

DRINKING WATER REVOLVING FUND  
PROJECT PLAN FOR WATER SERVICE REPLACEMENT PROJECT  
NEGAUNEE, MICHIGAN  
April, 2022

UP Engineers & Architects  
424 South Pine Street  
Ishpeming, Michigan 49849  
Project No: N10-02288

## **PROJECT BACKGROUND**

### **Delineation of Study Area**

The study area includes the entire City of Negaunee Water System. The City is supplied with water by the Negaunee Ishpeming Area Water Authority (NIAWA).

The Negaunee Water System has one 300,000 gallon storage tank which is shown on the system map, included in Appendix C to this report, and discussed further in the existing facilities section of this project plan.

The proposed water service replacement project will take place along with a USDA funded project.

Appendix B, Figure 1 shows a delineation of the project location within the City of Negaunee.

### **Land Use in Study Area**

The current land use for the City of Negaunee is shown in the land use map included in Appendix C to this report.

The existing land use within the proposed project area is zoned as town development, corridor/general commercial, industrial, and residential.

### **POPULATION DATA**

Population data for Negaunee is in the tables below:

Table 1. City of Negaunee - Historic Population

<b>Name</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>	<b>2020</b>
City of Negaunee	5,248	5,189	4,741	4,576	4,568	4,495

Table 2. City of Negaunee - Projected Population

	<b>Existing Population</b>	<b>+5 years</b>	<b>+10 years</b>	<b>+20 years</b>
<b>City of Negaunee</b>	4,495	4,495	4,495	4,495

Historical population data and projections for the City were obtained from the U.S. Census Bureau.

The City of Negaunee has seen little population change over time. There is no reason to think there will be any significant population changes in the service. Negaunee's water demand will likely not change significantly over time either.

### **WATER DEMAND**

The Negaunee system services no large industrial users and a relatively small amount of commercial users. With little projected population growth there is no reason to believe that there will be an increase in water demand.

## EXISTING FACILITIES

The Township's water system was originally constructed from 1979 to 1981.

A. *The condition of source facilities (e.g., wells, intakes, cribs, etc.).*

Water is supplied to Negaunee by the Negaunee Ishpeming Area Water Authority (NIAWA). The wells and treatment facilities are in acceptable condition, but are not part of the Negaunee water system.

B. *The method of water treatment, as well as the location and physical condition of facilities, including years in service of major components.*

The water is currently treated by the Negaunee Ishpeming Water Authority before being distributed to either community.

C. *An evaluation of storage tank and pump station capacities, including the adequacy and reliability of pump stations in maintaining system integrity.*

The System has one 300,000 gallon elevated steel storage tank. The tank is located on the north end of Pioneer Avenue. The tanks was constructed in 1964 and undergone maintenance on the interior and exterior coatings and other repairs most recently in 2005.

D. *The condition of service lines.*

Negaunee has many old watermains that likely supply water to customers through galvanized or lead service lines. Galvanized and lead services are not approved by EGLE and will have to be replaced where they are present.

E. *The type of conveyance system and the condition of any existing transmission and distribution mains.*

The City of Negaunee water system is made up of approximately 26.7 miles of watermain composed of either cast iron or ductile iron and ranging from new to 80 years old. The watermain sizes are between 2 and 18 inches. The mains under 6 inches in size do not meet EGLE's standard for minimum size for a watermain. The old and under sized mains are scattered around the city and many of them are scheduled to be replaced in the near future during the phase I water project.

F. *The method of residuals handling and disposal, if applicable.*

Not Applicable

G. *The Condition of Water Meters*

- H. A discussion of operation and maintenance including any problems, as well as an evaluation of opportunities to maximize operation and maintenance to improve drinking water quality.

The current water aquifer is corrosive and the treatment chemicals required to bring the water to an acceptable level are expensive and make the water undrinkable for use. Adding an alternative water source will help improve the drinking water quality.

- I. The design capacity of the waterworks system and existing uses of available capacity. Marquette Township is in a unique situation in regards to consumer demand and ability to respond with increased pumping. Due to its agreement with the City of Marquette, the Township is able to increase pumping to meet demand through the City of Marquette water distribution system connection. The Township is also in the process of exploring funding options for the Morgan Meadows Well Site.

- J. Evaluation of the System's climate Resiliency

### **Summary of Project Need**

The City of Negaunee likely has many water services that are made out of galvanized or lead materials and are not in compliance with EGLE and EPA standards. These noncompliant services will need to be replaced with new services to meet EGLE and EPA standards.

### **Compliance with the drinking water standards defined in the Administrative Rules for Act 399.**

- A. Any acute violations of a Maximum Contaminant Level or surface water treatment technique.  
None
- B. Any non-acute violations of a Maximum Contaminant Level or surface water treatment technique.  
None
- C. An evaluation of the existing treatment facility as conducted and/or reviewed by EGLE or other appropriate regulatory agency. The evaluation should compare the existing treatment facility to the requirements of Act 399.  
None
- D. A description of any waterborne disease outbreaks, their magnitude, and their apparent causes.  
None
- E. A Reliability Study/ Master Plan which substantiates water supply needs and outlines deficiencies that warrant correction.  
Attached in Appendix A of this to the project plan is the Reliability Study/ Master Plan. Performed by Stantec in 2013.

### **Orders or Enforcement Actions**

Please provide a copy of any court or enforcement order against the water supplier, including written enforcement actions, such as a Notice of Violation, Consent Agreement, or Department Order to correct deficiencies and achieve compliance with Act 399.

No official documentation from the EGLE in regards to these items.

### **Drinking Water Quality Problems**

- A. Drinking water quality problems being experienced by the water supplier should be identified. The aesthetic quality of the drinking water supply should also be discussed.
- The water system contains many galvanized or lead water services.
- B. Where the community is proposing to provide new service to areas currently served by individual wells, the project plan must document the nature, number and location of wells that are malfunctioning based on the EGLE, and/or local health department records, and/or sanitary surveys. The site characteristics (e.g., groundwater levels, soil permeability, geology) contributing to the problems must be documented. The system failures and limiting site characteristics must be plotted on a map along with existing habitation.
- No proposed expansion of water main into new areas to serve customers that currently operate private wells.
- C. Where surface water or groundwater contamination is of concern, point and nonpoint sources of pollution should be examined. For groundwater contamination, aquifer condition and type should be identified. Where surface water contamination is of concern, describe and evaluate the impact of these problems on the quality of drinking water.

### **PROJECTED NEED FOR THE NEXT 20 YEARS**

#### **EXPLORATORY WELL INVESTIGATIONS/WELL SITE SELECTION/TEST WELL DRILLING PROCEDURES**

Not Applicable

### **ANALYSIS OF ALTERNATIVES**

#### **Identification of Potential Alternatives**

##### **No-Action**

With a 'No-Action' alternative, the removal and replacement of deficient lead or galvanized water services will not occur along with proposed water projects and will have to be done at a later date after the project is completed and will lead to higher costs for the city including redoing a significant amount of surface restoration.

##### **Replacement of Old Deficient Service Lines**

This recommended proposed alternative, as outline in the project plan, includes the placement of new type K copper water services where lead or galvanized services are present.

##### **Optimum Performance of Existing Facilities**

The optimal performance of the City of Negaunee water system would require upgrades outlined in the proposed project plan. By performing the upgrades outlined in this plan, the reliability and performance of the system will be increased. To continue to strive towards optimum performance of the system, the City will continue to pursue funding options for all of the items outlined in the 20-year improvements plan.

**Regional Alternatives**

The City of Negaunee water system is already tied into the City of Ishpeming water system so there are no other regional alternatives.

**ANALYSIS OF PRINCIPLE ALTERNATIVES**

The only alternative presented is the “No-Action” alternative which would cause the water services to be replaced at a later date to comply with EGLE and EPA standards. This would lead to higher restoration costs for the city.

The recommended option is the replacement of deficient service lines where they are discovered within the upcoming watermain replacement project areas.

The Engineer’s Opinion of Cost is:

<b>City of Negaunee DWRP Water Service Replacement Project</b>				
Description	Quantity	Units	Unit Price	Total
1 Inch copper Water Service	3300	LFT	\$40.00	\$132,000.00
Interior Service Line Connection	135	EA	\$100.00	\$13,500.00
Surface Restoration	3100	LFT	\$200.00	\$620,000.00
Construction Subtotal				\$765,500.00
Engineering (15% of Construction Subtotal)				\$115,000.00
Contingency (20% of Construction Subtotal)				\$153,000.00
Administration				\$15,000.00
Project Total Cost Opinion				\$1,048,500.00

**Cost Effective Analysis**

A. Present Worth – Proposed Option of Distribution Upgrades

$PW = Present\ Value + Present\ Worth\ of\ Future\ Value + Net\ Present\ Worth\ of\ Annual\ Costs$

Present Value = Estimated Proposed Project Cost = \$1,048,500

Present Worth of Future Value = \$0 (Salvage Value = \$0)

**i. No Action**

PW = Present Value + Present Worth of Future Value + Net Present Worth of Annual Costs

Present Value = Estimated Project Cost = \$0

Present Worth of Future Value = \$0 (Salvage Value = \$0)

Net Present Worth of Annual Costs (applicable portion of Annual Cost is the water loss of 20%) = \$20,000 (ASSUMED, needs to be verified!) + cost of an average emergency leak callout = \$10,000, assume one per year, for a total Annual cost of:

$\$20,000 + \$10,000 = \$30,000$

PW = (20 years, 1.2%, \$0 salvage, \$0 present value, \$30,000 annual cost)  
= -\$530,000

ii. Proposed Project – Open Cut Installation of Ductile Iron Watermain

PW = Present Value + Present Worth of Future Value + Net Present Worth of Annual Costs

Present Value = Estimated Project Cost = \$3,265,000

Present Worth of Future Value = \$0 (Salvage Value = \$0)

Net Present Worth of Annual Costs (applicable portion of Annual Cost is the water loss of 10%) = \$10,000 (ASSUMED, needs to be verified!)

PW = (20 years, 1.2%, \$0 salvage, \$3,100,000 present value, \$10,000 annual cost)  
= -\$3,265,000 - \$177,000  
= -\$3,442,000

iii. Alternative – Directional Bore Installation of HDPE Watermain

PW = Present Value + Present Worth of Future Value + Net Present Worth of Annual Costs

Present Value = Estimated Project Cost = \$3,460,000

Present Worth of Future Value = \$0 (Salvage Value = \$0)

Net Present Worth of Annual Costs (applicable portion of Annual Cost is the water loss of 10%) = \$10,000 (ASSUMED, needs to be verified!)

PW = (20 years, 1.2%, \$0 salvage, \$3,460,000 present value, \$10,000 annual cost)  
= -\$3,460,000 - \$177,000  
= -\$3,637,000

B. Discount Rate

1.2% (per Whitehouse.com website 'Real' 20-year interest rate)

C. Salvage Value

Not Applicable. There is no salvage value for buried water services in either option.

D. Escalation

Leakage could increase slightly over time for the deficient water services, but they will need to be replaced in the near future anyway to comply with EGLE and EPA standards.

**E. Interest During Construction**

**F. CMAR, PDB, or FPDB Delivery Method**

**Environmental Evaluation**

**A. Cultural Resources**

No anticipated cultural impacts since the project is removing and replacing/repairing existing infrastructure. If it appears that cultural resources are being impacted, work would be immediately ceased, and the State would be contacted.

