CITY OF MACKINAC ISLAND

MACKINAC COUNTY, MICHIGAN

City of Mackinac Island

CLEAN WATER

STATE REVOLVING FUND (SRF)

PROJECT PLAN

DRAFT

WWTP IMPROVEMENTS

This Page Intentionally Blank

TABLE OF CONTENTS

ATTACHMENTS

EXECUTIVE SUMMARY

This Project Plan was completed to qualify for funding through the Clean Water State Revolving Fund (SRF) for improvements to the City of Mackinac Island wastewater treatment plant (WWTP). The SRF program assists municipalities in financing certain utility improvements projects over a 20 or 30-year term at favorable interest rates – typically between 1.875% and 2.5%. As such, projects reflect the long-term needs of the community.

This State Revolving Fund Project Plan is the first step in an application for SRF financing of the necessary improvements. This report presents the results of the engineering and scientific evaluations performed to determine the need for the project, develop alternatives to remedy identified problems, and to define the scope of the recommended/selected alternative. Background information on the existing system is also provided along with the rationale used to define alternative projects that can meet the long-term wastewater treatment needs of the City. The viable alternatives are evaluated and compared as to their financial and technical feasibility with regard to implementation.

Much of the equipment at the WWTP is undersized, in poor condition, or operating beyond its useful life. There are also concerns with the overall capacity of the WWTP. An evaluation of the condition of the WWTP was conducted in 2021 as part of the development of City's 2022 WWTP Master Plan. The proposed Project will focus on providing the best alternative to meet the project objectives and serve the long-term needs of the City.

Four alternatives were developed that could successfully address the project objectives. Based on a review of the technical feasibility and financial analysis , Alternative 3 – Expansion with Moving Bed Bioreactors (MBBRs) was identified as the preferred and Recommended Alternative because it has the lowest net present worth while addressing the needs of the WWTP.

Alternative 3 addresses the capacity issues by implementing a new secondary treatment process. The recommended alternative provides the most cost-effective solution to expand the facility and address future summer conditions while also effectively handling the smaller winter flows. Based on Moving Bed Biofilm Reactor (MBBR) technology, the recommended alternative has a relatively small footprint and the organic treatment capacity can be increased by simply adding additional media to the system as constructed. The MBBR system is simple to operate along with minimal mechanical equipment to maintain.

The User Charge for a typical residential customer is expected to increase $120 to $130 per month if the Recommended Alternative 3 is implemented, based on financing $28.8 million through an SRF loan at the current 1.875% interest for a 20-year bond period. Actual monthly costs will vary depending on financing terms, principal forgiveness/grant eligibility, individual usage, and community rate structure at the time of the project. If grant funding for the project is awarded, the user charge increase would be reduced proportionally. A preliminary determination by EGLE is that the City does qualify as a Disadvantaged Community.

I. INTRODUCTION

The City of Mackinac Island was established as a Village in 1847 and as a City in 1899 and is located in Mackinac County approximately 215 miles north of the City of Lansing. The City, with a permanent year-round population of 492 people, owns and maintains the sanitary sewer collection system,and the wastewater treatment plant (WWTP), as well as the water supply, storage, and distribution system within the City.

The City's sewer system serves most of the populated areas on the Island. The exception to this is the Village of Harrisonville, where most of the older homes and developments do not have sewer service and rely on septic tanks and drainfields to dispose of wastewater. The collection system consists of over 4 miles of gravity sewer, 5 pump stations, and approximately 7 miles of forcemain. A map of the Mackinac Island collection system is included as Figure A1, located in Appendix A.

Wastewater is collected throughout the service area and is pumped to the City's WWTP, which was originally constructed in 1970 and includes preliminary screening and grit removal, primary clarifiers, an oxidation tower, aeration tanks, final clarifiers, chlorine disinfection, aerobic sludge storage and sludge drying beds. The plant has undergone three major upgrades since its construction, the most recent of which occurred in 2012, and currently employs an activated sludge treatment system with grit and screenings removal, primary clarification, oxidation towers, aeration tanks, secondary clarification, and chlorine disinfection. The WWTP discharges to Lake Huron in accordance with Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit No. MI0026751. A copy of this permit is located in Appendix B.

An initial review of Mackinac's wastewater needs was performed in 2021 as part of the development of the City's WWTP Master Plan. Review of the WWTP identified issues with the existing headworks, secondary treatment system, final clarification, and disinfection system. During the summer months, the WWTP receives flows that approach the hydraulic capacity of the facility.

The purpose of this Project Plan is to fulfill and document the fulfillment of requirements found in the state statutes (MCL§324.5303) and rules that govern the State Revolving Fund (SRF) and the Strategic Water Quality Initiation Fund (SWQIF) programs (Michigan Administrative Code R323.952). A copy of these rules can be found at http://www.michigan.gov/orr/0,1607,7-142-5698---,00.html.

In addition, this Project Plan provides a basis for ranking the City's proposed wastewater system improvements in comparison to projects by other municipalities in a project priority listing for a low-interest State Revolving Fund loan. This is a financially attractive program where municipalities across Michigan compete for limited funds based on the merits of their proposed projects.

The scope of this Project Plan includes a summary of current issues with the City's wastewater system, the development of projected population growth and the wastewater needs of the service area for the 20-year planning period. The Project Plan identifies principal alternatives to meet the current and future wastewater needs and evaluates the environmental impacts of the recommended alternative.

The Project Plan presents projected user costs necessary to operate the utility and repay the low-interest loan for the recommended alternative. The Draft Project Plan will be available for public review 30 days prior to the public hearing, which will be held on May 12, 2022. A summary of public participation and public comments solicited by the City regarding the Project Plan and recommended alternative will be included in Appendix E.

The format of this report follows the project planning guidelines for Clean Water Revolving Funds (SRF and SWQIF) prepared by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Revolving Loan Section. Section II presents extensive background information including a description of the community,

the study area characteristics, the wastewater treatment capacity and the need for the project. Section III presents alternatives for resolution of the problems. Sections IV, V and VI further evaluate the recommended alternative, including a detailed description, evaluation of environmental impacts and mitigation measures. Section VII presents the public participation measures taken throughout the duration of the project planning phase.

II. PROJECT BACKGROUND

The City of Mackinac Island wastewater treatment plant is under the jurisdiction of the Michigan Department of Environment, Great Lakes, and Environment (EGLE). The WWTP is subject to both general standards and specific permit requirements under the National Pollutant Discharge Elimination System (NPDES). The State of Michigan has primacy for implementing these rules.

The City's WWTP is in poor condition and key improvements are needed to allow for continued reliable wastewater service. Since the WWTP is approaching its hydraulic capacity, permit compliance can be a difficult task, requiring an inordinate amount of extra time and effort from the City's operational staff. The last major improvements to the WWTP were conducted in 2012, but only a select portion of the WWTP assets related to the solids handling process at the facility were addressed. Much of the remaining equipment and infrastructure was installed prior to that project and has exceeded its anticipated useful life. The WWTP has a number of safety concerns that need to be addressed as well.

A. Study Area Characteristics

Delineation of Study Area

The Study Area is the City of Mackinac Island WWTP Service Area, which includes the entire City of Mackinac Island. The WWTP service area is shown in Figure A1, in Appendix A. Figure A1 also identifies the location of the pump stations and the WWTP.

B. Environmental Setting

Cultural Resources

The City of Mackinac Island is surrounded by Lake Huron, an important feature of the area.

A search of the Michigan Historic Sites (MSHP) Online website identified a number of state registered historical sites on Mackinac Island. These sites are: Fort Mackinac, Biddle House, The Mathew Geary House, The Grand Hotel, The Indian Dormitory, The Mission Church, The Mission House, The Round Island Lighthouse, The Robert Stuart House, and The Lawrence Andrew Young Cottage. The proposed project will include an expansion of the existing WWTP site to facilitate the construction of the new facilities while maintaining operation of the existing WWTP.

The City is working with Mackinac State Historic Parks (MSHP) to secure the additional property required for the proposed alternative. The proposed project is not anticipated to impact any of the previously identified historic sites and the City intends to complete the necessary historic and archeological reviews as required by MSHP.

The Natural Environment

Climate

Climatological data for the area is based on information from the Michigan State University Climatology Program. Data from St Ignace was used. The average January climatic conditions include average minimum temperatures of 12.8° F and average maximum temperatures of 26.2° F. The average July climatic conditions include average minimum temperatures of 58.4° F and average maximum temperatures of 75.4° F. The average rainfall is 28.97 inches and the average annual snowfall is 83.29 inches.

These climate conditions, specifically the winter conditions and design frost levels, would have equal design and construction impacts on all the principal alternatives and equally affect the length of construction seasons for all alternatives.

Air Quality

Air quality impacts due to construction dust and emissions in the area due to construction equipment would be temporary and similar for the principal alternatives.

Wetlands

A wetlands map was generated at the USFWS National Wetlands Inventory website. The map is included in Appendix A as Figure A2. There are a couple of freshwater ponds and freshwater forested/shrub wetlands on the Island. However, these areas are not near the site of the WWTP. It is not anticipated that this project will have any impacts on area wetlands.

EGLE will review any potential impacts to land-water interfaces.

The proper permits will be acquired before any construction commences.

Floodplains

The Federal Emergency Management Agency (FEMA) does not have floodplain information available for the City. Although there is not a map available, due to the difference in elevation between the shoreline and the WWTP site, there is not a concern of flooding at the site.

Special Designation Rivers (Trout, Natural, Wild & Scenic)

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.

Mackinac Island does not contain any of the rivers listed on the National Wild and Scenic Rivers System website, administered by the National Park System. The Island does not contain any rivers found on EGLEs Michigan Natural Rivers System website.

Major Surface Waters

The most noticeable natural feature in the Service Area is Lake Huron. Lake Huron provides recreational opportunities and aesthetic beauty to the area.

Recreational Facilities

Figure A3 shows the City's current recreational facilities. Much of the Island is classified as a state park and includes biking trails throughout. There are trails through the park for hiking as well. There are several natural features on the island noted as scenic spots, including: the Cave of the Woods, Sunset Rock, Devil's Kitchen, and Arch Rock. Great Turtle Park is located towards the center of the Island and Marquette Park on the south side for residents and visitors. There is also the British Landing beach on the northwest side of the island.

No improvements proposed in this Plan are anticipated to have a negative impact on any of these facilities.

Topography and Geology

Figure A4 shows the existing topography from the USGS quadrangle map. The elevations in the City gradually slope towards Lake Huron. Ground elevations vary from 590 feet to 885 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 A5; and the Bedrock Geology of Michigan Map (MDNR Geological Survey Division, 1987), see Figure A6.

The general geology of Mackinac Island is characterized by thin to discontinuous glacial till over bedrock which overlies Mackinac breccia.

Soils

Figure A7 is the USDA National Resources Conservation Service soil map for the City of Mackinac Island. Soils located at the WWTP site are St. Ignace silt loam, 0 to 6 percent slopes, which are well drained.

Agricultural Resources

Figure A8 shows the Farmland Classification for the soil types in the City. Soils at the WWTP site are classified as not prime farmland.

Flora and Fauna

A USFWS Section 7 review will be completed for this project if required by Mackinac State Historic Parks. According to the 2018 Master Plan, there are multiple protected plants on the Island. These include multiple orchid species, some ground pines (lycopodium species), and Pitcher's Thistle. Twisted Whitlow Grass is known to grow on the Island as well. Endangered species listed by the Michigan Natural Features Inventory and US Fish and Wildlife Services includes the Gray Wolf, Hine's Emerald (invertebrate), Michigan monkey-flower (vascular plant), and Piping Plover (bird).

The proposed work will extend the existing WWTP site, so impacts to any federally listed endangered or threatened species will be evaluated. All regulations will be followed, and the proper permits acquired before any construction would begin.

Unique Natural Features

The City is currently in conversations with Mackinac State Historic Parks about securing the additional property required for the proposed alternative. The City will complete the MNFI review if required. It is anticipated that no protected resources will be impacted.

Land Use in the Study Area

The land use distribution for the City of Mackinac Island, including residential, commercial, and employee housing, is shown in Table 1. Data used to develop Table 1 came from the City of Mackinac Island Master Plan (October 9, 2018). Figure A3, Current Land Use Map (found in Appendix A) is provided for a graphical summary of Table 1.

Table 1: Land Use Patterns (2018 Master Plan)

Land Use Category	Percent (%)
Residential, Year-Round	15.6%%
Residential, Seasonal	23.6%
Condominium (Attached Structure)	1.8%
Employee Housing	15.3%
Accomodations	3.5%
Commercial	11.2%
Institutional	3.7%
Museum	0.8%
Vacant	24.4%

The future land use distribution for the City of Mackinac Island is similar to the existing land use distribution with an expansion of the residential and commercial areas. A comparison between Figure A3 and Figure A9, Future Land Use, illustrates how the City is planning future development. Future land use is based on consideration of analyses, goals, policies, strategies, and public input.

Surface and Ground Waters

The City of Mackinac Island contains a few small ponds and waterways but is heavily influenced by Lake Huron. The City contains portions of the Round Island Channel and the Straits of Mackinac. Treated and disinfected effluent from the City of Mackinac Island WWTP is discharged to Lake Huron in accordance with the facility's NPDES permit.

The City owns and operates a lake draw water system and treatment plant, along with the distribution system. The water treatment plant was originally built in 1998 with improvements occurring in 2007 to upgrade the system to low pressure filtration. The filters were again replaced in 2016. The firm capacity of the system is 2.16 MGD. There are two concrete reservoirs that hold up to a total of 1,250,000 gallons.

C. Population Data

The City of Mackinac Island provides wastewater collection and treatment services to residents of the City of Mackinac Island as well as many seasonal tourists and employees. As of the 2018 Master Plan, the study area and service area permanent resident population included 492 people. Seasonal projections for the entire City and the service area are discussed below.

Population Projections

The fluctuation in population that the City of Mackinac Island experiences seasonally is significant. Due to this, summer and winter projections were separated.

<u>Summer Population</u>

Future summer population was estimated using the 2018 Master Plan and 2017 Zoning Ordinance. The Zoning Ordinance was reviewed to determine available land area for each zoning district. Areas for each zoning district were estimated and divided among allowable land uses. Maximum densities for each land use were multiplied by the area to give a total population. This was assumed to be an ultimate future build out. A summary of this information is provided in Appendix C.

The City estimates that approximately 55% of the potential future development could occur in the 20-year planning period. It is also assumed the Village of Harrisonville will be added to the collection system in the future due to failing septic systems.

In addition to overnight tourists and residents on the Island, there are daily tourists. The number of daily tourists was estimated using 3.5% growth per year, as referenced in the 2018 Master Plan.

Winter Population

Future winter population was determined as approximately 25% of the summer population, per the year-round housing estimate in the 2018 Master Plan.

Table 2 compares the current population to the 20-year population projection and the ultimate buildout population.

Table 2: Population Projections

	Current*		20-year		Ultimate	
	Summer	**Winter**	**Summer**	**Winter**	**Summer**	**Winter**
Island Residents	1,943	492	3,380	860	5,520	1,655
Hotel/Lodging Guests	3,006		5,750		10,460	
Seasonal Employees	4,000		5,070		8,420	
Total Residential Population	8,949	492	14,200	860	24,400	1,655
Day Trip Tourists	7,740	0	12,800	0	17,100	0
Total Design Population	**16,689**	**492**	**27,000**	**860**	**41,500**	**1,655**

**Data source: 2018 Master Plan Table 2-2.*
-Island residents are residents that live on the Island for the complete duration of the season
-Hotel/Lodging guests include tourists that remain on the Island overnight for at least one night in a hotel, motel, or bed and breakfast, etc.
-Seasonal employees include those who live and work on the Island during the summer

Service Population

The City wastewater treatment plant serves the majority of the Island. Harrisonville, a portion of the Island containing older homes and developments, currently uses septic tanks. As shown in Table 2 above, the majority of the service population are not island residents. Many of these estimates were projected using growth rates listed in the 2018 Master Plan. Based on the current estimated population and ultimate population listed above, approximately 30% of the available future development could occur in the next 20 years.

Winter residents are estimated to be 25% of the summer residential population per the 2018 Master Plan.

Current daily tourist numbers are estimated to be 7,740 persons per day. As noted above, the Master Plan estimates that this will increase by 3.5% per year.

Residential and commercial growth on the Island is currently limited by the WWTP. Development on the Island is limited to 10 REUs per year, and the total number of remaining REUs is limited. The demand for growth far exceeds the capacity of the existing WWTP.

D. Economic Characteristics

The people who live in the City of Mackinac Island hold jobs in a variety of sectors. Table 3 summarizes the number of people in each sector within the City in 2020. This information comes from the Census 2020 ACS 5-Year Estimates Subject Tables.

Table 3: Occupational Sectors, 2020

	City of Mackinac Island		Mackinac County	
	Number	Percentage	Number	Percentage
Management	148	23.9%	1,445	32.1%
Service	202	32.7%	1,060	23.6%
Sales and Office	76	12.3%	927	20.6%
Natural Resources, Construction, and Maintenance	87	14%	468	10.4%
Production, Transportation, and Material Moving	105	17%	597	13.3%

Economic statistics from the U.S. Census Bureau for 2020 indicate that the median household income in the City of Mackinac Island is comparable to nearby Cities and Villages, and slightly lower than the whole of Mackinac County and lower than the State of Michigan as a whole. In 2020, the estimated median household income of the City was $47,159. Table 4 shows the median income comparison for the City and surrounding areas.

Table 4: Median Income Statistics (Census 2020 Estimates)

Study Area	Household Income	% Below Poverty Level
City of Mackinac Island	$47,159	28.7%
City of St Ignace	$48,226	15.3%
Village of Mackinaw City	$36,406	15.2%
City of Cheboygan	$34,964	17.1%
Freedom Township	$81,000	10.9%
Brevort Township	$53,235	20.4%
Mackinac County	$50,058	15.5%
State of Michigan	$59,234	13.7%

E. Existing Facilities

Collection Facilities

The City's wastewater collection system is comprised of over 4 miles of gravity sewer, 5 pump stations, and approximately 7 miles of forcemain. A map of the collection system is provided in Appendix A, Figure A1.

Pump Stations

The collection system includes five pump stations. Table 5 presents details of each pump station.

Table 5: City of Mackinac Island Existing Pump Station Information

Pump Station	Capacity (GPM)
Biddle Point	1,200
Mission Point	200
Park Avenue	50
Stonecliffe	250
Stonebrook	80

The Biddle Point Pump Station receives a majority of the City's wastewater from areas served by the gravity sewer system and the Mission Point PS. Wastewater from the Biddle Point PS is pumped directly to the WWTP through a 12" forcemain. An improvement project is currently underway that will provide Biddle Point with a new tri-plex pump station rated for a firm capacity of 1,200 gpm.

The Park Avenue PS serves a portion of the West Bluff area and is tied into the main forcemain to the WWTP. Similarly, Stonecliffe PS is connected to the main forcemain and receives flow pumped from individual simplex grinder pumps, the Solid Waste Handling Facility and the Stonebrook Pump Station.

Three private pump stations serve the Harrisonville village area and discharge into the main influent 12-inch forcemain between the Biddle Point and Park Avenue Pump Stations.

The combined firm capacity of the pump stations discharging to the WWTP is estimated at 1,600 gpm, assuming 100 gpm from the private Harrisonville PS.

Treatment Facilities

The Mackinac Island WWTP is designed to treat an average daily flow of 0.54 million gallons per day (MGD) and is designed to accept a maximum daily flow of 0.96 MGD (during the summer months). During the winter months, the plant is designed for an average daily flow of 0.13 MGD and a maximum daily flow of 0.40 MGD.

Prior to the 1982 improvements project, the plant consisted of preliminary screening and grit removal, two primary clarifiers, an oxidation tower, two aeration tanks, two final clarifiers, chlorine disinfection, aerobic sludge storage and sludge drying beds. Many improvements were made during a 1982 upgrade project. These included the addition of a second oxidation tower, and an equalization basin. Mechanical screening equipment was also added to the headworks. In 1992, the plant was expanded again to include two additional

aeration tanks, two final clarifiers, and a sludge storage tank. A new fine screen and effluent pumps were also installed. In 2012, an outdoor summer headworks structure was added to accommodate peak summer flow rates. A process building was constructed to house a new sludge dewatering system, and the sludge drying beds were abandoned.

The current WWTP consists of a summer and winter headworks, primary clarifiers, oxidation towers, aeration tanks, final clarification, and gas chlorine disinfection. Since the City has such a large variation in flow between the summer and winter months, the WWTP has two modes of operation. The current process flow diagrams and hydraulic profiles for the treatment facility are included in Appendix A, Figures A10-A12.

Process Description - Summer

During the summer (mid-May – late October), influent wastewater is pumped to the Summer Headworks Building, where the flow is measured by an electromagnetic flow meter. The wastewater flows through an automatic screen to remove rags and other large inorganic debris prior to treatment. Following screening, the wastewater enters a vortex grit removal chamber to settle out sand and other grit that could damage downstream treatment equipment.

The wastewater flows by gravity through the winter headworks channel to the primary clarifiers where settleable organic matter is removed to reduce the organic loading to secondary biological treatment process.

Secondary treatment pumps lift and split the flow between two oxidation towers before sending the wastewater to the aeration tanks for additional biological treatment. Biological treatment occurs continuously in four aeration tanks.

Effluent from the aeration tanks is divided between four final clarifiers to remove biological solids and phosphorus. Ferric chloride chemical addition is used to aid in phosphorus removal.

From the final clarifiers, treated effluent flows to the chlorine contact chamber for disinfection prior to discharge. Plant effluent flow is measured by an ultrasonic level sensor over the chlorine contact tank weir prior to being pumped to the discharge location in Lake Huron.

Process Description - Winter

During the winter (November – mid-May), influent wastewater bypasses the summer headworks and enters the winter headworks. The wastewater passes through the winter mechanical screen to remove rags and other larger debris prior to treatment.

Following screening, flow is measured by an ultrasonic level sensor over the 6-inch Parshall flume. Excess flow diverts to an equalization tank.

Due to the low influent flow and loadings received during the winter months, the primary clarifiers, two of the aeration tanks, and both oxidation towers are taken out of service. Biological treatment is accomplished using an extended aeration process in two of the aeration basins. Final clarifier 2 is the only clarifier on-line during the winter months because it is located indoors.

From the final clarifier, the treated effluent flows to the chlorine contact chamber for disinfection prior to discharge.

Solids Handling

Settled sludge from the primary clarifiers is pumped to the two sludge decant tanks. Return activated sludge (RAS) from the final clarifiers is returned upstream of the aeration tanks or wasted to the sludge decant tanks. The scum is pumped out of the final clarifiers, as necessary.

The digested sludge pumps transfer sludge to either the flocculation tank of the rotary screw press or to the biosolids storage tank for temporary storage. The screw press dewaters the sludge to prepare the biosolids for landfill disposal.

The pressate from the screw press is pumped back through the plant, to either the primary clarifiers or the winter headworks channel after the Parshall flume.

Due to the low volumes of sludge produced during the winter months, the sludge dewatering unit is typically taken offline. Waste sludge is stored in the decant tanks and biosolids storage tank until spring.

Current Wastewater Flows

Average Influent Flow

Daily wastewater flow analysis (2017-2021) indicated that the treatment plant received a summer average wastewater flow of 0.61 MGD and a winter average of 0.10 MGD. Daily flows ranged from 0.011 MGD to 0.987 MGD with peaks up to 2.88 MGD during that period. The figure below shows the current hydraulic loading.

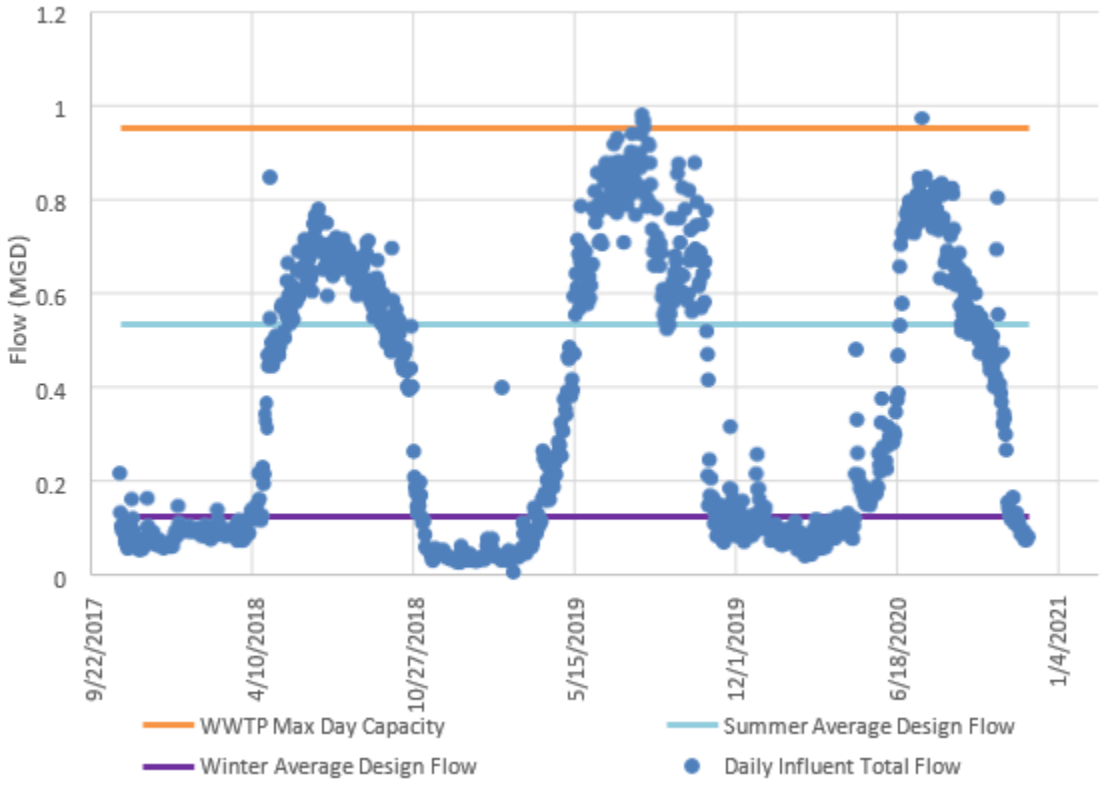


Figure 1. Current Hydraulic Loading

This hydraulic loading, as well as the I/I analysis and population projections in the following sections, was used to determine a per capita usage rate to use in flow projections. Additional resources considered were:

1. U.S. Department of Agriculture & Rural Development (USDA RD) *Bulletin 1780-2* – Recommends a usage rate of 70 gallons per capita per day (gpcd).
2. *2014 Recommend Standards for Wastewater Facilities (Ten States Standards)* – Recommends a per capita usage rate of 100 gpcd.
3. *Part 41 Michigan Department of Environmental Quality (MDEQ) Permit application for Wastewater Systems Improvements 2011 (2013 Mackinac Island WWTP Improvements)*. A usage rate of 110 gpcd was estimated.

