,451)	667,260	551,000	-	0.56
2029	0.0%	310,086	349,082	(38,995)	696,926	551,000	650,000	0.40
2030	0.0%	310,086	367,484	(57,398)	80,126	515,000	-	0.28
Targeted Minimum in 2026				**$ 76,166**				
Targeted Minimum in 2030				**$ 151,391**				
MINIMUM/CRITICAL Reserves 2026					**$ 181,716**			**1.45**
MINIMUM/CRITICAL Reserves 2030					**$ 244,701**			**1.45**

1. The five-year capital improvement plan was provided by the Village.
2. Financial projections should be updated during the budgeting process each year as expenses and capital expenditures change from projections.

FINANCIAL TARGETS

When evaluating rates to charge customers, three factors must be considered:

1. Debt Coverage Ratio
2. Minimum Cash Reserves
3. Optimal Net Income

Each of these factors is discussed below:

1) **Debt Coverage Ratio -** Debt coverage ratios are mandated by covenants established in the bond ordinance and must be maintained to ensure the utility maintains its bond rating and has the capacity to issue revenue bonds. Typical revenue bond coverage ratios require that cash generated from operations exceed 1.25 times the debt payments. Due to fluctuations in sales, mainly the result of weather or the economy, a safety factor is suggested to help ensure coverage ratios requirements are met or exceeded during low sales years. We have established a target of 1.45 for financial projection purposes. This becomes the minimum target and rates must be established to meet the debt coverage target.

Table Three below contains projected debt coverage ratios from 2026-2030. The projection includes bond issuances of $1.721 million in 2026 and $650,000 in 2029.

Table Three - Current Debt Coverage Ratio (Without Rate Adjustments; With Bond Issues)

Debt Coverage Ratio	Projected 2026	Projected 2027	Projected 2028	Projected 2029	Projected 2030
Add Net Income	$ (16,862)	$ (66,673)	$ (85,340)	$ (119,249)	$ (149,831)
Add Depreciation Expense	49,246	60,946	71,066	82,086	92,746
Add Interest Expense	36,227	72,454	71,207	83,590	95,918
Cash Available for Debt Service	$ 68,612	$ 66,727	$ 56,933	$ 46,427	$ 38,833
Debt Principal and Interest	$ 36,227	$ 102,079	$ 102,079	$ 115,761	$ 140,633
Projected Debt Coverage Ratio (Covenants)	1.89	0.65	0.56	0.40	0.28
Minimum Debt Coverage Ratio	**1.45**	**1.45**	**1.45**	**1.45**	**1.45**

Debt Ratios do not meet the targeted minimum starting in 2027.

2) **Minimum Cash Reserve Target** - To help ensure timely completion of capital improvements and enable the utility to meet requirements for large unexpected expenditures, a minimum cash reserve policy should be established. Minimum cash reserves attempts to quantify the minimum amount of cash the utility should keep in reserve, actual cash reserves may vary substantially above the minimum and is dependent on the life cycle of assets that are currently in service. The methodology used in this report is based on certain assumptions related to percent of operation and maintenance, rate base, capital improvements, and debt service. The establishment of minimum cash reserves should consider a number factors including:

- **Working Capital Lag** - Timing differences between when expenses are incurred and revenues received from customers. Establishing a minimum cash reserve helps to ensure cash exists to pay expenses in a timely manner.
- **Investment in assets** – Catastrophic events may occur that require substantial amounts of cash reserves to replace damaged assets. Some examples of catastrophic events include collection or interceptor breaks, floods, heavy rains, equipment failure. Many of these catastrophic events may allow the utility to recover the cost of damages from FEMA; however FEMA reimbursements can take between 6 months to 2 years to recover. The utility should ensure adequate cash reserves exist to replace the assets in a timely fashion. The minimum reserve levels are often combined with emergency funding from banks or bonding agencies.
- **Annual debt service** – Debt service payments do not occur evenly throughout the year and often occurs at periodic times typically every six months. The utility has to ensure adequate cash reserves exist to fund the debt service payment when the payment is due.
- **Capital improvement program** – Some capital improvements are funded through bond issuances and some through cash reserves. The establishment of a minimum cash reserve level helps to ensure timely replacement or construction of assets.

The targeted minimum cash reserve is approximately $212,000.