**B. The Natural Environment**

The environmental impacts of the proposed project are limited due to the locations of the service line improvements. The project will be taking place just outside of City right-of-way.

**Climate**

The City of Negaunee is located in the North Central Upper Peninsula. It has a temperate climate with major influence from Lake Superior. Recent extreme winters have played a significant role in the overall impact that weather plays on water system infrastructure within the UP. The winter of 2013 was the worst winter in recent memory with frost depths reaching down to over 9 feet.

**Air Quality**

N/A – no measurable impact by the proposed project

**Coastal Zones**

Final project to be reviewed by EGLE during the design phase of the project. Correspondence included in Attachment B.

**Major Surface Waters**

The City of Negaunee is located next to Teal Lake.

**Wild and Scenic Rivers**

According to the “Clean Water State Revolving Fund Project Plan Preparation Guidance” and the Michigan DNR website, there are no wild and scenic rivers located within the project area. Review letter response included in Attachment B.

**Floodplains**

The proposed project will include no surface improvements beyond the removal and replacement of valve boxes and fire hydrants. Thus the project will have no impact on the floodplain.



#### Wetlands

The proposed project is not expected to impact any wetlands that are located within the vicinity of the proposed project. However, a letter was sent by UPEA to the EGLE for review and approval of the proposed project without any need for a wetland permit. An onsite review will need to take place between UPEA and the EGLE concerning the project locations to determine no impact to the adjacent wetlands, as outline in the EGLE response. Response letter included in Attachment B.

#### Topography

See Appendix B for study area topographic maps.

#### Geology and Soils

Geology and Soils maps included in Appendix B.

#### Protected Plans and Animals

EGLE Review and Response letter included in Attachment B. This area includes four species that are under protection:

- Endangered
  - King Rail
  - Small Round-Leaved Orchis
- State Threatened
  - Lake Huron Tansy
  - Moor Rush

A permit would be submitted to the EGLE for review during the design phase of the project.

#### National Natural Landmarks

None

#### Unique Features

None

### **MITIGATION**

Minor mitigation is expected to handle construction related environmental issues.

#### **Mitigation Short-Term Impacts**

Short-term impacts shall be addressed with all necessary construction permits. Soil Erosion and Sedimentation Control permit shall be required to be obtained by the contractor prior to construction. Minor inconveniences will exist for the residential population located within the project area. The contractor shall be required to accommodate local traffic to the best of their ability during the construction process.

#### **Mitigation Long-Term Impacts**

Long-term impacts from the proposed project include increased reliability and water quality to the project area. A Reduction in loss due to leakage will result in reduced water treatment and pumping costs.

### **Implementability and Public Participation**

Public Participation into the selection of an alternative is a key aspect of the Drinking Water Revolving Fund Process. The two possible options, water main replacement and “No-Action” would be provided to the public for review during the public information meeting.

### **Technical and Other consideration**

Option 1 – Upgrades to the existing water services would take place along with the upcoming watermain replacement projects.

Option 2 – “No-Action”

This option would result in the water services being replaced at a later date.

### **Residuals**

A. Industrial/Commercial/Institutional

No significant large scale users located within the proposed project area.

B. Growth Capacity

### **Contamination**

There are a few known sources of contamination in the form of leaking underground storage tanks in the City of Negaunee. Attached **in appendix ?** is a map showing the locations.

### **NEW/INCREASED WATER WITHDRAWALS**

There are no new or increased withdrawals anticipated on the system due to the project.

## **SELECTED ALTERNATIVE**

### **Description**

The selected alternative is the project outlined in the project plan.

### **Relevant Design Parameters**

A. Major process features.

Removal and replacement of lead and galvanized water services where they are discovered during upcoming water projects in the City of Negaunee.

- B. Unit processes and sizes as related to service area needs.  
Areas where upcoming water projects are proposed are shown in the project map.
- C. Schematic flow diagram.  
Not Applicable for a water service replacement project
- D. Design criteria (e.g., process loading, existing and projected design flows, and other aspects of the preliminary basis of design). Per 2018 10-States Standards and Michigan DEQ regulations.
- E. Residuals management such as haul routes, times, and frequencies.  
Haul routes, construction means and methods are to be determined by the contractor. The engineer shall be responsible for oversight to ensure that they follow permit requirements issued by the Marquette County Road Commission
- F. Wells and intakes.  
Not Applicable. No Improvements planned for wells or intakes
- G. Water distribution system. Provide details including pipe lengths and sizes, street names, and proposed routes. The route details are not expected to be known at a design level of specificity, but citizens should be able to read the description of the selected alternative and know if major construction is being considered for their street.  
See Attached Project Map, Appendix C.
- H. Pump station types and sizes, including provisions for standby power, telemetry, etc.  
Not Applicable. No Improvements Planned for Pump Stations
- I. Storage facilities.  
Not Applicable. No Improvements planned for storage facilities
- J. Schedule for design and construction.
  - May 1 2022: Submitted Project Plan
  - October 2022: Receive funding for water service replacements
  - October 2022: Begin design engineering process
  - January 2023: Part 1 of Application Submitted
  - February 2023: Part 2 of Application Submitted
  - March 2023: Bid Advertisement
  - April 2023: Bid Opening
  - June 2023: Loan Closing
  - October 2023: Construction complete, project close out

## Hydrogeological Analysis

Not Applicable

## Finalization of Well Design

Not Applicable

## Schedule for Design and Construction

- May 1 2022: Submitted Project Plan
- October 2022: Receive funding for water service replacements
- October 2022: Begin design engineering process
- January 2023: Part 1 of Application Submitted
- February 2023: Part 2 of Application Submitted
- March 2023: Bid Advertisement
- April 2023: Bid Opening
- June 2023: Loan Closing
- October 2023: Construction complete, project close out

## Engineers Opinion of Cost

City of Neginee DWRF Water Service Replacement Project				
Description	Quantity	Units	Unit Price	Total
1 Inch copper Water Service	3300	LFT	\$40.00	\$132,000.00
Interior Service Line Connection	135	EA	\$100.00	\$13,500.00
Surface Restoration	3100	LFT	\$200.00	\$620,000.00
Construction Subtotal				\$765,500.00
Engineering (15% of Construction Subtotal)				\$115,000.00
Contingency (20% of Construction Subtotal)				\$153,000.00
Administration				\$15,000.00
Project Total Cost Opinion				\$1,048,500.00

## User Costs

- *Engineers Opinion of Cost*  
\$1,048,500
- *Estimated operation and maintenance costs, including replacement of equipment which may be necessary to ensure **that** the waterworks function properly throughout its useful life.*

See **Appendix Attachment E** for a summary of Water Budget Expenses including O & M costs. 2015 operation and maintenance costs were \$1, 154,716.

- *Other costs to be incurred by the system users.*  
Existing Debt **Service** Payments (2015 Budget)  
DWRF - \$57,588  
Grandview Circle - \$5,220  
Harglo Settlement - \$4,960

Public Works Facility - \$20,620  
Land Purchase - \$4,560

Total Debt Service Interest 2015 \$92,948

- *An analysis of the impacts of the annual user costs for water supply on the system users.* 1,160 Users consuming a total of 1,860 Residential Equivalent Units. The proposed project impact is calculated using the 20 year, 2.5% DWRP interest rate and term. The annual payment costs associated with this loan amount to \$9.25 per REU per month.
- *A demonstration of the water supplier's ability to repay the incurred debt, including discussion on how the project costs will be financed.*  
Debt Service fee shall be increased to pay for the new debt incurred by the proposed project. The debt service fee will increase by \$9.25 per REU per month.

### **Disadvantaged Community**

The City of Negaunee currently has an annual debt obligation of \$91,000 per year for the water fund. The proposed project will add a \$1,050,000.00 DWRP loan. This large scale project will add economic burden to the water customers who are currently on the system. The annual Operation and Maintenance costs exceed \$1,000,000.

See Attachment A Disadvantaged Community Worksheet.

### **Ability to Implemented Selected Alternative**

The City of Negaunee is the sole municipality involved in the proposed project plan. **A Support Resolution will be adopted by the Board to accept the project.** Resolution to be included in Attachment A- Appendix xyz?.

### **Environmental Evaluation**

#### A. Cultural Resources

No anticipated cultural impacts since the project is removing and replacing/repairing existing infrastructure. If it appears that cultural resources are being impacted, work would be immediately ceased, and the State would be contacted.

#### B. The Natural Environment

The environmental impacts of the proposed project are limited due to the locations of the lift station improvements. The project will be taking place within Township right-of-way.

#### Climate

The City of Negaunee is located in the North Central Upper Peninsula just 10 miles off the shores of Lake Superior. It has experienced a temperate climate with major influence from Lake Superior. Recent extreme winters have played a significant role in the overall impact that

weather plays on water system infrastructure within the UP. The winter of 2013 was the worst winter in recent memory with frost depths reaching down to over 9 feet.

#### Air Quality

N/A – no measurable impact by the proposed project

#### Coastal Zones

Final project to be reviewed by EGLE during the design phase of the project. Correspondence included in Attachment B.

#### Major Surface Waters

The City of Negaunee is located around the shores of Teal Lake.

#### Wild and Scenic Rivers

According to the “Clean Water State Revolving Fund Project Plan Preparation Guidance” and the Michigan DNR website, there are no wild and scenic rivers located within the project area. Review letter response included in Attachment B.

#### Floodplains

The proposed project will include no surface improvements beyond the removal and replacement of sanitary manholes. Thus the project will have no impact on the floodplain.

#### Wetlands

The proposed project is not expected to impact any wetlands that are located within the vicinity of the proposed project. However, a letter was sent by UPEA to the EGLE for review and approval of the proposed project without any need for a wetland permit. An onsite review will need to take place between UPEA and the EGLE concerning the project locations to determine no impact to the adjacent wetlands, as outline in the EGLE response. Response letter included in Attachment B.

#### Topography

See Appendix B for study area topographic map.

#### Geology and Soils

Geology and Soils maps included in Appendix B.

#### Protected Plans and Animals

EGLE Review and Response letter included in Attachment B. This area includes four species that are under protection:

- Endangered
  - King Rail
  - Small Round-Leaved Orchis
- State Threatened
  - Lake Huron Tansy
  - Moor Rush

A permit would be submitted to the EGLE for review during the design phase of the project.

National Natural Landmarks  
None

Unique Features  
None

### **Agricultural Land**

No Agricultural land is present in the City of Negaunee.

### **Social/Economic Impact**

Not Applicable

### **Construction/Operational Impact**

The contractor will be responsible to accommodate the needs of the residence within the project area during construction. Once the upgrades are completed, the Township will be able to operate its system with a higher level of reliability.

### **Indirect Impacts**

- A. **Changes in the rate, density, or type of development, including residential, commercial, industrial, and the associated transportation changes.**  
Changes to the rate, density, and type of development are not anticipated as the project will only effect existing deficient services. No expansion of the water system is proposed.
- B. **Changes in land use (e.g., open space, floodplains, prime agricultural land, and coastal zones).**  
None
- C. **Changes in air or water quality stemming from primary and secondary development.**  
Minor impact to air quality during construction due to construction activities. This impact would include necessary dust control measures.
- D. **Changes to the natural setting or sensitive ecosystems, or jeopardy to endangered species resulting from secondary growth.**  
None
- E. **Impacts on cultural, human, social, and economic resources.**  
None
- F. **Resource consumption over the useful life of the facility and the generation of wastes.**  
None
- G. **Aesthetic and other impacts.**  
There will be surface restoration in areas disturbed by the project.