Considering the average value of the sources discussed above, and the actual flows observed at the WWTP, a per capita usage rate of 80 gpcd was assigned to residents (including overnight tourists). It was assumed that day trip tourists would contribute approximately one-third the flow of residential user or 26.7 gpcd.

The current design and actual loading for the plant are shown in Table 6.

Table 6: Current Nutrient Loading

	Existing Basis of Design*		Current Summer Max Month Average		Current Winter Average	
	Concentration (mg/L)	Loading (lb/d)	Concentration (mg/L)	Loading (lb/d)	Concentration (mg/L)	Loading (lb/d)
BOD_5	750	6,003	633	3,500	82	67
Suspended Solids	650	5,202	335	1,867	64	51
NH_3-N	30	240	-	-	-	-
Phosphorus (Total P)	6.2	50	4.6	24	3.27	2.65

Wet Weather Flow

In October 2020, Fleis & VandenBrink (F&V) completed an Inflow & Infiltration (I/I) Analysis Flow Monitoring Report for the Biddle Point Pump Station Service Area. Based primarily on the flow responses observed during the April 29, 2020, 3.1-inch storm event, the 25-year 24-hour design storm I/I flows are projected to be approximately 0.75 MG during that 24-hour period (equivalent to 0.75 MGD), plus 0.06 MGD from constant groundwater infiltration. The peak hourly flow rate of I/I alone is projected to be 1,000 gpm.

Many buildings served by the sewer system, particularly those in the downtown area, appear to have sump pumps connected to the sanitary sewer system. F&V conducted a detailed evaluation and field investigation in Spring/Fall 2021 to determine the potential impact of the sump pumps and feasibility to reduce I/I. Based on the results of the study it was determined that existing sump pumps could be contributing approximately 60,000 gpd during dry weather and up to 325,000 gpm during wet weather events. A complete detailed report outlining the suspected sump connections to the sanitary sewer system has been provided to the City.

Recommendations to address the I/I include:

- Continuing to identify and disconnect sump pump discharges and other illicit connections to the sanitary sewer
- Construct the public assets necessary to support routing sump pump discharges to the lake

- Repair areas of the collection system identified as sources of I/I
    - Portions of sewer have been identified where active lateral joint infiltration occurs; however recent televising of the trunklines in the Downtown area indicate the majority of the sewer is in good condition.

F. Fiscal Sustainability Plan

The primary factors driving the need for an improvements project are aging infrastructure and the current hydraulic capacity concerns during the summer months. The following paragraphs identify the major assets at the WWTP and highlight the critical deficiencies that will be address as part of the proposed project.

The summer headworks has no by-pass channel with a manual bar screen to provide coarse screening in the event of a mechanical screen failure. There is no rock trap or preliminary screening on the septage receiving station, allowing high concentrations of solids and debris into the waste stream. The septage receiving station does not have a flow meter, leaving no way to accurately measure the flow. The summer headworks is located outside. This leaves it exposed to the elements, causing it to be unusable during the winter months. It also creates a higher potential for odors. The screen and headworks do not have the capacity for the projected design 20-year flow rate.

The winter headworks has an equalization basin, but it is too small to handle snow melt and heavy rain events, leading to overflows. Inadequate ventilation in the winter headworks is causing some of the equipment to begin corroding, including the HVAC system. Additional ventilation is needed to meet NFPA 820 requirements. The equipment does not have sufficient capacity to handle the projected 20-year flows. The aerated grit equipment has failed and is no longer in operation. During peak spring flows, there is a hydraulic bottleneck between the existing winter grit chamber and the aeration tanks. This bottleneck occurs because the primary clarifiers are bypassed, leaving all of the flow to pass through one pipe. This has caused overflows in the control building in the past.

The primary clarifiers do not have sufficient capacity to handle the current or projected flows. The current side water depth (SWD) does not meet Ten states design standards. The clarifier mechanisms have surface corrosion, and the sludge pumps are aging and past their expected useful life. Both clarifiers must be in service to pass the design flows hydraulically meaning that there is no redundancy.

The secondary treatment pump station wet well is located in the control room, where the electrical gear is located. This is not compliant with NFPA 820 standards. The wet well is small and does not have much storage capacity. In the event of a mechanical or electrical fault, the wet well could overflow and flood the control building basement, damaging process equipment and electrical gear.

The oxidation towers do not have the capacity to accommodate the projected 20-year flows. They are undersized and they are currently hydraulically and organically overloaded currently during periods of high flow. There are also structural concerns with the ladders and the wooden structures themselves so there is currently no safe method for the Operators to inspect the media. The towers are past their expected useful life, and are a source of nuisance odors in the summer.

The aeration tanks are undersized for biological treatment. The low-capacity blowers are past their expected useful life and the high-capacity blower is approaching the end of its useful life. Based on the approximate age of the aeration diffusers, it is likely that the diffuser membranes are due for replacement.

The final clarifiers do not have the capacity to accommodate the projected peak hour flows based on design standards for peak hourly overflow rates. The existing final clarifiers are undersized and do not meet Ten States Standards minimum SWD. The clarifier mechanisms are exhibiting surface corrosion. The treatment system does not have any redundancy. All four of the final clarifiers need to be online to hydraulically pass the design flows. The difference in tank geometries could lead to unbalanced flow splitting and decreased settling performance at peak flows. The pump configuration limits the operator's ability to waste sludge out of final clarifiers 3 and 4. Final clarifier 2 is the only clarifier online for winter operation as that is the final clarifier that is located inside. Final clarifier 2 is the oldest clarifier and the mechanism is original from 1972. Final clarifier 1 does have a cover, but it does not provide enough insulation and is prone to freezing so there is no reliable redundancy during the winter months.

The gas chlorine disinfection system does not have sufficient capacity to meet the minimum contact time required by Ten States Standards. Transporting chlorine gas to the Island and WWTP is a safety hazard. The WWTP experiences control issues with the chlorinator. The piping from the secondary treatment wet well to the oxidation towers runs through the chlorine contact tank. Therefore, if this pipe were to fail, raw primary effluent would flow into the final effluent.

Under peak flow conditions, there is the potential for the effluent pump station to be overloaded. The effluent pumps do not have sufficient capacity for the current or projected 20-year peak hour flows. The effluent wet well is small and, paired with rapid changes in flow, can make controlling pump discharge rates problematic. The small wet well could also overflow and flood the control building basement. The effluent discharge gravity sewer does not have the capacity to handle summer peak flows.

The chemical feed control system is not integrated into the WWTP alarm system. There are no alarms if the system experiences an issue. The chemical is transported to the plant via horse and dray, posing safety concerns.

Portions of the sludge piping is undersized and could be prone to plugging. The solids can only be processed and hauled off the Island in the summer months.

The basement sump collects recycle flows throughout the WWTP and pumps them to the winter headworks channel with sump pumps. The sump pumps, as well as the sump cover, have significant corrosion. The sump is located in the basement of the control building. If the sump pumps fail, the basement will flood.

The motor control centers (MCCs) in the Control Building have exceeded their expected useful life, and the plant lacks some of the desired automation and remote monitoring capabilities necessary for efficient operation of the facility with limited staff.

Summary of Areas of Concern

A summary of the areas within the existing WWTP that need improvement is as follows:

- The summer headworks has limited use and does not have sufficient capacity for projected flows.
- The winter headworks contains failing/aging equipment and does not have sufficient capacity for projected flows.
- The primary clarifiers do not have sufficient capacity for current or projected flows and they do not meet Ten States Standards.
- The secondary treatment pump station is not NFPA 820 compliant and could cause extensive damage to process and electrical equipment if it were to overflow.

- The oxidation towers do not have sufficient capacity for projected flows and pose safety concerns.
- The aeration tanks are undersized for biological treatment and the blowers/diffusers likely need maintenance/replacement due to age.
- The final clarifiers do not have redundancy and do not meet design standards.
- The gas disinfection system does not have sufficient capacity to meet Ten States Standards.
- Transporting chlorine gas to the WWTP poses a safety risk.
- The effluent pumps do not have sufficient capacity and could cause flooding that would damage process and electrical equipment.
- The chemical control system is not integrated into the WWTP alarm system.
- The basement sump pumps have significant corrosion that, if they failed, could lead to flooding of the basement.

In addition to the aging infrastructure issues seen at the WWTP, the plant is not able to accept additional wastewater as it is exceeding its design capacity. Because of this, current developments and commercial users are adding septic tanks. There are septic tanks in use on the Island, however, many of these are failing. The WWTP does not currently have the capacity to accept the flows if those users wanted to connect to the system.

G. Need for the Project

Compliance Status

The Mackinac Island WWTP has had multiple exceedances where it did not meet its NPDES discharge permit. During the past 4 years, the noncompliance events were mainly associated with not meeting the TSS minimum % removal, BOD_5 minimum % removal, total residual chlorine, and fecal coliform levels. There have been effluent overflows associated with the limited capacity of the effluent gravity sewer, that have occurred during periods of high precipitation/spring snow melt.

Noncompliance, Exceedences, Orders

The City of Mackinac Island is not currently under a consent order. The WWTP is generally meeting its treatment requirements. A copy of the current NPDES discharge permit (MI0026751) is included as Appendix B.

Water Quality Problems

There are no identified major point sources or non-point sources of pollution from on-site systems, or storm water runoff within the service area.

Projected Needs for the Next 20 Years

The projected 20-year wastewater needs are based on the population projections. The projected wastewater flows for design year 2040 are summarized in Table 7.

Table 7: Proposed 20-Year Design Hydraulic Loading		
	Summer (Max Month)	**Winter**
Overnight Tourist/ Resident Population	14,200	860
Tourist Population	12,800	0
	Hydraulic Loading	
	Summer	**Winter**
Overnight Tourist/ Resident Usage (gpd)	1,136,000	68,000
Tourist Usage (gpd)	342,000	0
Groundwater Infiltration (gpd)	60,000	60,000
25-year 24-hour design storm I/I flows	750,000	750,000
Max Month Avg. Daily Flow (gpd)[1]	1,538,000	128,000
Maximum Daily Flow (gpd)[2]	2,288,000	878,000
Peak Hour Flow (gpm)[3,4]	2,600	1,200

[1]Max Month average day demand is based on total resident and tourist usage plus ground water infiltration.

[2]Maximum Daily Flow is based on the average daily flow plus Inflow from the 25-year 24-hour storm.

[3] Summer Peak Hour Flow equals residential and tourist flow multiplied by Ten States Standards peaking factor (2.52) plus groundwater infiltration.

[4] Winter Peak Hour Flow equals residential and tourist flow multiplied by Ten States Standards peaking factor (3.84) plus groundwater infiltration, plus 1,000 gpm for peak I/I. Assuming EQ basin is offline during the winter months.

It should be noted that the design peak hour flow of 2,600 gpm exceeds the current firm capacity of the pump stations (1,600 gpm). Based on the population projections and potential I/I discussed above, planning for the long-term upgrade of the pump stations and WWTP influent and effluent forcemains may be required as the service area is expanded. The timing of this upgrade will be dependent on areas of development and the level of I/I removal that can be achieved.

Based on the projected hydraulic loading of greater than 1.0 MGD the NPDES permit classification would change as the plant is currently rated for a discharge of 0.96 MGD.

Projected nutrient loading is summarized in Table 8.

Table 8: Design Nutrient Loading		
	Concentration (mg/L)	**Loading (lb/d)**
BOD_5	750	9,600
Suspended Solids	650	8,300
NH_3-N	30	385
Phosphorus (Total P)	6.2	80

Future Environment without the Proposed Project

If the proposed project is not implemented, the WWTP will continue to operate at or above its rated hydraulic capacity. Assets at the WWTP would continue to be used past their expected useful life, reducing the reliability of treatment and reducing operator safety. The potential for effluent overflows would continue to exist, and permit exceedances could become more common. Economic growth and development on the Island would also be limited by not addressing the current deficiencies identified at the WWTP.

III. Analysis of Alternatives

A. Identification of Potential Alternatives

Alternatives to accomplish improvements to the City of Mackinac Island WWTP 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 facilities capable of delivering consistent reliable service and continued compliance with regulatory and permit requirements.
- Plan for future growth within the City and corresponding treatment capacity.
- Minimize operating costs through improved treatment methods.
- Rehabilitate/repair high priority areas of existing wastewater infrastructure.
- Minimize financial burden to the sewer system users.
- Minimize environmental impact during construction of the improvements project.
- Minimize environmental impact of WWTP operations and discharge.

Seven alternatives were developed for the City of Mackinac Island Wastewater Treatment Plant Improvements Project.

Alternative 1. No Action
Alternative 2. Expansion with Upgrades to the Existing Facilities
Alternative 3. Expansion with Moving Bed Bioreactors (MBBRs)
Alternative 4. Expansion with Oxidation Ditches
Alternative 5. Expansion with Membrane Bioreactors (MBRs)
Alternative 6. Expansion with Sequencing Batch Reactors (SBRs)
Alternative 7. Regional Alternative.

The No Action and Regional alternatives were evaluated to meet SRF Project Plan requirements. The other alternatives were developed to address the issues identified.

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

Financial analysis of feasible alternatives followed a present worth methodology. Capital costs, operations, maintenance and replacement costs, and salvage values were determined separately and discounted back to present value. The sum of these costs represents the present worth of the project.

The Alternatives are described in the following sections.

Alternative 1 - No Action

The “No-Action” Alternative is typically required to be evaluated by most funding agencies. No improvements would be implemented with this alternative. The “No Action” alternative would maintain current system operations.

The issues with the current biological treatment process, including inoperable equipment, hydraulic capacity issues, and structural defects and odors associated with the oxidation towers would not be addressed. Aging equipment would continue to deteriorate until ultimate failure, which could result in compliance problems in the future.

Leaving these problems unaddressed poses a serious risk of process failure and potential sanitary sewer overflows.

There is a cost associated with the “No Action” alternative, although it is difficult to quantify that cost currently.

The “No Action” alternative does not meet the project objectives and will not be evaluated further as a principal alternative.

Alternative 2 – Expansion with Upgrades to the Existing Facilities

Alternative 2 includes rehabilitating and expanding the existing biological treatment system.

Repairing the existing oxidation towers and expanding the aeration basins will not improve the hydraulics throughout of the current system. The WWTP will continue to be hydraulically overloaded and frequent bypasses will be necessary. The facility would continue not to meet current Ten States and NFPA-820 design standards.

The existing oxidation towers require the use of the secondary pump station which has historically been a reliability concern due to its small size and location within the facility. The compact footprint of the existing facility leaves no room for the feasible expansion of the secondary pump station or oxidation towers and aeration basins. Additionally, the seasonal odors generated by the oxidation towers would continue.

Without the oxidation towers, a significant expansion of the existing aeration basins would be required to convert the plant to a conventional activated sludge plant. Additionally, the current hydraulic profile does not allow for influent to flow by gravity from the primary clarifiers to the aeration basins.

The control building basement that houses the mechanical equipment and process piping has undergone many renovations in the past and there is minimal space available for additional equipment. Additionally, constructing the necessary expansion while maintaining operation of the existing facility would not be feasible.

Alternative 2 does not meet the primary project objective and will not be evaluated further as a principal alternative.

All Alternatives – WWTP Expansion

Alternatives 3 – 6 all include the expansion of the WWTP and include constructing an influent equalization basin, new headworks facility, the biological treatment system (discussed below), UV disinfection, a Storage Garage, and Control Building improvements.

<u>Influent Equalization Basin (All Alternatives)</u>

The proposed WWTP expansion would be designed to accommodate the projected peak hour flow from the lift stations. However, the WWTP is limited by the effluent sewer capacity. Repurposing the existing 250,000 gallon aeration basins as an influent equalization basin could reduce the peak hour demands of the effluent pump station.

Headworks (All Alternatives)

The existing configuration of separate winter and summer headworks is not capable of handling the future design flow rates. To address the hydraulic challenges that the winter headworks currently has and accommodate for expansion of the WWTP, a new headworks building would be constructed.

The new building would be climate controlled and used year-round. The building would be designed in accordance with NFPA-820 guidelines, and the HVAC system could be designed to accommodate the addition of a future odor control system.

Two screening channels would be constructed, allowing for a redundant influent screen in the event of mechanical failure or blockage of the primary unit. The existing summer mechanical screen could be relocated to the bypass channel and a new mechanical screen will be installed to handle peak flow rates.

Influent screening would be followed by a vortex grit removal system, similar to the current summer headworks technology. It is possible that a portion of the existing summer headworks grit removal equipment could be relocated to the new headworks building for re-use.

The existing winter headworks would be abandoned and the existing summer headworks could be repurposed as a septage receiving station.

Septage Receiving Station (All Alternatives)

The existing summer headworks would be converted to a septage receiving station by adding a severe duty screen with a rock trap to handle the heavy debris and solids associated with septage hauling. A dedicated septage flow meter would be installed for better measurement of the septage loading to the WWTP.

Primary Clarifiers (Alternatives 3-5)

It is not feasible to expand the existing primary clarifiers to meet the projected needs of the WWTP. In addition to the deficiencies identified in Section II.F, the primary clarifiers cannot flow by gravity to the aeration basins if the secondary pump station and oxidation towers are abandoned as discussed below.

To remedy this, the existing primary clarifiers would be replaced with a flow splitter and three new rectangular primary clarifiers. Rectangular clarifiers allow for a reduced footprint using shared wall construction, and three units provide the necessary redundancy. The proposed configuration allows for simple expansion in the future. New primary sludge pumps, piping, and valves would also be included.

Final Clarifiers (Alternatives 3-4)

In order to address the deficiencies identified with the existing final clarifiers, the clarifiers be replaced. Three new 45-ft diameter clarifiers would be designed and constructed in accordance with Ten States Standards recommended parameters for side water depth, surface overflow rate and solids loading rate. Two of the clarifiers would be provided with covers to allow for winter operation

New sludge piping and waste pumps would be provided to improve clarifier wasting and control.

Due to the filtering capabilities of MBRs and the integrated processes of SBRs, secondary clarifiers would not be necessary with Alternatives 5 and 6.

UV Disinfection (All Alternatives)

The existing chlorine contact chamber is undersized for the projected flows and expansion is not feasible within the existing footprint. Additionally, the transportation of chlorine gas to the WWTP is a safety hazard. To address these issues, an Ultraviolet (UV) disinfection system would be installed to provide reliable disinfection, reduce chemical usage, and improve overall site safety.

Effluent Pump Station Modifications (All Alternatives)

Improvements include the replacement of the air/vacuum relief valves and the WWTP effluent pumps.

Plant Automation (All Alternatives)

To allow operators to have a real-time status of plant operation, a supervisory control and data acquisition (SCADA) system would be installed. This would allow for remote access to alarm status as well as monitoring and control of process equipment.

Storage and Control Building Improvements (All Alternatives)

The WWTP currently has a small storage building and workshop. The space is not adequate for the needs of the plant. Construction of a larger facility (approximately 5,000 sf) would allow for additional storage of spare parts and equipment as well as a climate-controlled area for maintenance.

The existing control building could also be renovated to provide amenities for operations staff such as a locker room and dedicated break/training room.

Effluent Forcemain (All Alternatives)

During the original construction of the WWTP a 12” influent forcemain and 10” effluent sewer were placed in the same trench from Biddle Point up to the WWTP. Both pipes are approximately 50 years old and approaching their maximum capacity.

To address the immediate overflow concerns with the effluent sewer, the open gravity sewer would be converted to a closed pressure sewer and air/vacuum relief valves would be installed.

Alternative 3 – Expansion with Moving Bed Bioreactors (MBBRs)

Alternative 3 includes the addition of a Moving Bed Bioreactor (MBBR) biological treatment system. A MBBR would consist of concrete aerated basins, partially filled with plastic carrier media. The carrier media provides a surface for the formation of biofilms, or bacterial “colonies” that treat the wastewater similar to bacteria found in Conventional Activated Sludge systems.

Advantages

The primary advantage of Alternative 3 is that the MBBR system can accomplish a high degree of treatment in a reduced footprint, and the secondary pump station could be eliminated. Given that this approach will utilize attached growth processes, it is also resilient to shock loading and variable influent rates observed on the Island.

Another significant advantage of the MBBR process is that RAS is not required, eliminating the need for RAS pumping. Due to the nature of biologic growth in MBBR systems, all of the bacteria needed for treatment are sustained on the carrier media, and do not need to be replenished by return sludge. This provides significant OM&R savings, as well as capital costs for the eventual replacement of the RAS pumps.

The biofilm growth process also promotes the formation of large floc, due to the way in which biomass sloughing occurs. With proper coagulation and flocculation, sloughed biomass readily settles within the final clarifiers. All biomass collected at the bottom of the clarifiers can be wasted, requiring regular use of WAS pumps only.

Further advantages offered by an MBBR system are that MBBRs are generally well suited for preventing excessive filamentous bacterial growth, given the nature of biomass growth on the carrier media and the system's relative buffering capabilities, further improving settling. Attached growth process may also develop advanced microbial communities, as they generally can support a greater concentration of higher order life forms, typically found in sludge with a higher solids retention time (SRT). These organisms can further oxidize biomass grown on the media, providing a marginal decrease in realized sludge yield. As a result, the volume of sludge wasted should be less than or equal to current volumes, improving overall sludge storage needs.

A MBBR system also provides the most flexibility for future expansion. Should future population growth exceed current projections, additional media could be added to the existing tanks to increase the process capacity. This flexibility would allow the process to be designed to handle the current design flow and loading initially and allow for expansion as flows increase by simply adding media to the reactors. As the maximum media capacity is reached within the existing tanks, an additional MBBR train could be added to provide further treatment capacity.

Regarding ease of operation, an MBBR system provides the most "hands off" operational approach of the alternatives discussed herein, largely due to the lack of recycle flows. It also provides the opportunity for zone isolation for routine maintenance. Scheduled maintenance should be planned for seasonal low flow periods to minimize process disturbance.

Disadvantages

MBBRs are not typically designed to provide complete biological nutrient removal (BNR). The BNR process is designed to remove CBOD5, ammonia (NH3-N), as well as total nitrogen, and phosphorus below permit limits without the addition of chemicals. This MBBR system would not provide biological phosphorus removal or denitrification. Phosphorus removal will continue to be achieved with chemical precipitation of phosphorus.

Implementation

The preliminary concept of the MBBR system involves the construction of two reactors with two basins in each reactor. During the summer season, the reactors will operate in series, with one reactor as the lead and the other as the lag. These reactors will be alternated throughout the season to promote equal biofilm growth. During the winter season, the primary clarifiers would be bypassed and the reactors will operate in parallel to provide a continuous food supply to the micro-organisms in each reactor to preserve biomass growth during periods of low flow. Bypass piping and gates would be provided to allow for tank isolation and maintenance. Effluent from the MBBR system would be distributed to the final clarifiers through a new splitter box.

Figure A13 shows the proposed layout for Alternative 3 – Expansion with MBBR and can be found in Appendix A.

Alternative 4 – Expansion with Oxidation Ditches

Alternative 4 includes replacing the existing biological treatment system with an Oxidation Ditch. Oxidation ditches utilize a modified activated sludge process that allows for long solids retention times. Typical oxidation ditch treatment systems consist of a large ring or oval shaped concrete tank with multichannel configuration. Horizontally mounted aerators provide circulation, oxygen transfer, and aeration in the ditch. The mixing process entrains oxygen into the mixed liquor to foster microbial growth and the circular velocity ensures contact of microorganisms with the incoming wastewater. The aeration sharply increases the dissolved oxygen (DO) concentration, but decreases as biomass uptake oxygen as the mixed liquor travels through the ditch. Solids are maintained in suspension as the mixed liquor circulates around the ditch.

Advantages

The primary advantage of Alternative 4 is that the process has significant turndown capacity. Individual rings can be shut down during periods of low flow to conserve energy. Also, due to the large tank volume, the oxidation ditch has a long hydraulic retention time and complete mixing helps minimize the impact of a shock load or hydraulic surge.

If design solids retention times (SRTs) are selected for nitrification, a high degree of nitrification is possible. Oxidation ditch effluent is usually settled in a separate secondary clarifier. An anaerobic tank could be added prior to the ditch to enhance biological phosphorus removal and limit the amount of chemical used.

Disadvantages

Oxidation ditches require recycle flow from the final clarifiers, similar to an activated sludge process. New RAS pumps, piping, valves, and controls would be required to operate the system. The oxidation ditch also requires additional operator input and control of recycle flows to adjust for variable influent loading. Oxidation ditches require significantly larger tank volumes compared to other biological processes. The additional earthwork and concrete costs could significantly add to the capital costs of the project based on the unique project location and soil types.

Future expansion of the oxidation ditch treatment system is more complex and typically requires the construction of additional tank volume and mechanical equipment.

Implementation

Alternative 4 includes constructing a new oxidation ditch for biological treatment to meet the 20-year design flows and loadings. The preliminary oxidation ditch process design includes three “rings” or process channels operating in series during the summer months. Similar to Alternative 3, the primary clarifiers would be bypassed in the winter months and only one oxidation channel would be required to accomplish the winter treatment objectives. Disc aerators would be utilized to provide the necessary oxygen and mixing. Effluent from the oxidation ditch will discharge to the final clarifiers. New RAS pumps, piping, valves, and controls would also be included with this alternative.

Figure A14 shows the proposed layout for Alternative 4 – Expansion with Oxidation Ditches and can be found in Appendix A.

Alternative 5 – Expansion with Membrane Bioreactors (MBRs)

Alternative 5 involves expanding the facility using Membrane Bioreactors (MBRs) downstream of conventional aerated treatment basins. MBRs have the advantage of combining a suspended growth biological reactor with solids removal via filtration. Membrane filtration involves the flow of water containing pollutants across a membrane. Water permeates through the membrane into a separate channel for recovery. The water passing through the membrane is called the permeate, while the water with the more-concentrated materials is called the concentrate or retentate. The requirement is that the membranes prevent passage of particles the size of microorganisms, or about 1 micron, so that they remain in the system. This means that MBR systems are good for removing solid material, but the removal of dissolved wastewater components must be facilitated by using additional treatment steps.

The membrane filtration system in effect replaces the secondary clarifiers in a typical activated sludge treatment system. Membrane filtration allows a higher biomass concentration to be maintained, thereby allowing smaller bioreactors to be used. With the use of MBRs, a smaller opening fine screen is required for primary treatment to protect the hollow fiber membrane system.

Primary clarification and aeration basins are still required to treat the biological loading to the WWTP. The requirements used are similar to the aeration tank capacities needed for a conventional activated sludge plant. The existing tanks do not have sufficient capacity to provide the necessary aeration so additional tanks would need to be added.