Table Four – Minimum Cash Reserves (Without Rate Adjustments; With Bond Issues)

Risk Area	Percent Allocated	Projected 2026	Projected 2027	Projected 2028	Projected 2029	Projected 2030
Operation & Maintenance Less Depreciation Expense	12.3%	$ 30,141	$ 31,015	$ 31,915	$ 32,840	$ 33,793
Historical Rate Base	1%	25,709	30,319	35,829	41,339	46,489
Current Portion of Debt Service Reserve	100%	102,079	102,079	115,761	140,633	140,633
Five Year Capital Improvements - Net of bond proceeds	20%	23,786	23,786	23,786	23,786	23,786
Targeted Minimum Cash Reserve Levels		**$ 181,716**	**$ 187,200**	**$ 207,292**	**$ 238,599**	**$ 244,701**
Projected Cash Reserves		**$ 1,759,758**	**$ 1,263,406**	**$ 667,260**	**$ 696,926**	**$ 80,126**

Projected Cash Reserves are below MINIMUM levels starting in 2030.

Notes:

1. Operation and maintenance expenses exclude depreciation expense.
2. Rate base is historical investment in plant and equipment.
3. Five year capital is budgeted capital improvements for next five years and excludes capital improvements funded through debt issuances.

3) **Optimal operating income targets** - The optimal target for setting rates is the establishment of a target operating income to help ensure the following:

1. Funding of Interest Expense on the outstanding principal on debt. Interest expense is below the operating income line and needs to be recouped through the operating income balance.
2. Funding of the inflationary increase on the assets invested in the system. The inflation on the replacement of assets invested in the utility should be recouped through the Operating Income
3. Adequate rate of return on investment to help ensure current customers are paying their fair share of the use of the infrastructure and not deferring the charge to future generations.

As improvements are made to the system, the optimal operating income target will increase unless annual depreciation expense is greater than yearly capital improvements. The target established for 2026 is $76,166. The projected operating income is below the minimum throughout the projection.

Table Five – Rate of Return Calculation (Without Rate Adjustments; With Bond Issues)

	Percent Allocated	Projected 2026	Projected 2027	Projected 2028	Projected 2029	Projected 2030
Interest Expense On Debt	**2.1%**	72,454	72,454	71,207	83,590	95,918
Contributed Capital Estimated	**2.2%**	1,714	1,659	1,614	1,588	1,576
Inflationary Increase on Invested Assets	**4.5%**	1,997	20,604	41,616	34,878	53,897
Target Operating Income		**$ 76,166**	**$ 94,717**	**$ 114,437**	**$ 120,056**	**$ 151,391**
Projected Adjusted Operating Income		**$ 18,115**	**$ (692)**	**$ (18,124)**	**$ (36,669)**	**$ (55,072)**
Rate of Return in %		**4.1%**	**4.2%**	**4.2%**	**3.8%**	**4.2%**

Projected Operating Income is below optimal targeted operating income levels throughout the projection.

PROPOSED RATE TRACK

The projection indicates current revenues are not adequate to maintain the long-term financial stability of the Utility with the capital plan provided. Rate adjustments of 9.0% in 2026 – 2030 are projected to work the utility towards financial targets over the projection period. The rate track should be reviewed as part of the annual budget process as costs, revenues, growth and capital may vary from projections. Historical capital investment has been much lower than the capital plan provided and any changes in actual spending to projected spending will affect cash balances. Table Six is a summary of the financial results with the proposed rate adjustments.

Table Six – Financial Summary with Proposed Rate Adjustments and Bond Issues

Fiscal Year	Projected Rate Adjustments	Projected Revenues	Projected Expenses	Adjusted Operating Income	Projected Cash Balances	Capital Improvements	Bond Issues	Debt Coverage Ratio
2026	9.0%	336,734	294,298	42,436	1,786,405	709,000	1,721,000	2.63
2027	9.0%	365,780	313,104	52,676	1,345,881	461,000	-	1.20
2028	9.0%	397,440	330,537	66,903	837,501	551,000	-	1.42
2029	9.0%	431,950	349,082	82,868	989,882	551,000	650,000	1.46
2030	9.0%	469,565	367,484	102,081	534,026	515,000	-	1.42
Targeted Minimum in 2026				**$ 76,166**				
Targeted Minimum in 2030				**$ 151,391**				
MINIMUM/CRITICAL Reserves 2026					**$ 181,716**			**1.45**
MINIMUM/CRITICAL Reserves 2030					**$ 244,701**			**1.45**

With the rate track, the operating income is projected to be $42,436 in 2026 and increases to $102,081 by 2030. Cash balances are stabilizing, and the debt coverage ratios are improving throughout the projection period. As capital improvements materialize, the rate track will need to be reviewed and updated.

Water Department Findings

1) The projection indicates current revenues are not adequate to maintain the long-term financial stability of the Utility. Rate adjustments of 9.0% in 2026-2030 are proposed. The rate track should be reviewed as part of the annual budget process as costs, revenues, growth and capital may vary from projections and effect cash balances.