## **MITIGATION**

Minor mitigation is expected to handle construction related environmental issues.

### **Mitigation Short-Term Impacts**

Short-term impacts shall be addressed with all necessary construction permits. Soil Erosion and Sedimentation Control permit shall be required to be obtained by the contractor prior to construction. Minor inconveniences will exist for the residential population located within the project area. The contractor shall be required to accommodate local traffic to the best of their ability during the construction process.

### **Mitigation Long-Term Impacts**

Long-term impacts from the proposed project include increased reliability and water quality to the project area. Replacing the services with the upcoming watermain project will prevent these areas from being excavated in the future.

## **PUBLIC PARTICIPATION**

### **Public Meetings on Proposed Alternatives**

Due to the lack of feasible or competitive alternatives to this project, it is the opinion of UP Engineers & Architects and the City of Negaunee that additional meetings above and beyond City Board Meetings would be an unnecessary requirement of the decision making process.

### **The Formal Public Hearing**

Scheduled to take place in **April, 2016** to provide sufficient time to receive and react to public feedback.

### **Public Hearing Advertisement**

A notice of the public hearing must be advertised at least 30 days prior to the hearing in a newspaper of general circulation in the communities affected by the proposed project. A copy of the advertisement and an affidavit confirming its publication must be included in the final project plan. Instructions on where to find copies of the project plan and how to submit written comments about the project must be included in the advertisement. A model public hearing notice is provided in Attachment D.

### **Public Hearing Transcript or Recording**

The final project plan must be accompanied by one of the following:

- A. *A verbatim transcript of the public hearing, recorded by a court reporter or transcribed by a stenographer from a recording of the proceedings (most preferred).*
- B. *An audio recording of the public hearing.*
- C. *A video recording of the public hearing (least preferred).*



## **Public Hearing Contents**

The following items must be discussed during the public hearing:

- A. *A description of the drinking water quality needs and problems to be addressed by the proposed project and the principal alternatives that were considered.*
- B. *A description of the recommended alternative, including its capital costs and a cost breakdown by project components (e.g., supply, treatment, distribution, storage).*
- C. *A discussion of project financing and costs to users, including the proposed method of project financing and estimated monthly debt retirement; the proposed annual, quarterly, or monthly charge to the typical residential customer; and any special fees that will be assessed.*
- D. *A description of the anticipated social and environmental impacts associated with the recommended alternative and the measures that will be taken to mitigate adverse impacts.*

*In the event no one from the public attends the hearing (a reporter would be considered a member of the public, as would members of the applicant's governing body), the public hearing may be opened and closed without a formal presentation of the project plan. However, a transcript or recording must still be submitted with the final project plan documenting this action.*

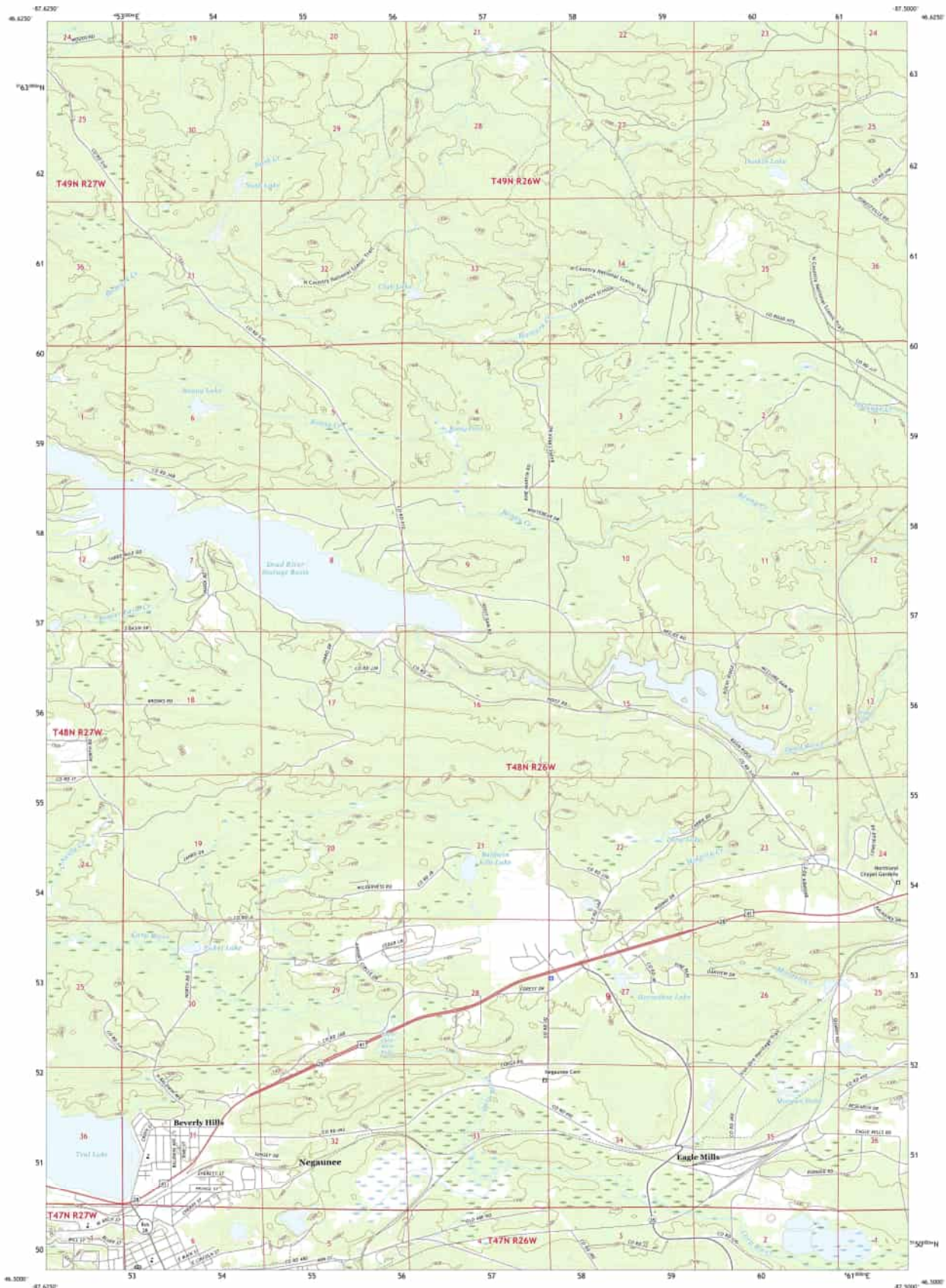
## **Comments Received and Answered**

The final project plan must include the following items:

- A. *A typed list with the names and addresses of the people who attended the public hearing.*
- B. *A copy of any written comments which were received during the public comment period for the proposed project.*
- C. *The applicant's responses to the comments received.*
- D. *A description of any changes which were made to the project as a result of the public participation process.*

## **Adoption of the Project Plan (Required)**

*The official period for receiving public comments on the proposed project may either end at the close of the formal public hearing or extend for a several days after the hearing. After the close of the public comment period, an alternative must be selected for implementation by the municipalities participating in the project. The final project plan submitted by the May 1 deadline must include resolutions from all of the participating local units of government to formally adopt the project plan and implement the selected alternative. A sample resolution can be found in Attachment A.*



**Produced by the United States Geological Survey**

North American Datum of 1983 (NAD83)  
 World Geodetic System of 1984 (WGS84) Projection and  
 1:24,000 scale and 7.5-minute resolution, Zone 16T  
 This map is a digital document. It is not a physical map.  
 This map is a digital document. It is not a physical map.  
 This map is a digital document. It is not a physical map.  
 This map is a digital document. It is not a physical map.

Map Date: August 2014 - October 2014  
 Map Series: U.S. Topographic Series, 2014  
 Map Scale: 1:24,000  
 Map Projection: UTM  
 Map Datum: NAD83  
 Map Contour Interval: 20 feet  
 Map Contour Elevation: 100 feet  
 Map Contour Interval: 20 feet  
 Map Contour Elevation: 100 feet



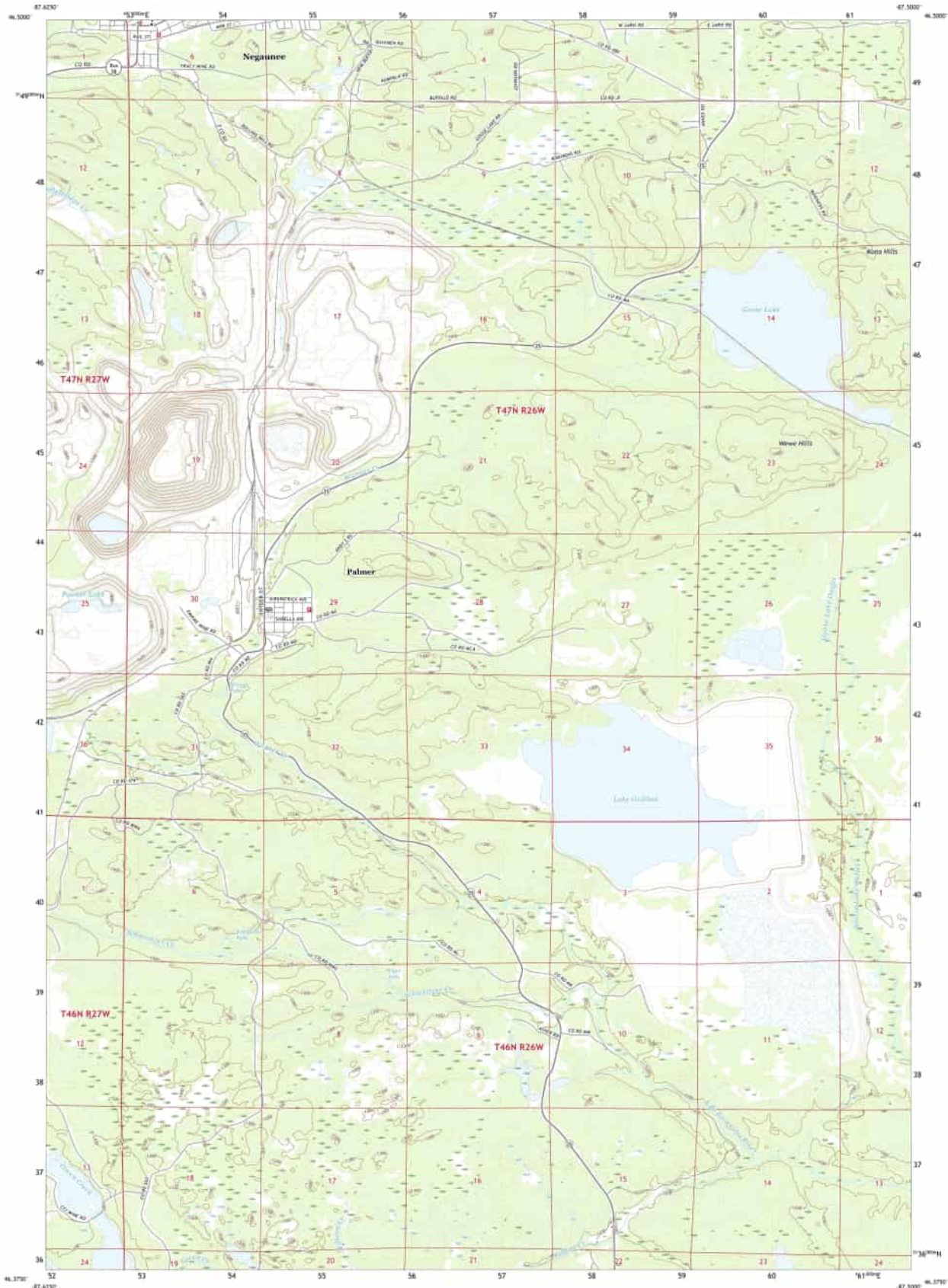
**ROAD CLASSIFICATION**

Expressway	Local Connector
Secondary Hwy	Local Road
Primary	US Route
Interstate Road	Water Route

1	2	3	1 Engineer Hill
4	5	6	2 Negaunee Hill
7	8	9	3 Negaunee Hill
10	11	12	4 Negaunee Hill







**Produced by the United States Geological Survey**  
 North American Datum of 1983 (NAD83)  
 World Geodetic System of 1984 (WGS84) Projection and  
 1:250,000 scale (not to scale). This map is not a legal document. It is intended for general  
 information only. Please contact your local government  
 for more information. Please contact your local  
 government for more information.