Sludge from the MBR process is either returned to the aeration tanks as RAS or wasted from the process, just like in a conventional active sludge system.

The MBR system will require new pumps, blowers, solids handling equipment, and control system.

Advantages

The membranes can be designed for operation in small spaces and provide high removal efficiency of contaminants such as nitrogen, phosphorus, bacteria, biochemical oxygen demand, and total suspended solids.

The primary advantage of Alternative 5 is that MBRs tend to have higher quality effluent than other biological treatment systems, and the land requirement for future expansion would be less than the other alternatives discussed. With the use of MBRs, the existing final clarifiers could be eliminated.

Disadvantages

The primary disadvantage of MBR systems is the higher capital and operating costs than conventional systems for the same throughput. O&M costs include chemical membrane cleaning and fouling control, and eventual membrane replacement. Energy costs are also higher because of the need for air scouring to control bacterial growth on the membranes.

Implementation

A new micro screen would be installed in the proposed headworks building, additional biological treatment volume would be added downstream of the proposed primary clarifiers and a new MBR process building would be constructed. The MBR would need to be located indoors in a climate-controlled environment to prevent freezing during the winter months.

The conceptual preliminary design of the MBR system includes 4 trains for summer operation. Only 1 train would be required during the winter months.

Figure A15 shows the proposed layout for Alternative 5 – Expansion with MBR and can be found in Appendix A.

Alternative 6 – Expansion with Sequencing Batch Reactors (SBRs)

Alternative 6 involves expanding the WWTP using Sequencing Batch Reactors (SBRs). The primary advantage of Alternative 6 is that an SBR contains multiple processes within one tank. Aeration and secondary clarification are not needed as this is completed within the SBR. This reduces the need for separate tanks that would need to be constructed to expand the WWTP. Each SBR would completely treat multiple batches of wastewater per day. Each batch would undergo five steps. These include:

- Fill
- React
- Settle
- Decant
- Idle

The fill step is when raw wastewater (or primary effluent) enters the tank. Mixing occurs during this stage. During the react stage, air is turned on the promote biologic treatment, including nitrification and BOD removal. The settle stage involves no mixing, as this is when the solids are allowed to settle out of the liquid. The decant period is when the clarified effluent from the settle stage is removed. The idle period is utilized when there are multiple tanks, allowing time for reactors to fill before the next unit starts its cycle. When sludge wasting occurs varies but typically is done during the react or idle phase.

Advantages

The SBR eliminates the need for multiple additional processes and structures. SBR's have the ability to handle the sudden increases and decreases in wastewater quantities and loadings in the spring and fall by adjusting cycle times.

Disadvantages

The primary disadvantage of SBR systems is the large tank volume and land area necessary to accommodate the proposed design flows and loadings. A SBR system would also require more operator oversight and maintenance compared to some of the other alternatives presented. This is because the necessary cycle times may vary from day to day depending on the influent flows and loadings. Additionally, the SBRs contain sophisticated mechanical equipment and automatic control valves that are critical system operation. Maintenance and troubleshooting of this system could become an operational challenge.

Without primary clarifiers, the waste sludge from the SBR would require an additional thickening process prior to dewatering.

A SBR system would also need to utilize an effluent equalization basin because the decant step is completed faster than the effluent pumps can discharge the water. To fully discharge the water without the use of an equalization basin, the effluent pumps and the effluent forcemain would need to be upsized.

Implementation

Alternative 6 includes constructing new SBRs for biological treatment to meet the 20-year design flows and loadings. The preliminary SBR process design includes four tanks, each operating as its own reactor. Effluent from the SBRs would discharge to an effluent equalization basin before disinfection. New solids handling equipment would be installed in two of the existing primary clarifiers before the sludge is routed to the existing solids handling process.

Figure A16 shows the proposed layout for Alternative 6 – Expansion with Sequencing Batch Reactors and can be found in Appendix A.

Alternative 7 – Regional Alternative

Since the WWTP is located on an island, it is not technically or financially feasible to consider other regional wastewater systems. The capital costs as well as the environmental impacts that would be associated with moving wastewater off the island are not practical.

Alternative 7 – Regional alternative does not meet the project objectives and is not considered further as a principal alternative.

B. Analysis of Principal Alternatives

Four feasible alternatives were developed that met the project objectives, identified as Alternatives No. 3, 4, 5, and 6. These alternatives were analyzed further and are summarized in the following sections.

The Monetary Evaluation

The monetary evaluation includes a present worth analysis. This analysis does not identify the source of funds but compares cost 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 exactly the same funds required paying 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 EGLE and has not yet been set for FY2023 SRF Projects. The discount rate of -0.5%, obtained from OMB Circular No. A-94 per SRF guidance, was used for the financial calculations.

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 EGLE guidance document establishes the estimated life for the project structures and equipment to assess salvage values at the end of the planning period. In general, concrete structures, earthwork basins, and piping have a useful life of 30-50 years and equipment has a useful life of 10-20 years.

The cost of labor, equipment, and materials is not escalated over the planning period 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.

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 -0.5%.
- Salvage values were included in the present worth cost.
- Energy costs escalation was assumed equal between the alternatives and therefore are not adjusted over the 20-year period.
- Land purchase/acquisition costs were not applicable 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. Table 9 shows the costs for breakdown for the principal Alternatives. The lowest net present worth belongs to Alternative No. 3 which is estimated at $28.51 million.

Table 9: Summary of Present Worth Cost Analysis

	Alternative 3 – Expansion with MBBRs	Alternative 4 – Expansion with Oxidation Ditches	Alternative 5 – Expansion with MBRs	Alternative 6 – Expansion with SBRs
Capital Cost	$28.8 M	$31.66 M	$30.63 M	$29.46 M
Annual OM&R	$190,000	$220,000	$350,000	$250,000
Net Present Value of OM&R Cost	$4.01 M	$4.64 M	$7.38 M	$5.27 M
Total Present Worth	$32.81 M	$36.3 M	$38.01 M	$34.73 M
Salvage Value	$4.3 M	$4.86 M	$3.62 M	$4.04 M
Net Present Worth	$28.51 M	$31.44 M	$34.39 M	$30.69 M

Partitioning the Project

The proposed project does not require any project partitioning.

The Environmental Evaluation

The major environmental impacts were analyzed for the principal alternatives.

The principal alternatives include construction at or adjacent to the existing WWTP site. The mitigation measures will be designed and implemented as required for the construction phase of the project, including dust control and erosion control activities, and restoration. Table 10 evaluates the impacts on various environmental features for Alternatives No. 3, 4, 5, and 6. The objective of the comparison is to highlight significantly differing impacts.

Table 10: Environmental Evaluation for the Principal Alternatives

Environmental Feature	Alternative No. 3	Alternative No. 4	Alternative No. 5	Alternative No. 6
Agricultural and Open Space Lands	NSI	NSI	NSI	NSI
Air Quality	T	T	T	T
Archeological Historic Sites	NSI	NSI	NSI	NSI
Drinking Water Supply Source	NA	NA	NA	NA
Endangered or Threatened Species	NSI	NSI	NSI	NSI
Fauna and Flora Communities/ habitat	NSI	NSI	NSI	NSI
Floodplains	NSI	NSI	NSI	NSI
Great Lakes Shoreline	NA	NA	NA	NA
Lakes and Streams	B	B	B	B
Parks and Recreational Facilities	NSI	NSI	NSI	NSI
Unique Features	NA	NA	NA	NA
Wetlands	NSI	NSI	NSI	NSI
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

No substantial indirect, direct, and cumulative impacts were identified.

Implementability and Public Participation

The draft Project Plan will be placed on display 30 days prior to the scheduled Public Hearing, which will be held on May 12, 2022.

A Public Hearing will be held to discuss project alternatives in terms of effectiveness, implementability, project costs, anticipated user rates, and environmental Impacts. The public notice will be published in the St. Ignace News. Public input presented at the Public Hearing will be considered during the review of the principal alternatives. A transcript of the Public Hearing will be included in Appendix E.

Technical and Other Considerations

Infiltration and Inflow Removal

F&V completed an initial evaluation of infiltration and inflow entering the wastewater collection system. This initial evaluation confirmed that a large amount of clean water is entering the system due to the connection of private sump pumps. These sump pumps are privately owned, and there currently are no storm sewer on the Island with the capacity to handle the sump pump flows. Some of these pumps had the ability to be readily disconnected from the sanitary sewer and this work has been completed. However, additional planning is ongoing to develop strategies to remove these connections. The equalization basin has been sized to handle the volume of water coming from these connections.

Sludge and Residuals

Minor modifications would be made to the existing sludge management system for all alternatives except Alternative 6. Alternative 6 would require additional solids handling to be put in place to use before the solids enter the current solids handling process.

Industrial Pretreatment Program

There are no industrial users in the City, however, there are a number of large commercial users. There are no significant or categorical wastewater users and the City does not currently administer an Industrial Pretreatment Program.

Growth Capacity

All of the feasible alternatives were designed to meet the existing and 20-year wastewater needs. The selected population growth rate and seasonal tourist growth was estimated using the best available information. As discussed previously, the 20-year design wastewater flow rates are based on these projections.

Reliability

Each of the principal alternatives provides improved reliability year-round for the plant by having the necessary processes indoors with the capacity to treat both summer and winter loading as well as an improved septage receiving station. The new WWTP will have the biological and hydraulic capacity to reliably treat projected demand for the planning period.

Alternative Sites and Routings

There are no alternative sites or routings but there would be an expansion of current WWTP site. Limits of the expansion would be selected to mitigate impacts on the surrounding area.

Contamination at the Project Site

A review of EGLE's Environmental Mapper website shows multiple sites of environmental contamination within the City of Mackinac Island. There are four sites of environmental contamination, one land use restriction (solid waste facility), five sites with storage tanks, and two baseline environmental assessment sites. None of these sites are located at the WWTP.

IV. Recommended Alternative

A. Description of the Recommended Alternative

The objectives of the wastewater collection and treatment system improvements project are identified as:

- Provide facilities capable of delivering consistent reliable service and continued compliance with regulatory and permit requirements.
- Plan for future growth within the City and corresponding treatment capacity.
- Minimize operating costs through improved treatment methods.
- Rehabilitate/repair high priority areas of existing wastewater infrastructure.
- Minimize financial burden to the sewer system users.
- Minimize environmental impact during construction of the improvements project.
- Minimize environmental impact of WWTP operations and discharge.

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

The present worth analysis determined that Alternative No. 3 has the lowest capital cost, lowest OM&R costs, and the lowest net present worth. Alternative No. 3 – Expansion with Moving Bed Bioreactors (MBBRs) is the Recommended Alternative.

Additional discussion of Recommended Alternative No. 3 is presented below.

B. Description of Improvements

The improvements at the WWTP will allow for more reliable operation and alleviate health and safety issues. Refer to Figure A13 for a conceptual site plan of the proposed improvements.

Many improvements are required at the WWTP to replace equipment that has exceeded its expected useful life and increase the hydraulic capacity of the plant. The improvements will also increase the safety of the plant as well as improve operator monitoring and control of the processes. All processes will be designed to handle the max month flows and follow the design standards outlined in Ten States Standards.

The existing aeration basins would be repurposed as an influent equalization basin. These 250,000 gallons of equalization would allow for peak hour demands on the effluent pump station to be reduced.

To improve the reliability of the headworks, the existing winter headworks would be abandoned and a new building would be constructed. This new building would house one headworks to be used year-round. Some of the existing summer headworks equipment could possibly be repurposed to this new headworks. The existing summer headworks would be repurposed as a septage receiving station.

The existing primary clarifiers would be replaced with three rectangular clarifiers that have the redundancy and capacity needed. The shape also allows for easier expansion if it is needed in the future.

The biological treatment system would be converted to a MBBR system. This would involve the construction of concrete basins, partially filled with media. The use of MBBRs also allows for future expansion, as more media can be added if needed.

The existing chlorine contact chamber is undersized and has other piping with partially treated wastewater going through it. Also, the transport of chlorine gas to the Island is also dangerous. A new UV disinfection system will be installed to provide reliable disinfection and increase safety.

The effluent pump station will have new pumps replaced and air/vacuum relief valves installed to improve the hydraulic issues currently experienced.

A SCADA system would be installed to assist operators by providing a real-time status of plant operations.

The larger, climate-controlled building would be built to allow for storage of spare parts as well as the truck. This building would also be used for equipment maintenance. The existing control building would be renovated to provide amenities to operations staff.

The effluent sewer would be converted from an open gravity sewer to a closed pressure sewer with air/vacuum relief valves.

Non-SRF, Longer-Term Capital Improvements Project

The SRF Project intends to address the most critical items first. The City has developed longer-term improvements needed. Many of the identified improvements for the WWTP are being addressed by this project plan. Additional improvements needed in the future include the replacement of the influent and effluent forcemains, and various pump station upgrades as the service area is expanded. Models of the influent forcemain have been completed and found that if expansion occurs in the downtown area, the capacity would not be sufficient. Collection system improvements to reduce I/I, mentioned in Section II.E, should be completed in the future as well.

Project Maps

The following maps and figure corresponding to the Selected Alternative are included in Appendix A:

- Figure A1 – Sanitary Sewer Collection System Map
- Figure A13 – Alternative 3: MBBR Proposed Site Plan

Controlling Factors

Factors that control the design of the proposed project include:

- Footprint and quantity of process equipment
- Maintenance required
- Operation reliability
- Automation
- Efficiency

The service area population is anticipated to experience nominal growth during the next 20 years. Projected wastewater needs were estimated using available Census data and projections for the City.

It is anticipated that the surface water discharge permit requirements for the improved facility would be similar to the requirements of the existing system until a new permit is received. The existing permit limitations are summarized in Table 11 below.

Table 11: Existing NPDES Permit Limitations

Parameter	Effluent Limit
Biological Oxygen Demand	30 mg/L (monthly) 45 mg/L (7-day)
Total Suspended Solids	30 mg/L (monthly) 45 mg/L (7-day)
Total Phosphorus	1.0 mg/L (monthly)
–pH	6.5 - 9.0 (daily)
Dissolved Oxygen	4.0 mg/L, min (daily)
Total Residual Chlorine	0.50 mg/L (daily)
CBOD or BOD % Removal	85% (minimum monthly)
Total Suspended Solids % Removal	85% (minimum monthly)

The existing NPDES Permit is rated for a plant discharge of 0.96 MGD. A preliminary meeting with EGLE was held on February 18th, 2021 to review the current permit conditions and discuss future expansion of the facility. Based on the projected hydraulic loading of greater than 1.0 MGD, the NPDES permit classification for the WWTP would change. A major permit modification request would be required for any modifications to the facility that would increase the capacity above 1.0 MGD. EGLE staff recommend the modification request be submitted well in advance of any anticipated construction project to allow sufficient time for the permits department to complete their review. EGLE indicated the following potential changes to the current permit conditions:

- Additional potential monitoring requirements for a WWTP rated above 1 MGD are as follows:
- The annual fee would increase to $5,500.
- There would be increased annual sampling requirements for metals, VOCs, and PFAS.
- There is a possibility for a stricter mercury limit.
- A Stormwater Pollution Prevention Plan (SWPPP) may be required.

Special Assessment District Projects

There is no special assessment district (SAD) associated with this project.

Sensitive Features and Mitigation

It is not anticipated that the Recommended Alternative will have permanent negative impacts to sensitive areas (wetlands, floodplains, or habitat for endangered species). The proposed construction will expand the existing WWTP site. All work will be performed in accordance with necessary permit requirements. Figure A2 shows locations of wetlands.

Project Delivery Method

The City is reviewing the various methods for delivering the construction of its project. EGLE has published the State Revolving Fund and Drinking Water Revolving Fund Project Delivery Methods Guidance Document in November 2015. The various delivery methods allowed include Design Bid Build (DBB), Construction Management at Risk (CMAR), Fixed-Price Design-Build (FPDB), and Progressive Design-Build (PDB).

The City is reviewing each of the available methods. A comparison/summary of each are outlined 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 City 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 City before or early on in the design process. An engineer works closely with the City 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. The "book is closed" on pricing around the 30% mark of the design process.

This particular project is a rehabilitation of an existing treatment facility and appropriate pricing will probably be too high considering the risk to the contractors until 70 to 90% plans are developed. The City staff want to be involved throughout the entire design and construction process. Therefore, FPDB was not considered further for this project.

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 design and construction of the project. Therefore, the City 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 City 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 City 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 has involvement 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 City may contract with a third party to act as the Owner's Advisor or use its own staff.

The City and the engineering firm that developed the Project Plan will have discussions regarding the available project delivery methods and advantages and disadvantages offered by each method to develop the preferred method for the City. Based on preliminary discussions, it is anticipated that the City will proceed with the Progressive Design Build delivery method for the project.

Estimated Schedule for Design and Construction

Table 12 presents the proposed project schedule, which follows the SRF FY2023 Q4.5 milestone schedule for PBD projects.

Table 12: Proposed Schedule for Design and Construction

Anticipated Date	Activity
June 2022	Submit Final SRF Project Plan to EGLE
August 2022	Proceed with Survey, Project Development, and Preliminary Design
January 2023	Begin Detailed Design
June 2023	Finalize Design and Submit Permit Applications
July 2023	EGLE Approval of Plans & Specs
September 2023	SRF Loan Closing
November 2023	Begin Construction
December 2025	Complete Construction
March 2026	O&M Manual, Startup Assistance, and Record Drawings

Cost Summary

Table 13 summarizes the net present worth (NPW) for the recommended alternative. Appendix D shows the breakdown of the project costs, as well as NPW calculations.

Table 13: Cost Summary of the Recommended Alternative

Description	Capital Costs	OM&R Costs PW	Salvage Value PW	NPW
Alternative No. 3 – Expansion with MBBRs	$28.8 M	$4.01 M	$4.3 M	$28.51 M

C. Authority to Implement the Selected Alternative

Implementation of a selected alternative is the responsibility of the City of Mackinac Island. The DPW Board will select an alternative at the May 12, 2022 public hearing and the resolution adopted at the May 18, 2022 City Council meeting. A copy of the resolution will be included in Appendix E.

D. User Costs

The City of Mackinac Island funds sewer and wastewater treatment operations entirely through user fees. Revenue is generated based on two types of charges: a monthly ready-to-serve fee, and a service charge per 1,000 gallons.

The Recommended Alternative is anticipated to increase the monthly user cost for a typical resident by approximately $120 to $130 over the anticipated charges without the project, assuming the City tax revenues apportioned to the sewer fund are not increased. The City will be working with a certified Municipal Financial Advisor to determine the best approach to using existing City tax revenue to offset a portion of the SRF Project. The $120 to $130 increase stated in this Project Plan is an estimate and does not consider grant elgibility or other items which may impact the rate structure.

E. Disadvantaged Community

Part 53, of the NREPA, provides for several benefits to municipalities who meet the state's criteria for disadvantaged community status. Those benefits include additional priority points and extended loan terms. Regardless of their status as a disadvantaged community, the City of Mackinac Island intends to secure a 20-year SRF loan. The disadvantaged community determination worksheet is included in Appendix F. A preliminary determination by EGLE is that the City is currently considered disadvantaged.

F. Useful Life

The City of Mackinac Island intends to secure a 20-year SRF loan for the construction of the recommended alternative. The weighted useful life for the Alternative 3 has been calculated to be 35.9 years, which is greater than the 20-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 the project dollars spent on those assets. The Useful Life Calculations for Alternative 3 are included in Appendix D. This analysis verifies that the components of the recommended alternative will cost-effectively address treatment requirements for the term of the loan. It is not anticipated that all of the equipment will last the entirety of the planning period. The City will have to annually reserve funds to account for some equipment replacement.

V. Evaluation of Environmental Impacts

A. Description of the Impacts

The potential beneficial and detrimental environmental impacts of the selected alternative are evaluated in this section of the project plan. The analyses of impacts are divided into direct, indirect, and cumulative impacts. Direct environmental impacts are those that are directly attributable to the construction and operation of the project. Indirect impacts are caused by the project but are removed in time and/or distance, and are often considered secondary in nature. Cumulative impacts are those impacts which increase in magnitude over time, or which result from individually minor, but collectively significant actions.

Beneficial or Adverse Impacts

A discussion of the full range of potential impacts (i.e., direct, indirect and cumulative) must identify the nature of the impacts in terms of both beneficial and adverse impacts. The following section will describe the positive and negative impacts resulting from the selected alternative with special emphasis on cultural or environmentally sensitive resources.

Short-Term and Long-Term Impacts

The analysis includes trade-offs between short-term uses and the maintenance enhancement of long-term productivity and vice versa.

Irreversible or Irretrievable Resources

The analysis of the environmental impacts also includes any irreversible commitments or use of irretrievable resources, such as the commitment of construction materials, energy, and land to the proposed project.

B. Analysis of Impacts

Direct Impacts

Direct impacts are the environmental impacts directly attributive to the construction and operation of the project. The City must consider impacts resulting from construction in areas which have not been previously disturbed. The effects of the proposed project are considered for each of the following environmental factors:

Historic, Archaeological, Geological, Cutural, or Recreational Areas

It is not anticipated that any historic properties or tribally important sites will be affected by the proposed improvements. Communication with the State Historic Preservation Office and the appropriate Tribal Historic Preservation Officers will be completed as required by Mackinac State Historic Parks.

Multiple properties/areas within the City are registered as Historic places; however no impacts to these properties are anticipated as part of the proposed project.

The proposed project construction will extend the existing WWTP property, therefore will cause some disturbances to the surrounding landscape.

Natural Settings and Sensitive Ecosystems

Excavation and building construction is planned at the existing WWTP site and extends outside it as well. Long-term impacts to the natural setting of Project Area will include removing some of the forested area surrounding the existing site.

Existing and Future Quality of Surface Water and Groundwater

The primary goal of the project is to improve the reliability of the existing wastewater service. The proposed project is not anticipated to cause negative changes to the quality of nearby surface or groundwaters.

Consumption of Materials, Land, Energy, and Construction & Operation

Construction materials, public funds, energy and manpower will be consumed to construct and operate the proposed improvements. No known shortage of these items exist, nor is it expected that a shortage of these items will result from implementing this project.

The only chemicals used during the construction would be fertilizers used after the seeding and mulching of disturbed areas from the construction operations.

Energy (both electrical and fossil fuels) will be used during the construction of the improvements. Electrical usage may increase slightly due to the larger blowers utilized by the biological treatment system as the size of the WWTP is increasing.

Human, Social, and Economic Impacts

There will be no dislocation of people during the construction. Minimal impact to residents is anticipated because a majority of the construction work would occur at and around the WWTP site.

Employment of some residents by the contractor(s) is a possibility for certain construction operations.

Construction and Operational Impacts

Construction will occur mostly during the winter months, reducing the number of vehicles used on the island while there are tourists present. There will be an impact to the permanent residents as there will be more vehicles present while construction under way.

During construction, equipment will increase local noise and dust levels during operations. There will be a short-term adverse impact on air quality during the construction phase due to dust and construction equipment emissions generated during the excavation operations.

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.

Examples of indirect impacts include undirected growth including additional traffic, over-extended police and fire protection, or heavy financial burden on existing and future residents for the cost of the water treatment system facilities. It is not expected that the proposed project would cause any significant undirected growth

that would result in changes to zoning, population density, or types of developments found throughout the City, including residential, commercial and industrial areas.

Infrastructure is already in place within the service area, and the proposed wastewater system improvements will only serve to enhance the existing City infrastructure.

The proposed project will not result in any changes in anticipated land use.

There are no anticipated indirect impacts due to changes to the natural setting or sensitive ecosystems or jeopardy to any endangered species resulting from potential secondary growth.

There are no anticipated changes in air or water quality stemming from any primary or potential secondary development as a result of the improvements since any additional commercial/industrial development would be subject to the City's existing zoning or land use requirements.

No additional generation of wastes is anticipated as a result of the proposed project.

Cumulative Impacts

There are no anticipated cumulative impacts that would increase in magnitude over time or result from individually minor, but collectively significant actions of the project. There is no anticipated new infrastructure proposed in conjunction with the proposed wastewater treatment plant improvements.

VI. MITIGATION

A. General

Structural and non-structural measures which avoid, eliminate, or mitigate adverse impacts on the environment need to be identified in the project plan. The cost of mitigation was considered during the financial analysis and is 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 City. Mitigation of short-term, long-term, and indirect impacts must be considered in the project plan.

B. Short-Term Construction-Related Mitigation

Traffic and Safety Hazard Control

There should not be any impact to residents regarding traffic control and maintaining access to homes and businesses. Since there are no private cars on the Island, and construction will not be taking place on any of the roadways, there will be increased traffic on the roads from the docks to the WWTP site, but it should not have significant impact on the residents. Reducing any impact 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.

Construction site safety is the responsibility of each trade contractor. The Contractors will be required to have only trained persons performing all phases of the work. The Contractors will also be required to comply with the Occupational Safety & Health Act (OSHA), including using back up 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

Construction activities will result in increased dust in the vicinity of the construction sites during the length of the proposed construction. 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 during dry and dusty periods. The Contractor will be required to control dust in accordance with methods described in the project specifications.

Noise Control

Noise levels will increase temporarily during construction of the proposed project. Construction activities will only be allowed during the hours approved by the City, and would be subject to all local noise control ordinances. Construction workers and site visitors may be required to wear earplugs to minimize the effects of long-term noise during the construction operations.

Soil Erosion and Sedimentation Control

The Contractor will be required to obtain a soil erosion and sedimentation control permit from the local agency prior to the start of the work. It is anticipated that mitigation measures that may be utilized will include silt fence, straw bales, rip rap, geotextile fabric, and other such methods, as appropriate.

Restoration of Disturbed Areas

As previously stated, the project specifications will require the Contractor to provide and maintain access at all times to the site, homes, and businesses. Traffic control, including signage and flag persons must be provided if a situation arises where it is needed. Restoration of disturbed areas will also be defined in the specifications. Restoring disturbed lawn areas, roadways, existing utilities, etc. will be completed in a timely fashion and in accordance with the project specifications.

Service Disruption

Potential minor service disruptions are anticipated during construction. Bypass pumping may be required on a temporary basis during improvements.

C. Mitigation of Long-Term Impacts

General Construction

Mitigation measures would be developed to ensure that sensitive environments do not suffer permanent damage. Every effort will be made to avoid potential long-term or irreversible adverse impacts during the construction of the wastewater treatment plant improvements.

The construction work at the WWTP will incorporate “best management practice” methods for installing pipelines or disturbing the earth. The design and project specifications will include the proper use of physical measures to reduce soil erosion to a manageable level and any disturbed slope areas will be immediately seeded, mulched and/or sodded to prevent soil erosion and/or sedimentation.

Siting Decisions

For the Recommended Alternative, an expansion of the existing WWTP site will be required. Negotiations between the City and Mackinac State Historic Parks are currently in process to obtain the additional land required for the treatment plant expansion and construction.