Fiscal Year	Projected Rate Adjustments	Projected Revenues	Projected Expenses	Adjusted Operating Income	Projected Cash Balances	Capital Improvements	Bond Issues	Debt Coverage Ratio
2026	9.0%	336,734	294,298	42,436	1,786,405	709,000	1,721,000	2.63
2027	9.0%	365,780	313,104	52,676	1,345,881	461,000	-	1.20
2028	9.0%	397,440	330,537	66,903	837,501	551,000	-	1.42
2029	9.0%	431,950	349,082	82,868	989,882	551,000	650,000	1.46
2030	9.0%	469,565	367,484	102,081	534,026	515,000	-	1.42
Targeted Minimum in 2026				**$ 76,166**				
Targeted Minimum in 2030				**$ 151,391**				
MINIMUM/CRITICAL Reserves 2026					**$ 181,716**			**1.45**
MINIMUM/CRITICAL Reserves 2030					**$ 244,701**			**1.45**

2) A cash reserve policy should be considered and updated each year with the budget process based on the following formula:

Risk Area	Percent Allocated	Projected 2026	Projected 2027	Projected 2028	Projected 2029	Projected 2030
Operation & Maintenance Less Depreciation Expense	**12.3%**	$ 30,141	$ 31,015	$ 31,915	$ 32,840	$ 33,793
Historical Rate Base	**1%**	25,709	30,319	35,829	41,339	46,489
Current Portion of Debt Service Reserve	**100%**	102,079	102,079	115,761	140,633	140,633
Five Year Capital Improvements - Net of bond proceeds	**20%**	23,786	23,786	23,786	23,786	23,786
Targeted Minimum Cash Reserve Levels		**$ 181,716**	**$ 187,200**	**$ 207,292**	**$ 238,599**	**$ 244,701**
Projected Cash Reserves		**$ 1,759,758**	**$ 1,263,406**	**$ 667,260**	**$ 696,926**	**$ 80,126**

9.0% Proposed Rate Design

Village of Howard City
Water Department
Forecasted 2026 with 9% Proposed Rate Increase

Meter Size	Current Monthly Rate	Proposed 2026 Rate
Inside City		
Residential		
5/8" x 3/4"	$ 13.84	$ 14.95
Other Classes of users within the Village		
5/8" x 3/4"	27.68	30.00
(Commercial)		
1"	34.60	37.50
1 1/2"	55.35	60.00
2"	110.68	121.00
3"	152.20	166.00
4"	193.70	211.00
1" 108	121.09	132.00
5/8" 108	96.86	106.00
Outside City		
Outside the Village Limits		
5/8" x 3/4"	55.35	60.00
1"	69.20	75.00
1 1/2"	110.68	120.00
2"	221.38	242.00
3"	304.40	332.00
CONSUMPTION		
In City	$ 3.41	3.71
Outside City	$ 6.62	7.42

APPENDIX D
OPINION OF PROBABLE COSTS

PREPARED FOR:

VILLAGE OF HOWARD CITY

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 870660

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Summary Table: Engineer's Opinion of Probable Project Costs

Alternatives Analysis

Summary of Alternatives - Net Present Worth Analysis						
Alternative	**Project Cost**	**Annual OM&R Cost**	**Net Present Worth of OM&R Cost (1)**	**Total Present Worth**	**Salvage Value**	**Net Present Worth**
WWTP System Improvements						
Alternative D - Water System Improvements	$ 18,932,000	$ 20,000	$ 384,000	**$ 19,316,000**	$ 6,844,000	**$ 12,472,000**

Note: This table represents budgetary estimates for planning purposes. Further definition of the scope of the projects through preliminary and final design will provide details necessary to improve the accuracy of the costs.

(1) Discount Rate 0.4%

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Engineer's Opinion of Probable Project Cost [1]

Project: Village of Howard City - DWSRF Project Plan — *Project No.* 870660
Basis for Estimate: [X] Conceptual [ ] Basis of Design [ ] Final
Work: **Alternative D - Water System Improvements**