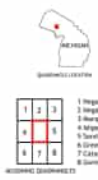
Imagery: 2014, August 2014 - October 2014  
 Base: U.S. Census Bureau, 2010  
 Hydrography: National Hydrographic Survey, 2010  
 Contours: National Hydrographic Survey, 2010  
 Boundaries: Michigan State, 2010  
 Place Names: Michigan State, 2010  
 Wetlands: National Wetlands Inventory, 2010



**SCALE 1:24 000**

0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5  
 0 100 200 300 400 500 600 700 800 900 1000  
 0 100 200 300 400 500 600 700 800 900 1000  
 METERS FEET

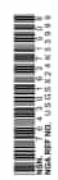
CONTOUR INTERVAL: 20 FEET  
 NORTH AMERICAN VERTICAL DATUM OF 1988  
 This map was produced in conformance with the  
 National Geospatial Program US Topo Product Standard, 2011.  
 A metadata file associated with this product is available at: [www.usgs.gov](http://www.usgs.gov)

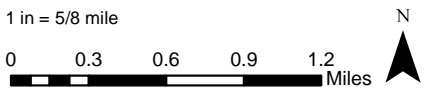
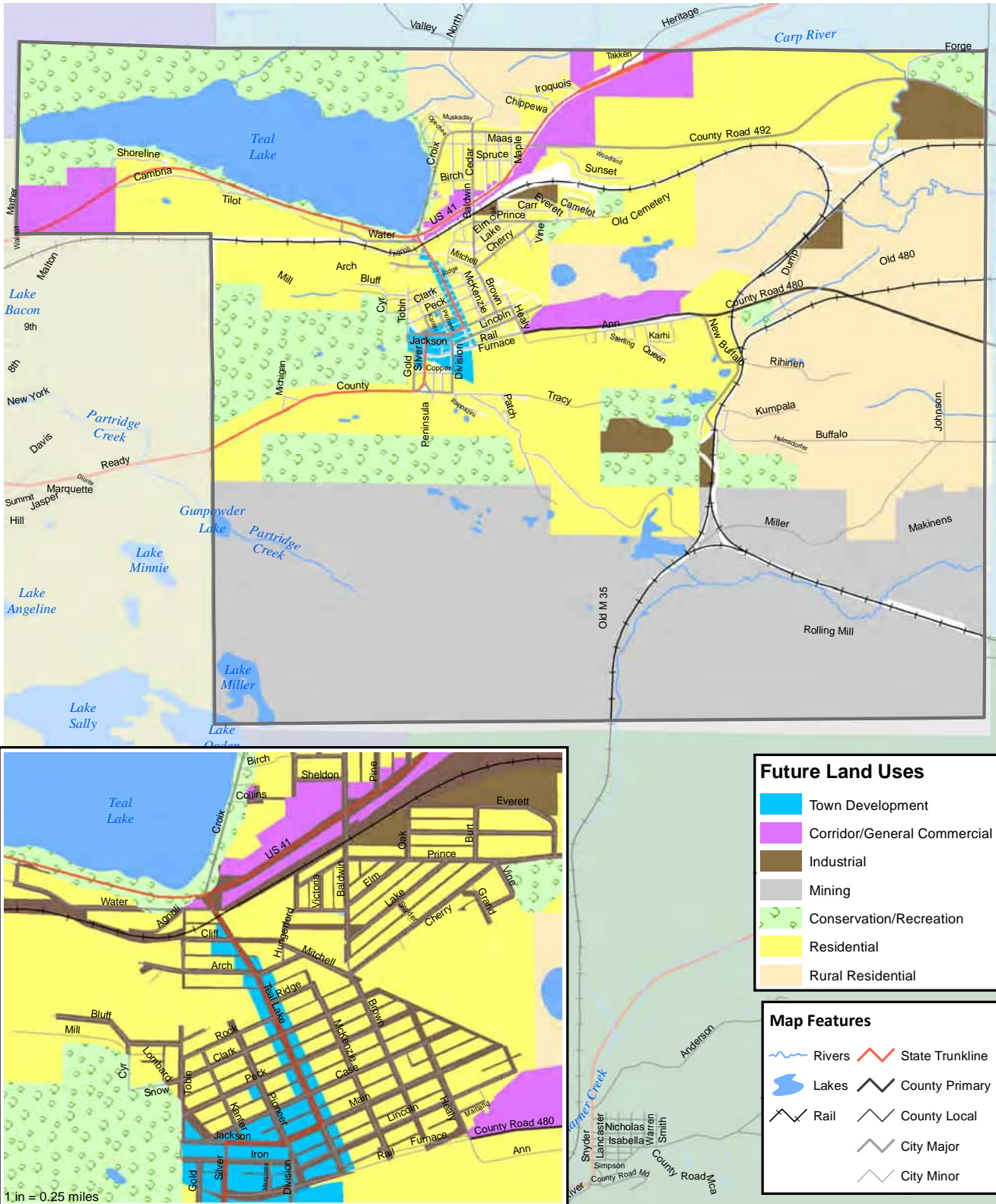


**ROAD CLASSIFICATION**

Expressway	Local Connector
Secondary Hwy	Local Road
Artery	US Road
Interstate Road	State Road

1 Impassable DP  
 2 Impassable  
 3 Impassable  
 4 Impassable  
 5 Trench  
 6 Open Wash  
 7 Closed Wash  
 8 Ditch





# CITY OF NEGAUNEE FUTURE LAND USES



Data Sources: State of MI, Marquette County

Map 10



## Map Legend

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

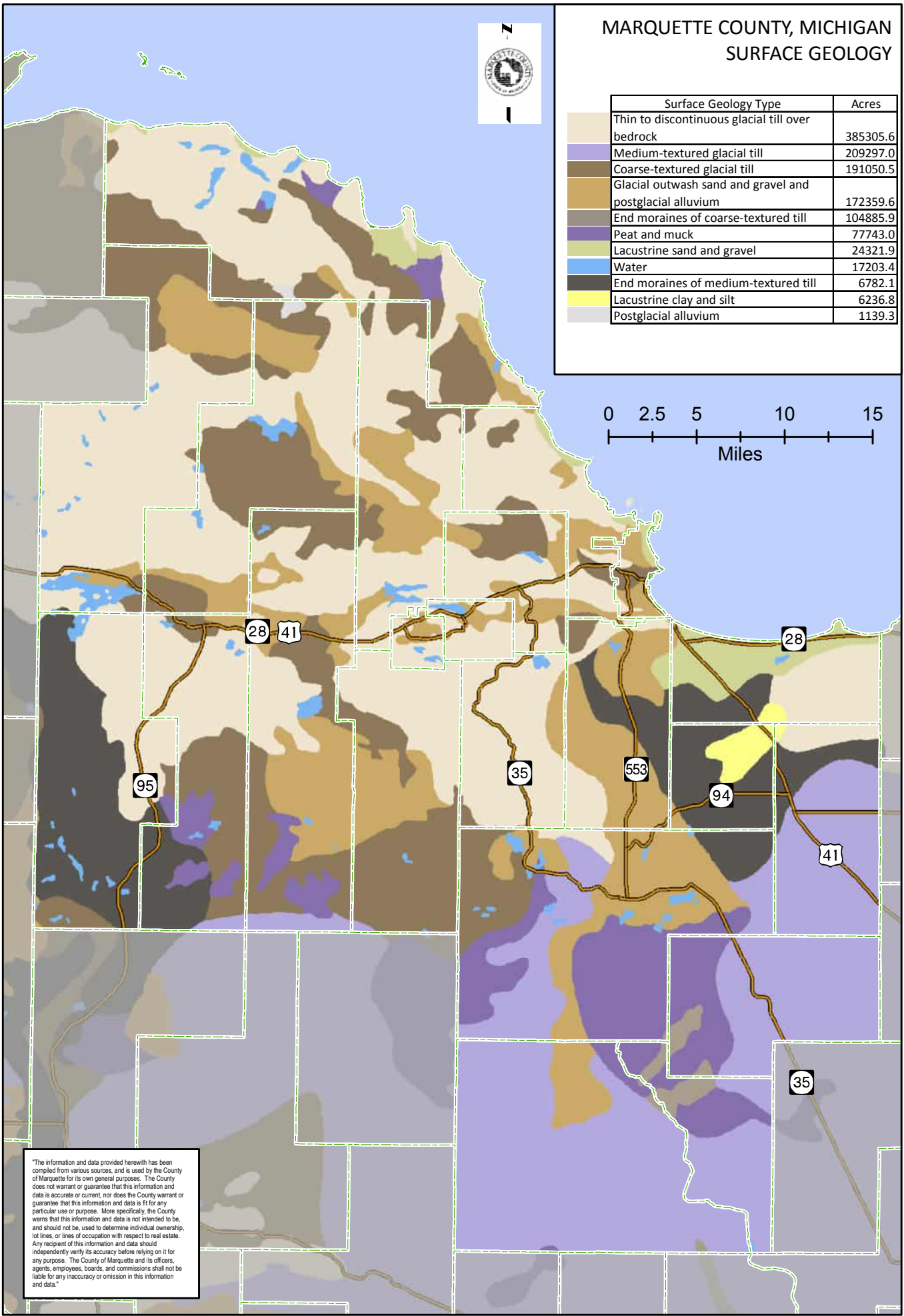
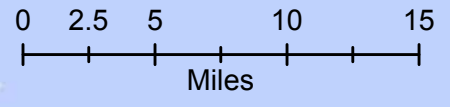
- Wetland Data**
- Wetland (Hydric) Soils
- National Wetlands Inventory 2005
- Potential Wetland Restoration
- Wetland Overlay**
- Highest Potential - Hydric and Presettlement
- High Potential - Hydric Soils Only
- Moderate Potential - Presettlement Wetlands Only
- Part 303 Final Wetlands Inventory
- Wetlands as identified on NWI and MIRIS maps
- Soil areas which include wetland soils
- Wetlands as identified on NWI and MIRIS maps and soil areas which include wetland soils
- Stream Data**
- Coastal Data**
- Historic Landcover**
- SSURGO Soils**
- Wetlands Monitoring**