Operational Impacts

The treatment site is located off of Annex Rd, set back at least 1,200 feet from nearby residences and largely removed from the populated areas to provide both a visual buffer and dissipation of odors.

The potential impact of effluent discharge has been investigated, and NPDES permit limits have been issued by EGLE that must be met by the treatment process before discharge and are protective of the environment.

D. Mitigation of Indirect Impacts

Master Plan and Zoning

The most effective way of mitigating unrestricted growth in any community is proactive creation of zoning districts and effective enforcement of that zoning. The City has zoning in place, and officials have historically had a significant role in the development of the City. Unrestricted growth is not anticipated with or without the proposed project.

Ordinances

The City has ordinances in place to control increased stormwater and NPS pollution due to growth. The proposed project is not anticipated to have any impact on area growth, therefore not directly increasing stormwater and NPS pollution.

Staging of Construction

Significant improvements have not been made to portions of the WWTP since 2012. Many of these processes are past or approaching their expected useful life and are in poor condition. The majority of the WWTP does not have enough capacity for the existing flows and loadings or for projected growth and portions of the plant do not meet current design standards. These improvements would be increasing the capacity of the system but needs to be prioritized to allow for the growth outlined in the City's Master Plan.

VII. PUBLIC PARTICIPATION

A. Public Meetings on Project Alternatives

A Public Hearing for the SRF Project Plan will be held on May 12, 2022 at the Mackinac Island City Hall to discuss the need for the project, principal alternatives, environmental impacts, description of the Recommended Alternative and associated cost estimates and user charge, and schedule of the proposed project.

A copy of the public hearing transcript and presentation will be included in Appendix E.

B. The Formal Public Hearing

A formal public hearing on project alternatives and user costs will be held on May 12, 2022 at the Mackinac Island City Hall.

Public Hearing Advertisement

The Public Hearing will be advertised in a local newspaper (the St. Ignace News) on April 7, 2022, 35 days prior to the hearing date, in accordance with SRF guidelines. Copies of the Draft Project Plan detailing the proposed project will be available for inspection on April 11, 2022 at the Mackinac Island City Offices. The public hearing advertisement, along with the affidavit confirming its publication, will be included in Appendix E.

Public Hearing Transcript

A verbatim transcript of the public hearing will be included in Appendix E.

Public Hearing Contents

The following items will be discussed at the public hearing:

- Project background.
- A description of the wastewater treatment plant needs and problem areas.
- A description of the principal alternatives considered.
- A breakdown of capital costs and OM&R costs for each of the principal alternatives.
- Proposed method of financing.
- Comparison of environmental impacts for the principal alternatives.
- Recommended Alternative.
- Proposed monthly user costs for the implementation of the Recommended Alternative for the average residential customer.

Public Hearing Comments Received and Answered

Written comments from the public can be received before, during, or subsequent to the Public Hearing. Questions and comments received during the Public Hearing will be addressed as a part of the Question and Answer portion of the presentation.

C. Adoption of the Project Plan

The official period for receiving comments will end at the close of the formal public hearing. After the close of the public comment period, an Alternative will be selected for implementation by the City Council. A copy of the City's resolution to adopt the Project Plan and to implement an alternative will be included in Appendix E.

APPENDIX A
MAPS AND FIGURES

PREPARED FOR:

City of Mackinac Island

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 847241

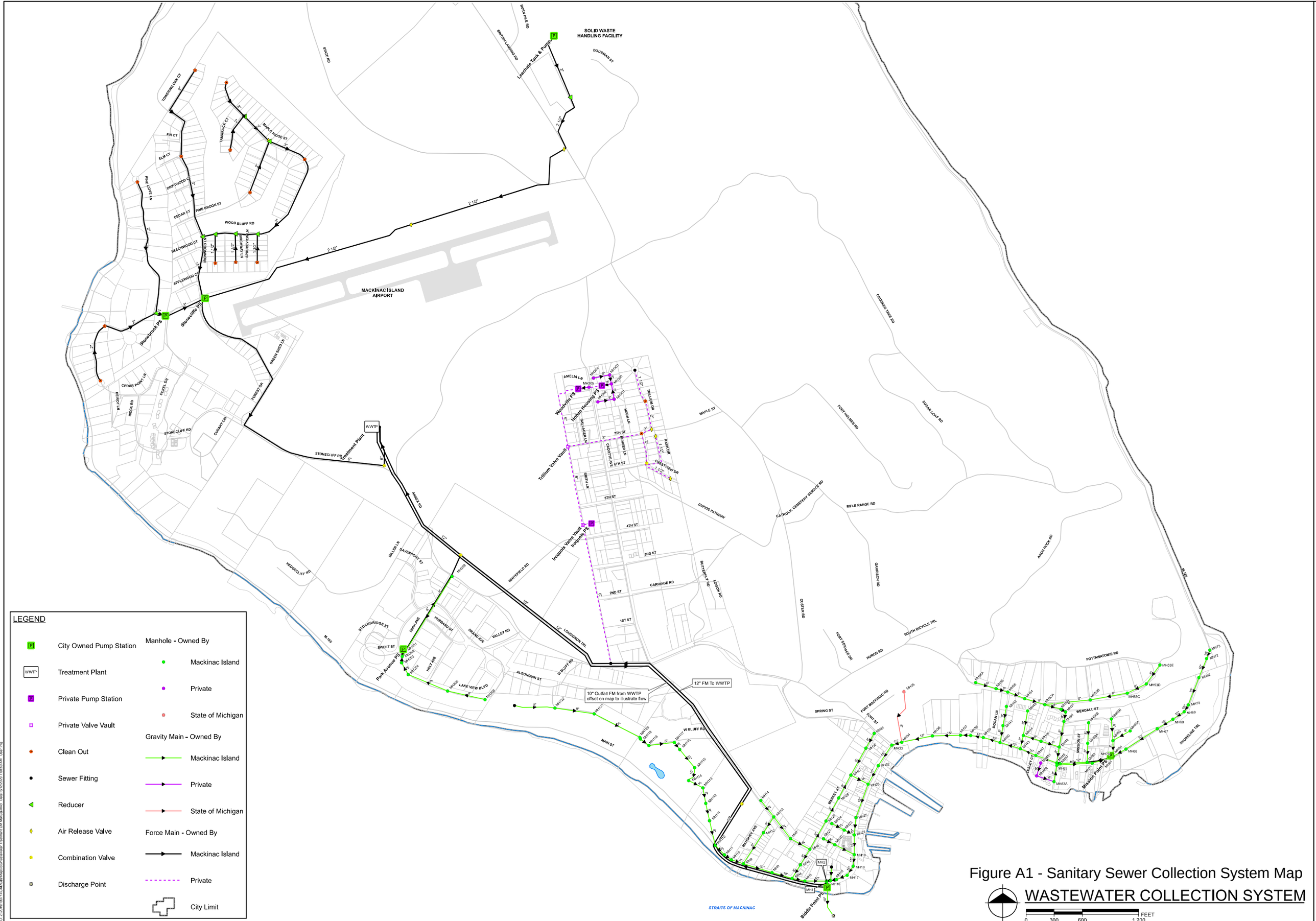


Figure A1 - Sanitary Sewer Collection System Map

WASTEWATER COLLECTION SYSTEM

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands Map

March 17, 2022

Wetlands

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

Figure A2 - USFWS Wetland Map

Figure 4-2

Existing Land Use Map

City of
Mackinac Island
Mackinac County, Michigan

Master Plan

Existing Land Use Categories

- Residential, Year-Round
- Residential, Seasonal
- Condominium Attached Structure
- Employee Housing
- Accommodations (For Rental to Guests)
- Commercial
- Institutional
- Museum
- Recreation
- Vacant Land/Rights-of-Way

Existing Land Use Source: City of Mackinac Island, 2017;

- State Highway
- Improved (Asphalt) Roads
- Unimproved (Gravel) Roads
- Property Lines
- Water Bodies

May 25, 2018

WADE TRIM
271 West McCoy Rd
Gaylord, MI 49735
www.WadeTrim.com

\\Adata\projects\MCK2009\01\GIS-data\Projects\Existing Land Use Map.mxd

Figure A3 - Existing Land Use Map

Figure A4 - USGS Quadrangle Topo Map

1982 QUATERNARY GEOLOGY OF MICHIGAN

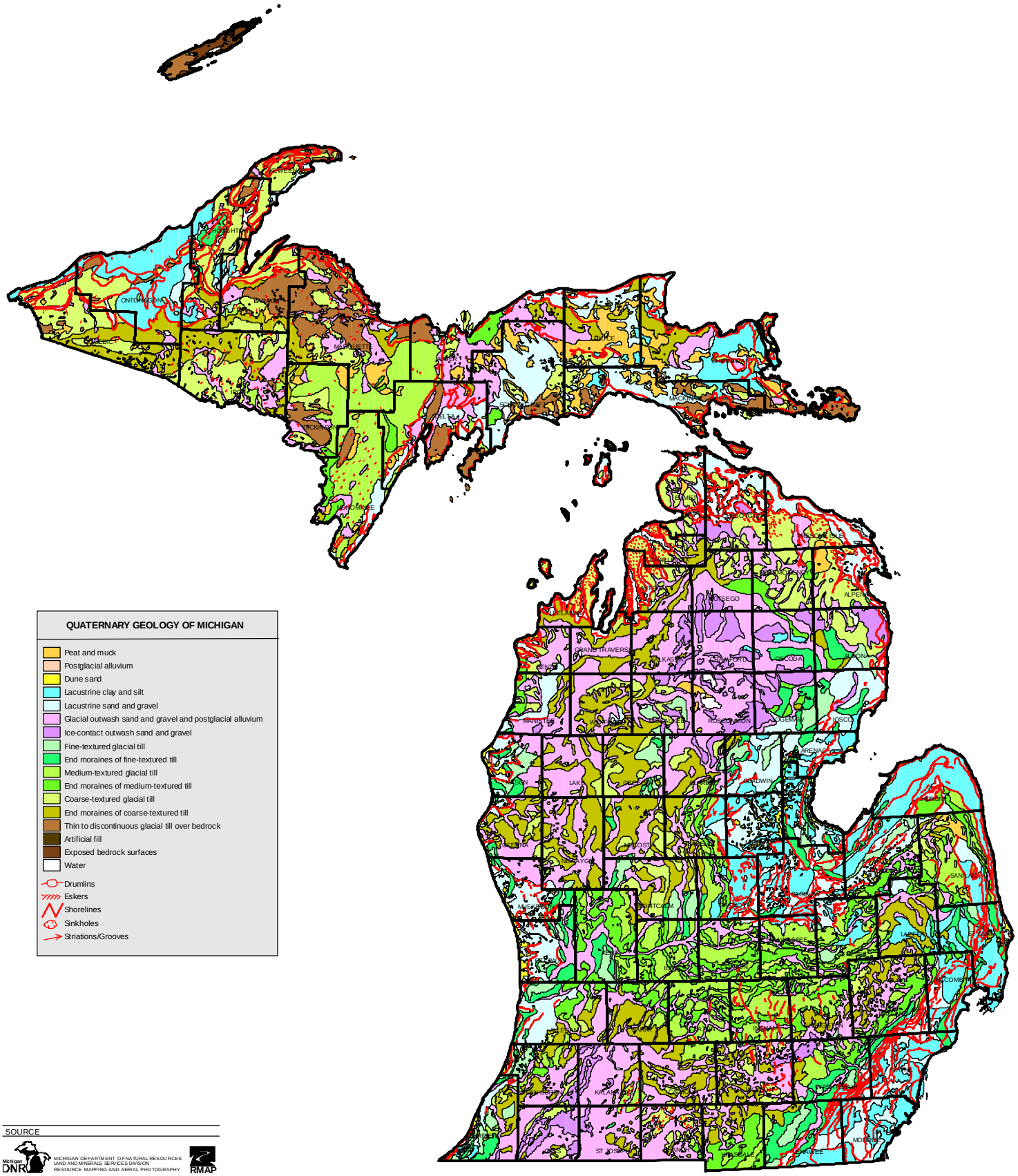
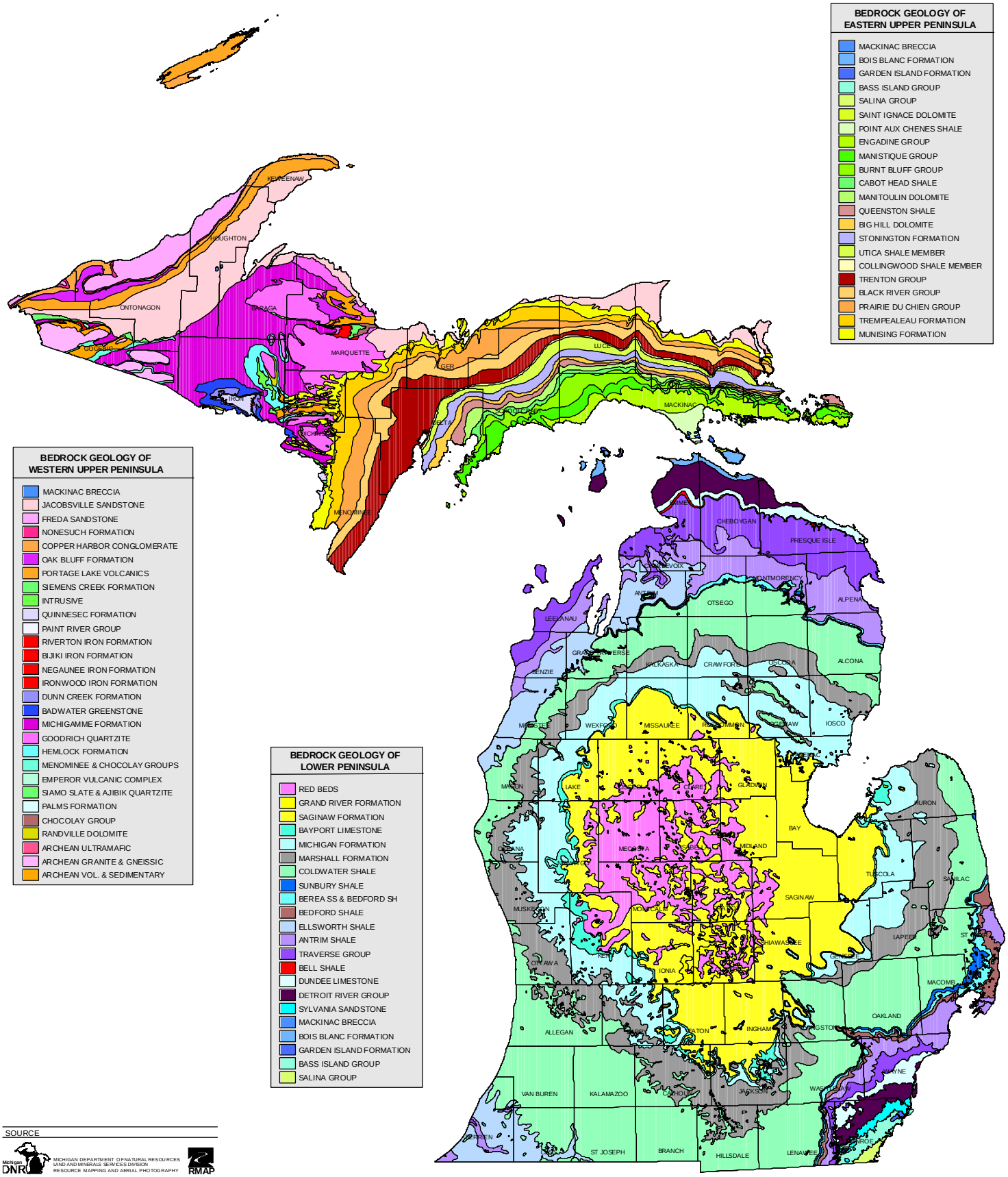


Figure A5 - Quaternary Geology of Michigan Map

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 A6 - Bedrock Geology of Michigan Map

Soil Map—Mackinac County, Michigan

Figure A7 - USDA Soils Map

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: Mackinac County, Michigan
Survey Area Data: Version 14, Sep 1, 2021

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

Date(s) aerial images were photographed: Apr 14, 2017—Oct 6, 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
27B	Greylock fine sandy loam, 1 to 6 percent slopes	16.4	0.3%
27D	Greylock fine sandy loam, 6 to 15 percent slopes	6.3	0.1%
33	Pits, sand and gravel	8.5	0.1%
35	Histosols and Aquents, ponded	6.7	0.1%
36	Markey and Carbondale mucks	33.2	0.6%
52A	Ingalls fine sand, 0 to 3 percent slopes	4.3	0.1%
61B	Paquin sand, 0 to 6 percent slopes	55.8	0.9%
70B	St. Ignace silt loam, 0 to 6 percent slopes	865.3	14.4%
70D	St. Ignace silt loam, 6 to 15 percent slopes, rocky	294.8	4.9%
70F	St. Ignace-Rock outcrop complex, 35 to 70 percent slopes	316.7	5.3%
116	Udipsamments and Udorthents, nearly level	18.2	0.3%
124D	Alpena gravelly loam, 0 to 15 percent slopes	712.1	11.8%
163B	Esau-Zela complex, 0 to 3 percent slopes	17.4	0.3%
164A	Moltke loam, 0 to 3 percent slopes	5.3	0.1%
W	Water	1.6	0.0%
Totals for Area of Interest		**6,024.8**	**100.0%**

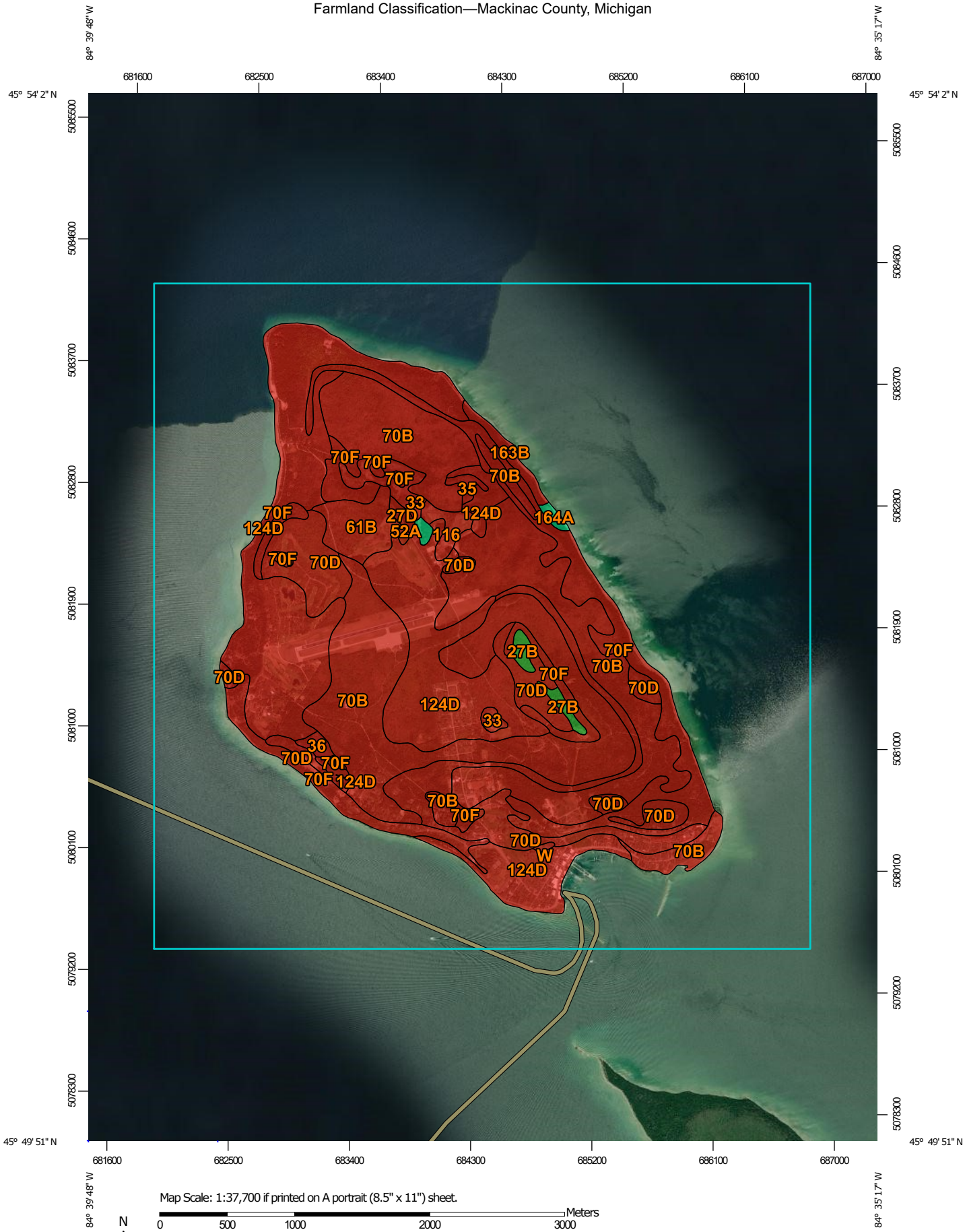


Figure A8 - USDA Farmland Classification Map

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

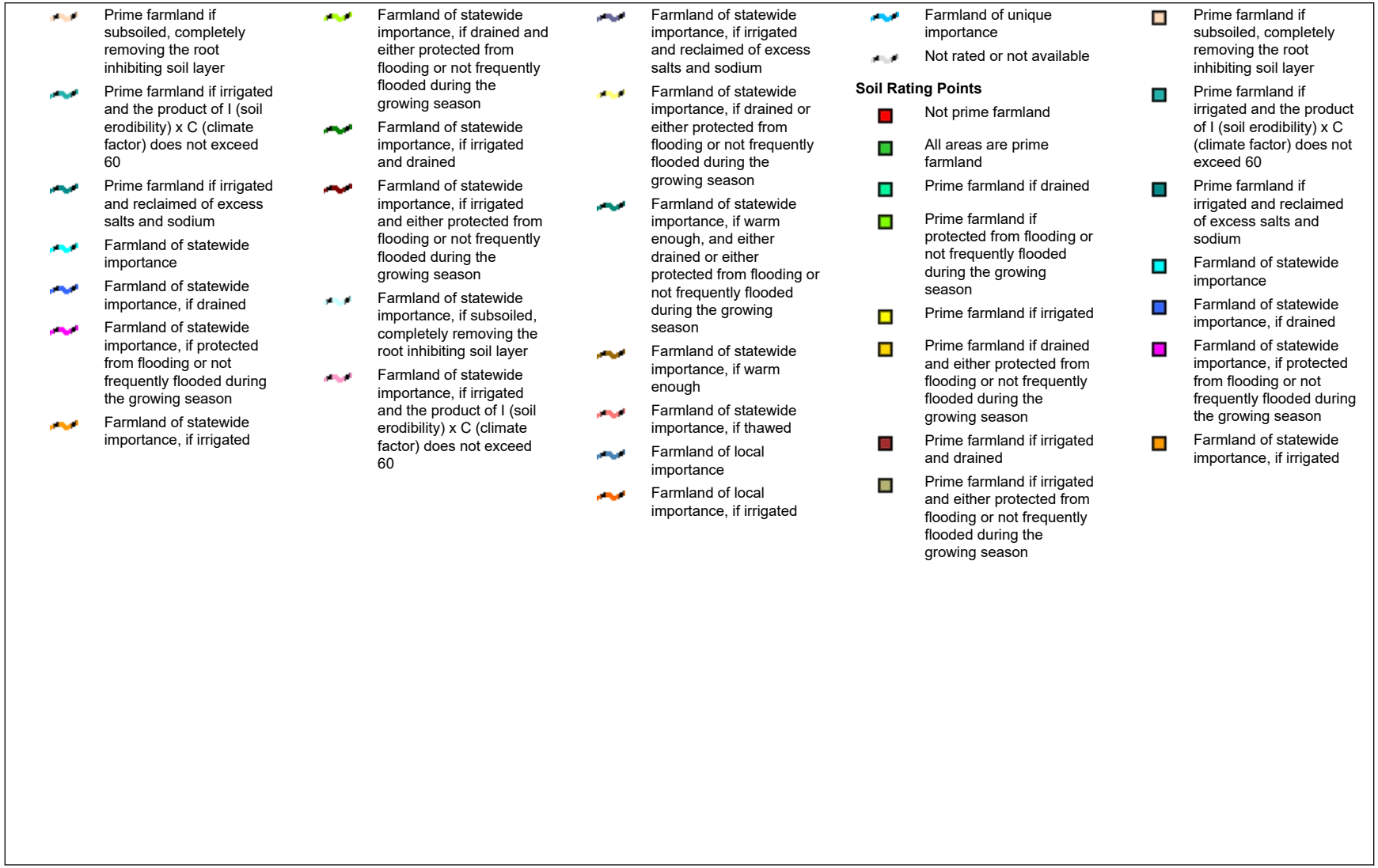
Soils

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.