Item	Description	Unit	Qty.	Unit Price	Amount
1	**Watermain Replacement**				
	8" WM Replacement on Hemlock From Shaw to north dead end	LFT	470	$350	$165,000
	8" WM Replacement on Alder From Chestnut to Shaw	LFT	1,020	$350	$357,000
	8" WM Replacement on Meuncher From Edgerton to north dead end	LFT	750	$350	$263,000
	8" WM Replacement on Meuncher From Chestnut to Shaw	LFT	1,100	$350	$385,000
	8" WM Replacement on Godfrey From Williams to north dead end	LFT	310	$350	$109,000
	8" WM Replacement on Cass From Edgerton to north dead end	LFT	860	$350	$301,000
	8" WM Replacement on Cass From Elm to Shaw	LFT	630	$350	$221,000
	8" WM Replacement on Lincoln From south dead end to Rathburn	LFT	880	$350	$308,000
	8" WM Replacement on Grant From Edgerton to Rathburn	LFT	720	$350	$252,000
	8" WM Replacement on Sherman From Emory to Williams	LFT	1,540	$350	$539,000
	8" WM Replacement on Cedar From Walnut to Joy	LFT	900	$350	$315,000
	12" WM Replacement on Cedar From Walnut to Water Tower	LFT	1,100	$400	$440,000
	8" WM Replacement on Ash From Cherry to Walnut	LFT	560	$350	$196,000
	8" WM Replacement on Spruce From Park to north dead end	LFT	280	$350	$98,000
	8" WM Replacement on Willow From Walnut to Emory	LFT	470	$350	$165,000
	8" WM Replacement on Locust From Cherry to Park	LFT	1,400	$350	$490,000
	8" WM Replacement on Poplar From Walnut to north dead end	LFT	400	$350	$140,000
	8" WM Replacement on Ensley From Washburn to Williams	LFT	3,270	$350	$1,145,000
	8" WM Replacement on Williams From Meuncher to west dead end	LFT	390	$350	$137,000
	8" WM Replacement on Williams From Sherman to Ensley	LFT	1,450	$350	$508,000
	8" WM Replacement on Rathburn From Grant to Lincoln	LFT	330	$350	$116,000
	8" WM Replacement on Edgerton From Cass to Muencher	LFT	450	$350	$158,000
	8" WM Replacement on Edgerton From Orton to Grant	LFT	800	$350	$280,000
	8" WM Replacement on Shaw From Sherman to White	LFT	1,250	$350	$438,000
	8" WM Replacement on Elm From Cass to Muencher	LFT	270	$350	$95,000
	8" WM Replacement on Park From Locust to Sherman	LFT	1,180	$350	$413,000
	8" WM Replacement on Chestnut From Cedar to Pine	LFT	380	$350	$133,000
	8" WM Replacement on Emory From east dead end to Orton	LFT	1,090	$350	$382,000
	8" WM Replacement on Walnut From east dead end to Poplar	LFT	260	$350	$91,000
	8" WM Replacement on Walnut From Joy to Ensley	LFT	2,400	$350	$840,000
	8" WM Looping Shaw to Sycamore to Chestnut	LFT	4,800	$350	$1,680,000
	8" WM Looping Edgerton to Hemlock	LFT	500	$350	$175,000
	8" WM Looping Ensley	LFT	350	$350	$123,000
	8" WM Looping Williams to Edgerton	LFT	490	$350	$172,000
	8" WM Looping Shaw to Spruce	LFT	580	$350	$203,000
	8" WM Looping Emory to Poplar	LFT	150	$350	$53,000
	8" WM Looping Legion to Orton	LFT	1,200	$350	$420,000
	8" WM Looping Orton to Washburn East	LFT	80	$350	$28,000
	8" WM Looping Cherry/Ash to fire hydrant to West	LFT	60	$350	$21,000
2	**Service Line Replacement**				
	Service Line Replacement	EA	221	$4,000	$884,000
3	**General Conditions, Bonds, Insurance, Mobilization**		10%		**$1,324,000**
				Construction Costs:	**$14,563,000**
4	**Construction Contingency**				$1,456,000
5	**Engineering & Administration**				$2,913,000
				Total Project Cost:	**$18,932,000**

Notes:

(1) This estimate represents a budgetary cost estimate to be used for planning purposes. Further definition of the scope of the project through preliminary and final design will provide details necessary to improve the accuracy of conceptual estimates.

APPENDIX E
PUBLIC PARTICIPATION

PREPARED FOR:

VILLAGE OF HOWARD CITY

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 870660

NOTICE OF PROJECT PLANNING PUBLIC MEETING

The Village of Howard City will hold a public meeting on the proposed Drinking Water State Revolving Fund – Water System Improvements project for the purpose of receiving comments from interested persons.

The meeting will be held at 7:00 p.m. on April 21, 2025 at the Howard City Village Hall located at 125 E. Shaw Street, Howard City, MI 49329.

The purpose of the proposed project is to improve the Village's aging water system and comply with EGLE Lead and Copper Rules. Recommended improvements include watermain replacement, watermain looping, and replacement of eligible water services.

Impacts of the proposed project include improved water quality, increased pressure and reliability. Short-term construction related impacts include noise and dust during construction.

The estimated cost to users for the proposed project will be $148.44 monthly. Actual costs will vary depending on financing terms, principal forgiveness and/or grants, as well as the final user charge rate structure.

A copy of the plan detailing the proposed project are available for inspection via the Village website; www.howardcity.org

Written comments received before the meeting record is closed on April 21, 2025 will receive responses in the final project planning document. Written comments should be sent to: Michael Falcon, Village Manager, PO Box 510, Howard City, MI 49329.