# MARQUETTE COUNTY, MICHIGAN SURFACE GEOLOGY

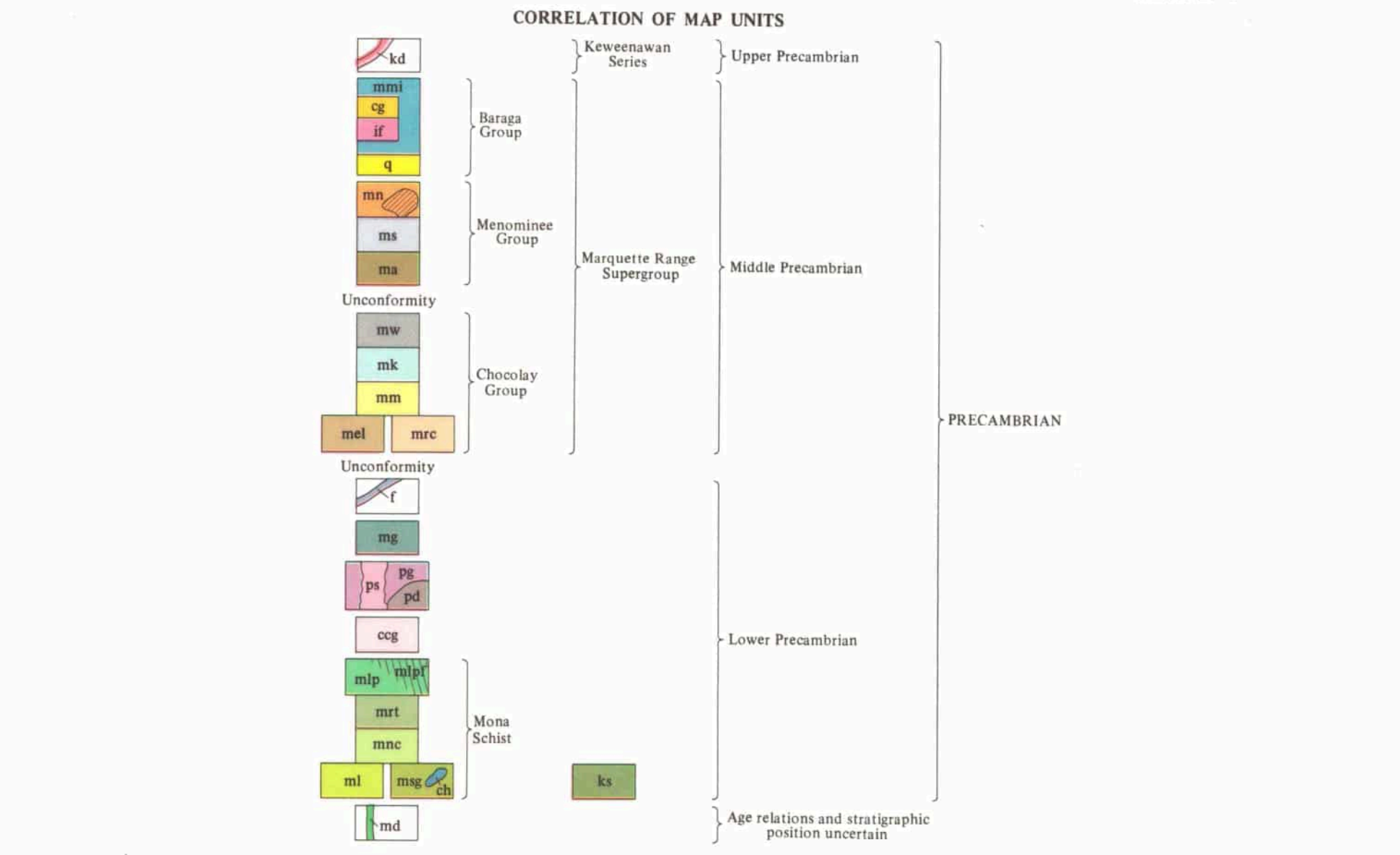
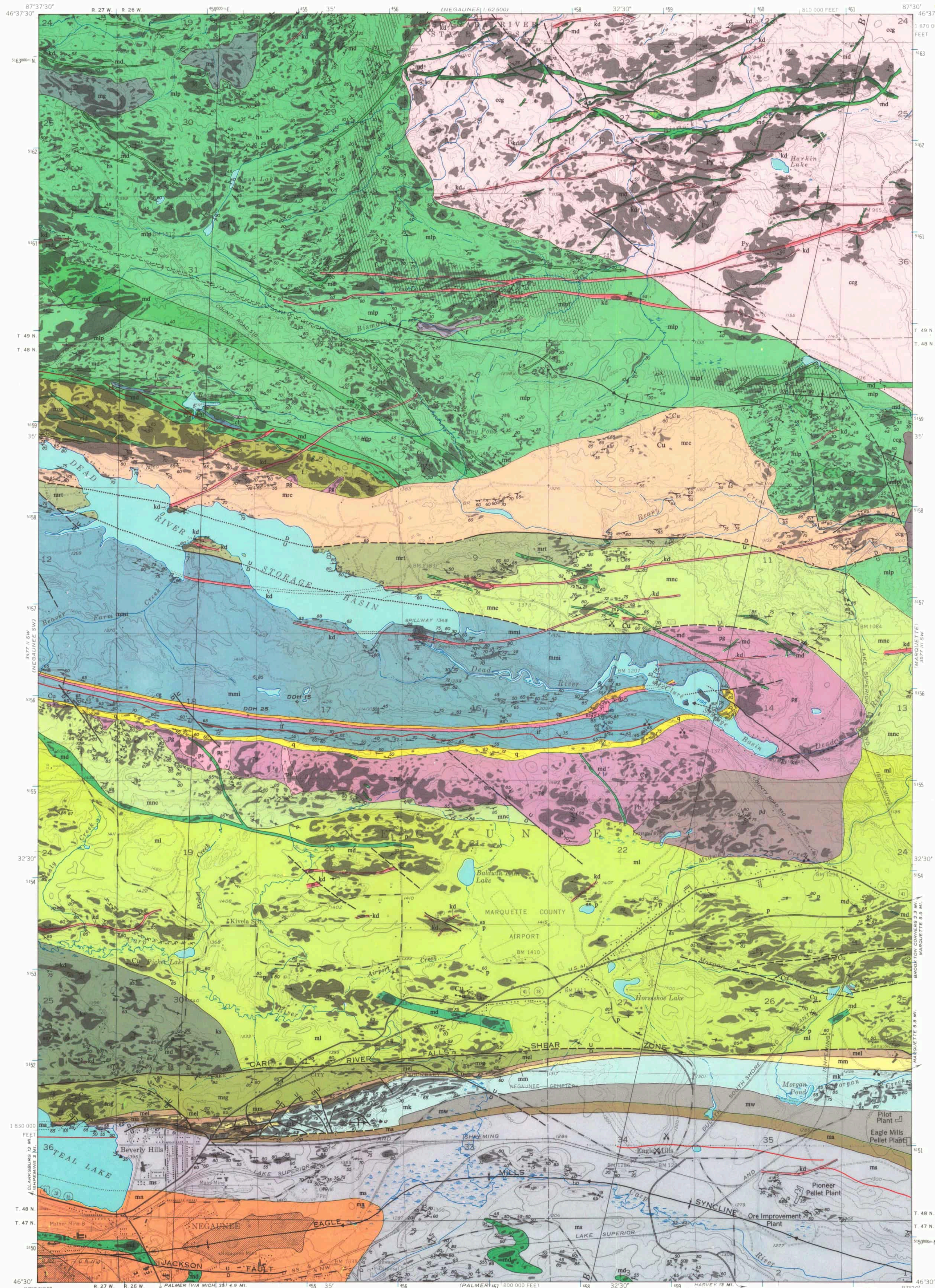


Surface Geology Type	Acres
Thin to discontinuous glacial till over bedrock	385305.6
Medium-textured glacial till	209297.0
Coarse-textured glacial till	191050.5
Glacial outwash sand and gravel and postglacial alluvium	172359.6
End moraines of coarse-textured till	104885.9
Peat and muck	77743.0
Lacustrine sand and gravel	24321.9
Water	17203.4
End moraines of medium-textured till	6782.1
Lacustrine clay and silt	6236.8
Postglacial alluvium	1139.3



"The information and data provided herewith has been compiled from various sources, and is used by the County of Marquette for its own general purposes. The County does not warrant or guarantee that this information and data is accurate or current, nor does the County warrant or guarantee that this information and data is fit for any particular use or purpose. More specifically, the County warns that this information and data is not intended to be, and should not be, used to determine individual ownership, lot lines, or lines of occupation with respect to real estate. Any recipient of this information and data should independently verify its accuracy before relying on it for any purpose. The County of Marquette and its officers, agents, employees, boards, and commissions shall not be liable for any inaccuracy or omission in this information and data."





**DESCRIPTION OF MAP UNITS**

**Kd** **DIABASE** - Massive black dike rock with diabasic texture; weathers to dull brown. Not metamorphosed. Can be traced between outcrops in many areas, as it creates a sharp negative magnetic anomaly.

**Mm1** **MICHIGAMME SLATE** - Thin-bedded graywacke with local carbon-rich beds, and sericitic, chloritic, carbonaceous, and pyritic metasilite and slate. Unconformable against Dead River pluton and Nealy Creek Member of Mona Schist. Thin magnetite argillite unit causes magnetic anomaly in lower part of formation. Greater than 5,000 feet thick.

**cg** **Conglomerate** composed of angular chert clasts in coarse-grained graywacke matrix.

**q** **Chert-goethite-hematite iron-formation**

**me** **NEGAUNEE IRON-FORMATION** - Dark-brown thin-bedded chert-hematite-goethite iron-formation. Red and gray jaspilite near west border of quadrangle. Poorly exposed. Contains important iron ore deposits. Mined areas shown by ruled pattern. Greater than 2,000 feet thick.

**ms** **SIAMO SLATE** - Dark-gray thin-bedded slate, weathers gray to brown. Beds of massive graywacke; some containing abundant mud chips; as much as 10 feet thick in some exposures. Rusty-brown-weathering seams mark carbonate-rich beds. Magnetic unit in lower part (Goose Lake Member?) not exposed but indicated by magnetic anomaly. Conglomerate beds in upper part. Chert dikes conspicuous in some exposures. Upper contact gradational. 1,500 to 2,000 feet thick.

**ma** **AJIBIK QUARTZITE** - Gray to white vitreous quartzite; sericitic slate and graywacke near base. Locally iron stained pink to purple. Ripple marks and crossbeds common. Marker bed containing pink chert granules near base. Overlaps older formations near Teal Lake. Averaging 150 feet thick.

**Unconformity**

**mw** **WEVE SLATE** - Not exposed in quadrangle; projected from Marquette quadrangle, where it is gray and greenish-gray laminated and massive sericitic-chlorite-quartz slate.

**mk** **KONA DOLOMITE** - Pinkish-gray fine- to medium-grained crystalline dolomite, locally cherty, and thin beds of purplish-gray argillite and argillaceous dolomite near Morgan Pond. Light-gray to white quartzite, interbedded with purplish-gray ferruginous, sericitic slate and chert breccia west of Negaunee Cemetery. 800 to 1,200 feet thick.

**mm** **MESNARD QUARTZITE** - Gray to pink vitreous thick-bedded quartzite; lenticular; ripple marks common. Maximum thickness 200 feet.

**md** **ENCHANTMENT LAKE FORMATION** - Conglomerate, graywacke, arkose, sericitic quartzite, and sericitic slate. Unconformably overlies Mona Schist on north limb of Eagle Mills syncline. Lenticular; maximum thickness 150 feet.