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

Soil Survey Area: Mackinac County, Michigan
Survey Area Data: Version 14, Sep 1, 2021

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

Date(s) aerial images were photographed: Apr 14, 2017—Oct 6, 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
27B	Greylock fine sandy loam, 1 to 6 percent slopes	All areas are prime farmland	16.4	0.3%
27D	Greylock fine sandy loam, 6 to 15 percent slopes	Not prime farmland	6.3	0.1%
33	Pits, sand and gravel	Not prime farmland	8.5	0.1%
35	Histosols and Aquents, ponded	Not prime farmland	6.7	0.1%
36	Markey and Carbondale mucks	Not prime farmland	33.2	0.6%
52A	Ingalls fine sand, 0 to 3 percent slopes	Prime farmland if drained	4.3	0.1%
61B	Paquin sand, 0 to 6 percent slopes	Not prime farmland	55.8	0.9%
70B	St. Ignace silt loam, 0 to 6 percent slopes	Not prime farmland	865.3	14.6%
70D	St. Ignace silt loam, 6 to 15 percent slopes, rocky	Not prime farmland	294.8	5.0%
70F	St. Ignace-Rock outcrop complex, 35 to 70 percent slopes	Not prime farmland	316.7	5.3%
116	Udipsamments and Udorthents, nearly level	Not prime farmland	18.2	0.3%
124D	Alpena gravelly loam, 0 to 15 percent slopes	Not prime farmland	712.1	12.0%
163B	Esau-Zela complex, 0 to 3 percent slopes	Not prime farmland	17.4	0.3%
164A	Moltke loam, 0 to 3 percent slopes	Prime farmland if drained	5.3	0.1%
W	Water	Not prime farmland	1.6	0.0%
Totals for Area of Interest			**5,940.3**	**100.0%**

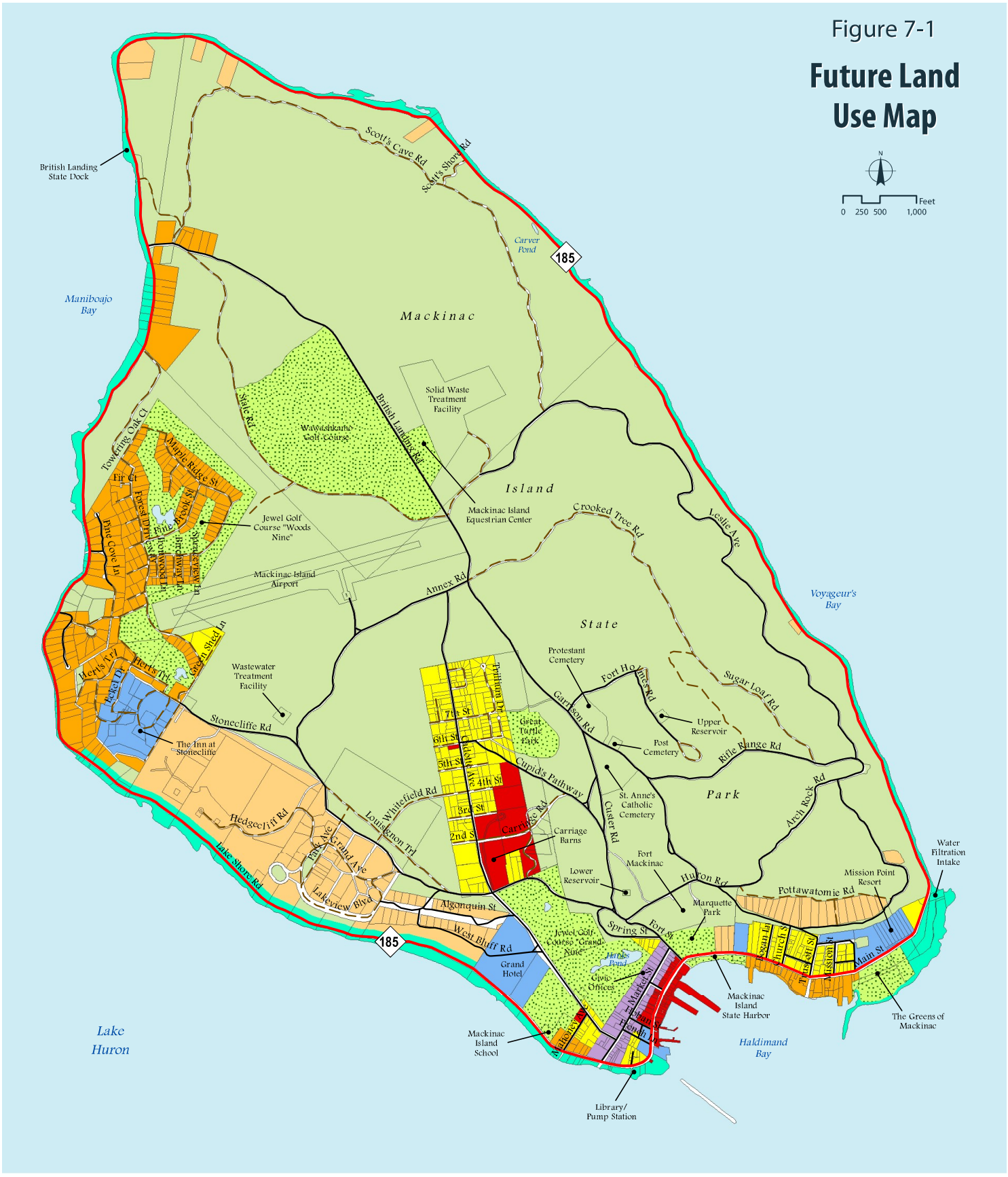
Description

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



City of
Mackinac Island
Mackinac County, Michigan

Master Plan

Future Land Use Categories

- Conservation/Park
- Recreation/Open Space
- Shoreline Residential
- Cottage Residential
- Mixed Residential
- Single Family Residential
- Hotel/Resort
- Market Street
- Commercial

Property Line Source: Mackinac County Equalization;

- State Highway
- Improved (Asphalt) Roads
- Unimproved (Gravel) Roads
- Property Lines
- Water Bodies

Adopted by the Mackinac Island Planning Commission on October 9, 2018

WADE TRIM
271 West McCoy Rd
Gaylord, MI 49735
www.WadeTrim.com

\\dtdata\projects\MCK2009\01d\GIS-data\Projects\Future Land Use Map.mxd

Figure A9 - Future Land Use Map

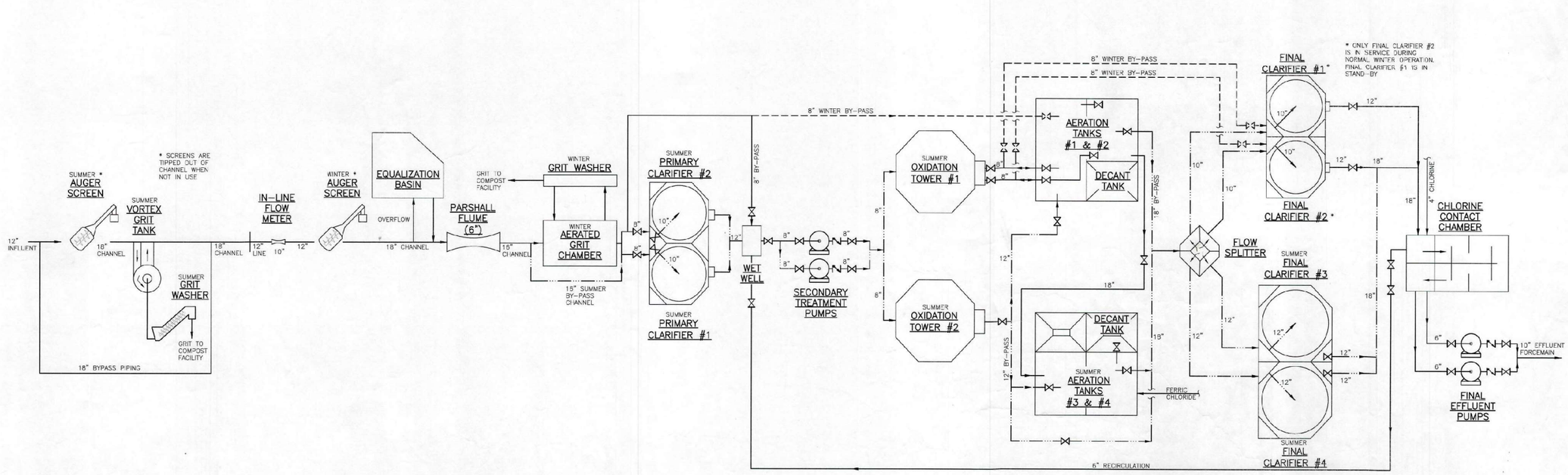
SYMBOL LEGEND

SUMMER SCHEMATIC PIPING

WINTER SCHEMATIC PIPING

NOTES

1. SEE 400 SERIES SHEETS FOR P&ID OF SUMMER HEADWORKS.
2. SEE 500 SERIES SHEETS FOR P&ID OF WINTER HEADWORKS.
3. SCHEMATIC IS DEPICTED WITH ALL ALTERNATES INCLUDED.



SHOWING SUMMER AND WINTER OPERATIONS

OVERALL PLANT FLOW SCHEMATIC

NO SCALE

Figure A10 - Existing Wastewater Treatment Plant Overall Flow Schematic

fishbeck, thompson, carr & huber inc.

engineers
scientists
architects
constructors

City of Mackinac Island
Mackinac Island, Mackinac County, Michigan

Wastewater Treatment Plant Improvements

2/14/12	CONSTRUCTION SET
10/19/11	BIDS & CONSTRUCTION

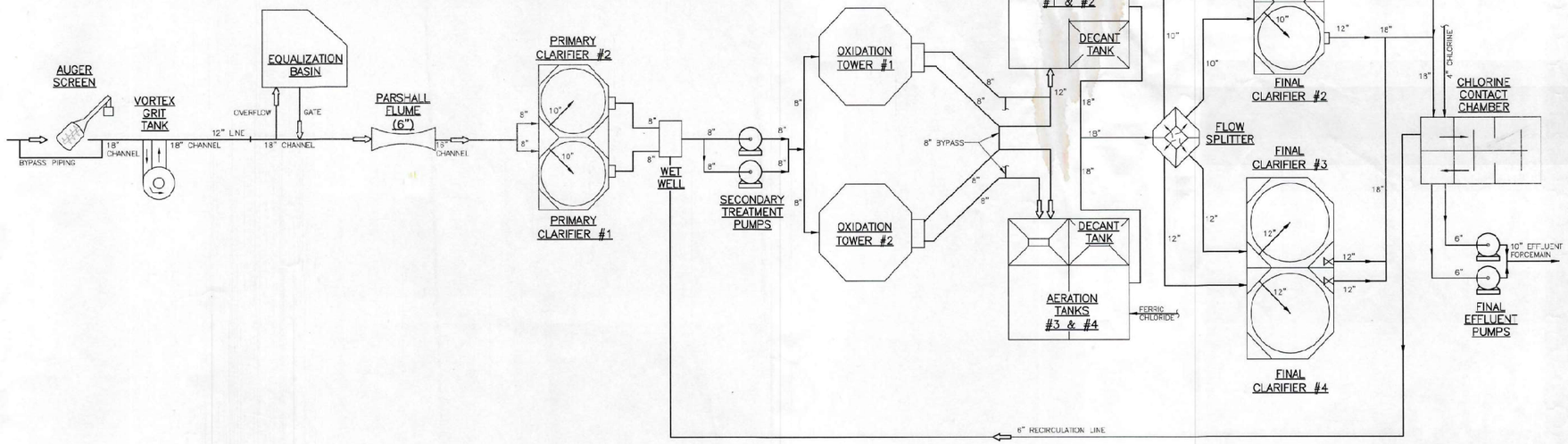
Drawn By	RSZ
Designer	JJF/CHS
Reviewer	JCR
Manager	JCR

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

PROJECT NO.
G080509CD

SHEET NO.
133

PLOT INFO: U:\CAD\G080509CD\CE\133-G080509CD.DWG LAYOUT: 133 DATE: 2/13/2012 TIME: 11:26:06 AM USER: RSZ

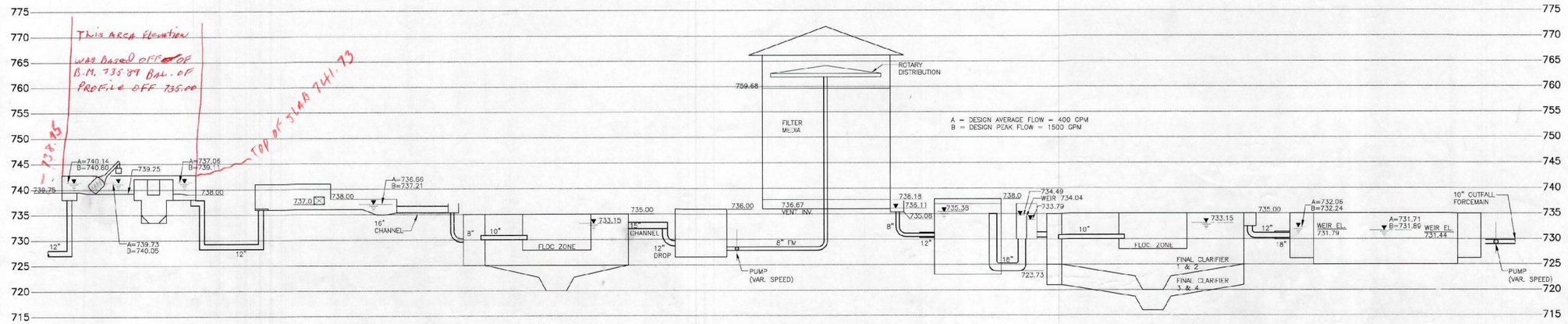


SUMMER FLOW SCHEMATIC

NO SCALE

NOTES

1. SEE 500 SERIES SHEETS FOR P&ID OF WINTER HEADWORKS.
2. SCHEMATIC IS DEPICTED WITH ALL ALTERNATES INCLUDED.



SUMMER HYDRAULIC PROFILE

SCALE: 3/32" = 1'-0"

0 6 12 24

AUGER SCREEN | VORTEX GRIT TANK | EQUALIZATION BASIN | PARSHALL FLUME (6") | POLY-ELECTROLYTE MIX TANK | PRIMARY CLARIFIERS (2) | WET WELL | OXIDATION TOWERS (2) | AERATION TANKS (4) | FLOW SPLITTER | POLY-ELECTROLYTE MIX TANK | FINAL CLARIFIERS (4) | RECIRCULATION WET WELL | CHLORINE CONTACT TANK | FINAL WET WELL

Figure A11 - Existing WWTP Summer Operation Flow Schematic and Hydraulic Profile

fitch

engineers
scientists
architects
constructors

Fishbeck Thompson Carr & Huber, Inc

City of Mackinac Island

Mackinac Island, Mackinac County, Michigan

Wastewater Treatment Plant Improvements

2/14/12	CONSTRUCTION SET
10/18/11	BIDS & CONSTRUCTION

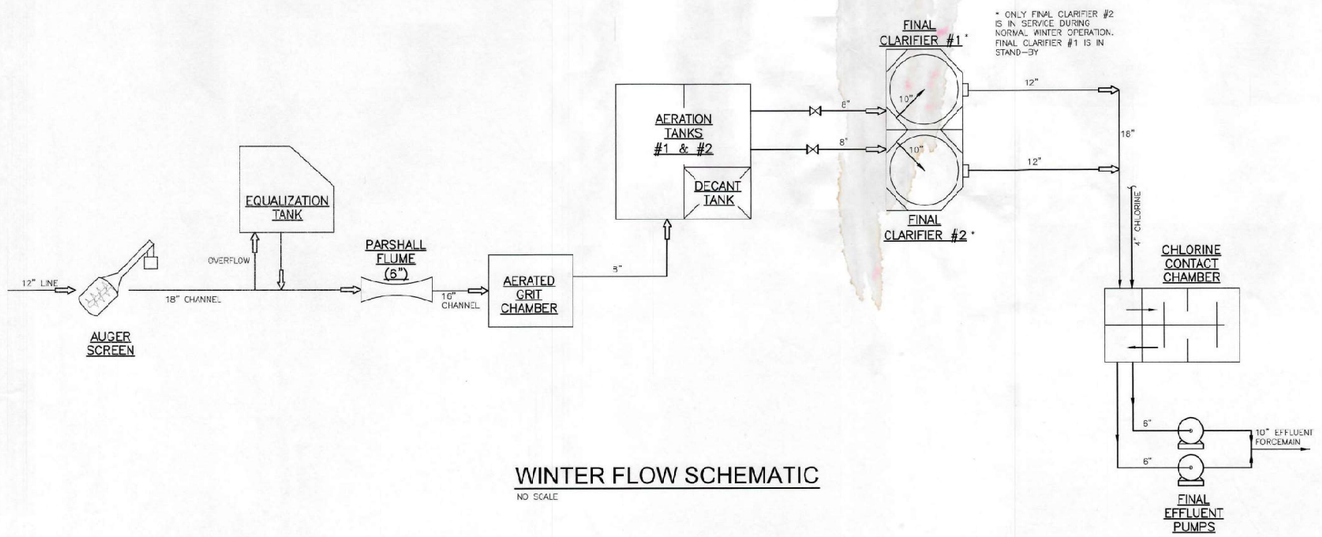
Drawn By	RS2
Designer	JJF/EHS
Reviewer	WEL
Manager	JCR

Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

PROJECT NO.
G080509CD

SHEET NO.
134

PLOT INFO: U:\CADD\G080509CD\CD\134-080509CD.DWG LAYOUT: 134 DATE: 2/13/2012 TIME: 11:26:10 AM USER: RS2

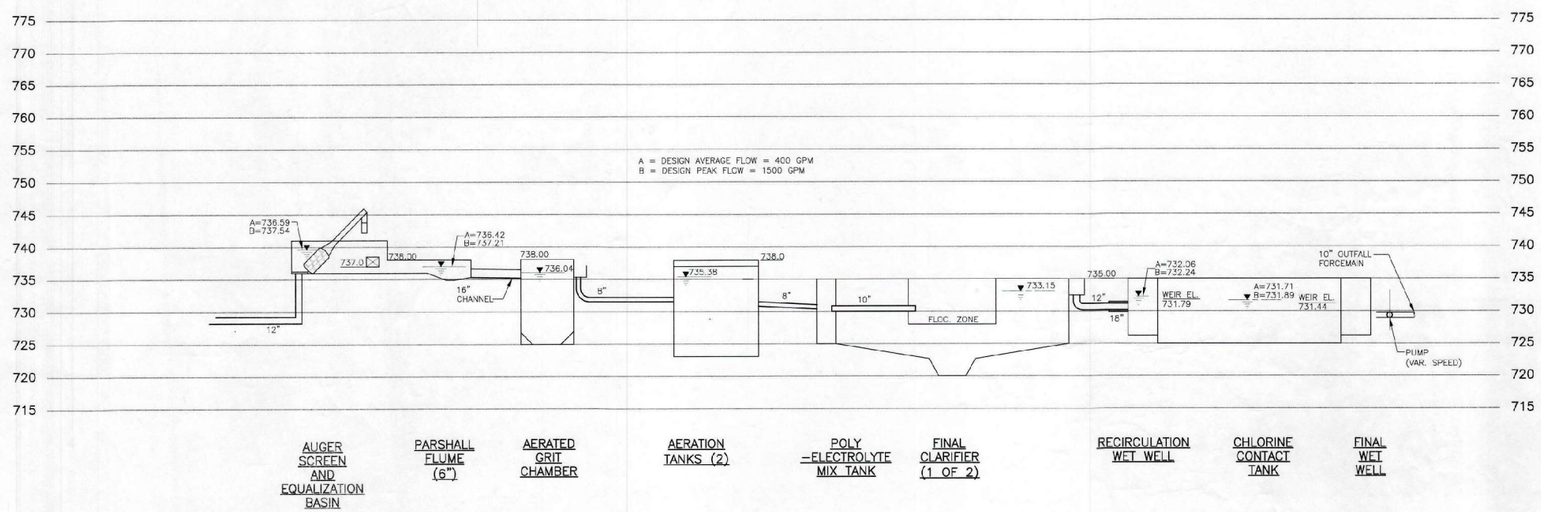


WINTER FLOW SCHEMATIC

NO SCALE

NOTES

1. SEE 400 SERIES SHEET FOR P&ID OF SUMMER HEADWORKS.
2. SCHEMATIC IS DEPICTED WITH ALL ALTERNATES INCLUDED.



WINTER HYDRAULIC PROFILE

SCALE: 3/32" = 1'-0"

0 6 12 24

Figure A12 - Existing WWTP Winter Operation Flow Schematic and Hydraulic Profile

fitch

engineers
scientists
architects
constructors

fishbeck, thompson, carr & huber, inc.

City of Mackinac Island

Mackinac Island, Mackinac County, Michigan

Wastewater Treatment Plant Improvements

2/14/12	CONSTRUCTION SET
10/18/11	BIDS & CONSTRUCTION

Drawn By	RS2
Designer	JJH/EHS
Reviewer	WEL
Manager	JCR

Hard copy is intended to be 24"X36" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

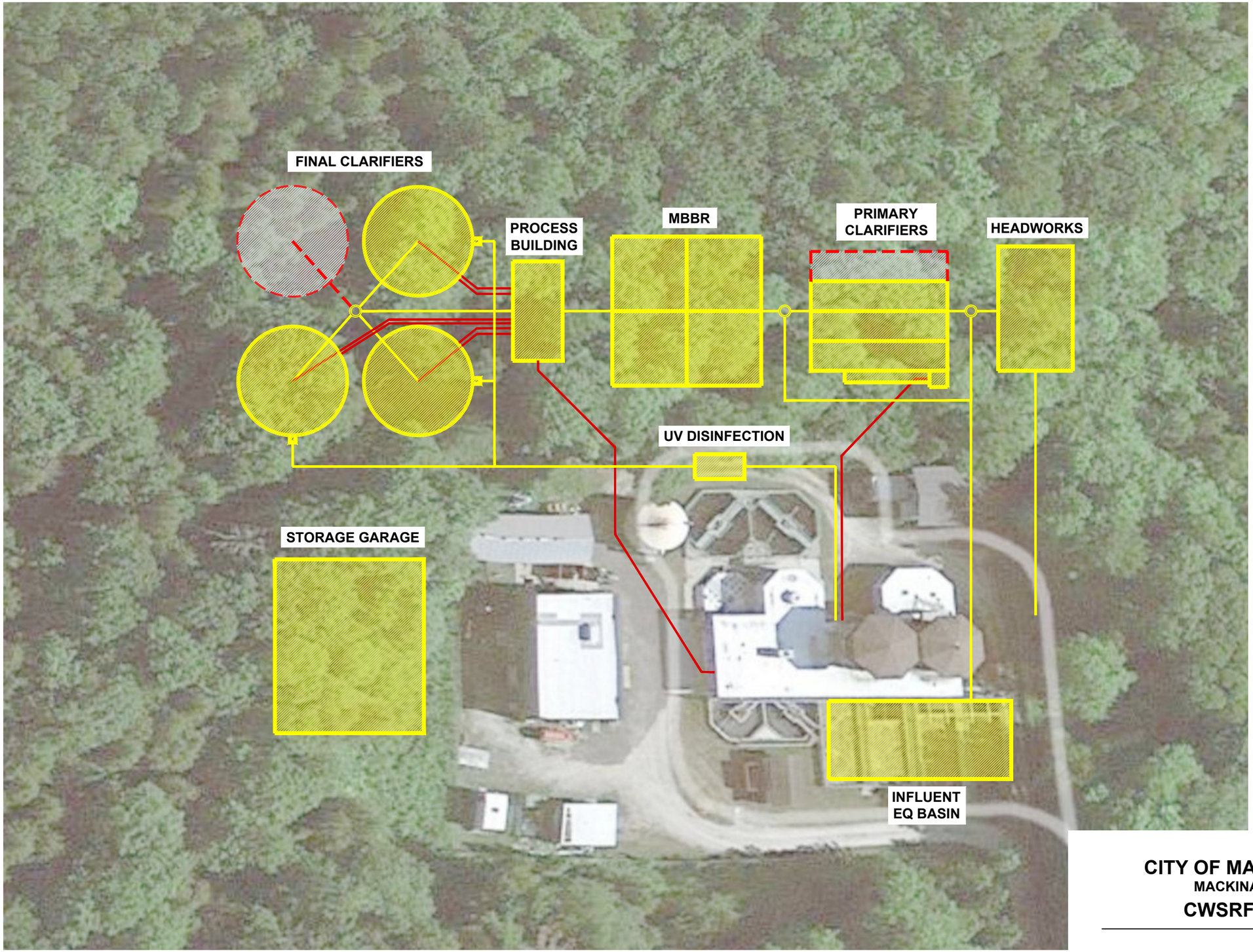
PROJECT NO.

G080509CD

SHEET NO.