**mrc** **REANY CREEK FORMATION** - Conglomerate, chloritic slate, some containing widely dispersed boulders of granite and intraclasts of arkose, fine-grained gray feldspathic quartzite, and pink arkose. In part of glacial origin. Unconformably overlies Mona Schist north of Dead River. Age in doubt, might be pre-Marquette Range Supergroup. 1,500 to 3,500 feet thick.

**Unconformity**

**mg** **FELSIC METAVOLCANIC ROCK** - Gray porphyritic felsic rock, quartz phenocrysts common; amphibole and pyroxene phenocrysts rare. Weathers light gray to near white. Cataclastically deformed; locally mylonitized. Mainly volcanic rock, but includes some possible intrusive rock. Some crystal tuff. Occurs as dikes or sills(?) and as irregular-shaped bodies of uncertain orientation. Common along boundaries of thick coarse-grained metabasite. Indicated only by (f) where outcrops are too small to map. Hornblende-syenite shown by (hs).

**mt** **METAGABBRO** - Dark-gray to green medium-grained rock. Mineralogically identical to the metabasite (md). Forms two intrusive bodies in northwest part of quadrangle.

**pd** **DEAD RIVER PLUTON** - Massive nonfoliated porphyritic rock; pink to red on weathered surface. Age uncertain, possibly late early Precambrian.

**ps** **Hornblende diorite**

**pi** **Porphyritic syenite** containing large and abundant perthite phenocrysts

**pp** **Granodiorite porphyry**

**ccg** **COMPEAU CREEK GNEISS** - Light-gray to light-pink foliated medium- to coarse-grained tonalitic gneiss. Stippling indicates zone of intense silicification.

**mip** **LIGHTHOUSE POINT MEMBER** - Dark-green fine-grained layered amphibolite; near contact with Compeau Creek Gneiss less distinctly layered and streaked with light-gray felsic material. At least 8,500 feet thick.

**mipf** **Felsic augen zone.**

**mrt** **SHEARED RHYOLITE TUFF MEMBER** - Pink to greenish-gray strongly sheared rhyolitic rock; glassy quartz phenocrysts common. Bright green wafers of clay, probably altered lapilli, are conspicuous locally. 1,300 to 3,000 feet thick.

**mnc** **NEALY CREEK MEMBER** - Dark-gray to gray-green quartz-feldspar-sericitic-chlorite schist. Biotite present near Dead River pluton. Possibly a metamorphosed tuff of intermediate composition. 2,000 to 3,000 feet thick.

**ml** **LOWER MEMBER** - Dark-green massive metabasite. Large pillow structures common. About 10,000 feet thick.

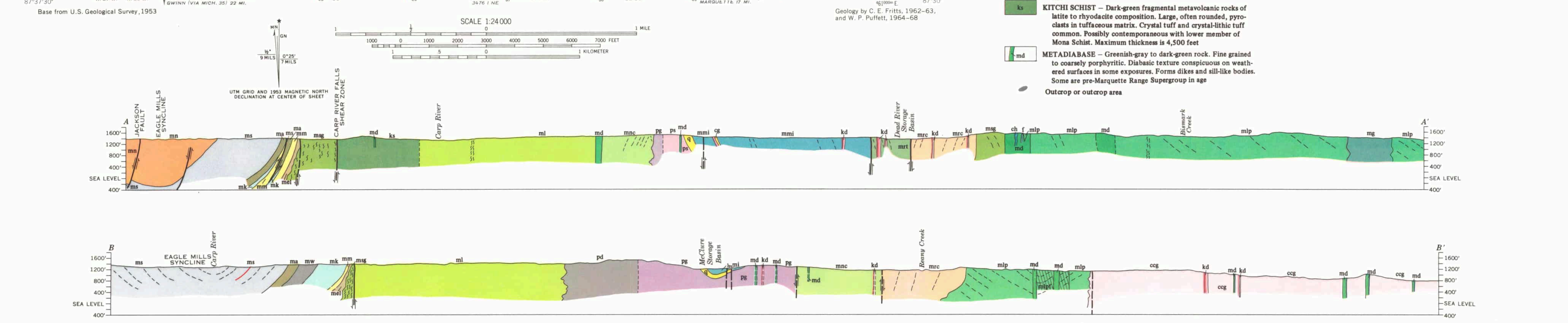
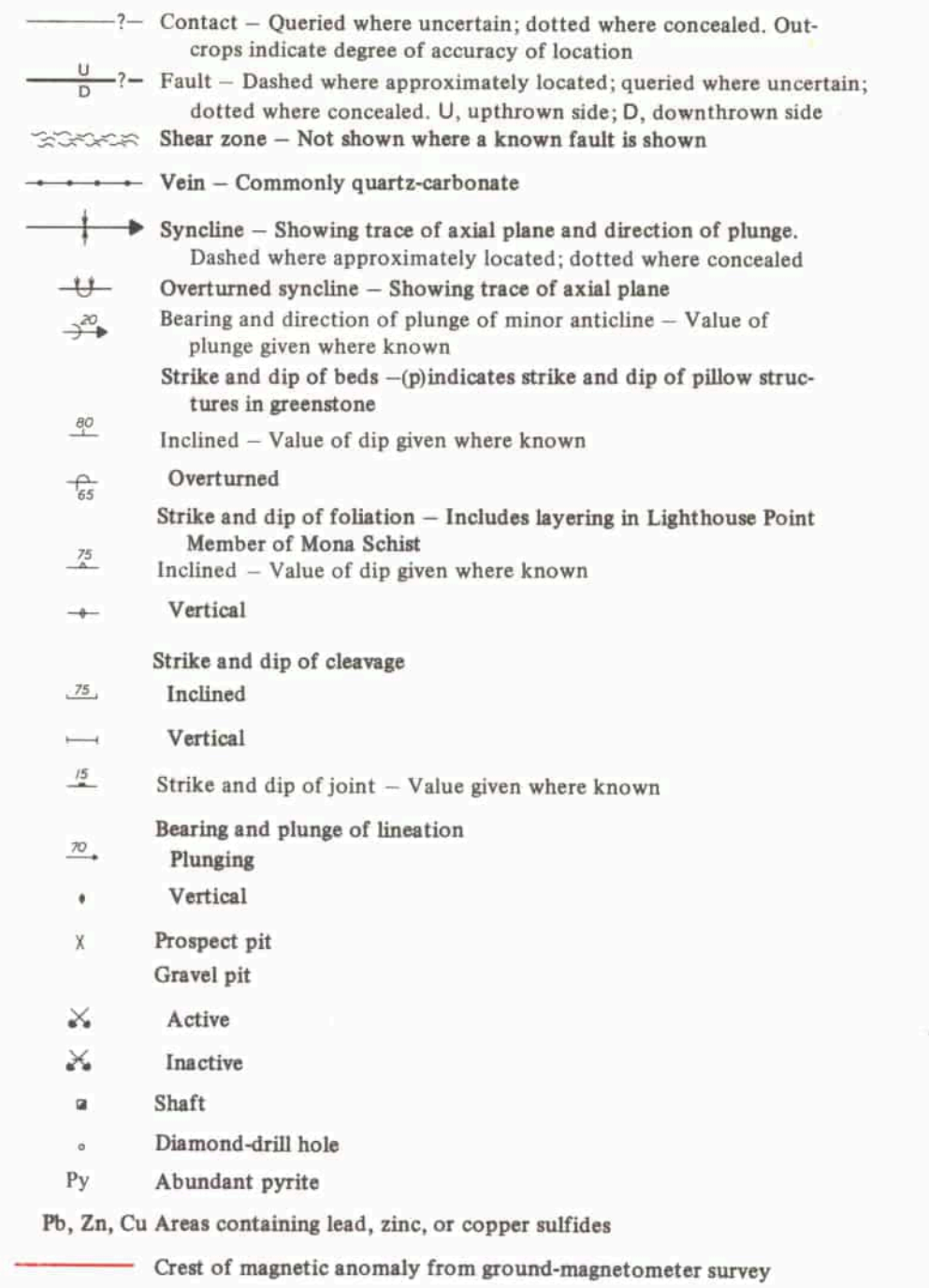
**mg** **UNDIFFERENTIATED GREENSTONE** - South of the Carp River Falls shear zone unit generally sheared and includes sheared felsic rock; possibly Kitchi Schist in part. North of Dead River unit mainly fine-grained massive metabasite containing abundant intrusions of felsic rock and coarse-grained metabasite.

**ch** **Chert beds**, locally contain magnetite, sphalerite, and chalcocyanite

**ks** **KITCHI SCHIST** - Dark-green fragmental metavolcanic rocks of latite to rhyodacite composition. Large, often rounded, pyroclasts in tuffaceous matrix. Crystal tuff and crystal-lithic tuff common. Possibly contemporaneous with lower member of Mona Schist. Maximum thickness is 4,500 feet.