135

PLOT INFO: U:\CAD\WORK\G080509CD\DWG\135-G080509CD.DWG LAYOUT: 135 DATE: 2/12/2012 TIME: 11:26:13 AM USER: RS2



NORTH

LEGEND:

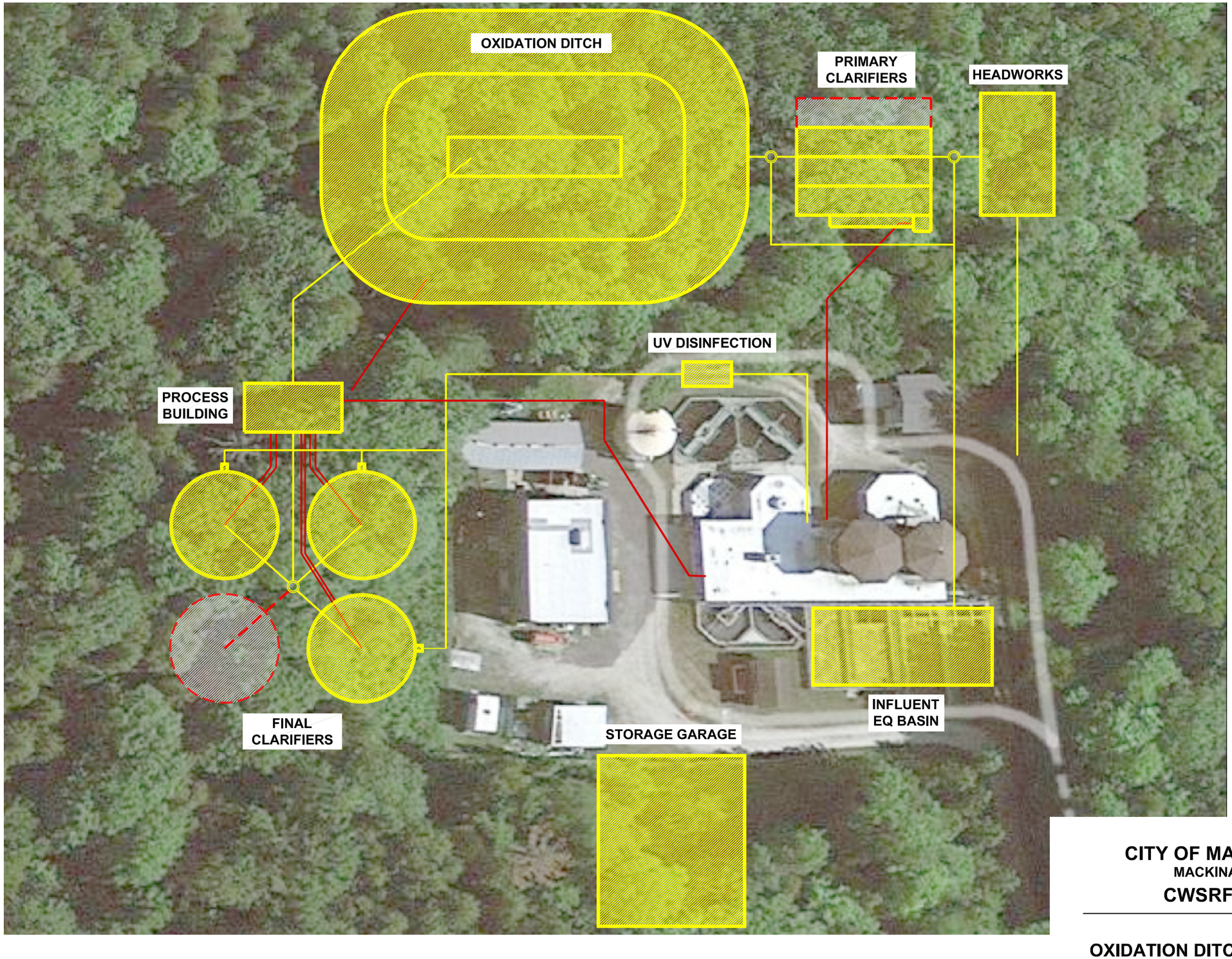
- WASTEWATER
- SLUDGE
- PROPOSED STRUCTURES
- FUTURE

CITY OF MACKINAC ISLAND
MACKINAC COUNTY, MICHIGAN
CWSRF PROJECT PLAN

FIGURE A13
MBBR EXPANSION - ALTERNATE 3

F&V PROJECT NO. 847240

F&V



NORTH

LEGEND:

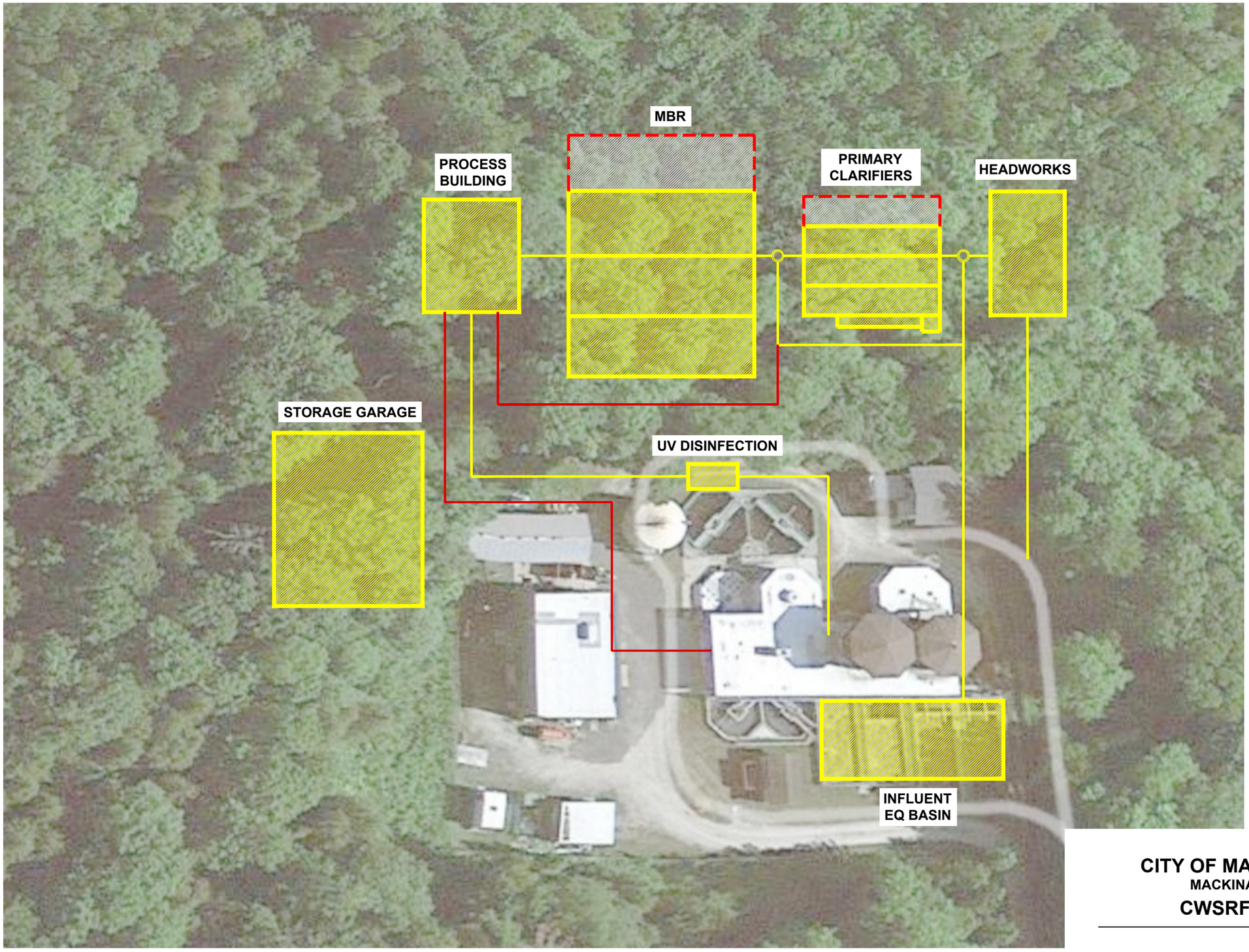
- WASTEWATER
- SLUDGE
- PROPOSED STRUCTURES
- FUTURE

CITY OF MACKINAC ISLAND
MACKINAC COUNTY, MICHIGAN
CWSRF PROJECT PLAN

FIGURE A14
OXIDATION DITCH - ALTERNATE 4

F&V PROJECT NO. 847240

F&V



NORTH

LEGEND:

- WASTEWATER
- SLUDGE
- PROPOSED STRUCTURES
- FUTURE

CITY OF MACKINAC ISLAND
MACKINAC COUNTY, MICHIGAN
CWSRF PROJECT PLAN

FIGURE A15
MBR - ALTERNATE 5

F&V PROJECT NO. 847240

F&V

NORTH

LEGEND:

- WASTEWATER
- SLUDGE
- PROPOSED STRUCTURES
- FUTURE

CITY OF MACKINAC ISLAND
MACKINAC COUNTY, MICHIGAN
CWSRF PROJECT PLAN

FIGURE A16
SBR - ALTERNATE 6

F&V PROJECT NO. 847240

F&V

APPENDIX B
NPDES PERMIT - EXISTING

PREPARED FOR:

City of Mackinac Island

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 847241

PERMIT NO. MI0026751

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, 33 U.S.C., Section 1251 *et seq*., as amended; Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); Part 41, Sewerage Systems, of the NREPA; and Michigan Executive Order 2011-1,

City of Mackinac Island
Market Street
PO Box 455
Mackinac Island, MI 49757

is authorized to discharge from the **Mackinac Island WWTP** located at

3134 Stonecliff Rd.
Mackinac Island, MI 49757

designated as **Mackinac Island WWTP**

to the receiving water named Lake Huron in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

This permit is based on a complete application submitted on March 29, 2016, as amended through December 16, 2016.

This permit takes effect on December 1, 2018. The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date, this permit shall supersede National Pollutant Discharge Elimination System (NPDES) Permit No. MI0026751 expiring October 1, 2016.

This permit and the authorization to discharge shall expire at midnight on **October 1, 2023**. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application that contains such information, forms, and fees as are required by the Michigan Department of Environmental Quality (Department) by **April 4, 2023**.

Issued: November 29, 2018.

Original signed by Christine Alexander
Christine Alexander, Manager
Permits Section
Water Resources Division

PERMIT FEE REQUIREMENTS

In accordance with Section 324.3120 of the NREPA, the permittee shall make payment of an annual permit fee to the Department for each October 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by January 15 for notices mailed by December 1. The fee is due no later than 45 days after receiving the notice for notices mailed after December 1.

Annual Permit Fee Classification: Municipal Minor, less than 1 MGD (Individual Permit)

In accordance with Section 324.3132 of the NREPA, the permittee shall make payment of an annual biosolids land application fee to the Department if the permittee land applies biosolids. In response to the Department's annual notice, the permittee shall submit the fee, which shall be postmarked no later than January 31 of each year.

CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Upper Peninsula District Office of the Water Resources Division. The Upper Peninsula District Office is located at 1504 West Washington Street, Marquette, MI 49855, Telephone: 906-228-4853, Fax: 906-228-4940.

CONTESTED CASE INFORMATION

Any person who is aggrieved by this permit may file a sworn petition with the Michigan Administrative Hearing System within the Michigan Department of Licensing and Regulatory Affairs, c/o the Michigan Department of Environmental Quality, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Department of Licensing and Regulatory Affairs may reject any petition filed more than 60 days after issuance as being untimely.

PART I

Section A. Limitations and Monitoring Requirements

1. Final Effluent Limitations, Monitoring Point 001A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge treated municipal wastewater from Monitoring Point 001A through Outfall 001. Outfall 001 discharges to Lake Huron. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration				Monitoring	Sample
Parameter	**Monthly**	**7-Day**	**Daily**	**Units**	**Monthly**	**7-Day**	**Daily**	**Units**	**Frequency**	**Type**
Flow	(report)		(report)	MGD	---		---	---	Daily	Report Total Daily Flow
Biochemical Oxygen Demand (BOD5)	240	360	(report)	lbs/day	30	45	(report)	mg/l	5X Weekly	24-Hr Composite
Total Suspended Solids (TSS)	240	360	(report)	lbs/day	30	45	(report)	mg/l	5X Weekly	24-Hr Composite
Total Phosphorus (as P)	8.0	---	(report)	lbs/day	1.0	---	(report)	mg/l	5X Weekly	24-Hr Composite
Fecal Coliform Bacteria	---	---	---	---	200	400	(report)	cts/100 ml	5X Weekly	Grab
Total Residual Chlorine	---	---	---	---	---	---	0.50	mg/l	5X Weekly	Grab
Total Mercury Apr – Nov										
Corrected	(report)		(report)	lbs/day	(report)		(report)	ng/l	Monthly	Calculation
Uncorrected	---		---	---	---		(report)	ng/l	Monthly	Grab
Field Duplicate	---		---	---	---		(report)	ng/l	Monthly	Grab
Field Blank	---		---	---	---		(report)	ng/l	Monthly	Preparation
Laboratory Method Blank	---		---	---	---		(report)	ng/l	Monthly	Preparation
	12-Month Rolling Avg				**12-Month Rolling Avg**					
Total Mercury Apr – Nov	0.000075	---	---	lbs/day	9.0	---	---	ng/l	Monthly	Grab
					Minimum % Monthly		**Minimum % Daily**			
BOD5 Minimum % Removal	---	---	---	---	85	---	(report)	%	Monthly	Calculation
TSS Minimum % Removal	---	---	---	---	85	---	(report)	%	Monthly	Calculation
					Minimum Daily		**Maximum Daily**			
pH	---	---	---	---	6.5	---	9.0	S.U.	5X Weekly	Grab
Dissolved Oxygen	---	---	---	---	4.0	---	---	mg/l	5X Weekly	Grab

The following design flow was used in determining the above limitations but is not to be considered a limitation or actual capacity: 0.96 MGD.

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Sampling Locations
Samples for BOD5, Total Suspended Solids, and Total Phosphorus shall be taken prior to disinfection. Samples for Fecal Coliform Bacteria, Total Residual Chlorine, Total Mercury, pH, and Dissolved Oxygen shall be taken after disinfection. The Department may approve alternate sampling locations that are demonstrated by the permittee to be representative of the effluent.

c. Total Residual Chlorine (TRC)
Compliance with the TRC limit shall be determined on the basis of one or more grab samples. If more than one (1) sample per day is taken, the additional samples shall be collected in near equal intervals over at least eight (8) hours. The samples shall be analyzed immediately upon collection and the average reported as the daily concentration. Samples shall be analyzed in accordance with Part II.B.2. of this permit.

d. Percent Removal Requirements
These requirements shall be calculated based on the monthly (30-day) effluent BOD5 and TSS concentrations and the monthly influent concentrations for approximately the same period.

e. Final Effluent Limitation for Total Mercury
The final limit for total mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the WQBEL of 1.3 ng/l, pursuant to Rule 1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average, the calculation of which may be done using blank-corrected sample results. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 7 monthly average results then dividing the sum by 8. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to three (3) months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any month is less than or equal to the LCA, the permittee will be considered to be in compliance for total mercury for that month, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.3. of this permit.

After a minimum of 8 monthly data points have been collected, the permittee may request a reduction in the monitoring frequency for total mercury. This request shall contain an explanation as to why the reduced monitoring is appropriate and shall be submitted to the Department. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency for total mercury indicated in Part I.A.3. of this permit. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.

f. Total Mercury Testing and Additional Reporting Requirements
The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, "Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry." The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is required unless the permittee can demonstrate to the Department that an alternate sampling procedure is representative of the discharge. Guidance for clean technique sampling is contained in EPA Method 1669, Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (Sampling Guidance), EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

In order to demonstrate compliance with EPA Method 1631E and EPA Method 1669, the permittee shall report, on the daily sheet, the analytical results of all field blanks and field duplicates collected in conjunction with each sampling event, as well as laboratory method blanks when used for blank correction. The permittee shall collect at least one (1) field blank and at least one (1) field duplicate per sampling event. If more than ten (10) samples are collected during a sampling event, the permittee shall collect at least one (1) additional field blank AND field duplicate for every ten (10) samples collected. Only field blanks or laboratory method blanks may be used to calculate a concentration lower than the actual sample analytical results (i.e., a blank correction). Only one (1) blank (field OR laboratory method) may be used for blank correction of a given sample result, and only if the blank meets the quality control acceptance criteria. If blank correction is not performed on a given sample analytical result, the permittee shall report under "Total Mercury – Corrected" the same value reported under "Total Mercury – Uncorrected." The field duplicate is for quality control purposes only; its analytical result shall not be averaged with the sample result.

2. Quantification Levels and Analytical Methods for Selected Parameters

Quantification levels (QLs) are specified for selected parameters in the table below. These QLs shall be considered the maximum acceptable unless a higher QL is appropriate because of sample matrix interference. Justification for higher QLs shall be submitted to the Department within 30 days of such determination. Where necessary to help ensure that the QLs specified can be achieved, analytical methods may also be specified in the table below. The sampling procedures, preservation and handling, and analytical protocol for all monitoring conducted in compliance with this permit, including monitoring conducted to meet the requirements of the application for permit reissuance, shall be in accordance with the methods specified in the table below, or in accordance with Part II.B.2. of this permit if no method is specified in the table below, unless an alternate method is approved by the Department. With the exception of total mercury, all units are in ug/l. The table is continued on the following page:

Parameter	QL	Units	Analytical Method
1,2-Diphenylhydrazine (as Azobenzene)	3.0	ug/l	
2,4,6-Trichlorophenol	5.0	ug/l	
2,4-Dinitrophenol	19	ug/l	
3,3'-Dichlorobenzidine	1.5	ug/l	EPA Method 605
4,4'-DDD	0.05	ug/l	EPA Method 608
4,4'-DDE	0.01	ug/l	EPA Method 608
4,4'-DDT	0.01	ug/l	EPA Method 608
Acrylonitrile	1.0	ug/l	
Aldrin	0.01	ug/l	EPA Method 608
Alpha-Hexachlorocyclohexane	0.01	ug/l	EPA Method 608
Antimony, Total	1	ug/l	
Arsenic, Total	1	ug/l	
Barium, Total	5	ug/l	
Benzidine	0.1	ug/l	EPA Method 605
Beryllium, Total	1	ug/l	
Beta-Hexachlorocyclohexane	0.01	ug/l	EPA Method 608
Bis (2-Chloroethyl) Ether	1.0	ug/l	
Boron, Total	20	ug/l	
Cadmium, Total	0.2	ug/l	
Chlordane	0.01	ug/l	EPA Method 608
Chromium, Hexavalent	5	ug/l	
Chromium, Total	10	ug/l	
Copper, Total	1	ug/l	
Cyanide, Available	2	ug/l	EPA Method OIA 1677
Cyanide, Total	5	ug/l	

Parameter	QL	Units	Analytical Method
Delta-Hexachlorocyclohexane	0.01	ug/l	EPA Method 608
Dieldrin	0.01	ug/l	EPA Method 608
Di-N-Butyl Phthalate	9.0	ug/l	
Endosulfan I	0.01	ug/l	EPA Method 608
Endosulfan II	0.01	ug/l	EPA Method 608
Endosulfan Sulfate	0.01	ug/l	EPA Method 608
Endrin	0.01	ug/l	EPA Method 608
Endrin Aldehyde	0.01	ug/l	EPA Method 608
Fluoranthene	1.0	ug/l	
Heptachlor	0.01	ug/l	EPA Method 608
Heptachlor Epoxide	0.01	ug/l	EPA Method 608
Hexachlorobenzene	0.01	ug/l	EPA Method 612
Hexachlorobutadiene	0.01	ug/l	EPA Method 612
Hexachlorocyclopentadiene	0.01	ug/l	EPA Method 612
Hexachloroethane	5.0	ug/l	
Lead, Total	1	ug/l	
Lindane	0.01	ug/l	EPA Method 608
Lithium, Total	10	ug/l	
Mercury, Total	0.5	**ng/l**	EPA Method 1631E
Nickel, Total	5	ug/l	
PCB-1016	0.1	ug/l	EPA Method 608
PCB-1221	0.1	ug/l	EPA Method 608
PCB-1232	0.1	ug/l	EPA Method 608
PCB-1242	0.1	ug/l	EPA Method 608
PCB-1248	0.1	ug/l	EPA Method 608
PCB-1254	0.1	ug/l	EPA Method 608
PCB-1260	0.1	ug/l	EPA Method 608
Pentachlorophenol	1.8	ug/l	
Phenanthrene	1.0	ug/l	
Selenium, Total	1.0	ug/l	
Silver, Total	0.5	ug/l	
Strontium, Total	1000	ug/l	
Sulfides, Dissolved	20	ug/l	
Thallium, Total	1	ug/l	
Toxaphene	0.1	ug/l	EPA Method 608
Vinyl Chloride	0.25	ug/l	
Zinc, Total	10	ug/l	

3. Pollutant Minimization Program for Total Mercury

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of total mercury at or below 1.3 ng/l. The permittee shall develop and implement a Pollutant Minimization Program in accordance with the following schedule.

On or before April 1, 2019, the permittee shall submit to the Department an approvable Pollutant Minimization Program for mercury designed to proceed toward the goal. The Pollutant Minimization Program shall include the following:

a. an annual review and semi-annual monitoring of potential sources of mercury entering the wastewater collection system;

b. a program for quarterly monitoring of influent and periodic monitoring of sludge for mercury; and

c. implementation of reasonable cost-effective control measures when sources of mercury are discovered. Factors to be considered include significance of sources, economic considerations, and technical and treatability considerations.

The Pollutant Minimization Program shall be implemented upon approval by the Department.

On or before March 31 of each year following approval of the Pollutant Minimization Program, the permittee shall submit a status report for the previous calendar year to the Department that includes 1) the monitoring results for the previous year, 2) an updated list of potential mercury sources, and 3) a summary of all actions taken to reduce or eliminate identified sources of mercury.

Any information generated as a result of the Pollutant Minimization Program set forth in this permit may be used to support a request to modify the approved program or to demonstrate that the Pollutant Minimization Program requirement has been completed satisfactorily.

A request for modification of the approved program and supporting documentation shall be submitted in writing to the Department for review and approval. The Department may approve modifications to the approved program (approval of a program modification does not require a permit modification), including a reduction in the frequency of the requirements under items a. and b.

This permit may be modified in accordance with applicable laws and rules to include additional mercury conditions and/or limitations as necessary.

4. Short Term Waste Characterization Study

As a condition of this permit, the permittee shall monitor the discharge from monitoring point 001A for the constituents listed below. This is due to previous data being provided with quantification levels used by the laboratory that were not sufficiently sensitive to determine if these parameters were being discharged at levels below Michigan water quality standards. Sampling shall take place when the facility is actively processing leachate and "summer commercial" nondomestic wastewater. By March 29, 2019, the permittee shall submit to the Department for review and approval, a sampling plan designed to ensure the samples will be taken during such a time. The sampling shall be a onetime event during this permit cycle and be consistent with the Department approved plan. The sampling results shall be submitted to the Department in a report that also includes the date, time, and approximate amount of leachate and septage received by the plant during the 24-hour period prior to the time of sampling. Grab samples shall be collected for available cyanide, total phenols, and the Volatile Organic Compounds identified below. For all other parameters, 24-hour composite samples shall be collected. Upon written request, an alternate schedule may be approved by the Department.

Metals (Total Recoverable), Cyanide and Total Phenols

antimony	arsenic	available cyanide	barium
beryllium	boron	cadmium	chromium
copper	lead	nickel	selenium
silver	thallium	zinc	
total phenolic compounds			

Volatile Organic Compounds

acrolein	acrylonitrile	benzene	bromoform
carbon tetrachloride	chlorobenzene	chlorodibromomethane	chloroethane
2-chloroethylvinyl ether	chloroform	dichlorobromomethane	1,1-dichloroethane
1,2-dichloroethane	trans-1,2-dichloroethylene	1,1-dichloroethylene	1,2-dichloropropane
1,3-dichloropropylene	ethylbenzene	methyl bromide	methyl chloride
methylene chloride	1,1,2,2,-tetrachloroethane	tetrachloroethylene	toluene
1,1,1-trichloroethane	1,1,2-trichloroethane	trichloroethylene	vinyl chloride

Acid-Extractable Compounds

p-chloro-m-cresol	2-chlorophenol	2,4-dichlorophenol	2,4-dimethylphenol
4,6-dinitro-o-cresol	2,4-dinitrophenol	2-nitrophenol	4-nitrophenol
Pentachlorophenol	phenol	2,4,6-trichloropheno	

Base/Neutral Compounds

acenaphthene	acenaphthylene	anthracene	benzidine
benzo(a)anthracene	benzo(a)pyrene	3,4-benzofluoranthene	benzo(ghi)perylene
benzo(k)fluoranthene	bis(2-chloroethoxy)methane	bis(2-chloroethyl)ether	bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate	4-bromophenyl phenyl ether	butyl benzyl phthalate	2-chloronaphthalene
4-chlorophenyl phenyl ether	chrysene	di-n-butyl phthalate	di-n-octyl phthalate
dibenzo(a,h)anthracene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene
3,3'-dichlorobenzidine	diethyl phthalate	dimethyl phthalate	2,4-dinitrotoluene
2,6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	fluorene
Hexachlorobenzene	hexachlorobutadiene	hexachlorocyclo-pentadiene	hexachloroethane
indeno(1,2,3-cd)pyrene	isophorone	naphthalene	nitrobenzene
n-nitrosodi-n-propylamine	n-nitrosodimethylamine	n-nitrosodiphenylamine	phenanthrene
pyrene	1,2,4-trichlorobenzene		

The results of the analysis shall be submitted to the department within 30 days of the date on which the sample was collected. If, upon review of the analysis, it is determined that any of the materials or constituents require limiting to protect the receiving waters in accordance with applicable water quality standards, the permit may then be modified by the Department in accordance with applicable laws and rules.

5. Untreated or Partially Treated Sewage Discharge Reporting and Testing Requirements

In accordance with Section 324.3112a of the NREPA, if untreated sewage, including sanitary sewer overflows (SSO) and combined sewer overflows (CSO), or partially treated sewage is directly or indirectly discharged from a sewer system onto land or into the waters of the state, the entity responsible for the sewer system shall immediately, but not more than 24 hours after the discharge begins, notify, by telephone, the Department, local health departments, a daily newspaper of general circulation in the county in which the permittee is located, and a daily newspaper of general circulation in the county or counties in which the municipalities whose waters may be affected by the discharge are located that the discharge is occurring.

The permittee shall also annually contact municipalities, including the superintendent of a public drinking water supply with potentially affected intakes, whose waters may be affected by the permittee's discharge of combined sewage, and if those municipalities wish to be notified in the same manner as specified above, the permittee shall provide such notification. Such notification shall also include a daily newspaper in the county of the affected municipality.

At the conclusion of the discharge, written notification shall be submitted in accordance with and on the “Report of Discharge Form” available via the internet at: http://www.deq.state.mi.us/csosso/ , or, alternatively for combined sewer overflow discharges, in accordance with notification procedures approved by the Department.

In addition, in accordance with Section 324.3112a of the NREPA, each time a discharge of untreated sewage or partially treated sewage occurs, the permittee shall test the affected waters for *Escherichia coli* to assess the risk to the public health as a result of the discharge and shall provide the test results to the affected local county health departments and to the Department. The testing shall be done at locations specified by each affected

local county health department but shall not exceed 10 tests for each separate discharge event. The affected local county health department may waive this testing requirement, if it determines that such testing is not needed to assess the risk to the public health as a result of the discharge event. The results of this testing shall be submitted with the written notification required above, or, if the results are not yet available, submit them as soon as they become available. This testing is not required, if the testing has been waived by the local health department, or if the discharge(s) did not affect surface waters.

Permittees accepting sanitary or municipal sewage from other sewage collection systems are encouraged to notify the owners of those systems of the above reporting and testing requirements.

6. Facility Contact

The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address and telephone number of the new facility contact).

a. The facility contact shall be (or a duly authorized representative of this person):
- for a corporation, a principal executive officer of at least the level of vice president; or a designated representative if the representative is responsible for the overall operation of the facility from which the discharge originates, as described in the permit application or other NPDES form,
- for a partnership, a general partner,
- for a sole proprietorship, the proprietor, or
- for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

b. A person is a duly authorized representative only if:
- the authorization is made in writing to the Department by a person described in paragraph a. of this section; and
- the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).

Nothing in this section releases the permittee from properly submitting reports and forms as required by law.

7. Monthly Operating Reports

Part 41 of Act 451 of 1994 as amended, specifically Section 324.4106 and associated R 299.2953, requires that the permittee file with the Department, on forms prescribed by the Department, operating reports showing the effectiveness of the treatment facility operation and the quantity and quality of liquid wastes discharged into waters of the state.

Within 30 days of the effective date of this permit, the permittee shall submit to the Department a revised treatment facility monitoring program to address monitoring requirement changes reflected in this permit, or submit justification explaining why monitoring requirement changes reflected in this permit do not necessitate revisions to the treatment facility monitoring program. The permittee shall implement the revised treatment facility monitoring program upon approval from the Department. Applicable forms and guidance are available on the Department's web site at http://www.michigan.gov/deq/0,1607,7-135-3313_44117---,00.html. The permittee may use alternate forms if they are consistent with the approved treatment facility monitoring program. Unless the Department provides written notification to the permittee that monthly submittal of operating reports is required, operating reports that result from implementation of the approved treatment facility monitoring program shall be maintained on site for a minimum of three (3) years and shall be made available to the Department for review upon request.

PART I

Section B. Storm Water Pollution Prevention

This section (Section B: Storm Water Pollution Prevention) is not needed for this permit.

PART I

Section C. Industrial Waste Pretreatment Program

1. Industrial Waste Pretreatment Program

It is understood that the permittee does not receive the discharge of any type or quantity of substance which may cause interference with the operation of the treatment works; and, therefore, the permittee is not required to immediately develop an industrial pretreatment program in accordance with Section 307 of the Federal Water Pollution Control Act. The permittee is required to comply with Section 307 of the Federal Water Pollution Control Act upon accepting any such discharge for treatment. The permittee is required to notify the Department within thirty (30) days if any user discharges or proposes to discharge such wastes to the permittee for treatment.

Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

a. pollutants which cause pass-through or interference;

b. pollutants which create a fire hazard or explosion hazard in the sewerage system, including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21;

c. pollutants which will cause corrosive structural damage to the sewerage system; but in no case, discharges with pH less than 5.0, unless the works is specifically designed to accommodate such discharges;

d. solid or viscous pollutants in amounts which will cause obstruction to the flow in the sewerage system resulting in interference;

e. any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the treatment plant;

f. heat in amounts which will inhibit biological activity in the treatment plant resulting in interference; but in no case, heat in such quantities that the temperature at the treatment plant exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless the Department, upon request of the permittee, approves alternate temperature limits;

g. pollutants which result in the presence of toxic gases, vapors or fumes within the sewerage system in a quantity that may cause acute worker health and safety problems; and

h. any trucked or hauled pollutants, except at discharge points designated by the permittee.

If information is gained by the Department that the permittee receives or is about to receive industrial wastes, then this permit may be modified in accordance with applicable laws and rules to incorporate the requirements of Section 307 of the Federal Water Pollution Control Act.

PART I

Section D. Residuals Management Program

1. Residuals Management Program for Land Application of Biosolids

A permittee seeking authorization to land-apply bulk biosolids or prepare bulk biosolids for land application shall develop and submit a Residuals Management Program (RMP) to the Department (see Part I.D.1.e) for approval. Effective upon Department approval of the permittee's RMP, the permittee is authorized to land-apply bulk biosolids or prepare bulk biosolids for land application in accordance with the requirements established in R 323.2401 through R 323.2418 of the Michigan Administrative Code (Part 24 Rules) which can be obtained via the internet (http://www.michigan.gov/deq/ and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids, then click on Biosolids Laws and Rules Information which is under the Laws & Rules banner in the center of the screen). The permittee's approved RMP, and any approved modifications thereto, are enforceable requirements of this permit. Incineration, landfilling and other residual disposal activities shall be conducted in accordance with Part II.D.7. of this permit.

a. RMP Approval and Implementation
A permittee seeking approval of an RMP shall submit the RMP to the Department (see Part I.D.1.e) at least 180 days prior to the land application of biosolids. The permittee may utilize the RMP Electronic Form which can be obtained via the internet (http://www.michigan.gov/biosolids then click on RMP Electronic Form which is under the Downloads banner in the center of the screen) or obtain detailed requirements from the Department. The RMP shall become effective and shall be implemented by the permittee upon written approval by the Department.

b. Annual Report
On or before October 30 of each year, the permittee shall submit an annual report to the Department for the previous fiscal year of October 1 through September 30. The report shall be submitted electronically via the Department's MiWaters system at https://miwaters.deq.state.mi.us. At a minimum, the report shall contain:

1) a certification that current residuals management practices are in accordance with the approved RMP, or a proposal for modification to the approved RMP; and

2) a completed Biosolids Annual Report Form, available at https://miwaters.deq.state.mi.us.

c. Modifications to the Approved RMP
Prior to implementation of modifications to the RMP, the permittee shall submit proposed modifications to the Department (see Part I.D.1.e.) for approval. The approved modification shall become effective upon the date of approval. Upon written notification, the Department may impose additional requirements and/or limitations to the approved RMP as necessary to protect public health and the environment from any adverse effect of a pollutant in the biosolids.

d. Record Keeping
Records required by the Part 24 Rules shall be kept for a minimum of five years. However, the records documenting cumulative loading for sites subject to cumulative pollutant loading rates shall be kept as long as the site receives biosolids.

e. Contact Information
RMP-related submittals shall be made to the Department.

PART II

Part II may include terms and /or conditions not applicable to discharges covered under this permit.

Section A. Definitions

Acute toxic unit (TU_A) means $100/LC_{50}$ where the LC_{50} is determined from a whole effluent toxicity (WET) test which produces a result that is statistically or graphically estimated to be lethal to 50% of the test organisms.

Annual monitoring frequency refers to a calendar year beginning on January 1 and ending on December 31. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Authorized public agency means a state, local, or county agency that is designated pursuant to the provisions of section 9110 of Part 91 of the NREPA to implement soil erosion and sedimentation control requirements with regard to construction activities undertaken by that agency.

Best management practices (BMPs) means structural devices or nonstructural practices that are designed to prevent pollutants from entering into storm water, to direct the flow of storm water, or to treat polluted storm water.

Bioaccumulative chemical of concern (BCC) means a chemical which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor of more than 1000 after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation. The human health bioaccumulation factor shall be derived according to R 323.1057(5). Chemicals with half-lives of less than 8 weeks in the water column, sediment, and biota are not BCCs. The minimum bioaccumulation concentration factor (BAF) information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the biota-sediment accumulation factor (BSAF) methodology. The minimum BAF information needed to define an inorganic chemical as a BCC, including an organometal, is either a field-measured BAF or a laboratory-measured bioconcentration factor (BCF). The BCCs to which these rules apply are identified in Table 5 of R 323.1057 of the Water Quality Standards.

Biosolids are the solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. This includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

Bulk biosolids means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

Certificate of Coverage (COC) is a document, issued by the Department, which authorizes a discharge under a general permit.

Chronic toxic unit (TU_C) means 100/MATC or $100/IC_{25}$, where the maximum acceptable toxicant concentration (MATC) and IC_{25} are expressed as a percent effluent in the test medium.

Class B biosolids refers to material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with the Part 24 Rules. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Combined sewer system is a sewer system in which storm water runoff is combined with sanitary wastes.

Daily concentration is the sum of the concentrations of the individual samples of a parameter divided by the number of samples taken during any calendar day. The daily concentration will be used to determine compliance with any maximum and minimum daily concentration limitations (except for pH and dissolved oxygen). When required by the permit, report the maximum calculated daily concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the Discharge Monitoring Reports (DMRs).

For pH, report the maximum value of any *individual* sample taken during the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs and the minimum value of any *individual* sample taken during the month in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. For dissolved oxygen, report the minimum concentration of any *individual* sample in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Daily loading is the total discharge by weight of a parameter discharged during any calendar day. This value is calculated by multiplying the daily concentration by the total daily flow and by the appropriate conversion factor. The daily loading will be used to determine compliance with any maximum daily loading limitations. When required by the permit, report the maximum calculated daily loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs.

Daily monitoring frequency refers to a 24-hour day. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Department means the Michigan Department of Environmental Quality.

Detection level means the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.

Discharge means the addition of any waste, waste effluent, wastewater, pollutant, or any combination thereof to any surface water of the state.

EC_{50} means a statistically or graphically estimated concentration that is expected to cause 1 or more specified effects in 50% of a group of organisms under specified conditions.

Fecal coliform bacteria monthly
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a discharge event. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR. If the period in which the discharge event occurred was partially in each of two months, the calculated monthly value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a reporting month. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

Fecal coliform bacteria 7-day
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days of discharge during a discharge event. If the number of daily concentrations determined during the discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean value for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. If the 7-day period was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days in a reporting month. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. The first calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

Flow-proportioned sample is a composite sample with the sample volume proportional to the effluent flow.

General permit means a National Pollutant Discharge Elimination System permit issued authorizing a category of similar discharges.

Geometric mean is the average of the logarithmic values of a base 10 data set, converted back to a base 10 number.

Grab sample is a single sample taken at neither a set time nor flow.

IC_{25} means the toxicant concentration that would cause a 25% reduction in a nonquantal biological measurement for the test population.

Illicit connection means a physical connection to a municipal separate storm sewer system that primarily conveys non-storm water discharges other than uncontaminated groundwater into the storm sewer; or a physical connection not authorized or permitted by the local authority, where a local authority requires authorization or a permit for physical connections.

Illicit discharge means any discharge to, or seepage into, a municipal separate storm sewer system that is not composed entirely of storm water or uncontaminated groundwater. Illicit discharges include non-storm water discharges through pipes or other physical connections; dumping of motor vehicle fluids, household hazardous wastes, domestic animal wastes, or litter; collection and intentional dumping of grass clippings or leaf litter; or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-storm water waste directly into a separate storm sewer.

Individual permit means a site-specific NPDES permit.

Inlet means a catch basin, roof drain, conduit, drain tile, retention pond riser pipe, sump pump, or other point where storm water or wastewater enters into a closed conveyance system prior to discharge off site or into waters of the state.

Interference is a discharge which, alone or in conjunction with a discharge or discharges from other sources, both: 1) inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and 2) therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or, of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act. [This definition does not apply to sample matrix interference].

Land application means spraying or spreading biosolids or a biosolids derivative onto the land surface, injecting below the land surface, or incorporating into the soil so that the biosolids or biosolids derivative can either condition the soil or fertilize crops or vegetation grown in the soil.

LC_{50} means a statistically or graphically estimated concentration that is expected to be lethal to 50% of a group of organisms under specified conditions.

Maximum acceptable toxicant concentration (MATC) means the concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration that did not cause the occurrence of a specific adverse effect. An upper chronic limit is the lowest tested concentration which did cause the occurrence of a specific adverse effect and above which all tested concentrations caused such an occurrence.

Maximum extent practicable means implementation of best management practices by a public body to comply with an approved storm water management program as required by a national permit for a municipal separate storm sewer system, in a manner that is environmentally beneficial, technically feasible, and within the public body's legal authority.

MGD means million gallons per day.

Monthly concentration is the sum of the daily concentrations determined during a reporting period divided by the number of daily concentrations determined. The calculated monthly concentration will be used to determine compliance with any maximum monthly concentration limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly concentration in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

For minimum percent removal requirements, the monthly influent concentration and the monthly effluent concentration shall be determined. The calculated monthly percent removal, which is equal to 100 times the quantity [1 minus the quantity (monthly effluent concentration divided by the monthly influent concentration)], shall be reported in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Monthly loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined during a reporting period. The calculated monthly loading will be used to determine compliance with any maximum monthly loading limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly loading in the "AVERAGE" column under "QUANTITY OR LOADING" on the DMR.

Monthly monitoring frequency refers to a calendar month. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Municipal separate storm sewer means a conveyance or system of conveyances designed or used for collecting or conveying storm water which is not a combined sewer and which is not part of a publicly-owned treatment works as defined in the Code of Federal Regulations at 40 CFR 122.2.

Municipal separate storm sewer system (MS4) means all separate storm sewers that are owned or operated by the United States, a state, city, village, township, county, district, association, or other public body created by or pursuant to state law, having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law, such as a sewer district, flood control district, or drainage district, or similar entity, or a designated or approved management agency under Section 208 of the Federal Act that discharges to the waters of the state. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

National Pretreatment Standards are the regulations promulgated by or to be promulgated by the Federal Environmental Protection Agency pursuant to Section 307(b) and (c) of the Federal Act. The standards establish nationwide limits for specific industrial categories for discharge to a POTW.

No observed adverse effect level (NOAEL) means the highest tested dose or concentration of a substance which results in no observed adverse effect in exposed test organisms where higher doses or concentrations result in an adverse effect.

Noncontact cooling water is water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product or finished product.

Nondomestic user is any discharger to a POTW that discharges wastes other than or in addition to water-carried wastes from toilet, kitchen, laundry, bathing or other facilities used for household purposes.

Outfall is the location at which a point source discharge enters the surface waters of the state.

Part 91 agency means an agency that is designated by a county board of commissioners pursuant to the provisions of section 9105 of Part 91 of the NREPA; an agency that is designated by a city, village, or township in accordance with the provisions of section 9106 of Part 91 of the NREPA; or the Department for soil erosion and sedimentation activities under Part 615, Part 631, or Part 632 pursuant to the provisions of section 9115 of Part 91 of the NREPA.

Part 91 permit means a soil erosion and sedimentation control permit issued by a Part 91 agency pursuant to the provisions of Part 91 of the NREPA.

Partially treated sewage is any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is treated to a level less than that required by the permittee's National Pollutant Discharge Elimination System permit, or that is not treated to national secondary treatment standards for wastewater, including discharges to surface waters from retention treatment facilities.

Point of discharge is the location of a point source discharge where storm water is discharged directly into a separate storm sewer system.

Point source discharge means a discharge from any discernible, confined, discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock. Changing the surface of land or establishing grading patterns on land will result in a point source discharge where the runoff from the site is ultimately discharged to waters of the state.

Polluting material means any material, in solid or liquid form, identified as a polluting material under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

POTW is a publicly owned treatment work.

Pretreatment is reducing the amount of pollutants, eliminating pollutants, or altering the nature of pollutant properties to a less harmful state prior to discharge into a public sewer. The reduction or alteration can be by physical, chemical, or biological processes, process changes, or by other means. Dilution is not considered pretreatment unless expressly authorized by an applicable National Pretreatment Standard for a particular industrial category.

Public (as used in the MS4 individual permit) means all persons who potentially could affect the authorized storm water discharges, including, but not limited to, residents, visitors to the area, public employees, businesses, industries, and construction contractors and developers.

Public body means the United States; the state of Michigan; a city, village, township, county, school district, public college or university, or single-purpose governmental agency; or any other body which is created by federal or state statute or law.

Qualified Personnel means an individual who meets qualifications acceptable to the Department and who is authorized by an Industrial Storm Water Certified Operator to collect the storm water sample.

Qualifying storm event means a storm event causing greater than 0.1 inch of rainfall and occurring at least 72 hours after the previous measurable storm event that also caused greater than 0.1 inch of rainfall. Upon request, the Department may approve an alternate definition meeting the condition of a qualifying storm event.

Quantification level means the measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calculated at a specified concentration above the detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

Quarterly monitoring frequency refers to a three month period, defined as January through March, April through June, July through September, and October through December. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Regional Administrator is the Region 5 Administrator, U.S. EPA, located at R-19J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

Regulated area means the permittee's urbanized area, where urbanized area is defined as a place and its adjacent densely-populated territory that together have a minimum population of 50,000 people as defined by the United States Bureau of the Census and as determined by the latest available decennial census.

Secondary containment structure means a unit, other than the primary container, in which significant materials are packaged or held, which is required by State or Federal law to prevent the escape of significant materials by gravity into sewers, drains, or otherwise directly or indirectly into any sewer system or to the surface or ground waters of this state.

Separate storm sewer system means a system of drainage, including, but not limited to, roads, catch basins, curbs, gutters, parking lots, ditches, conduits, pumping devices, or man-made channels, which is not a combined sewer where storm water mixes with sanitary wastes, and is not part of a POTW.

Significant industrial user is a nondomestic user that: 1) is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or 2) discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process waste stream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the permittee as defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's treatment plant operation or violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Significant materials Significant Materials means any material which could degrade or impair water quality, including but not limited to: raw materials; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (see 40 CFR 372.65); any chemical the facility is required to report pursuant to Section 313 of Emergency Planning and Community Right-to-Know Act (EPCRA); polluting materials as identified under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code); Hazardous Wastes as defined in Part 111 of the NREPA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills and significant leaks means any release of a polluting material reportable under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

Special-use area means secondary containment structures required by state or federal law; lands on Michigan's List of Sites of Environmental Contamination pursuant to Part 201, Environmental Remediation, of the NREPA; and/or areas with other activities that may contribute pollutants to the storm water for which the Department determines monitoring is needed.

Stoichiometric means the quantity of a reagent calculated to be necessary and sufficient for a given chemical reaction.

Storm water means storm water runoff, snow melt runoff, surface runoff and drainage, and non-storm water included under the conditions of this permit.

Storm water discharge point is the location where the point source discharge of storm water is directed to surface waters of the state or to a separate storm sewer. It includes the location of all point source discharges where storm water exits the facility, including *outfalls* which discharge directly to surface waters of the state, and *points of discharge* which discharge directly into separate storm sewer systems.

SWPPP means the Storm Water Pollution Prevention Plan prepared in accordance with this permit.

Tier I value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier I toxicity database.

Tier II value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier II toxicity database.

Total maximum daily loads (TMDLs) are required by the Federal Act for waterbodies that do not meet water quality standards. TMDLs represent the maximum daily load of a pollutant that a waterbody can assimilate and meet water quality standards, and an allocation of that load among point sources, nonpoint sources, and a margin of safety.

Toxicity reduction evaluation (TRE) means a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

Water Quality Standards means the Part 4 Water Quality Standards promulgated pursuant to Part 31 of the NREPA, being R 323.1041 through R 323.1117 of the Michigan Administrative Code.

Weekly monitoring frequency refers to a calendar week which begins on Sunday and ends on Saturday. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

WWSL is a wastewater stabilization lagoon.

WWSL discharge event is a discrete occurrence during which effluent is discharged to the surface water up to 10 days of a consecutive 14 day period.

3-portion composite sample is a sample consisting of three equal-volume grab samples collected at equal intervals over an 8-hour period.

7-day concentration

FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily concentrations determined. If the number of daily concentrations determined during the WWSL discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations. When required by the permit, report the maximum calculated 7-day concentration for the WWSL discharge event in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days in a reporting month divided by the number of daily concentrations determined. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations in the reporting month. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

7-day loading

FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily loadings determined. If the number of daily loadings determined during the WWSL discharge event is less than 7 days, the number of actual daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations. When required by the permit, report the maximum calculated 7-day loading for the WWSL discharge event in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days in a reporting month divided by the number of daily loadings determined. If the number of daily loadings determined is less than 7, the actual number of daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations in the reporting month. When required by the permit, report the maximum calculated 7-day loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

24-hour composite sample is a flow-proportioned composite sample consisting of hourly or more frequent portions that are taken over a 24-hour period. A time-proportioned composite sample may be used upon approval of the Department if the permittee demonstrates it is representative of the discharge.

PART II

Section B. Monitoring Procedures

1. Representative Samples

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations promulgated pursuant to Section 304(h) of the Federal Act (40 CFR Part 136 – Guidelines Establishing Test Procedures for the Analysis of Pollutants), unless specified otherwise in this permit. **Test procedures used shall be sufficiently sensitive to determine compliance with applicable effluent limitations**. Requests to use test procedures not promulgated under 40 CFR Part 136 for pollutant monitoring required by this permit shall be made in accordance with the Alternate Test Procedures regulations specified in 40 CFR 136.4. These requests shall be submitted to the Manager of the Permits Section, Water Resources Division, Michigan Department of Environmental Quality, P.O. Box 30458, Lansing, Michigan, 48909-7958. The permittee may use such procedures upon approval.

The permittee shall periodically calibrate and perform maintenance procedures on all analytical instrumentation at intervals to ensure accuracy of measurements. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

3. Instrumentation

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring instrumentation at intervals to ensure accuracy of measurements.

4. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: 1) the exact place, date, and time of measurement or sampling; 2) the person(s) who performed the measurement or sample collection; 3) the dates the analyses were performed; 4) the person(s) who performed the analyses; 5) the analytical techniques or methods used; 6) the date of and person responsible for equipment calibration; and 7) the results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Department.

PART II

Section C. Reporting Requirements

1. Start-up Notification

If the permittee will not discharge during the first 60 days following the effective date of this permit, the permittee shall notify the Department within 14 days following the effective date of this permit, and then 60 days prior to the commencement of the discharge.

2. Submittal Requirements for Self-Monitoring Data

Part 31 of the NREPA (specifically Section 324.3110(7)); and R 323.2155(2) of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, allow the Department to specify the forms to be utilized for reporting the required self-monitoring data. Unless instructed on the effluent limitations page to conduct "Retained Self-Monitoring," the permittee shall submit self-monitoring data via the Department's MiWaters system.

The permittee shall utilize the information provided on the MiWaters website, located at https://miwaters.deq.state.mi.us, to access and submit the electronic forms. Both monthly summary and daily data shall be submitted to the Department no later than the 20th day of the month following each month of the authorized discharge period(s). The permittee may be allowed to submit the electronic forms after this date if the Department has granted an extension to the submittal date.

3. Retained Self-Monitoring Requirements

If instructed on the effluent limits page (or otherwise authorized by the Department in accordance with the provisions of this permit) to conduct retained self-monitoring, the permittee shall maintain a year-to-date log of retained self-monitoring results and, upon request, provide such log for inspection to the staff of the Department. Retained self-monitoring results are public information and shall be promptly provided to the public upon request.

The permittee shall certify, in writing, to the Department, on or before January 10th (April 1st for animal feeding operation facilities) of each year, that: 1) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained; and 2) the application on which this permit is based still accurately describes the discharge. With this annual certification, the permittee shall submit a summary of the previous year's monitoring data. The summary shall include maximum values for samples to be reported as daily maximums and/or monthly maximums and minimum values for any daily minimum samples.

Retained self-monitoring may be denied to a permittee by notification in writing from the Department. In such cases, the permittee shall submit self-monitoring data in accordance with Part II.C.2., above. Such a denial may be rescinded by the Department upon written notification to the permittee. Reissuance or modification of this permit or reissuance or modification of an individual permittee's authorization to discharge shall not affect previous approval or denial for retained self-monitoring unless the Department provides notification in writing to the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

Monitoring required pursuant to Part 41 of the NREPA or Rule 35 of the Mobile Home Park Commission Act (Act 96 of the Public Acts of 1987) for assurance of proper facility operation shall be submitted as required by the Department.

5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittee shall submit a *written* notification to the Department indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

6. Noncompliance Notification

Compliance with all applicable requirements set forth in the Federal Act, Parts 31 and 41 of the NREPA, and related regulations and rules is required. All instances of noncompliance shall be reported as follows:

a. 24-Hour Reporting
Any noncompliance which may endanger health or the environment (including maximum and/or minimum daily concentration discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days.

b. Other Reporting
The permittee shall report, in writing, all other instances of noncompliance not described in a. above at the time monitoring reports are submitted; or, in the case of retained self-monitoring, within five (5) days from the time the permittee becomes aware of the noncompliance.

Written reporting shall include: 1) a description of the discharge and cause of noncompliance; and 2) the period of noncompliance, including exact dates and times, or, if not yet corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

7. Spill Notification

The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittee has determined that the release is not in excess of the threshold reporting quantities specified in the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code), by calling the Department at the number indicated on the second page of this permit (or, if this is a general permit, on the COC); or, if the notice is provided after regular working hours, call the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706 (calls from **out-of-state** dial 1-517-373-7660).

Within ten (10) days of the release, the permittee shall submit to the Department a full written explanation as to the cause of the release, the discovery of the release, response (clean-up and/or recovery) measures taken, and preventive measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

8. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset, shall notify the Department by telephone within 24 hours of becoming aware of such conditions; and within five (5) days, provide in writing, the following information:

a. that an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. that the permitted wastewater treatment facility was, at the time, being properly operated and maintained (note that an upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation); and

c. that the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

In any enforcement proceedings, the permittee, seeking to establish the occurrence of an upset, has the burden of proof.

9. Bypass Prohibition and Notification

a. Bypass Prohibition
Bypass is prohibited, and the Department may take an enforcement action, unless:

1) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2) there were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass; and

3) the permittee submitted notices as required under 9.b. or 9.c. below.

b. Notice of Anticipated Bypass
If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least ten (10) days before the date of the bypass, and provide information about the anticipated bypass as required by the Department. The Department may approve an anticipated bypass, after considering its adverse effects, if it will meet the three (3) conditions listed in 9.a. above.

c. Notice of Unanticipated Bypass
The permittee shall submit notice to the Department of an unanticipated bypass by calling the Department at the number indicated on the second page of this permit (if the notice is provided after regular working hours, use the following number: 1-800-292-4706) as soon as possible, but no later than 24 hours from the time the permittee becomes aware of the circumstances.

d. Written Report of Bypass
A written submission shall be provided within five (5) working days of commencing any bypass to the Department, and at additional times as directed by the Department. The written submission shall contain a description of the bypass and its cause; the period of bypass, including exact dates and times, and if the bypass has not been corrected, the anticipated time it is expected to continue; steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass; and other information as required by the Department.

e. Bypass Not Exceeding Limitations
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to ensure efficient operation. These bypasses are not subject to the provisions of 9.a., 9.b., 9.c., and 9.d., above. This provision does not relieve the permittee of any notification responsibilities under Part II.C.11. of this permit.

f. Definitions

1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

10. Bioaccumulative Chemicals of Concern (BCC)

Consistent with the requirements of R 323.1098 and R 323.1215 of the Michigan Administrative Code, the permittee is prohibited from undertaking any action that would result in a lowering of water quality from an increased loading of a BCC unless an increased use request and antidegradation demonstration have been submitted and approved by the Department.

11. Notification of Changes in Discharge

The permittee shall notify the Department, in writing, as soon as possible but no later than 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of: 1) detectable levels of chemicals on the current Michigan Critical Materials Register, priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, or the Pollutants of Initial Focus in the Great Lakes Water Quality Initiative specified in 40 CFR 132.6, Table 6, which were not acknowledged in the application or listed in the application at less than detectable levels; 2) detectable levels of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information; or 3) any chemical at levels greater than five times the average level reported in the complete application (see the first page of this permit, for the date(s) the complete application was submitted). Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the compliance schedules.

12. Changes in Facility Operations

Any anticipated action or activity, including but not limited to facility expansion, production increases, or process modification, which will result in new or increased loadings of pollutants to the receiving waters must be reported to the Department by a) submission of an increased use request (application) and all information required under R 323.1098 (Antidegradation) of the Water Quality Standards or b) by notice if the following conditions are met: 1) the action or activity will not result in a change in the types of wastewater discharged or result in a greater quantity of wastewater than currently authorized by this permit; 2) the action or activity will not result in violations of the effluent limitations specified in this permit; 3) the action or activity is not prohibited by the requirements of Part II.C.10.; and 4) the action or activity will not require notification pursuant to Part II.C.11. Following such notice, the permit or, if applicable, the facility's COC may be modified according to applicable laws and rules to specify and limit any pollutant not previously limited.

13. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall submit to the Department 30 days prior to the actual transfer of ownership or control a written agreement between the current permittee and the new permittee containing: 1) the legal name and address of the new owner; 2) a specific date for the effective transfer of permit responsibility, coverage and liability; and 3) a certification of the continuity of or any changes in operations, wastewater discharge, or wastewater treatment.

If the new permittee is proposing changes in operations, wastewater discharge, or wastewater treatment, the Department may propose modification of this permit in accordance with applicable laws and rules.

14. Operations and Maintenance Manual

For wastewater treatment facilities that serve the public (and are thus subject to Part 41 of the NREPA), Section 4104 of Part 41 and associated Rule 2957 of the Michigan Administrative Code allow the Department to require an Operations and Maintenance (O&M) Manual from the facility. An up-to-date copy of the O&M Manual shall be kept at the facility and shall be provided to the Department upon request. The Department may review the O&M Manual in whole or in part at its discretion and require modifications to it if portions are determined to be inadequate.

At a minimum, the O&M Manual shall include the following information: permit standards; descriptions and operation information for all equipment; staffing information; laboratory requirements; record keeping requirements; a maintenance plan for equipment; an emergency operating plan; safety program information; and copies of all pertinent forms, as-built plans, and manufacturer's manuals.

Certification of the existence and accuracy of the O&M Manual shall be submitted to the Department at least sixty days prior to start-up of a new wastewater treatment facility. Recertification shall be submitted sixty days prior to start-up of any substantial improvements or modifications made to an existing wastewater treatment facility.