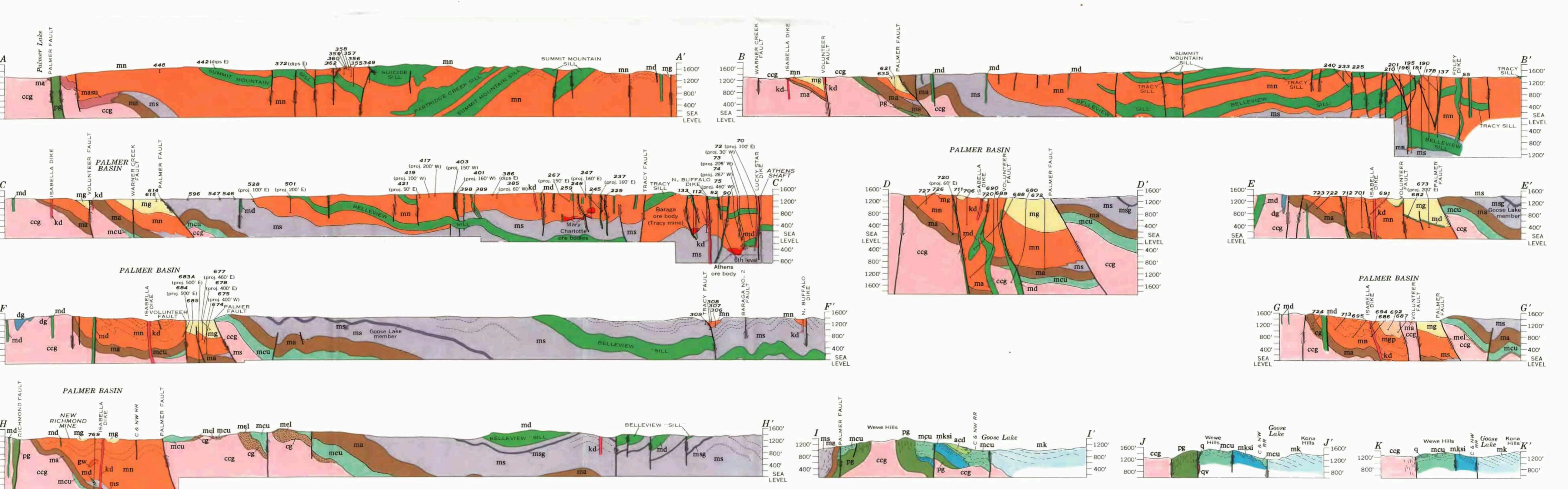
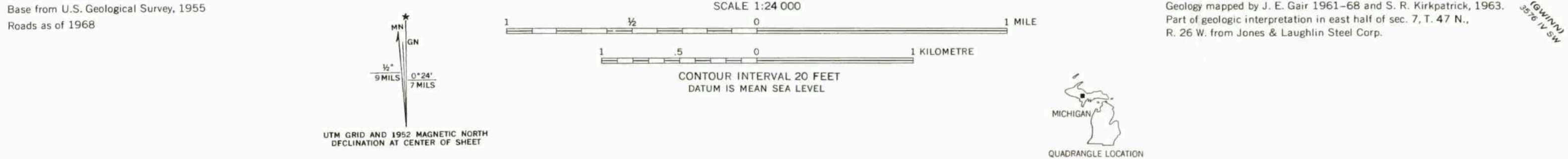
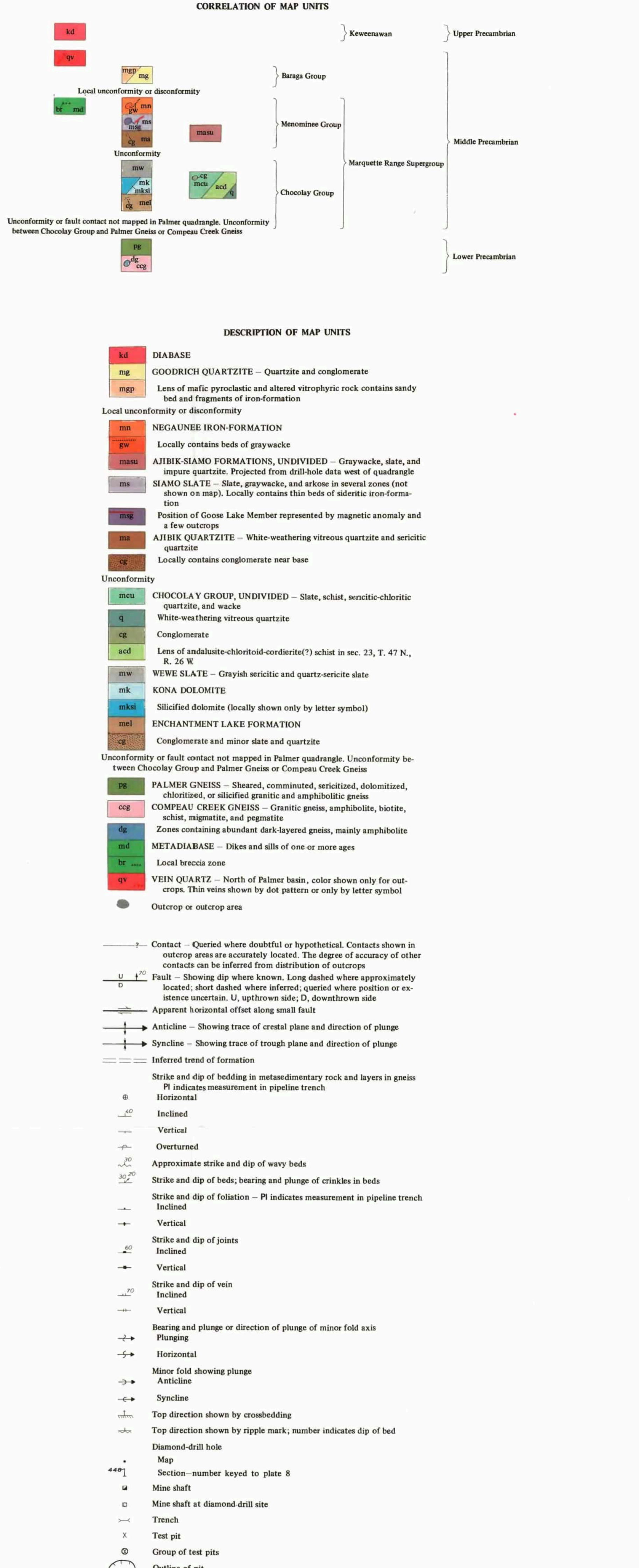
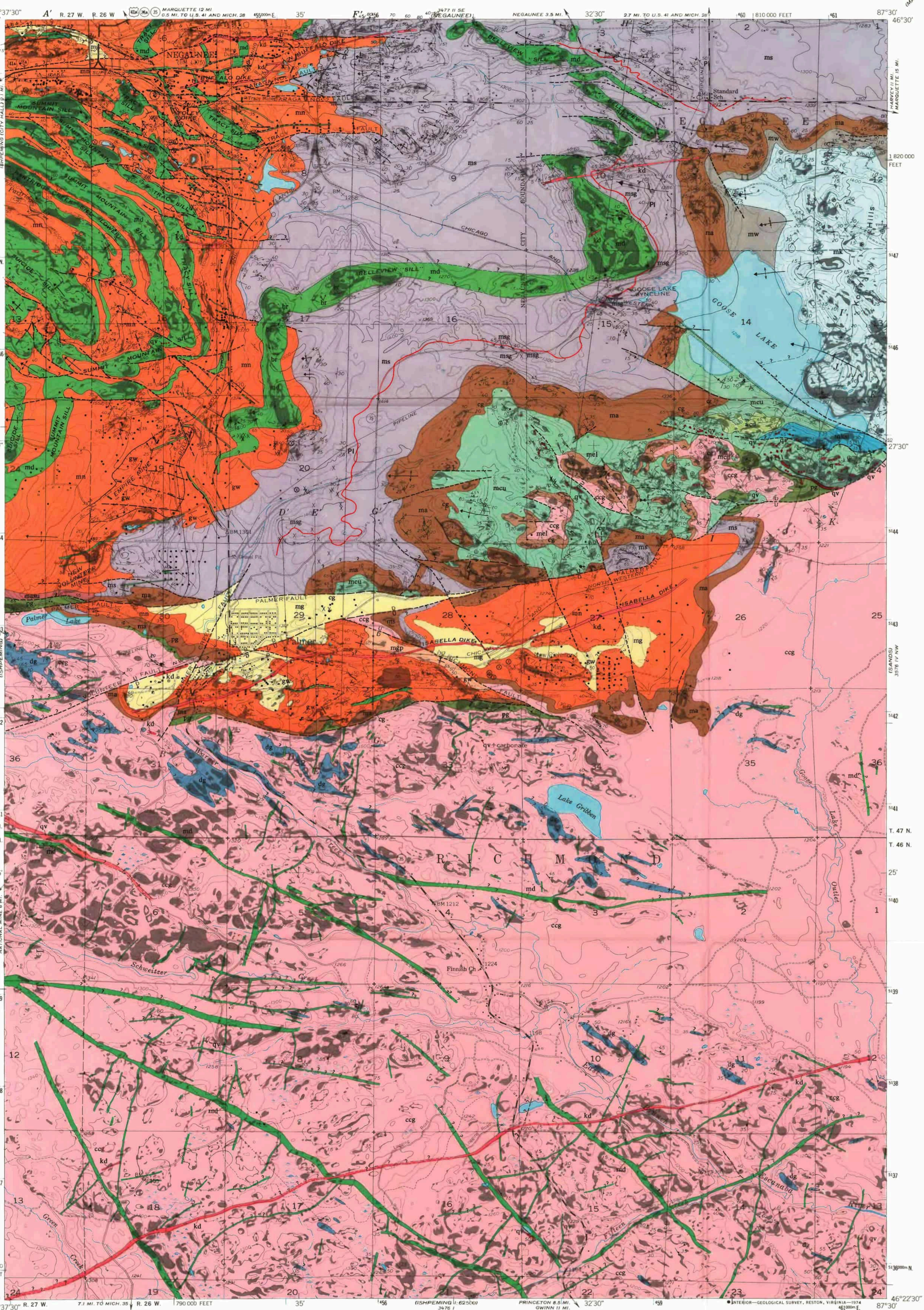
**md** **METADIABASE** - Greenish-gray to dark-green rock. Fine grained to coarsely porphyritic. Diabasic texture conspicuous on weathered surfaces in some exposures. Forms dikes and sill-like bodies. Some are pre-Marquette Range Supergroup in age.

**Outcrop or outcrop area**



BEDROCK GEOLOGIC MAP AND SECTIONS OF THE NEGAUNEE QUADRANGLE, MARQUETTE COUNTY, MICHIGAN





BEDROCK GEOLOGIC MAP AND SECTIONS OF THE PALMER QUADRANGLE, MARQUETTE COUNTY, MICHIGAN





Clear Map Map Zooms Map Quick Keys Site Details

## Layers

Street Aerial Hybrid PLAT Land Use TOPO

Toggle layer visibility by clicking the corresponding checkbox

Land Use Restriction

Environmental Management

Leaking Underground Storage Tanks (Part 213 Closed)

Leaking Underground Storage Tanks (Part 213 Open)

Sites of Environmental Contamination (Part 201)

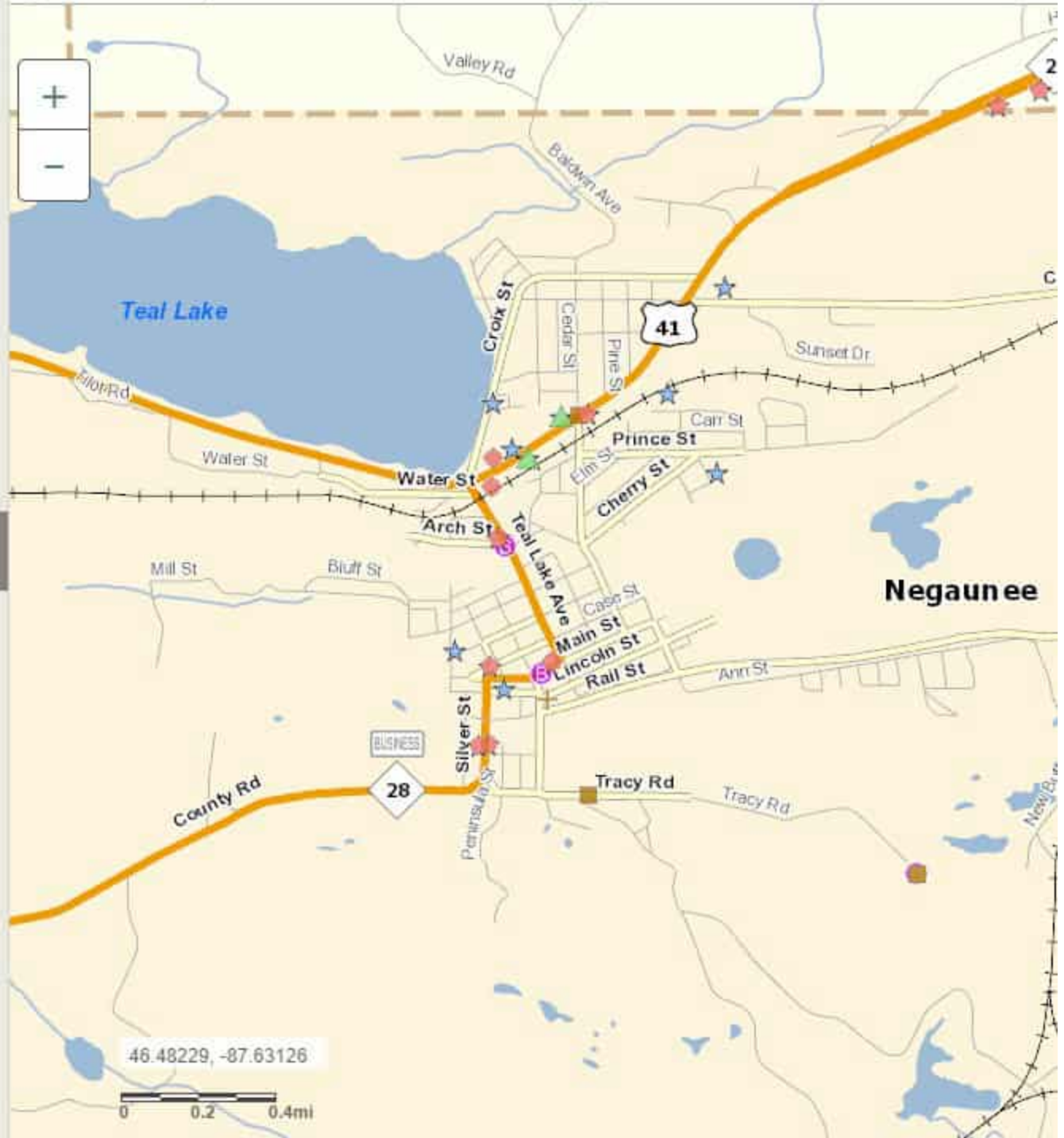
Underground Storage Tanks (Part 211 Active)