15. Signatory Requirements

All applications, reports, or information submitted to the Department in accordance with the conditions of this permit and that require a signature shall be signed and certified as described in the Federal Act and the NREPA.

The Federal Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

The NREPA (Section 3115(2)) provides that a person who at the time of the violation knew or should have known that he or she discharged a substance contrary to this part, or contrary to a permit, COC, or order issued or rule promulgated under this part, or who intentionally makes a false statement, representation, or certification in an application for or form pertaining to a permit or COC or in a notice or report required by the terms and conditions of an issued permit or COC, or who intentionally renders inaccurate a monitoring device or record required to be maintained by the Department, is guilty of a felony and shall be fined not less than $2,500.00 or more than $25,000.00 for each violation. The court may impose an additional fine of not more than $25,000.00 for each day during which the unlawful discharge occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than $25,000.00 per day and not more than $50,000.00 per day of violation. Upon conviction, in addition to a fine, the court in its discretion may sentence the defendant to imprisonment for not more than 2 years or impose probation upon a person for a violation of this part. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction. However, the person shall not be subject to the penalties of this subsection if the discharge of the effluent is in conformance with and obedient to a rule, order, permit, or COC of the Department. In addition to a fine, the attorney general may file a civil suit in a court of competent jurisdiction to recover the full value of the injuries done to the natural resources of the state and the costs of surveillance and enforcement by the state resulting from the violation.

16. Electronic Reporting

Upon notice by the Department that electronic reporting tools are available for specific reports or notifications, the permittee shall submit electronically all such reports or notifications as required by this permit, on forms provided by the Department.

PART II

Section D. Management Responsibilities

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit, more frequently than, or at a level in excess of, that authorized, shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of the NREPA and/or the Federal Act and constitutes grounds for enforcement action; for permit or Certificate of Coverage (COC) termination, revocation and reissuance, or modification; or denial of an application for permit or COC renewal.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility certification by the Department, as required by Sections 3110 and 4104 of the NREPA. Permittees authorized to discharge storm water shall have the storm water treatment and/or control measures under direct supervision of a storm water operator certified by the Department, as required by Section 3110 of the NREPA.

3. Facilities Operation

The permittee shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

4. Power Failures

In order to maintain compliance with the effluent limitations of this permit and prevent unauthorized discharges, the permittee shall either:

a. provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit; or

b. upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to the surface waters or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

6. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of polluting materials in accordance with the requirements of the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code). For a Publicly Owned Treatment Work (POTW), these facilities shall be approved under Part 41 of the NREPA.

7. Waste Treatment Residues

Residuals (i.e. solids, sludges, biosolids, filter backwash, scrubber water, ash, grit, or other pollutants or wastes) removed from or resulting from treatment or control of wastewaters, including those that are generated during treatment or left over after treatment or control has ceased, shall be disposed of in an environmentally compatible manner and according to applicable laws and rules. These laws may include, but are not limited to, the NREPA, Part 31 for protection of water resources, Part 55 for air pollution control, Part 111 for hazardous waste management, Part 115 for solid waste management, Part 121 for liquid industrial wastes, Part 301 for protection of inland lakes and streams, and Part 303 for wetlands protection. Such disposal shall not result in any unlawful pollution of the air, surface waters or groundwaters of the state.

8. Right of Entry

The permittee shall allow the Department, any agent appointed by the Department, or the Regional Administrator, upon the presentation of credentials and, for animal feeding operation facilities, following appropriate biosecurity protocols:

a. to enter upon the permittee's premises where an effluent source is located or any place in which records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect process facilities, treatment works, monitoring methods and equipment regulated or required under this permit; and to sample any discharge of pollutants.

9. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Act and Rule 2128 (R 323.2128 of the Michigan Administrative Code), all reports prepared in accordance with the terms of this permit, shall be available for public inspection at the offices of the Department and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Act and Sections 3112, 3115, 4106 and 4110 of the NREPA.

10. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or the facility's COC, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

PART II

Section E. Activities Not Authorized by This Permit

1. Discharge to the Groundwaters

This permit does not authorize any discharge to the groundwaters. Such discharge may be authorized by a groundwater discharge permit issued pursuant to the NREPA.

2. POTW Construction

This permit does not authorize or approve the construction or modification of any physical structures or facilities at a POTW. Approval for the construction or modification of any physical structures or facilities at a POTW shall be by permit issued under Part 41 of the NREPA.

3. Civil and Criminal Liability

Except as provided in permit conditions on "Bypass" (Part II.C.9. pursuant to 40 CFR 122.41(m)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond the permittee's control, such as accidents, equipment breakdowns, or labor disputes.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Federal Act except as are exempted by federal regulations.

5. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Federal Act.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environmental Quality permits, or approvals from other units of government as may be required by law.

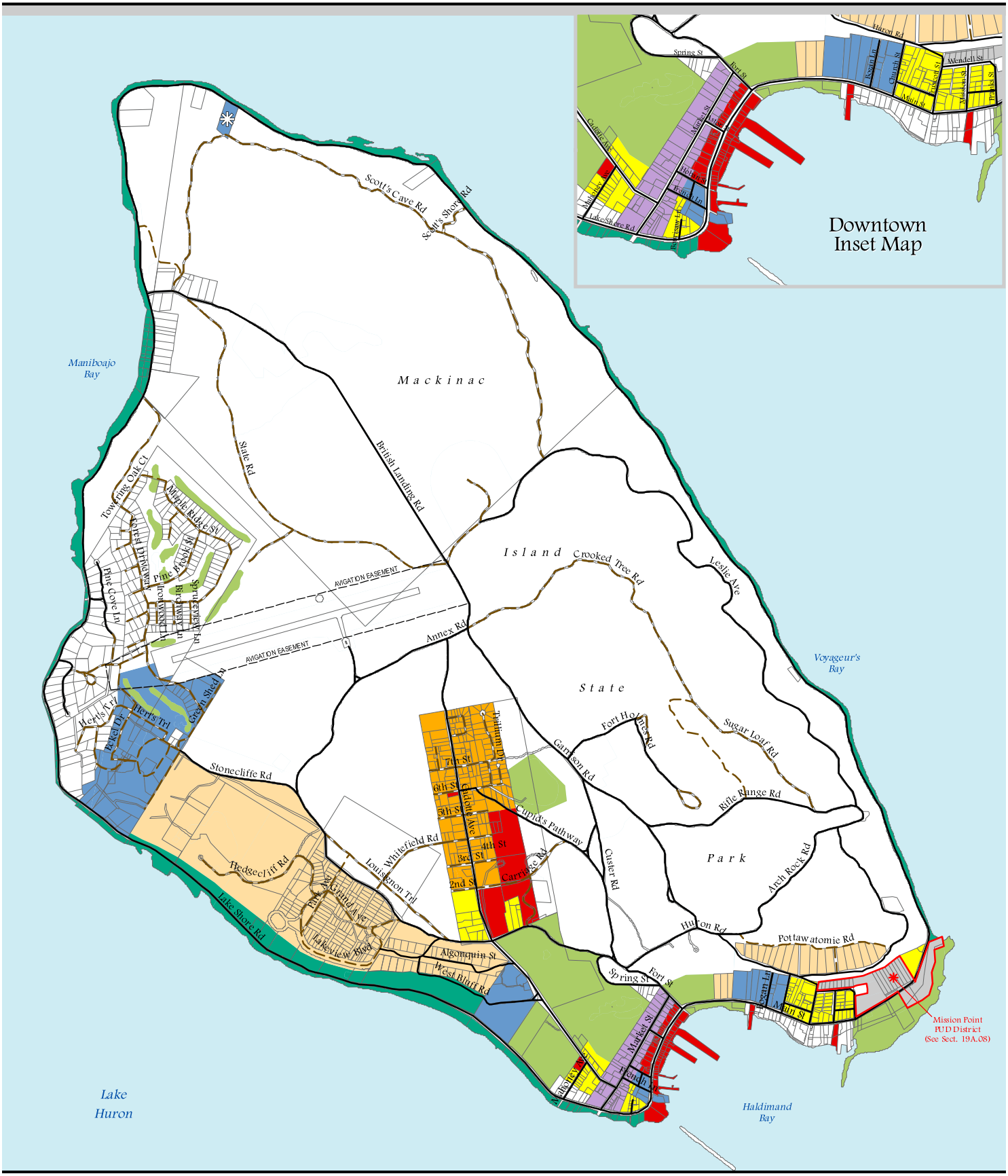
APPENDIX C
POPULATION AND FLOW PROJECTIONS

PREPARED FOR:

City of Mackinac Island

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 847241



Zoning Map

City of
Mackinac Island
Mackinac County, Michigan

- R-1 Low Density Residential
- R-3 High Density Residential
- R-4 Harrisonville Residential
- HB Hotel/Boardinghouse
- C Commercial
- MD Market
- CD Cottage
- ROS Recreation/Open Space
- RS Shoreline Residential
- 2015 Indicates that the property was rezoned with a statement of conditions

- Improved (Asphalt) Roads
- Unimproved (Gravel) Roads
- Property Lines

Property Line Source: Mackinac County Equalization

Adopted October 16, 2013
Effective November 12, 2013
Amended Through May, 2017

N

0 250 500 1,000 Feet

WADETRIM
271 West McCoy Rd
Gaylord, MI 49735
www.WadeTrim.com

Mackinac Island Estimated Ultimate Population Breakdown

Zoning District		Allowable Land Use	Area		%	Area		Maximum Density				Ultimate Summer	%	Ultimate Winter
			Acre	sf	Allocation	Acre	sf					Population	Year round	Population
R-1	Low Denisty Residential	State Park	1,646.0	71,699,760	100%	1,646.0	71,699,760	0	DU/ac	2.5	ppl/DU	-	0%	
R-1	Low Denisty Residential	Residential	189.2	8,241,552	100%	189.2	8,241,552	3	DU/ac	2.5	ppl/DU	1,419	30%	425
R-3	High Density Residential	Residential	25.7	1,119,492	60%	15.4	671,695	20	DU/ac	2.5	ppl/DU	771	30%	231
		Boarding House	25.7	1,119,492	40%	10.3	447,797	500	sf/person			895	0%	-
R-4	Harrisonville	Residential	51.0	2,221,560	60%	30.6	1,332,936	10	DU/ac	2.5	ppl/DU	765	30%	229
		Boarding House	51.0	2,221,560	40%	20.4	888,624	500	sf/person			1,777	0	-
R-4	Mission Point PUD	Residential	13.8	601,128	40%	5.5	240,451	10	DU/ac	2.5	ppl/DU	138	30%	41
		Boarding House	13.8	601,128	60%	8.3	360,677	500	sf/person			721	0	-
HB	Hotel/Boarding	Residential	71.8	3,127,608	10%	7.2	312,761	20	DU/ac	2.5	ppl/DU	359	30%	107
		Boarding House	71.8	3,127,608	30%	21.5	938,282	300	sf/person			3,127	0	-
		Hotel	71.8	3,127,608	60%	43.1	1,876,565	60	BR/ac	2	ppl/BR	5,169	0	-
C	Commercial	Residential	26.3	1,145,628	33%	8.7	378,057	30	DU/ac	2.5	ppl/DU	650	30%	195
		Boarding House	26.3	1,145,628	33%	8.7	378,057	250	sf/person			1,512	0	-
		Hotel	26.3	1,145,628	33%	8.7	378,057	230	sf/room	2	ppl/rm	3,992	0	-
MD	Market	Residential	14.4	627,264	60%	8.6	376,358	7	DU/ac	2.5	ppl/DU	151	30%	45
		Boarding House	14.4	627,264	30%	4.3	188,179	500	sf/person			376	0	-
		Hotel	14.4	627,264	10%	1.4	62,726	450	sf/room	2	ppl/rm	1,296	0	-
CD	Cottage	Residential	154.1	6,712,596	100%	154.1	6,712,596	1	DU/ac	2.5	ppl/DU	385	30%	115
ROS	Recreational/Open Space	N/A	102.5	4,464,900	100%	102.5	4,464,900	0					0	-
RS	Shoreline Residential	Residential	87.8	3,824,568	100%	87.8	3,824,568	4	DU/ac	2.5	ppl/DU	878	30%	267
		Total:	2,416.0							**Total:**		24,381		1,655

Ultimate Population Breakdown	
Year-round residents	1,655
Seasonal Residents	3,861
Hotel/lodging guests	10,457
Seasonal Employees	8,408

Mackinac Island Estimated Ultimate Population Breakdown

Zoning District		Allowable Land Use	Ultimate Summer Population	% Year round	Ultimate Winter Population	% of Ultimate Development	Current Summer population	% Year round	Current Winter Population	% of Ultimate Development	Design Summer population	% Year round	Design Winter Population
			Ultimate Population			**Current Population**				**Design Population**			
R-1	Low Denisty Residential	State Park	-	0%		35%	-	0	-	55%	-	0%	-
R-1	Low Denisty Residential	Residential	1,419	30%	425	35%	501	25%	127	55%	780	25%	198
R-3	High Density Residential	Residential	771	30%	231	35%	272	25%	69	55%	424	25%	108
		Boarding House	895	0%	-	35%	313	0%	-	55%	492	0%	-
R-4	Harrisonville	Residential	765	30%	229	35%	270	25%	68	100%	765	25%	195
		Boarding House	1,777	0	-	35%	622	0%	-	80%	1,422	0	-
R-4	Mission Point PUD	Residential	138	30%	41	35%	49	25%	12	55%	76	25%	20
		Boarding House	721	0	-	35%	252	0%	-	55%	397	0	-
HB	Hotel/Boarding	Residential	359	30%	107	35%	126	25%	32	55%	197	25%	50
		Boarding House	3,127	0	-	35%	1,094	0%	-	55%	1,720	0	-
		Hotel	5,169	0	-	35%	1,809	0%	-	55%	2,843	0	-
C	Commercial	Residential	650	30%	195	35%	229	25%	58	55%	359	25%	91
		Boarding House	1,512	0	-	35%	529	0%	-	55%	832	0	-
		Hotel	3,992	0	-	35%	1,397	0%	-	55%	2,196	0	-
MD	Market	Residential	151	30%	45	35%	53	25%	13	55%	83	25%	21
		Boarding House	376	0	-	35%	132	0%	-	55%	208	0	-
		Hotel	1,296	0	-	35%	454	0%	-	55%	712	0	-
CD	Cottage	Residential	385	30%	115	35%	136	25%	34	55%	213	25%	55
ROS	Recreational/Open Space	N/A		0	-	35%	-	0%	-	55%	-	0	-
RS	Shoreline Residential	Residential	878	30%	267	35%	307	25%	78	55%	483	25%	122
		Total:	24,381		1,655	**Total:**	8,546	**Total:**	492	**Total:**	14,200	**Total:**	860

Ultimate Population Breakdown	
Year-round residents	1,655
Seasonal Residents	3,861
Hotel/lodging guests	10,457
Seasonal Employees	8,408

Current Population Breakdown	
Year-round residents	492
Seasonal Residents	1,451
Hotel/lodging guests	3,660
Seasonal Employees	2,943

Design Population Breakdown	
Year-round residents	860
Seasonal Residents	2,520
Hotel/lodging guests	5,750
Seasonal Employees	5,070

APPENDIX D
OPINION OF PROBABLE COST

PREPARED FOR:

City of Mackinac Island

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 847241

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Summary Table Engineer's Preliminary Opinion of Probable Project Costs						
Alternative	Project Cost	Annual OM&R Cost	Net Present Worth of OM&R Cost (1)	Total Present Worth	Salvage Value	Net Present Worth
Alternatives						
Alternative 3 - MBBR WWTP Expansion	**$28,800,000**	$190,000	$4,010,000	$32,810,000	$4,300,000	**$28,510,000**
Alternative 4 - Oxidation Ditch WWTP Expansion	**$31,660,000**	$220,000	$4,640,000	$36,300,000	$4,860,000	**$31,440,000**
Alternative 5 - MBR WWTP Expansion	**$30,630,000**	$350,000	$7,380,000	$38,010,000	$3,620,000	**$34,390,000**
Alternative 6 - SBR WWTP Expansion	**$29,460,000**	$250,000	$5,270,000	$34,730,000	$4,040,000	**$30,690,000**

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) Net Present Worth calculated using the discount rate for a 20-year period (i = -0.5%) based on SRF guidance for FY2021.

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Engineer's Opinion of Probable Cost
Mackinac Island WWTP Project Plan

Client: City of Mackinac Island
Project Mackinac Island WWTP Project Plan
Project No. 847241
Date: June-22

Alternative 3 - WWTP Expansion w/ MBBR

Item	Item Description	Unit	Qty	Estimated Unit Price	Total Cost
General Construction Costs					
1	Contractors General Conditions and OH&P	LS	1	$2,720,000	$2,890,000
2	Site Development (clearing, grading, driveway, and parking)	LS	1	$300,000	$320,000
3	Site Piping/Utilities (well, water, sanitary, and process)	LS	1	$330,000	$350,000
4	Demolish Existing Facilities	LS	1	$800,000	$850,000
WWTP Process Equipment and Structures					
1	Headworks	LS	1	$1,600,000	$1,700,000
2	Equalization	LS	1	$520,000	$550,000
3	Septage Receiving	LS	1	$610,000	$650,000
4	Primary Clarifiers	LS	1	$1,740,000	$1,850,000
5	Biological Treatment - MBBR	LS	1	$3,770,000	$4,000,000
6	Final Clarifiers	LS	1	$5,180,000	$5,500,000
7	Disinfection	LS	1	$1,164,000	$1,230,000
8	Effluent Pump Station Modifications	LS	1	$470,000	$500,000
Electrical/Controls/SCADA					
1	Plant Automation	LS	1	$250,000	$270,000
2	Motor Control Centers/Electrical Gear	LS	1	$250,000	$270,000
Building Improvements					
1	Control Building Renovation	LS	1	$650,000	$690,000
2	Storage Garage	LS	1	$500,000	$530,000
				Subtotal, Construction:	**$22,150,000**
				Engineering, Administration & Legal:	$4,430,000
				Contingency:	$2,220,000
		Total Estimated Project Cost 2023 Dollars:			**$28,800,000**

Notes:
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.

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Engineer's Opinion of Probable Cost
Mackinac Island WWTP Project Plan

Client: City of Mackinac Island
Project Mackinac Island WWTP Project Plan
Project No. 847241
Date: June-22

Alternative 4 - WWTP Expansion w/ Oxidation Ditch

Item	Item Description	Unit	Qty	Estimated Unit Price	Total Cost
General Construction Costs					**$4,690,000**
1	Contractors General Conditions and OH&P	LS	1	$2,990,000	$3,170,000
2	Site Development (clearing, grading, drainage, driveway, and parking)	LS	1	$300,000	$320,000
3	Site Piping/Utilities (well, water, sanitary, and process)	LS	1	$330,000	$350,000
4	Demolish Existing Facilities	LS	1	$800,000	$850,000
Equipment					**$17,870,000**
1	Headworks	LS	1	$1,600,000	$1,700,000
2	Equalization	LS	1	$520,000	$550,000
3	Septage Receiving	LS	1	$610,000	$650,000
4	Primary Clarifiers	LS	1	$1,740,000	$1,850,000
5	Biological Treatment - Oxidation Ditch	LS	1	$4,940,000	$5,240,000
6	Final Clarifiers	LS	1	$5,800,000	$6,150,000
7	Disinfection	LS	1	$1,164,000	$1,230,000
8	Effluent Pump Station Modifications	LS	1	$470,000	$500,000
Electrical/Controls/SCADA					**$570,000**
1	Plant Automation	LS	1	$280,000	$300,000
2	Motor Control Centers/Electrical Gear	LS	1	$250,000	$270,000
Building Improvements					**$1,220,000**
1	Control Building Renovation	LS	1	$650,000	$690,000
2	Storage Garage	LS	1	$500,000	$530,000
				Subtotal, Construction:	**$24,350,000**
				Engineering, Administration & Legal:	$4,870,000
				Contingency:	$2,440,000
		Total Estimated Project Cost 2023 Dollars:			**$31,660,000**

Notes:
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.

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Engineer's Opinion of Probable Cost
Mackinac Island WWTP Project Plan

Client: City of Mackinac Island
Project Mackinac Island WWTP Project Plan
Project No. 847241
Date: June-22

Alternative 5 - WWTP Expansion w/ MBR

Item	Item Description	Unit	Qty	Estimated Unit Price	Total Cost
General Construction Costs					**$4,780,000**
1	Contractors General Conditions and OH&P	LS	1	$2,900,000	$3,080,000
2	Site Development (clearing, grading, drainage, driveway, and parking)	LS	1	$476,000	$500,000
3	Site Piping/Utilities (well, water, sanitary, and process)	LS	1	$330,000	$350,000
4	Demolish Existing Facilities	LS	1	$800,000	$850,000
Equipment					**$16,950,000**
1	Headworks	LS	1	$2,130,000	$2,260,000
2	Equalization	LS	1	$520,000	$550,000
3	Septage Receiving	LS	1	$610,000	$650,000
4	Primary Clarifiers	LS	1	$1,740,000	$1,850,000
5	Biological Treatment and MBR	LS	1	$9,340,000	$9,910,000
6	Disinfection	LS	1	$1,164,000	$1,230,000
7	Effluent Pump Station Modifications	LS	1	$470,000	$500,000
Electrical/Controls/SCADA					**$610,000**
1	Plant Automation	LS	1	$300,000	$320,000
2	Motor Control Centers/Electrical Gear	LS	1	$275,000	$290,000
Building Improvements					**$1,220,000**
1	Control Building Renovation	LS	1	$650,000	$690,000
2	Storage Garage	LS	1	$500,000	$530,000
				Subtotal, Construction:	$23,560,000
				Engineering, Administration & Legal:	$4,710,000
				Contingency:	$2,360,000
		Total Estimated Project Cost 2023 Dollars:			**$30,630,000**

Notes:
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.

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Engineer's Opinion of Probable Cost
Mackinac Island WWTP Project Plan

Client: City of Mackinac Island
Project Mackinac Island WWTP Project Plan
Project No. 847241
Date: June-22

Alternative 6 - WWTP Expansion w/ SBRs

Item	Item Description	Unit	Qty	Estimated Unit Price	Total Cost
General Construction Costs					**$4,470,000**
1	Contractors General Conditions and OH&P	LS	1	$2,780,000	$2,950,000
2	Site Development (clearing, grading, drainage, driveway, and parking)	LS	1	$300,000	$320,000
3	Site Piping/Utilities (well, water, sanitary, and process)	LS	1	$330,000	$350,000
4	Demolish Existing Facilities	LS	1	$800,000	$850,000
Equipment					**$16,400,000**
1	Headworks	LS	1	$1,600,000	$1,700,000
2	Equalization	LS	1	$520,000	$550,000
3	Septage Receiving	LS	1	$610,000	$650,000
4	Biological Treatment - SBR	LS	1	$9,470,000	$10,050,000
5	Disinfection	LS	1	$1,164,000	$1,230,000
6	Effluent Pump Station Modifications	LS	1	$470,000	$500,000
7	Effluent Equalization	LS	1	$740,000	$790,000
8	Solids Thickening	LS	1	$880,000	$930,000
Electrical/Controls/SCADA					**$570,000**
1	Plant Automation	LS	1	$280,000	$300,000
2	Motor Control Centers/Electrical Gear	LS	1	$250,000	$270,000
Building Improvements					**$1,220,000**
1	Control Building Renovation	LS	1	$650,000	$690,000
2	Storage Garage	LS	1	$500,000	$530,000
				Subtotal, Construction:	**$22,660,000**
				Engineering, Administration & Legal:	$4,530,000
				Contingency:	$2,270,000
		Total Estimated Project Cost 2023 Dollars:			**$29,460,000**

Notes:
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 DOCUMENTS

PREPARED FOR:

City of Mackinac Island

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 847241

APPENDIX F
DISADVANTAGED COMMUNITY DETERMINATION WORKSHEET

PREPARED FOR:

City of Mackinac Island

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

Project No.: 847241

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

DISADVANTAGED COMMUNITY STATUS DETERMINATION WORKSHEET

The following data is required from each municipality to assess the disadvantaged community status. Please provide the necessary information and return to:

Mark Conradi
Water Infrastructure Financing Section
Finance Division
conradim@michigan.gov

Please contact Mark Conradi (conradim@michigan.gov) with any questions on the completion of the form.

Please check the box this determination is for:

DWSRF ☐

CWSRF ☑

Total amount of anticipated debt for the proposed project, if applicable.

$30,000,000

Annual payments on the existing debt for the system.

$494,993

Total operation, maintenance, and replacement expenses for the system on an annual basis.

$1,414,238

Number of residential equivalent users (REUs) in the system.

3,000

For determinations made using anticipated debt, a final determination will be made based upon the awarded loan amount.

If you need this information in an alternate format, contact EGLE-Accessibility@Michigan.gov or call 800-662-9278.

EGLE does not discriminate on the basis of race, sex, religion, age, national origin, color, marital status, disability, political beliefs, height, weight, genetic information, or sexual orientation in the administration of any of its programs or activities, and prohibits intimidation and retaliation, as required by applicable laws and regulations. Questions or concerns should be directed to the Nondiscrimination Compliance Coordinator at EGLE-NondiscriminationCC@Michigan.gov or 517-249-0906.

This form and its contents are subject to the Freedom of Information Act and may be released to the public.

Mackinac Island city, Michigan

Place in Michigan

Mackinac Island city, Michigan is a city, town, place equivalent, and township located in Michigan. Mackinac Island city, Michigan has a land area of 4.4 square miles.

Total Population	Median Household Income	Bachelor's Degree or Higher	Employment Rate	Total Housing Units	Without Health Care Coverage	Total Households	Hispanic or Latino (of any race)
583	$43,125	33.6%	67.8%	980	29.7%	492	22

Populations and People

Age and Sex

43.1 +/- 9.7

Median Age in Mackinac Island city, Michigan

Population by Age Range in Mackinac Island city, Michigan

VIEW OPTIONS

Under 5 years - 1.1%

Federal Poverty MAHI	Applicant MAHI from census.gov	Poverty %
27,750	$43,125	28.7

Amount of Debt - FY23 project only	$30,000,000
Terms	20
Rate	1.875%
Operation Maintenance & Replacement (OM&R)	$1,414,238
New annual debt	$1,812,644
Existing debt (annual payment)	$494,993
Total Annual Cost	**$3,721,875**
REUs	3,000
Annual User Cost	**$1,241**
MI MAHI	$59,234
Applicant MAHI:	$43,125
MAHI Threshold $	**$431**
Disadvantaged without calculation needed - Poverty %	**NO**
Disadvantaged without calculation needed - Poverty - MAHI	**NO**
Disdavantaged	**YES**