Underground Storage Tanks (Part 211 Closed)

Remediation & Redevelopment District

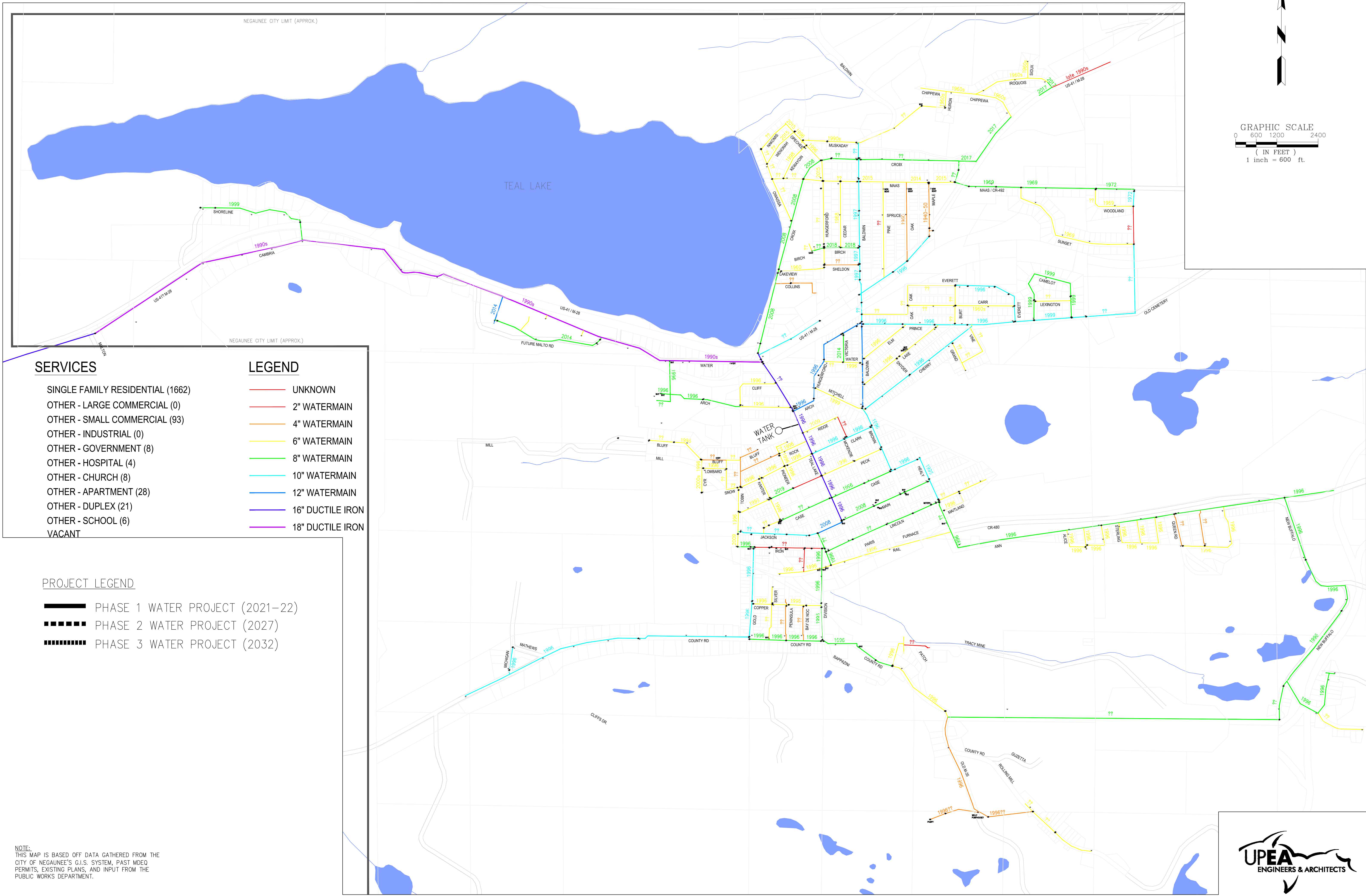
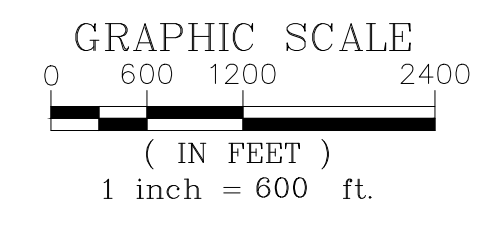
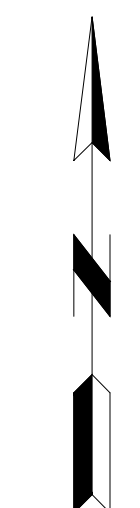
Cadillac District

Gaylord District





# CITY OF NEGAUNEE



## SERVICES

- SINGLE FAMILY RESIDENTIAL (1662)
- OTHER - LARGE COMMERCIAL (0)
- OTHER - SMALL COMMERCIAL (93)
- OTHER - INDUSTRIAL (0)
- OTHER - GOVERNMENT (8)
- OTHER - HOSPITAL (4)
- OTHER - CHURCH (8)
- OTHER - APARTMENT (28)
- OTHER - DUPLEX (21)
- OTHER - SCHOOL (6)
- VACANT

## LEGEND

- UNKNOWN
- 2" WATERMAIN
- 4" WATERMAIN
- 6" WATERMAIN
- 8" WATERMAIN
- 10" WATERMAIN
- 12" WATERMAIN
- 16" DUCTILE IRON
- 18" DUCTILE IRON

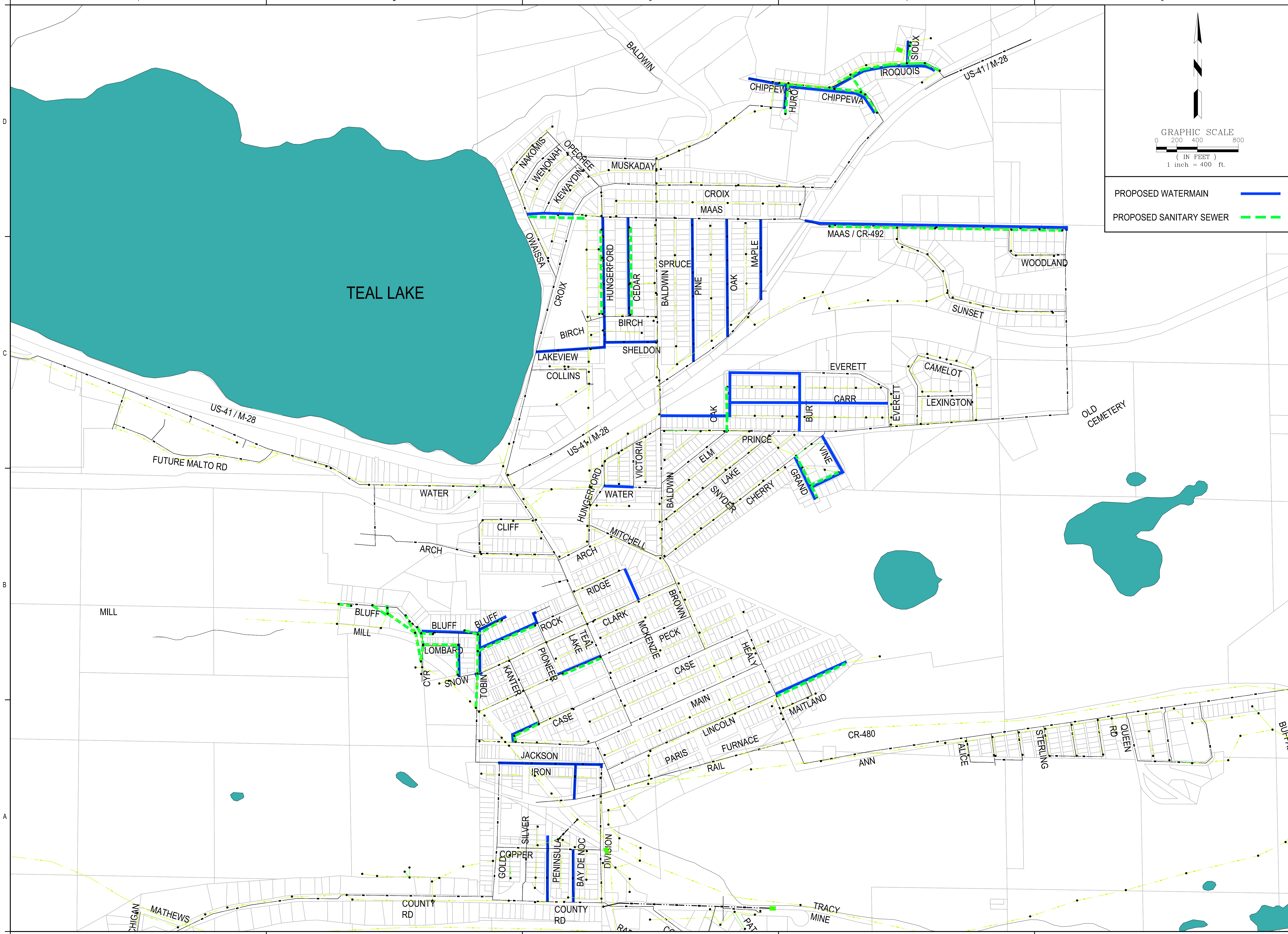
## PROJECT LEGEND

- PHASE 1 WATER PROJECT (2021-22)
- PHASE 2 WATER PROJECT (2027)
- PHASE 3 WATER PROJECT (2032)

NOTE:  
 THIS MAP IS BASED OFF DATA GATHERED FROM THE CITY OF NEGAUNEE'S G.I.S. SYSTEM, PAST MDEQ PERMITS, EXISTING PLANS, AND INPUT FROM THE PUBLIC WORKS DEPARTMENT.







**CITY OF NEGAUNEE  
WATER SYSTEM MAP**  
CITY OF NEGAUNEE  
NEGAUNEE, MI

ISSUED FOR:	DATE:

PROJECT NO:	CITY OF NEGAUNEE
DESIGNED BY:	
DRAWN BY:	
CHECKED:	MT
APPROVED:	MT

**PROJECT MAP**  
**G004**

7/10/2021 10:50 AM  
P:\1001891 NEGAUNEE CITY PHASE I WATER PROJECT\DWG\PHASE I WATER COVERING